

The Beechcraft Bonanza: A Collection of Notes

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Preface

I started the beech-owners mailing list in 1996. Out of the many fine members, one stood out. Bob Siegfried (a.k.a "Old Bob") is known not only for his wisdom and both knowledge of aviating and the Beechcraft Bonanza, but also for his wonderfully succinct writing style. I started this compilation over 15 years ago, got overwhelmed with his thousands of posts, set it aside and forgot about it. Meeting Old Bob at Oshkosh this past summer brought new enthusiasm to the project. I hope everyone enjoys reading this as much as I have.

Howard G Page

Burlingame, CA, September, 2015

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V-tail AD' <i>s</i>		478
28 Volt Bonanza' <i>s</i>		488
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Baron E-55 TE-1152 (oddball <i>serial</i>)	number)	425
Fixed <i>step</i>		686
Drag testing, was Assist <i>step</i>		1122
Pulling up the assist <i>step</i>	, was Annual from heaven.	1151
One Main Landing Gear Won' t	Extend	148
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Chapter 1

AIRMAN

1.1 AIRMAN-APPROACH

Go Around Configuration**Tue, 31 Aug 1999 10:19:20**

In a message dated 8/31/99 8:08:36 AM Central Daylight Time, tturner@vol.com writes:

Could it be that, with some flaps extended, the center of lift translates rearward, giving you the same pitch stability effect as moving the center of gravity forward? I certainly notice this increase in stability when using "approach flaps" for an instrument approach. Maybe it "feels better" because it's a little more stable in pitch that way.

Good Morning Tom,

Could be! I also think it gives me a little nicer view over the nose at lift off.

I generally use flaps on an approach for the same reason. Makes it a little easier to spot the required visual references in time to complete the approach and landing. This is especially true for those approaches where the lowest minima are only available to category "A" aircraft. When my heavy old clunker is below ninety knots, the nose is quite high without flap and since most of those approaches are nonprecision, the extra visibility really helps.

While I am on the approach flap subject, I have noted several references recently to the advantage of using NO flap on the approach to make it easier to go-around. I wonder if the folks who advocate that procedure have considered the following.

If the aircraft is stabilized on the usual three degree glide path (or stabilized anywhere else for that matter) at or above the flaps up best rate of climb speed for the existing weight, the flaps may be fully retracted from any position, including full flap, with no loss in altitude or increase in the sink rate. In fact, if the aircraft is in that desired stabilized approach condition and nothing is done except to retract the flaps and maintain the existing airspeed by judicious rotation of pitch, the aircraft will likely level off and may even climb a bit.

Following that line of reasoning a little further, the "best" flap to use on an approach would be the most flap that could be carried with the power available. It makes the go-around that much easier because the power is already up and the engine temperatures are stabilized in a good operating range.

In the days of yore, most "heavy" piston operators utilized an approach flap until the runway was in sight and a landing was assured. This philosophy changed with the early jets as they had horrendously slow spool up times. If the power was well back and a go around initiated, things could get a little exciting!

On the Sud Est Caravelle, there was a fourteen-second spool up time from throttles closed to full rated power. More than half of the available thrust came in the last three or four seconds. Consequently, full flaps and speed brakes were deployed to add drag and permit the engines to be close to climb power on the approach. If a missed

approach became necessary, all that was required was a slight increase in power up to T/O thrust, speed brakes to retract, flaps to departure flap and a positive rotation to hold the approach speed which had been chosen to be (among other considerations) above the best rate of climb speed of the departure flap. Once a positive rate of climb was established, the gear was retracted. Worked like a charm!

After we saw the light, the same procedures were applied to the piston fleet. That was the beginning of the philosophy of the "stabilized" approach which is now considered the only way to go by all air carrier operators.

If I am flying my Bonanza near gross weight into Denver with a load of ice, the power available would not likely be enough to allow full flap and still have latitude to make power adjustments. If I were heading into New Orleans at the end of a long solo flight, I could probably carry full flap with twenty inches or so. Therefore, the amount of flap I carry on an approach "depends"!

Any comments?

Happy Skies,

Old Bob

[ARTICLES/19990831_101920_msg07672.tex]

Approach Engine RPM**Thu, 8 Feb 2001 15:09:59**

In a message dated 2/8/01 1:50:50 PM Central Standard Time, lanius@firstworld.net writes:

As part of your SOP, do you land with the prop set at a relatively low RPM setting or do you feed in the prop control on short final when out of prop governing range? If you land with the lower RPM setting, what RPM do you typically use in the pattern?

Thanks.....wpl

Good Afternoon Patrick,

I normally land with whatever RPM I have set for the final portion of the flight.

I do not make it a practice to shove the prop governor control to the high RPM position on short final. I prefer to wait until I have need for a higher RPM before running the prop lever forward.

The RPM I use in the pattern is dependent on the weight, elevation and other power requirements, but it is generally between 2000 and 2100.

In the event a go around is required, I richen the mixture slightly, (not necessarily to full rich) add manifold pressure to around 24 or 25 inches, then bring up the RPM and the rest of the MP together followed by adjusting the mixture, as appropriate, and opening the cowl flaps. I find this quite comfortable to do in the Bonanza, but not all pilots find it practical. For those folks I suggest adding the MP up to 24, then the RPM to redline followed by full throttle.

Happy Skies,

Old Bob

[ARTICLES/20010208.150959_msg03164.tex]

Approach Engine RPM**Thu, 8 Feb 2001 15:54:25**

In a message dated 2/8/01 2:39:03 PM Central Standard Time, Mavitor@aol.com writes:

I thought it [high RPM, low MP] was a good thing, in the sense that a vacuum is created in the cylinder which sucks in oil (you know the blue cloud on the old cars) and it helped lube rings & valve stems.

Good Afternoon Mike,

Yeh, that was the method that Harley Davidson recommended to get oil up into the cylinders on the 1936 flat head I owned once upon a time.

Somehow, it doesn't seem to be a good idea on all aircooled engines. On the R3350 we were constantly busting the ring lands until a procedure was instigated to keep the engine pulling. As Paul mentioned, almost everybody recommends the same thing for all of the geared engines. I have also been told there are issues with the reversal of forces on the pistons at relatively high rpms.

It may be an Old Wives Tale, but I was taught it by the same folks who taught me that ten percent on the lean side of best power was an excellent way to operate the engine and they have been proven correct. I have seen no evidence that the low manifold pressure, high RPM, with the prop driving the engine is a 'good thing' and a lot of evidence that it can be a 'bad thing.'

I don't have any idea what all the details are, but there is enough anecdotal evidence around that I just don't want to do it.

I tend to stick with that which I was taught until I find evidence that I was taught wrong.

Happy Skies,

Old Bob

[ARTICLES/20010208_155425_msg03172.tex]

Approach Speed and Approach Category**Thu, 27 Jan 2000 12:43:23**

In a message dated 1/27/00 9:48:41 AM Central Standard Time, wabpilot@yahoo.com writes:

In my J35, I flew precision approaches at 18" MP and 2200 RPM. This is about 45% power and yielded 120 KTS indicated in level flight.

Good Morning Alan,

What works for you is the right thing to use, just remember though, that higher speed means higher minima. If you approach at 120 knots, you are at the upper limit for approach category B aircraft. Any speed above 120 and you would be required to use Category C minima. There isn't a whole lot of difference between A and B minima most places, but when you get up to Cat C, the minima often raises dramatically. There are many airports which aren't authorized for anything other than Category A and B aircraft and a few that are restricted to Category A. If you fly the higher speeds, you are required to use the higher minima.

I occasionally use 150 to 160 knots on an ILS at a very busy field, especially if the weather is reported a couple of hundred feet above minima, but only if the field is approved for approach Category D! It is kinda fun to be told to slow down because you are overtaking a 747!

My airplane has a 154 knot gear extension speed, so those higher speeds aren't bad. Our friends who are flying straight 35s have a gear and flap extension limit speed of 87 knots. Quite a different animal to manage!

All of the Bonanza series of aircraft are capable of maneuvering safely at or below 90 knots. If the operator desires to use the lower category A minima, all of the Bonanzas are capable of doing so safely.

As always, it depends!

Happy Skies,

Old Bob

[ARTICLES/20000127.124323.msg01852.tex]

Go Around Configuration**Mon, 13 Jul 1998 23:32:05**

Good Evening Bob Newman,

In a message dated 98-07-13 22:42:38 EDT, you write:

My BPPP instructor taught me to use +9 to +12 degrees trim for landing, and to deploy full flaps only when the landing was assured.

This is in no way critical of what your instructor taught you. I obviously don't know what point he was trying to bring across when that procedure was suggested to you.

I would, however, comment that I would be hesitant to list any certain degree of trim as a standard. I would rather that one would choose a speed to which one wanted to trim and then cease trimming thereafter.

One choice (but certainly not the only one) might be the desired balked landing climb speed for the configuration the aircraft was in. As an example, if the chosen speed were 80 knots, one would quit trimming at 80 knots and slow up further by increasing the back pressure to increase the angle of attack.

Different loadings would give different degrees of trim, trimming to a speed chosen for the particular weight and configuration would be much more consistent.

I am a devotee of full flap landings in the Bonanza at almost all times. The most flap that any have is 30 degrees and that is so little that a go-around at any but the heaviest weights or very high density altitudes is little or no problem. I really don't think holding the flap until a landing is assured is a good idea. That entails a configuration change at a most inopportune time in the approach. Why make it hard on yourself. I find it most comfortable to take all of the flap at once. When I need them at all, I generally put them all of the way down. There are always exceptions, but it rarely seems pertinent to do otherwise. Many years ago it was common to hold the flap until landing was assured but I don't think you will find any major operator who recommends it today. My old company asked us to cease using that procedure in the middle fifties.

If a partial flap landing is chosen for whatever reason, I would recommend landing with the flap you have chosen. It makes for a much more stabilized approach.

One thing to remember about flaps, they can be raised any time that you have a speed above the best angle of climb speed for the configuration you are going to and the current weight of the aircraft.

That is, if you determine that 81 knots is the proper best angle of climb speed for the current weight of your aircraft with the flaps fully retracted, you can retract the flaps to zero any time you have at least 81 knots and there will be no loss in altitude provided the aircraft is rotated to compensate for the flap retraction.

As someone said earlier, there are at least as many proper ways to fly an airplane as

there are pilots who fly them but I would urge you to consider the above when choosing your technique.

Happy Skies,

Bob Siegfried
Ancient Aviator

[ARTICLES/19980713_233205_msg03680.tex]

Selection Partial Flaps**Wed, 20 Jan 1999 11:20:15**

Good Morning Mark Jennings,

In a message dated 1/19/99 11:58:11 PM Central Standard Time, markjenn@halcyon.com writes:

Another instructor I had used the "counting" technique to set partial flaps and avoid having to look at the indicator. I recall it as 4-seconds for 0-20 degrees and 2-seconds for 20-30 degrees, then full. But I'm a one-step pilot now.

"Counting" is OK, but the number of seconds for various extensions will vary considerable between different models. The flap extension times for the very early airplanes are much greater than the later ones. There was also a change on the later airplanes when the twenty-eight volt electrical system was added.

If one likes to make a partial extension, why not just put them out until the effect is what you like. I have always done it by the feel of the airplane and find that I can teach that to students in a very short time. When you have time, you can check to see just how many degrees of flap have extended and adjust your approach speed accordingly if desired.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990120_112015_msg00857.tex]

High Drag Approaches**Tue, 7 Sep 1999 14:29:15**

In a message dated 9/6/99 3:44:12 PM Central Daylight Time, jdeakin@avweb.com writes:

We may end up agreeing to disagree on high drag approaches. They were an excellent solution to some very real problems with the jets, but they are NOT a "good thing" with props! In fact, with many, if not all prop airplanes, the high-drag, "stabilized" approach is quite unsafe. One of the problems I have is breaking high-time airline pilots of this habit in the big recip. Real easy to do, I'll just fail an engine on the four-mile ILS final, on glideslope. Unless they are very, very quick, and very, very good, they can't make the runway. There's a reason we did it that way, back before jets.

Good Afternoon John,

This is not a subject that can be covered in a short time but I will try to hit the high points.

The use of full flap on one of the old piston airplanes is just the same as the use of full flap on a new jet powered aircraft.

It is not a function of what powers the aircraft, but of the power available and the speed to be flown.

On the carrier for whom I flew, we had a problem with throttle plate icing on the DC-7 which caused some serious situations. It was found that there were fewer problems if higher power could be carried on the approach.

Now how can you increase the amount of power and still hold the glide path?

One way is to increase the drag. How does one do that? One way is to put out some more flap, but with the proviso that the speed is maintained at the speed that would have been flown with the lesser flap setting. That way, should an engine be lost at four miles out on an ILS, the drill would be to retract the flap to the amount of flap that could be carried with the reduced power available. As long as the aircraft is at or above the appropriate speed for the flap setting to which the flap is being retracted, there is no problem maintaining the glidepath. The extra flaps were just drag. Now if one decides to slow down to the best L/D for the greater flap extension, altitude would have to be sacrificed or an awful lot of power be available to prevent a loss of altitude.

I don't remember all of the power settings we used and I never flew any model of the Connies. I did fly the DC-6 and DC-7 for some thirteen years, the last six as captain and the last five during the introduction of jet transports to the industry. It was during that time that our company began to develop procedures that recommended full flap stabilized approaches for the DC-6 and DC-7 fleet.

There was a lot of grumbling at first and since our company didn't insist that we fly the airplane in any manner we didn't care for, the full flap stabilized approach took quite a while to be accepted.

It was only to be used at those times when there was sufficient power available such that the glide path could be held on a full flap approach with a power that was (per my memory) somewhere close to cruise power. If more power than that was required, a lesser flap would be selected. In addition, the speed held was always that speed which would have been held with the lesser flap setting. Company policy was changed and it was recommended that whatever flap was used for the approach would be the flap the was landed with. This took some runway analysis by our engineering department and all of the squares were filled as required.

I became convinced of the efficacy of the full flap approach after a friend of mine was flying a DC-7 freighter into Cleveland one dark and stormy night when he had a bit of a problem.

He was using the old method of approach flap and when he got to two hundred feet there was nothing in sight. He attempted to add power so as to get out of town and they were frozen solid. He pushed and then pulled and then pushed again followed by a REAL hard yank back and that is when they broke loose. He was by then a little under one hundred feet and the runway was in sight so he went ahead and landed. It was an icy runway and a he had little too much speed, but with lot's of reverse and a little luck, he got it stopped.

The company answer was to once again suggest that we consider using a higher power on the approach as there was less chance of the throttles freezing at higher powers and they also suggested that we make constant adjustments to the throttle during the approach so as to minimize freezing.

I was flying the same trip a couple of nights later. It was a clear night so I decided to try the company recommended full flap procedure plus a little thought of my own. I advised the tower that we would be executing a go around from the two hundred foot point.

The aircraft was set up with full flap, power was set accordingly and the speed recommended by the company was held. I am not sure, but I believe that recommended approach speed was the same as the recommended missed approach speed.

Then, when the aircraft was at minima, I simulated frozen throttles by not touching them at all. Running the props up to full T/O RPM gave us close to METO power on all four with the throttles set just as they had been for the approach. My recollection is that the manifold pressure increased from somewhere in the 30 to 32 inch range up to around 45 to 48 inches with just the increase in RPM. Flaps were retracted to the go around flap setting and the gear was retracted after positive rate, just like the big boys in the jets!

It worked like a charm and I became a believer in the company recommended procedure. The key is to maintain a speed appropriate to the flap to be used for the missed approach

and to take no more flap than can be carried with a reasonable amount of power. I don't remember precisely what the company set as a limit, but I think it was somewhere around cruise power. That is the number that I now use when deciding how much flap to use on a low approach. I imagine it is a carryover from those days of yore!

I doubt if the procedure would have been practical on the DC-4, but it worked great on the 6s and 7s except at the high elevation airports.

Just a quickie view of the procedure and I am sure I have skimmed over many of the fine points, but I think it does point up that there is more than one way to skin a cat.

Happy Skies,

Old Bob

[ARTICLES/19990907_142915.msg08036.tex]

Go Around Configuration**Wed, 20 Jan 1999 01:09:11**

Good Evening Bob Newman,

In a message dated 1/19/99 10:02:32 PM Central Standard Time, newmanb@erols.com writes:

Lew has more experience than I can ever hope to have, but I don't agree with this technique of one step flaps deployment in the Bonanza. A go-around from the full flaps configuration is not the safest maneuver in the Bonanza, and a lot of other airplanes for that matter.

I stand on the side of the airplane being flown in what ever manner the pilot feels is the best for his operation.

Having said that, I must say that I agree with Lew and that my normal procedure is to take full flap whenever I take any flap. But if you prefer the flaps in increments, why not do it.

My comment will be about your last statement that a go around from a full flap configuration is less than safe. That is just not true.

The key to a safe go around is to operate at a speed that is pertinent for the flap configuration in which the pilot intends to fly the missed approach.

At any individual combination of glide path and speed, a greater amount of flap will require a greater amount of power to be carried.

Instead of waiting until the landing is assured before adding full flaps, why not take those flaps early, but maintain the speed that you would have maintained with the lesser flap setting. That means that you would be using the flaps as a drag device which allows carrying a higher power and allowing the stability that is thereby inherent to be used for the approach.

A decent speed, but not the only speed, to use would be the appropriate maximum rate of climb speed for the clean configuration at the weight that exists. Once the landing is assured, the speed can be reduced to the minimum for the conditions to effect the landing as efficiently as possible. On a twin I would suggest holding the best single engine climb speed with landing flaps until the point at which the landing is assured and then reducing to a speed appropriate to the flap to be used for landing.

The stabilized approach adds a lot of precision to the procedure and removes one configuration change and re-trimming that would otherwise be required.

If a missed approach is desired, all one must do is add the rest of the available power and rotate to hold the airspeed while retracting the flaps. If the airplane is capable of climbing with the power available, it will climb. The advantage of this procedure is that the power is already up and the engine is developing considerable thrust, possibly

enough so that a climb might be possible by taking no action other than raising the flaps and rotating the aircraft. When a positive rate of climb is achieved, raise the gear and away we go!

The procedure of waiting till the landing was assured before going to full flaps was the one that was used by many airlines prior to the jet age. The early jets had such a slow spool up time that it was necessary to operate them in as high a drag configuration as possible in order to have the engines spooled up adequately for a go around.

After the procedure was adopted for the jets, it was experimented with on the pistons as well and I believe every major carrier recommended using the same philosophy for their piston fleets as well as the turbine fleet. I don't know of anyone on my old airline that continued with the old procedure after trying the full flap stabilized approach concept.

The key is establishing a configuration that will allow a stable approach in the conditions that prevail and flying an approach airspeed appropriate for the missed approach configuration.

The Bonanza series has relatively little flap available. The most on any model is thirty degrees. Unless you have a load of ice, are at a very high density altitude or in some other dire circumstance, full flaps can be comfortably carried on any normal glide path while maintaining the speed appropriate for the missed approach.

I started using the full flap stabilized approach on my Bonanza and most other light aircraft shortly after it was adopted by my employer for the piston fleet and have never seen a reason to return to the old procedure.

Even Ancient Aviators do sometimes adopt more modern techniques!

Happy Skies,

Bob Siegfried Very Old Guy

[ARTICLES/19990120_010911_msg00847.tex]

Circling Approaches**Sun, 1 Apr 2001 18:41:21**

In a message dated 4/1/01 1:51:37 PM Central Daylight Time, asthmadr@compuserve.com writes:

Well, someone with Jepp charts for that airport needs to check to see if the approach was not authorized or not and report back. Anyone??? I don't have charts for that area. Larry

Good Afternoon Larry,

There seems to be considerable confusion concerning the fact that this approach is only authorized as a "circling approach," by the media, and some other folks as well.

There are many approaches that are restricted to that type approach for reasons other than runway alignment.

Any runway that does not meet the "straight in" IFR criteria will be restricted to circling minima. It could be as simple as the runway not having adequate IFR markings. That occasionally happens to some of the low use airports that can't afford to paint the runway. I don't suggest that is the reason here, but just to point out that there are many reasons for the circling criteria.

A more likely reason would be that the approach requires a descent rate of more than 400 feet per mile. I haven't run the calculations, but that is a possibility.

Another common reason for a restriction is that some obstacle penetrates the approach path inside the criteria set for the straight in criteria. A radio tower located a hundred feet to the side of the runway threshold would not be likely to cause any trouble to a normal visual landing, but it could cause the runway to fail to be qualified for a straight in.

Another very likely possibility is that a successful missed approach, meeting the TERPS missed approach criteria, cannot be conducted from any point beyond the MAP.

Lot's of possibilities!

There is no requirement that the aircraft NOT land straight in if the pilot chooses to do so and the if operation is within the "normal" capabilities of his aircraft.

There is also no blanket restriction concerning circling at night, in fact most circling approaches ARE approved for night operations.

In some cases, the flight check folks will decide that the obstruction lighting in the circling area is not adequate and circling will be restricted to one side or the other of the runway or not approved at all.

The Jeppesen plate for Aspen shows no restrictions on circling at night at Aspen.

I don't have any knowledge as to what the inspection team found which precipitated the Notam that disallowed night operations, but that restriction is generally a result of the obstruction lighting not being up to the standards that were originally approved. It could be something as simple as trees or bushes that have grown up in front of the lights and obscured their view from the approach path.

It is highly unlikely that any of the actions or lack of actions in relation to the Notamed conditions had anything to do with this accident. Had the aircraft executed the missed approach at the missed approach point, there would have been no accident and no problem. Did he see adequate visual clues to proceed beyond the MAP? Were those visual cues somehow obscured during the visual segment of the approach? Did the pilot take appropriate action based on the conditions encountered?

Those are the questions that must be answered. All of this attention to the approach being Notamed out is just obscuring the real problem. If the approach was properly conducted, regulatory conditions complied with and no equipment failure, there should have been no problem, Notam or no Notam.

Happy Skies,

Old Bob

[ARTICLES/20010401.184121.msg07051.tex]

Backup GS Desirability**Thu, 28 Dec 2000 18:55:51**

In a message dated 12/28/00 5:13:36 PM Central Standard Time, jtsmall@onramp.net writes:

The notion is simply that some redundancy is present. Are there some data on this issue ... or are we dealing strictly with preferences?

Good Evening John,

Good question. I really don't know of any good reason why I like the dual GS.

I did have one glide slope failure during an approach that was right down at minima.

There was no flag, the glide path needle just seemed to be floating up and down when I didn't think it should. I executed a miss and went out to try another approach.

After reviewing the rate of descent that should be required to hold the glide path for the ground speed I anticipated, I tried it again. The needle was unstable and directed more action than I thought was proper. Another miss and I went to my alternate. After landing, I called my radio shop to make an appointment for repair and told them to order whatever was needed to add a second glide slope to my panel.

As long as both needles agree, I feel fairly confident that the slope is correct, but if one should disagree with the other, I suppose that I would once again execute that missed approach. In reality, the check that allowed me to catch the first failure is probably more than adequate and the dual GS is just overkill.

I have no hesitancy to fly with just one radio. That includes flying an ILS with one glide slope. But if the rates of descent or other check points don't add up, the miss is the way to go for me!

We could add redundancy and back up to the point that the airplane would no longer be capable of flight.

Experience has shown that reasonable safety is available with very little equipment onboard. The secret is to know how to use what you do have and have some idea of how things should be going so that if the timing of events doesn't seem reasonable, action will be taken before a dangerous condition develops.

Happy Skies,

Old Bob

[ARTICLES/20001228.185551.msg18521.tex]

Changing Tanks and Pre Landing Checklist

Fri, 5 Feb 1999 05:46:10

Good Morning John and All,

In a message dated 2/4/99 11:07:00 PM Central Standard Time, johnmills@sprynet.com writes:

I still prefer to make my last tank change before starting the descent. This completes it before the high-workload time of descent and landing, particularly IFR. When the "G" comes up in the checklist, all that's required is a mental recollection of doing it or confirmation that it has been done. No chance of interrupting flow at a critical time. John Mills.

I guess we have about beat this one to death but I think it might be helpful to remember that just because Beech has placed the admonition: "Select cell more nearly full" as a "BEFORE LANDING" item of the "OPERATING CHECK LIST" it doesn't mean any action is required approaching the airport, on downwind, ten miles out, two miles out, or on final.

Where the physical manipulation of the controls is performed is not as important as the sequencing of events in a manner and at a time which will provide for the action to take place with reasonable certainty regardless of the variables that occur in the approach and arrival at the landing site.

With a single pilot operation, it becomes ever more important that we establish habits that will, hopefully, catch the things that bite!

"OPERATING CHECK LISTS" as listed by Beech, might well be divided into "Plan To Do Lists", "Do Lists", "Check Lists" and "Think About Whether It's Been Done Lists".

That's why most of us have established some variation of the GUMP or GUMPS or GUMPF as a last ditch check to be performed religiously to catch those "gotcha" items at least once somewhere in the final stages of the arrival procedure.

With a little planning, keeping our own comfort in establishing operating parameters in mind, we should be able to establish a habit pattern that will enable us to get all of the required steps completed in a timely manner without rushing our thought process at any point in the flight.

I think you John, have established that procedure in a manner that works for you and that is what is important.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990205_054610_msg01959.tex]

Circling Approachs**Sun, 27 Aug 2000 12:00:21**

In a message dated 8/27/00 9:41:56 AM Central Daylight Time, MikeM86949@aol.com writes:

Now, the Bo is a very nice aircraft for doing circling approaches and I have no qualms about doing them in any weather. But circling approaches have a well deserved reputation as being hazardous for whatever reason. I have a M3 GPS and the straight in approaches are very nice and are safer. Especially in rough turbulence, with rain pouring across the windshield at night with marginal runway lighting - going straight in makes all the difference in the world.

Good Morning Mike,

Thank you for the kind words and support! But, I would like to present some support for the circling approach.

I agree that straight in approaches to relatively low minima are much easier than circling approaches. However, I would rather not say that circling approaches are less safe.

Circling approaches are a different phase of flight that has had very little emphasis in these days when very few airlines ever use them. Why did the airlines quite doing circling approaches? Not because they were inherently less safe, but because it saved them money!

In the days of the DC-3 and into the early operations of the heavier pistons, we were still doing a lot of circling and it was relatively easy to maintain proficiency. As airline travel became more important to the economy, money was spent to provide more runways and to clear obstacles so that we could land with lower weather minima. By the time the Jets came on the scene, the airlines had straight in approaches to almost every runway they used and there few enough obstacles that the minima was, and is, relatively low everywhere they go.

The consequence was that proficiency in circling endeavors decreased. That meant that more time had to be spent in the twice annual proficiency training and checks to bring everyone up to proficiency in a technique that really wasn't used often enough to justify the expense of the training and checking required. Circling minima for a 747 generally runs around 800 and 2 & 1/2. That is so close to VFR that it just isn't worth spending any money to provide the capability.

Now let's get back to how you and I use our flying machines. If we are shooting an approach to an airport where the nonprecision approach allows a straight in MDA of 350 feet AG and the circling MDA is 370, I think all of us would prefer the straight in and wouldn't want to go for the circling unless we had a LOT of very recent experience and practice executing low altitude maneuvers at low speed.

However, let's now assume that the approach we are executing has a minima of 800 and one for both the circling and straight in minima. The wind is calm, the runway is three thousand feet long, has medium intensity runway lights, but no approach or conspicuity lighting of any sort. Unbelievably, the ceiling is right at 800 feet and the visibility not a bit over one statute mile!

Even though we have the airplane slowed down below ninety knots, stabilized at the MDA and are dragging full flaps, it is hard to see the runway over the nose one mile from the threshold at 800 feet!

So we spot the runway before the missed approach point, but are way too high for a straight in to that 3000 foot strip. Why not slide over one quarter to a half mile to the right of the runway and just set up a nice gentle circling approach to the other end?

We know that the 800 feet will clear all obstacles in the circling area by 300 feet and since the visibility is one mile, we should be able to see any obstacles that are in the way during the visual descent to the runway. Any obstacle that penetrates the 20 to 1 slope required for a visual runway is required to have a red light on top so even if we are not real familiar with the field we should be able to set up an approach where the descent is started somewhere along the downwind and a comfortable approach made without ever going outside the allowed one mile from the field, yet still maintain height at or above the required 20 to 1 slope on the approach.

Most folks are like the airlines, they have little or no need for the circling maneuver, but it is a neat technique to have in your little bag of tricks for those boonie airports that have those high MDA approaches. If you have local knowledge of the obstacles in the area, it makes it a little more comfortable when setting up the descent to the runway, but it can still be plenty safe if you are aware of the obstacle clearance and marking requirements for a VFR runway.

My home airport has a circling approach with a MDA of 651 feet AG, visibility required is one mile. Even if the approach was lined up with the runway, it would still be a circling approach since the runway only qualifies as a Visual runway, not an Instrument runway. The visual twenty to one slope requires displaced thresholds at each end and there is 2339 feet between those thresholds. Unless the visibility is well above the minima, it is rare that we could spot the runway in time to maneuver for a straight in approach. Almost every IFR approach requires the full around the field circling maneuver.

If some new regs are developed that would allow descent to 350 or 400 feet for a straight in approach, that would certainly be more desirable than the circle, but once the MDA gets up around 600 to 800 feet, there are some advantages to the circling approach.

Happy Skies,

Old Bob

[ARTICLES/20000827_120021.msg12647.tex]

Circling Approaches**Fri, 18 Feb 2000 10:43:38**

In a message dated 2/18/00 6:08:32 AM Central Standard Time, KR2616TJ@aol.com writes:

The point I was making is that without visual cue, there is nothing in the regs. that allow you to go below the MDA, or execute any maneuver (circling) past the MAP other than shoot the published miss. Simply knowing the surrounding terrain is not approved justification

Good Morning Dana,

I agree with your feelings completely! I was merely pointing out that the language is much more specific than it was many years ago. The approach and the miss are intended to be flown as published and the maneuvering following the sighting of the appropriate visual cues has very definite and precise limitations.

There is nothing wrong or unsafe about a circling approach.

But the limitations concerning altitude, flight path and visual requirements are to be observed with at least the same precision as are the localizer and glide slope while executing an ILS.

Should conditions require a missed approach during the circling maneuver, any required turns are to be made inside the charted circling area while the aircraft is being established on the missed approach segment.

As an example, let's suppose that you are circling to land on the far end of the runway with which the approach is aligned. You start the descent while on the downwind leg (remember though, there may be an obstacle within three hundred feet of the circling altitude!) and are on base well below the circling altitude when the runway end is suddenly no longer in view.

The appropriate action is to continue your turn toward the runway while initiating a climb to the missed approach altitude. When you consider that you are nearing the approach end of the runway, a turn should be made, if one is required, to intercept the departure path and the climb continued until the missed approach altitude is reached. All of this maneuvering to establish flight on the missed approach flight path should be done at or below the speed appropriate to the approach category being used.

One of the reasons that I constantly counsel folks to observe the limitations on approach speeds is due to the differences in clear areas provided for the various approach classifications.

If an aviator is going to operate to the limits of a category A aircraft, the indicated airspeed must be maintained at 90 knots or less.

If a bonanza is flown on the approach and during the circling maneuver at speeds between

that and 120 knots, it is a category B aircraft and those are the minima which must be observed.

Too many operators figure they can do anything they want once they are beneath the cloud. Collisions with towers are often the result. Such obstacles can be very hard to spot even if you know where they are!

In order to gain approval of a circling approach for a category A aircraft, the area checked for obstacles is one and three-tenths statute miles in radius from the thresholds of the approved runways with the developed circles joined by straight tangential lines. The circling altitude must be three hundred feet above an obstacle within that area. The area checked for a category B aircraft uses a one and one half mile radius.

Fly outside that area and there could be a tower or other obstacle far above the circling altitude.

There are no restrictions on what obstacles might be in the space outside of that circling area.

You will note that there are a number of airports where circling is not permitted to one side or the other of a specified runway. That means that there is an obstacle which could not be cleared by three hundred feet during flight at the specified circling altitude. It could be solid rock or it could be a radio tower!

Thank you for the opportunity to expand on the discussion and I am glad that we are in agreement on the requirements for descent!

Happy Skies,

Old Bob

[ARTICLES/20000218.104338.msg03100.tex]

Crosswind Landings**Thu, 21 Jan 1999 21:57:32**

Good Evening Jerry Frank,

In a message dated 1/21/99 1:17:44 PM Central Standard Time, gfrank@kiwi.dep.anl.gov writes:

No such remark is in my Bonanza manual. How come? And is it OK. I learned to side slip on final for a crosswind landing (wing low into the wind hold runway heading). But now I use the crab method on final.

I know of no restriction on slipping the Bonanza with flaps extended. I like it and have used the slip whenever I thought it was appropriate. I prefer the wing low method of cross wind correction though I don't generally transition from the crab to the wing low until I am below twenty to thirty feet. The most important thing in any cross wind situation is not the type of correction used, but to make sure that the airframe is tracking down the runway and not setting up a drift to the side.

It is always better to land a little sideways than to allow a set or drift to the side of the runway to develop.

If the aircraft is tracking properly and you accidentally hit a little crooked, it is fairly easy to straighten it out, but if the aircraft has started drifting down wind, it will be hard to maintain control regardless of how nice the nose is pointing down the runway!

Happy Skies,

Old Bob

[ARTICLES/19990121.215732.msg00961.tex]

Crosswind Landings

Fri, 22 Jan 1999 11:03:36

In a message dated 1/22/99 6:47:24 AM Central Standard Time, commwlthsls@msn.com writes:

I've been reading all this banter about using flaps and gear during an approach and I haven't seen anything on cross controlling during a crosswind landing.

—

what is the story about cross controlling?

Good Morning John,

I suppose it would be best to determine first on an agreed definition of what "cross controlling" really means.

In my mind, a strict definition would be that the controls are "crossed" any time that the aileron is displaced and the rudder is neutral or in the opposite direction. The same would hold true for the rudder. If it were displaced toward either direction with the aileron in neutral or displaced in the opposite direction that would technically be "crossed controls."

If we are climbing out at low speed in our beautiful high powered Bonanzas with the normal for the USA built airplanes right hand rotation propellor, we will likely be holding considerable right rudder (notwithstanding the crooked engine versions) even though the aileron might be neutral, or at least close to it, to hold that little ball in the middle.

There are many other modes of flight where it is required that we have some displacement of the aileron and/or rudder in a direction opposite to each other in order to maintain that "ball centered" flight.

While I was taught to call that condition coordinated flight, I like to call it "balanced flight" even though the controls are technically crossed. Coordination to me always meant that the rudder and aileron should be either in neutral or displaced in the same direction and we all know that those conditions are rarely obtained in normal flight.

What then would be "crossed control" flight? I don't really know, but I generally think of it in the very narrow sense of that time at which we are either slipping or skidding, intentionally or otherwise, and therefore not in "balanced flight."

The recent posts concerning crosswind landings have debated the merits of "wing down" crosswind correction as opposed to the "crab and kick it out" method.

I feel that I am a devotee of the wing down method but I don't establish the slip until fairly late in the landing and I suppose there is an element of the "kick it out" method in my transition from balanced flight to the wingdown crosswind correction.

Tom Turner earlier today posted the following:

Persons with airline experience tend to favor the crab method, because that's standard procedure in the big jets. Bob S. and others, please correct me if I'm wrong, but airline procedure went from slideslip (wing low) method as standard to the crab method with the introduction of the 707 and DC-8, because in those airplanes there was a danger of dragging the outboard engine nacelle in a wing-low landing.

When I was a beginning flight instructor at the University of Illinois, most of the other instructors were gentlemen who had just returned from making the world safe for the rest of us and the debate about which was better, kick it out or stick the wing down was a constant subject of debate in all of our bull sessions.

If there was such a thing as a consensus, it was among the returnees from the Army or the Navy. The Army trained pilots tended to like the wing down and the Navy pilots seemed more enamored of the kick it out!

When I started my airline career as a DC-3 copilot, the same division was alive and well. Even among the fellows that had flown the open cockpit mail planes, there was no unanimity of opinion.

Since I ended up as one of those in the wing down camp, I suppose my view is tainted, but I thought that the wingdowners were the majority.

When I flew with those Captains who expounded and utilized the "kick it out" it always seemed to me that if they didn't touch down during the kickout, the maneuver rapidly changed into a wing down one and both the wing down pilots and the kick it out pilots either ended up with "crossed controls" or we started drifting sideways across the runway which required all of that skill and daring possessed by those stalwart airline aviators to save the day!

The kiddie car landing gear on the DC-4, DC-6 and DC-7 made it a little more academic than the conventional gear on the DC-3 but the debate ranged on.

I understand that some airlines designated one or the other as the method to be used but my airline allowed the pilots to use their own discretion. Some of the instructors tried very hard to influence that decision but I always felt that the wingdowners were the big winner. (Remember, I'm prejudiced!)

Back to your question Tom. When the 707 and DC-8 were introduced, the kick it out boys said: "Hey guys, all you wingdowners are going to have to land with the kick out now because if you don't, you are going to catch a pod,"

I managed to fly the left seat of various jet airplanes for some 24 years before I retired and remained a slave to the wing down crosswind method. However, I am sure my technique was different in the DC-8, 720, 747 and such than it was in the Caravelle and others which had no engines out there on the wing to worry about.

The 747 was particularly tricky as spoilers are deployed on main gear spoolup and that

effectively doubles the authority of whatever aileron input is held. We wing downers had to be very sensitive to the main gear spinup and remove half of the aileron at just the right time. If the aileron was held too long, the wing would drop and catch a pod. If too much aileron is taken out, the airplane will roll to the downwind side and catch a pod.

The kick out crowd would hold the crab until just before they thought it would touch and then shove in the rudder and opposite aileron. Hopefully it would touch fairly well pointed down the runway and before any appreciable drift developed to the down wind side. If the aircraft touched before the kickout, there was the potential for a roll to develop toward the downwind pod and a few were hit that way. If the kick out was a little too early, a downwind drift developed and the normal reaction was to paste it on.

The flat landing which then occurs, brings the engine pods closer to the surface and an occasional pod was dragged during the ensuing recovery.

Those are the academic discussions we had and arguments used. Pods were drug by both camps.

It wasn't anywhere near as bad as I make it sound because we aviators are always arguing about how good we are and obviously only those of great skill could ever successfully navigate the skies!

Very few pods were drug by either camp and those that were, often just had a scratch or two which could be signed off after an inspection and taken out on a trip immediately.

The first four engine jet I flew was the 720. It was a version of the 707 for those who may not be familiar. That series had more than it's share of catching pods, possibly due to it's being the first kid on the block, but I always thought that it was something of a wiggler also.

I was constantly cautioning my copilots to be sure and get that nose pointing down the runway before contact, whether they used the kickout or the wing down.

After a thousand or so hours in the airplane I gained enough confidence in the machine so that when I had a copilot who was going to land sideways, I decided to just go ahead and let it touch. I expected a lurch to the downwind side which I could correct with my consummate skill since I knew it was going to happen.

Lo and behold the old clunker came on just as nice as could be! Just like an Ercoupe! The key was to be sure that the mass of the airplane was tracking down the runway! Just like any other aircraft I have ever flown. The 720 would settle down on the mains and as traction was gained the nose would swing around to an appropriate heading, the only action necessary was to apply the upwind aileron at a rate which would preclude the wing rolling that might otherwise occur.

I was fortunate enough to attend a session at the US Airforce Test Pilots School last November at which the highlight for me was an opportunity to fly the T-38 for one hour and ten minutes, an hour and a half if you include the taxi time! (Looks good in my log

book)

The big thing I came away with was that the Airforce pilots have been taught to go ahead and let it land sideways for the last twenty years or so! No wonder our current crop of airline pilots tend to favor the kick it out method. Obviously there are a lot of considerations that I certainly haven't covered.

The big thing is that the methods aren't really all that different and each has nuances of technique that we all sneak in that have seasonings of the other flavor. Think it through and use that which appropriate for the type of aircraft and the conditions that prevail.

Didn't someone mention something about how to skin a cat?

Happy Skies

Bob Siegfried Ancient Aviator

[ARTICLES/19990122_110336_msg00982.tex]

Demonstrated Crosswind Component**Fri, 22 Jan 1999 17:09:32**

In a message dated 1/22/99 3:27:14 PM Central Standard Time, diamondlil@diamondlil.seanet.com writes:

Isn't the demonstrated crosswind component in our poh the best that could be done with a test pilot in that particular airplane? Cheers Carmine Pecoraro

Good Afternoon Carmine Pecoraro,

It could be in some cases, but it is normally the greatest crosswind that was available during the certification testing program.

That is why it is informational and not limiting. Some professional flight departments and many individual operators have adopted the maximum demonstrated cross wind figure as the maximum to be used for their operation, but it is not a limit as far as the FEDs are concerned. It was not a limit for the airline at which I was employed, but many of the pilots would use it as a limit. That is certainly a reasonable thing to do. Those who elected to land with higher winds, and were successful, were not criticized for doing so.

It is not uncommon for a manufacturer to come out with an amended maximum demonstrated crosswind figure for their airplane when the one used during certification testing has proven to be a competitive disadvantage to the sale of their product.

There is another rather nefarious use made of the certification process. In some cases, the use of aggressive control inputs to control the direction of the aircraft in a crosswind introduces sufficient drag such that the accelerate/stop distances are adversely affected. In that case, the manufacturer may elect to demonstrate their performance to some lesser crosswind component so as to get better numbers for the stop and go situation.

Nothing is simple is it?

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990122_170932_msg01007.tex]

Descent Below MDA**Thu, 17 Feb 2000 16:48:04**

In a message dated 2/17/00 12:15:20 PM Central Standard Time, KR2616TJ@aol.com writes:

I know of no FAA approval to descend below MDA without the runway environment in sight, prior to the MAP.

Good Afternoon Dana,

I think you are correct, but there is a caveat. The FAA changed the wording many years ago and the rules no longer say "runway environment in sight."

They currently list ten options for acceptable visual guidance cues. Nine of those will allow a descent all the way to the runway as long as one of the required visual cues is in sight and the visibility is at or above that required for the approach. The tenth cue, the approach light system, will allow descent to one hundred feet above the touch down zone (provided the visibility is at or above minima). If one or more of the other nine cues, the red terminating bars or the red side row bar lights of the approach light system are in sight by one hundred feet above the touch down zone elevation, then the approach may be continued. Otherwise, a missed approach is mandatory.

I agree that is rather picky, but the FAA does define things rather thoroughly these days!

Besides, it's been a slow day!

Happy Skies,

Old Bob

[ARTICLES/20000217.164804.msg03079.tex]

Descent Below MDA

Thu, 17 Feb 2000 21:43:46

In a message dated 2/17/00 5:51:40 PM Central Standard Time, rcb@appsig.com writes:

I can imagine the "runway environment" rule was loosely interpreted by pilots before the FAA narrowly defined it.

Good Evening Bob,

You are quite correct! There were some pretty loose conditions that were utilized under that provision.

It is my recollection that there was an accident where the individual had descended upon sighting a Kentucky Fried Chicken. He was aware that there was a KFC near the end of the runway. According to the story I remember, it was the wrong KFC!

Maybe someone in our group has a more accurate memory of the precipitative action which brought about the current regulation.

Let's face it, the vast majority of the FARs have an accident that brought them about!

Happy Skies,

Old Bob

[ARTICLES/20000217_214346_msg03086.tex]

Crosswing Landing - Fuel Unporting**Thu, 21 Jan 1999 22:12:08**

Good Evening John Small,

In a message dated 1/21/99 2:19:18 PM Central Standard Time, jtsmall@onramp.net writes:

This would be the 'uphill' tank that would un-port wouldn't it? The 'down-hill' tank, or the wing pointed into the slip would have the fuel placed against the wing root I believe.

Let's consider it this way. You are landing with a left crosswind, you lower the left wing for crosswind compensation and establish a slip sufficiently strong to do so. If you are feeding from the left fuel tank there is a possibility that the intake in the left tank may un-ported. It is located at the root of the wing and with the left wing down, the root is the highest portion of the tank.

The safest move would be to select the right tank for landings with a left crosswind and the left tank for landings with a right crosswind.

Does that add up?

Happy Skies

Bob Siegfried Ancient Aviator

[ARTICLES/19990121_221208.msg00962.tex]

GS Failure

Sat, 30 Dec 2000 10:51:09

In a message dated 12/30/00 8:04:27 AM Central Standard Time, MikeM86949@aol.com writes:

Makes me wonder how many others have flown stuck GS needles into the ground, where the investigators did not realize what happened.

Good Morning Once Again Mike,

Sorry to follow so closely with another message, but I did want to comment on this aspect of the stuck needle problem.

I hope you don't mind if I use your message as a springboard for some review of what we should be monitoring on an ILS approach.

Your point is well taken, but there are a lot of other things that should protect a pilot from flying a stuck needle into the ground.

Before we had so many methods of cross checking our approaches, we were always cautioned to make an input to the controls anytime the needles were steady for more than a couple of seconds. While the primary concern was a failure of the ground transmitter or the aircraft's receiver, that technique would surely have shown a pilot that his needles were stuck.

For me, it is rarely necessary that I put that intentional error input to the controls because my approaches generally wiggle enough on their own!

There is still the DA(H), usually at 200 feet AG. If the pilot flew the stuck needles to 200 AG and then executed the required missed approach, it is unlikely that he/she would hit anything unless the aircraft had made an unusually steep descent.

If we look at the descent table for our anticipated ground speed and set up that rate of descent at the time the glide slope comes down from the top of the instrument and hits the center, we would be unlikely to be so far from the threshold that we would hit an obstacle in the approach zone.

I am not fully up to speed on the current TERPS, but my recollection is that the slope for the ILS approach final clearance zone is around forty to one. That puts the highest allowable obstacle at one statute mile from the threshold around 132 feet (disregarding the earth's curvature of course). A two hundred foot obstacle would have to be at least one and one half statute miles from the threshold.

While I agree that a stuck glide slope needle is not a Good Thing, if the normal ILS procedures are followed, there are a lot of things that should let our stalwart aviator know that things are not what they should be.

Intercepts from above the glide slope are OK, but having a nice stable level flight segment before the intercept point allows an observation of the steady descent of the needle from

the top of the instrument case to the center. An initiation of the planned descent rate should cause the needle to stabilize near the center. As we pass the outer marker, or an approved substitute, the altitude should be checked. If all of that seems OK, the needle is in the center, STUCK OR NOT, and we maintain the expected rate of descent, we should arrive at two hundred feet awfully close to the middle marker, (provided it has not been decommissioned)!

In any case, if the required visual cues are not visible at the DA(H), a miss is in order. So, even if the needle does stick after the outermarker altitude check and, even if we do have such confidence in our stabilized approach that we don't check for a stuck needle, the approach should not result in the aircraft hitting the ground, provided that the pilot does not bust the minima.

My point is, there was considerable monitoring capability designed into the basic ILS approach when it was conceived. Even if we don't have redundant equipment, we should be able to safely handle component failure.

Happy Skies,

Old Bob

[ARTICLES/20001230.105109.msg18677.tex]

GUMP Check**Sun, 11 Jul 1999 17:12:28**

Good Afternoon All,

Does anyone besides me remember the cartoon character Andy Gump?

That was where the GUMP came from, it was easy to tell the W.W.II guys to remember old Andy GUMP.

Shortly after W.W.II, many of us started adding an F (for Flaps) to the string and in some areas of the country, GUMPF is still quite prevalent. Some of the purists are complaining about using the G for fuel since gasoline is no longer the prevalent fuel, but I still use it and did so when I was flying turbine aircraft as well.

Whatever works for you is the way to go!

Happy Skies,

Old Bob

PS - Incidentally, for me the M reminds me to adjust the mixture for what I desire it to be for the landing. That is generally quite well leaned out. The same thing goes for the P. I set the Prop for a range that will give me reasonable response considering the altitude, temperature and the weight of the aircraft. With my Bonanza that is usually somewhere between 2000 and 2200 RPM.

If you have the governor control all the way forward, you will not get thrust as soon as you will with the governor set for some lower RPM and it is likely to overspeed on a panic go around. If you are making a go around, setting the mixture and propeller as appropriate should be part of your go-around procedure anyhow!

[ARTICLES/19990711.171228.msg05914.tex]

Go Around Configuration - Baron**Mon, 26 Feb 2001 11:46:58**

In a message dated 2/26/01 7:48:59 AM Central Standard Time, Pete.Bedell@aopa.org writes:

I retract them at 400 feet AGL because of the Baron's "settling" habit. That's what we do at the airline too so it's easy to remember.

-Pete

Good Morning Pete and Tom,

Even the Baron flaps CAN be retracted without a "settling," IF the airspeed is at or above the appropriate speed for the flap configuration which is to be selected AND the aircraft is rotated to maintain that speed.

The selection of a speed to be maintained on the approach and the ability to maintain that speed are key elements of the approach.

Difficult pitch changes do occur in some aircraft. If the trim change is extreme, that can certainly be a valid reason to change to a different procedure, but a firm rotation will eliminate the settling IF the initial speed is proper.

It has been a few years since I was actively instructing in the Baron and I don't remember the amount of pitch change required, but I am confident that I taught that full flap could be used, when power and weight allowed, and I am absolutely certain that I taught the flaps should be retracted fully as soon as the speed was appropriate.

Once again, I would like to emphasize that we didn't require a full flap approach, we just suggested that as much flap be used as could comfortably be carried with the power and weight that existed. We trained to full flap and demonstrated full flap misses were not difficult, provided appropriate speeds were chosen and maintained.

My recollection is that the Baron went around so well that there was little need for rapid action of any sort, but I have always been a stickler for accurate and positive speed control, so I imagine some relatively aggressive pitch efforts were made!

We were operating three Twin Bonanzas in our charter fleet during the time that we adopted the full flap approach as the suggested standard. The POH for that airplane suggested making an initial flap retraction to an intermediate setting, I think it was fifteen degrees, but am not sure. We found that very unhandy to do and eliminated the step by setting the goal of attaining clean speed before raising any flap and just making one retraction. We found, through experimentation, that the aircraft was rarely flown below the optimum clean flap speeds anywhere except in the very last stages of the flare for landing. Even there, by the time the power was applied, there was generally adequate airspeed to go for the clean configuration without going to an intermediate setting.

Due to the current litigious climate, I might be less inclined to recommend operating procedures that differ from the POH than I was in 1960!

Happy Skies,

Old Bob

PS Pete, what type of equipment are you operating at your airline?

[ARTICLES/20010226.114658.msg04648.tex]

Go Around Configuration**Sat, 24 Feb 2001 10:38:22**

In a message dated 2/24/01 9:09:48 AM Central Standard Time, MikeM86949@aol.com writes:

Then get the flaps up slowly after reaching V_y . BTW, I keep flaps up until landing is assured. I have a C33.

Good Morning Mike,

Your procedure is fine, but I must comment!

There is no other way to bring the flaps up on any Bonanza or Bonanza derivative except to bring them up slowly!

The older the Bonanza, the slower the flaps will come up. There were some increases made throughout the production of the twelve volt machines, but no major change in retraction speed occurred until 1978 and the application of the twenty-four volt system. Even those are relatively slow coming up.

There is an Old Wives Tale out there concerning the danger of retracting flaps due to the potential of a loss of altitude, an increase in rate of descent or a decrease in rate of climb which might occur during the flap retraction.

There is absolutely no truth to that particular OWT, PROVIDED that the speed is maintained at or above the speed that is equivalent to the best angle of climb speed for the flap position to which you are going. I would recommend that the speed always be kept not only above the best angle of climb speed, but well above that, possibly as high as the best rate of climb speed, throughout the approach if the approach minima you desire to use will allow.

As long as the speed is above the appropriate speed for the flap configuration that you have selected, there will be NO loss in performance during retraction.

Even a manually operated flap can be snapped up with no problem if the aircraft is rotated in pitch rapidly enough to maintain the airspeed.

The key is to always be at, or at least, rapidly accelerating toward, the optimum speed for the flap configuration you will end up with.

Speed - speed - speed. Not fast, but accurately controlled SPEED. That is the answer!

Happy Skies,

Old Bob

[ARTICLES/20010224_103822.msg04455.tex]

Approach Airspeed - Greater Than Normal**Sat, 30 Jan 1999 15:33:01**

Good Afternoon Bob Newman,

In a message dated 1/30/99 1:51:31 PM Central Standard Time, newmanb@erols.com writes:

Then he told me I had jet traffic directly behind and requested I maintain 140 if possible. My approach was uhh ... shall we say unstabilized. How does one configure the airplane to get stabilized on the glideslope at this speed? I usually use the gear to establish the descent rate necessary to track the glideslope at 105 knots on the ILS; but that was not an option this night. What's the right way to do this? Did the controller make an unreasonable request?

Last things first: No the controller did not make an unreasonable request, provided that you wished to accept it.

For your purpose of training, it was probably not appropriate. At this stage of the game you should be making those stabilized approaches and, depending on the type of airplane and the minima to which you are operating, the 105 knots is not an unreasonable speed to use.

The 140 knot request is not an unusual one to receive when flying at airports with a fair amount of jet traffic. It is a speed that most air carrier aircraft can accommodate and so is often used for separation.

If I am shooting an approach in weather that is truly down around the minima, I will advise the controller before the intercept of the speed I intend to use on final. If the weather is well above minima, say 800 feet when the DH/DA is 200 or so, I will leave the wheels in the wells, the flaps up and let her slide down the ILS at a nice stabilized 140 knots. Works great and the faster you are going, the easier it is to track the localizer and glide slope. BUT, if that is the plan, you must have a method worked out to get your aircraft configured for the landing maneuver after you break out at the 600 foot level or so, and that can be tricky for some of our airplanes. The length of the runway will be a consideration as will the visibility.

If things don't work out, you must be mentally prepared to execute the go around procedure even though the conditions may be well above the minima. You have effectively raised your personal minima to the amount that will be required so that you can reconfigure your aircraft.

At your stage of training, I would suggest that you stick with a speed chosen by you and your instructor as the most desirable for the type of approach that you are using and try to advise the controller early about your plans. They will generally be most accommodating at all except the very busy airports.

Just one more small point. Be sure the approach speed chosen is consistent with the minima to which you are operating. If you are going to fly to the Category A minima, you must be 90 knots or less, if you elect to fly at 105 knots you must use the Category B minima. For straight in approaches, that is rarely a problem, but for circling approaches it can be a significant factor.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990130_153301_msg01497.tex]

Approach Airspeed**Sun, 7 Nov 1999 11:47:31**

In a message dated 11/7/99 9:47:01 AM Central Standard Time, wings@inetnebr.com writes:

I am a new owner of a V35B and am uncertain as to what speeds I should be flying downwind/base and final in VFR patterns and when to start setting up for Vectored Approach's? I 17 hours in on training unfortunately several different CFI's which each had there own different way of setting up.

Any help whould sure be appreciated.

Thanks by wings@inetnebr.com (Bob Vanderheiden)

Good Morning Bob,

The thing that is sometimes neglected in training is that there is a big difference from the minimum to the maximum weights at which you are likely to operate your airplane.

The power off, gear down, full flap stalling speed for your airplane is listed as 63 mph when it is at the gross weight of 3400 pounds. Should you be flying solo with minimum fuel on board you might well be at a weight as low as 2550 pounds! The stalling speed with it in the dirty configuration and power off would be less than 54 mph at that lighter weight. Add a little power and the stall speed drops rapidly. In the same configuration and with full power it could be as little as 44 mph!

The FAA recommends that maneuvering and approach speeds be determined in reference to the stall speed of the configuration in which the aircraft is being flown.

For maneuvering (such as downwind) the minimum recommended speed would be 150 per cent of stall speed. Approach should be at a minimum of 130 per cent of stall.

Almost everyone recommends that speed be increased on final when there is any wind and especially in gusty conditions.

I like the rule of thumb whereby I add one half of the steady reported wind and the full reported gust value to the approach speed, but I limit the total addition to twenty knots for the Bonanza.

If I were flying the airplane at 2550 pounds with full flaps and the gear down while carrying a little power, the stall speed would be below 54 mph. 130 per cent of that figure would be 70.2 mph. That would be the minimum recommended final approach speed. Should the wind be reported as west ten, gusts to twenty and I was landing on runway 27, I would add fifteen to the calculated speed for a new minimum approach speed of 85.2 mph. That should work well at that light weight.

The same numbers developed for max gross would be stall speed 63, 130 percent speed 81.9 and with the wind correction, 96.9.

Now I wouldn't expect anyone to calculate those numbers every time, but the exercise should be done enough times so that the principle is understood and the large difference in speeds for different conditions understood.

For what it is worth, my V35B has all speeds listed in knots and I use 100 to 110 on downwind, slow to 80 to 90 on base and 70 to 80 plus whatever wind correction is pertinent on final. Over the fence I try to have the speed down another ten knots or so. The ten knot range is for the difference between maximum and minimum weights.

Hope that helps!!

Happy Skies,

Old Bob

[ARTICLES/19991107_114731_msg10275.tex]

Interesting Approaches**Fri, 28 Jan 2000 22:03:16**

In a message dated 1/28/00 8:30:50 PM Central Standard Time, hgp@madaket.netwizards.net writes:

Anyone know any other strange approaches? Anyone ever fly the approach to JFK that requires one to turn while descending, following the lead in lights?

Good Evening Howard,

That is the Canarsie approach. There is a set of lights for the right runway and one for the left. It makes a very nice approach, but the most interesting one of all was the ILS to the southeast runway at the old Hong Kong airport. It was closed a year or so ago.

You flew a standard localizer and glideslope to a position in space that was 600 feet above the airport and a mile and a half or so southwest of the runway. You then stated to look for a large checkerboard sign on the side of the mountain ahead. When it was adequately in sight, you would start a right turn to pick up the runway. There was also a set of flashing lead in lights such as those used at JFK, but the turn was a lot tighter and the flight path was a lot closer to the obstacles over which the approach was flown.

Interestingly, it had a very good safety record and there were rarely any misses after the 600 foot point. It was such a demanding procedure that everyone was really up for it and generally right on the numbers for speed, altitude and attitude.

Ah, for the good old days!

Happy Skies,

Old Bob

[ARTICLES/20000128.220316.msg01970.tex]

Night Landings**Wed, 1 Mar 2000 10:16:32**

In a message dated 2/29/00 9:19:41 PM Central Standard Time, swo49@hotmail.com writes:

Could you expand of this topic a bit more. At Lee (KANP) - 2500' with displacements, I am nervous about night landings. Steve

Good Morning Steve,

I don't know how much good I could do over this forum! Exactly where in the process of utilizing available cues any individual is currently, is difficult to evaluate via the written word. Not only that, there are a multitude of adequate ways to solve the visual approach equation.

The instructor who asked that you start your landing procedure by determining the proper approach speed utilizing 1.3 times your stall speed was on the right track. I hope he/she added that the speed should be determined based upon your actual operating weight, not your maximum allowable gross, and that the resulting speed should be adjusted for wind and gust conditions.

That same sort of evaluation should be used for every problem perceived.

The relative difficulty of a night approach is dependent on the cues available to delineate the landing area and the obstacles on the approach. With good, evenly spaced runway lights and adequate obstacle lighting it may even be easier to make a precision approach and touchdown at night than it is in the daytime!

Individual problems, I may be able to discuss, but for the big picture, let's discuss it at the Bonanza table in the Type Club Tent at Sun 'n Fun.

Your 2500 foot strip is 170 feet longer than the one I fly out of and we have no obstruction lighting on the obstacles that control our twenty to one displaced thresholds.

I find that I am often closer to the proper numbers and often use less runway at night than I do in the daytime.

I almost forgot to mention, you should be able to land with as much precision without the landing lights as you can with the landing lights on a well lit runway. The primary uses of the landing lights are to aid in picking up obstacles in time to avoid them, pick out landing areas that have unlit guidance cues and to aid in making a smooth touch down. As I said before, in some fog or haze conditions, the landing lights can be a detriment.

Happy Skies,

Old Bob

[ARTICLES/20000301_101632.msg03986.tex]

Night Landings

Wed, 1 Mar 2000 11:09:27

In a message dated 3/1/00 8:23:48 AM Central Standard Time, newmanb@rocketmail.com writes:

Part of my night flying equipment is a 3 D-cell Maglite which is bright enough to aid during taxi. Don't try to use it for a landing light though.

Good Morning Bob,

During my early instructing days, we were flying off an unlit grass field. The curriculum did require night landings. On the nights when we were going to do night landings (funny, we never discussed night takeoffs, just night landings!) we would set those round black kerosene flare pots along the edge of the grass area to give us a fair idea of where the landing area was. We didn't use a lot of them, generally one on each side of the runway at each end and one on each side at the middle.

That gave us enough to determine the alignment, but nothing to tell us when to flare.

I tried using a big three cell flashlight to help find the ground, but found that it was of little help. The area that should be used to judge the flare is out in front of the airplane and not alongside. The flashlight was not powerful enough to light up an area far enough in front of the airplane to do any good and actually interfered with observing other cues when pointed at the ground close in.

None of us really have any depth perception at altitudes used in the flare maneuver. What we think is depth perception is evaluation of the size of known objects. That is why the one eyed pilots do just as good a job as the rest of us.

What did work for us to help the students decide when to flare was to just keep it descending until the glow from the running lights were visible in their peripheral vision.

That low intensity light only lit up the ground when we were close enough that the flare wouldn't be too high and yet we still had time to arrest the descent.

It worked like a charm on the J-3s, Champs and T-Crafts of the day.

Later on, when I was instructing in helicopters, we found that the same technique was very helpful in low altitude maneuvering. The landing lights were required for good autorotations in an unlit area, but for general maneuvering they tended to blot out all other visual cues. The running lights gave just the right amount of illumination without interfering with the view of things further away.

One more subject that I just thought of that is pertinent to the night landing discussion.

If you are landing on a large sod, gravel, dirt or other surface that has no lines or direct guidance on the landing surface, once you are on the ground, the landing lights are worthless for telling where the landing area is. Whatever is in your landing lights gives you the impression that you are going straight. You may be going straight all right, but

not necessarily straight in the direction desired. It is imperative that there be a method of maintaining a course that will keep you aligned with the landing surface. Hopefully there will be a light at the end of the landing surface which may be aimed for.

A very good method of maintaining alignment is to go back on instruments. Note the heading that you are holding during the final stages of the stabilized approach, correct that for any drift or wind correction angle and nail that heading during the rollout.

If I am going to land on an unlit surface and someone has offered to light that surface with an automobile, it is best to have them place the car so that it is pointed away from the runway at the far end. If there are two cars available, you can place one at the approach end with it pointing toward the landing area. I then land over the first one and head toward the taillights of the second. The head lights of the first aid in determining the landing area. I land using landing lights, if I have them, and then turn them off immediately following touch down. Haven't had to do that in many years, but it worked OK when I was young and foolish! It is imperative that the persons placing the automobiles be knowledgeable individuals!

Enough reminiscing!

Happy Skies,

Old Bob

[ARTICLES/20000301_110927.msg03992.tex]

Reporting "Procedure Turn Inbound"**Wed, 26 Apr 2000 12:32:44**

In a message dated 4/26/00 10:51:32 AM Central Daylight Time, bonanza6xh@yahoo.com writes:

When ATC asks you to report "procedure turn inbound", does that mean report when you complete your 180 turn and are on the inbound LEG of the procedure turn, or when you turn from the inbound leg onto the final approach leg?

Good Morning Jason,

The accepted interpretation is that point at which you have completed the normal 180 degree turn and are starting the leg from which you will intercept the inbound course.

In the days of yore when procedure turns were common and many folks used the 80/260 course reversal procedure, common practice was to call the procedure turn inbound when the heading was passing through a position ninety degrees to the inbound course.

I don't recall ever seeing any of this in writing, but it was discussed with the air traffic folks at the time and it was agreed that such a notification was pertinent. You definitely are not expected to wait until established on the inbound course before making the call. If the controller wants that, he/she will ask for a call when established.

If you are late with the call and don't make it until you are established inbound, that is how the call should be made. "Bonanza 20318 established inbound" not "procedure turn inbound."

Does that help?

Happy Skies,

Old Bob

[ARTICLES/20000426.123244.msg07096.tex]

Missed Approach - Nav Failure**Fri, 28 Jan 2000 20:59:45**

In a message dated 1/28/00 4:37:51 PM Central Standard Time, foosej@oz.net writes:

Hi, IF you were at the outer marker and the GS, and the LOC both went out, what would you do? Continue to fly the heading for a while and then guess where the MAP was and do the missed? Hypothetical in this age of radar, I'm sure, but just curious. Maybe do a 180 back to the hold? Dunno'. John

Good Evening John,

It has been a couple of years since I reviewed the TERPS, but just off the top of my head I think this is still the basic philosophy.

All missed approach procedures are drawn so that they have at least a chance of being flown with no facility guidance at all. The theory is that any time you are executing any approach procedure there is the potential for failure of the aid being used. It is anticipated that the pilot will fly to the point at which the MAP or DA/DH would have been, plus any distance that would be flown during any required straight ahead climb before starting any turns. This obviously leaves a lot of loose ends to be covered by the pilot using deductive reasoning procedures. There are many approaches around the world which would be very difficult to fly without some sort of positional guidance. A couple that come immediately to mind are the miss at Aspen, Colorado and the miss from the northwest bound approach at the old Hong Kong airport!

With the proliferation of radars now available, the situation is much improved, but the DR is still the basis for the missed approach procedure.

This brings up the point of timing the approach. There is no doubt that it would help ones situational awareness to have an exact time at which the FAF was crossed, but I know of no requirement that it be done other than on those approaches where it is a specified method of defining the MAP. When timing is the specified method, the missed approach procedure provides a greater obstacle clear zone during the miss than when the MAP is defined only by a DME or GPS fix. I imagine a case could be made that one should always have a time from which to base the evaluation of the DR during a non-guided miss, but it just isn't required!

I still think that an overall view of the obstacles in the area and at least a rough idea of where the missed approach goes and why it does so, is about all any one mind can handle.

In any case, if the approach is abandoned for any reason, the climb to missed approach altitude may be commenced any time after the FAF. Turns are to be initiated either by the guidance shown on the procedure, or by the pilots best estimate of his position so as to comply with the track described for the missed approach procedure.

I think that is still current information!

Happy Skies,

Old Bob

[ARTICLES/20000128.205945.msg01960.tex]

Visual Decent Point (VDP) Usefulness**Sun, 14 Jan 2001 10:02:13**

In a message dated 1/14/01 7:35:14 AM Central Standard Time, jds@oklahoma.net writes:

Speaking of RNAV (GPS) approaches, I haven't had a chance yet, to study up on VDP's on the newer approach plates. Can you enlighten me as to their purpose and how to use them, please? I'm sure it's simple, but I'd rather clear up any confusion before I really need to know! Thanks for your help.

—Joey Sager

Good Morning Joey,

I guess I am the wrong guy to ask because I don't like them!

The VDPs are put on with the thought that if the runway is spotted after the VDP, it is no longer practical to make a safe landing.

The assumption is that you are flying an airplane that is not capable of comfortably flying a glidepath that is not close to three degrees and that must land in the Touch Down Zone.

It is primarily pointed toward air carrier aircraft and others who are using sophisticated Flight Management Computers which will provide some sort of a computer generated glide path.

There are many instructors, system designers and regulators around the country who are advocating using various methods to adapt the constant rate descent procedures to all non precision approaches, whether the aircraft is equipped to provide electronic guidance or not.

I think that is a mistake!

First, I think that there are many neat techniques and procedures which will work beautifully in the simulator or in controlled training environments which don't adapt well to the rapidly changing conditions that are common in a deteriorating weather situation.

Second, that effort to turn the non precision approach into a constant descent approach tends to sucker the unwary into either executing a miss long before it is necessary or busting the minima while looking for the runway.

Next, I believe the effort to change a non precision approach into a constant rate of descent approach deprives the operator of a valuable resource to aid in finding and safely landing at the airport.

It is going to be difficult for me to shorten this as I feel I am leaving out more than I am

saying with every word I write, so please excuse all of the loose ends that are already in this message and those to follow!

The idea of determining a point beyond which a landing will no longer be practical is a good one. I have used, and taught, such a procedure for at least the last fifty years.

However, there are so very many conditions that should be considered that I don't think it is proper to delineate a point on a chart where everyone should make that decision.

I have experimented with my Bonanza and find that a comfortable approach can be made on a glide path as steep as six degrees. Much higher angles could be used with a head wind and power off, but six degree works well and allows enough power to make corrections at ninety knots, calm winds and relatively low elevations. I haven't checked it at high altitude airports.

There are many airplanes, from the Helio Courier to the Lockheed C-130 that are capable of much steeper descents than a Bonanza.

The length of the runway in relation to the landing distance required by the airplane you are flying is a major consideration in determining the point at which a landing is no longer a safe, practical, maneuver.

If I am at six hundred feet at the threshold of a twelve thousand foot runway when I spot the runway, it is any easy and safe maneuver to continue straight ahead to a landing IF I am flying a Bonanza or other aircraft capable of as steep, or steeper, an approach at ninety knots or less.

For an air carrier operated 747, the VDP makes sense. I think it is a very poor idea to restrict the operation of all aircraft just to comply with a point that is applicable to a few.

Publishing such a point tends to imply that anyone who operates otherwise is operating beyond the rules and that is definitely not the case.

It also discourages the operator from properly evaluating the conditions that do apply to the individual approach and that leads to developing a breed of pilots who don't think for themselves.

To me, the publishing of a VDP is a bad idea. That point should be determined by every operator considering the individual factors which apply to the specific case at hand.

Thanks for asking, I bet your sorry you did, however if you would care for me to expand on any of the points covered, I would be happy to attempt to do so, but it won't be short!

Happy Skies,

Old Bob

[ARTICLES/20010114.100213.msg00900.tex]

1.2 AIRMAN-MISC

Aileron Rolls

Wed, 1 Mar 2000 12:21:04

In a message dated 3/1/00 10:14:16 AM Central Standard Time, jds@oklahoma.net writes:

This reminds me. I have a friend - a fellow pilot - who was always trying to get me to do an aileron roll in my V35B. This was several years ago. He claimed to have done it many times in such a plane, though his young age made me doubt that statement somewhat. Anyone ever try this? He never persuaded me to try it, although it did sound like fun. Would it cause adverse effects to any of the instruments or the plane? —Joey

Good Morning Joey,

This is a tough question on which to comment.

Let me start by relaying a story which I heard many years ago which may or may not be true.

It was said that the absolute first aerobatic Debbie made was sold to a very successful person in Colorado Springs who had been a Navy fighter pilot. The story was that he picked up the airplane at the factory and as he was approaching his home airport, called on Unicom and told the locals to come out to the runway and watch his arrival. He was making a nice high speed pass down the main runway. As he arrived near where everyone was watching, up went the nose and he started a roll. You guessed it, he dished out and bored in!

The supposition is that he practiced a bit on the way home and felt that he was back in his fighter trim.

The story may or may not be true, I don't know, but it did hit fairly close to home.

Back in the early fifties, I was a copilot flying the DC-6. That airplane utilized a flight engineer. Most of them were new hires fresh out of the military and we civilians always enjoyed hearing all of their wonderful tales.

One of those engineers had been instructing in the Beech Mentor and we discussed aerobatics at length. I had never done aileron rolls. In the Stearman that I flew when doing aerobatics, we had always done slow rolls. The idea of doing a roll that never had any negative G forces appealed to me greatly!

We discussed the similarity of the Bonanza and the Mentor and came to the worldly experienced decision that the Bonanza ought to roll just as nice as did the Mentor. He assured me that the Mentor went around sweet and smooth and never showed more than a G and a quarter to a G and a half during the maneuver.

Well, the next day I took out the straight model 35 in which I was a partner, got it up to a reasonable altitude, stuck the nose down to build the speed my flight engineer

had suggested, pitched it up to the nose high attitude that he had designated, threw in the aileron, released the backpressure a bit as it went inverted, as I had been told, and completed the roll. It worked beautifully and was just as my engineer had described.

So – The next day I loaded up my partner and went out to show him what I had learned.

Fortunately, I went to five thousand feet AGL to show off. I thought I did it exactly as I had the day before, but somehow it didn't work! I dished out and ended up heading straight for terra firma with the speed rapidly approaching the redline.

The point is that even if the roll can be completed safely IF everything goes just right, the airplane is not built to stand the forces that might be put upon it if the maneuver is not properly performed.

In addition, it is just plain illegal to do it in an airplane that is not certificated for such flight.

There are many places that you can go and fly with competent instructors in airplanes that are suitability certificated.

As to possible damage of the instruments in your airplane. That depends on the instruments installed. Most folks who have aerobatic aeroplanes install instruments that are supposed to be non-tumbling. That helps, but most seem to overhaul their instruments more often than do those of us who don't do aerobatics in our airplanes equipped with the same instruments.

Have fun, but keep it legal!

Happy Skies,

Old Bob

[ARTICLES/20000301_122104_msg04005.tex]

Aileron Rolls

Wed, 1 Mar 2000 12:58:28

In a message dated 3/1/00 11:23:17 AM Central Standard Time, hgp@madaket.netwizards.net writes:

I understand an aileron roll is undesirable because it might cause the engine oil pickup to go dry for the duration. A barrel roll, correctly performed, will most likely not cause this to happen.

Howard

Good Morning Howard,

There is obviously some confusion between the various type of rolls. This is not new, it has been true as long as I have been flying and is dependent on who the authority is as to who is correct.

I accept the interpretation that a slow roll is that roll in which the airplane is actually flying in the inverted position when it is upside down in relation to the ground.

The barrel roll is one in which there is a positive, at least one G, pull all of the way around.

Between those two extremes are various rolls which I would term aileron rolls. When does a "loosened" barrel roll become an aileron roll and when does a very slow aileron roll become a slow roll? That is always open to interpretation.

The classic style of slow roll is a very uncomfortable maneuver. First you are laying over on one side trying to keep the nose from dropping during the hopefully momentary knife edge flight, then comes a little more comfortable time hanging inverted by the straps while the airplane is actually flying upside down and then that other effort at getting through the knife edge flight and back up to normal flight.

Now, if you happen to be lucky enough to be flying a T-38, you just shove the stick over to one side or the other and the airplane will just spin around to it's hearts content. Is that a slow roll or an aileron roll? Hard to say and yet no other control input is required other than to shove the stick to one side or the other! The roll normally seen at airshows, as done by Bob Hoover and Bobby Younkin, are what I would call an aileron roll. A reasonable pitch up to position the nose for the start of the maneuver, aileron toward the direction of desired roll, a little rudder input to keep the nose describing a reasonably small circle and a relaxed back pressure during the "inverted" portion of the flight followed by an increased back pressure as the aircraft is once again level with the world. No extreme cross control, almost coordinated flight and no negative G, but it can get close to zero while inverted. That is what I mean when I say aileron roll. A full barrel roll is completely coordinated all of the way around. In the WW II days, it was considered that the G force should be constant all of the way around as well, but most of us thought they felt a little nicer if the back pressure was released just a little

bit when inverted. I guess that was the start of the aileron roll!

Other folks have other definitions, but those are the ones that I use.

Happy Skies,

Old Bob

[ARTICLES/20000301.125828.msg04010.tex]

Closing Cabin Door In Flight**Mon, 28 Feb 2000 15:27:40**

In a message dated 2/28/00 2:00:07 PM Central Standard Time, wes@mailzone.com writes:

Can't speak for the Bonanza, but in a Piper you can often close the door if you first open the pilot's vent window.....

Good Evening All,

Please don't try it!

There is a good chance of bending the door and it is a hassle in any case. If you have just departed from a place to which you cannot possibly return and have several hours of flight in freezing temperatures, it might be worth the effort to close the door.

If you absolutely want to make the effort, try to remove the upholstery from the back of the door and up on top. On most of the airplanes, the covering up on top will pry out easily. The lower back is tougher. If you have a passenger, it is easier but it can be done when you are alone. Pull on the rear of the door until the back latch has engaged, (opening the pilot weather window and fish tailing the airplane does help) then reach up and pull in on the top while you rotate the latching mechanism to the locked position.

It is really much better to just come back in and land. It is noisy but the open door will affect the performance very little at the lower airspeeds. If you get real slow on an approach, the door will swing out a little just before the stall and the right wing will stall first. Normal approach speeds are more than adequate, but I wouldn't hold it off a long time.

Back in the days when I was doing a lot of Bonanza instruction, we used to include door pops with all of our students. We experimented with various procedures to close the door in flight and success was variable and individual airplane dependent.

I actually installed handles on one of my straight thirty-fives to demonstrate the feasibility of doing the "pull it closed" technique described above.

I quit doing the door pop as a normal thing when I noticed that some of the doors were becoming ill fitting. Even if a student wants to do a door pop in his own airplane for training, I strongly recommend that no effort be made to close it. The doors are not designed for that sort of strain, they are hard to get sealed as it is, and the airplane flies just fine with the door open.

Happy Skies,

Old Bob

PS I have even quit taxiing in hot weather with the door open. The hinges are subjected to a lot more wear and they are expensive and hard to repair. Why cause unnecessary expense.

[ARTICLES/20000228.152740.msg03804.tex]

Closing Door In Flight**Thu, 13 Apr 2000 16:53:30**

In a message dated 2/28/00 2:00:07 PM Central Standard Time, wes@mailzone.com writes:

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[ARTICLES/20000413.165330.msg06292.tex]

Determining the Speed of an Aircraft

Mon, 15 Nov 1999 21:34:18

In a message dated 11/15/99 3:04:31 PM Central Standard Time, william-prim@reliantenergy.com wrote:

When in the market for an aircraft, how would one attempt to evaluate whether an airframe is a fast one or is one that was assembled a little more carefully?

Then— In a message dated 11/15/99 3:32:15 PM Central Standard Time, tturner@vol.com writes:

The mechanics told me that checking the rig was a very time-consuming art form, requiring specialized tools. Fly the plane "by the book," then compare it to the book to see how it does.

And—

Good Evening Bill, Tom and All,

This brings up an important point. Determining the actual speed of an airplane is a very difficult thing to do. I find that it generally takes me a couple of hundred hours of operation before I really get a handle on just how fast or slow any individual airplane is.

Calculating the airspeed as Tom suggests is a very good method, IF all of the instruments are performing as designed. Unfortunately, there is a lot of potential for error in the indicating system on our flying machine.

One method that I have been using for the last few years (following the availability of good cheap GPS units) is to make several runs into and out of the wind on a day when the wind appears to be fairly steady. This isn't accurate unless the winds are steady and the air is neither rising nor descending, but it is the best way I know of. If anyone has a better method, I would love to hear about it!

I turn into or out of the wind until my heading and the track made good are coincident. I will then fly for a few miles and note the groundspeed. If it stays fairly steady and the track stays consistent, I figure the air mass is relatively stable and I have a chance of getting decently accurate numbers. I then make a one eighty turn and repeat the process. Once again, if the indications are stable, I will note the ground speed, do the math and determine an average speed which should be my airspeed if air mass conditions have remained the same for both runs. When conditions are nice and smooth, I will often make several runs in both directions. The more consistent the numbers, the greater confidence I have in the numbers developed. Once a true airspeed is developed, the speed can be calculated in the normal manner and the accuracy of the indicated airspeed determined.

When evaluating an airplane that you are about to purchase, it is handy to have one on

which an airspeed evaluation has previously been done fly along side. That is probably the easiest way to check an airspeed indication. If they are both indicating about the same at high and low airspeeds, then you could calculate TAS and get a reasonable idea how close the candidate aircraft is coming to the book figures.

As to what to look for to determine proper rig, that can be difficult, but if either of the fixed tabs are perceptibly bent, chances are the airplane is out of rig. It is also helpful to eyeball the flap position in relation to the wing. If either one has been drooped at all to correct a wing heaviness, it will slow the airplane substantially. Look around the airframe for general skin waviness and skin fits. If you see evidence of considerable oil canning or that the skins are wavy where fastened together, it is likely that things were forced together at the factory and the airplane is likely to be permanently out of rig. If the bad rigging is from poor fitting in the jigs, there is not much that can be done about it. If the bad rigging is due to the wings being improperly attached, that is fixable, but it may not be easy!

Even Mike Smith said that rigging was mainly a matter of trial and error till things worked right. It takes a lot of time and, if done by the book, requires a lot of expensive tools and jigs! Ball parking and luck may do the job, but I wouldn't count on it. Best to buy a fast one!

Happy Skies,

Old Bob

[ARTICLES/19991115_213418_msg10626.tex]

Determining the Speed of an Aircraft

Mon, 15 Nov 1999 22:40:52

In a message dated 11/15/99 9:32:57 PM Central Standard Time, raven@tminet.com writes:

In answer to your question regarding determining TAS for the aircraft, I found the following:

<http://www.ntps.com/sftware.htm>

I have not used it, but the idea behind it looks right.

Good Evening Bill,

The math seems easy enough, but the usual problem still exists. There is an assumption that the airmass conditions remain constant and that is what I find to be the biggest and hardest to quantify variable!

I quote from the first page of the instructions:

The following assumptions were made: "during the time it took to do the three legs, wind and temperature did not change"

And there lies the rub!!

Thanks for the information, there are some handy ideas there.

Happy Skies,

Old Bob

[ARTICLES/19991115.224052.msg10633.tex]

Finding Traffic Hidden by the Sun

Sat, 24 Jun 2000 09:38:57

In a message dated 6/23/00 11:29:00 PM Central Daylight Time, raven@tminet.com writes:

If anyone has a strategy for finding traffic in the sun, it ought to be me,
but I don't- any secrets or tips from the Ancient Aviator?

Good Morning Bill,

No real good one! I carry one of those little rubber instrument covers with a suction cup on the back to cover the attitude gyro in case of a failure.

I will occasionally stick it on the windshield to cover the sun when it starts to burn holes in my eyeballs.

I also try to change my heading about five degrees left or right and then back the other way every two or three minutes to change the angle of closure with any traffic that is out there.

Trouble is, I then have to move my 'Sun Spot'!

The fighter jocks tell me that the better way is to use your thumb to cover the sun. That way you can spot the bad guys that are trying to hide in the sun before shooting you down!

Happy Skies,

Old Bob

[ARTICLES/20000624_093857_msg10049.tex]

Flap Setting

Thu, 8 Jun 2000 11:49:11

In a message dated 6/8/00 10:15:18 AM Central Daylight Time, JH722700@MSXSEPC.SHELL.COM writes:

If your bird does not have flap preselect (approach position), one can get a pretty good approximation by extending the flaps until they are parallel with a fully deflected aileron - i.e. yoke hard over and extend flap until flap and aileron are parallel. Then use speeds as above.

Good Morning Jack,

That will give a very accurate position for twenty degrees of flap. Ten degrees can be set by lining up the center of the big round washers on either side of the flap tracks with the trailing edge of the portion of the wing ahead of the flap. Fifteen would be halfway between.

Happy Skies,

Old Bob

[ARTICLES/20000608.114911.msg09339.tex]

Flap Setting

Thu, 8 Jun 2000 23:06:25

In a message dated 6/8/00 8:46:25 PM Central Daylight Time, johnmills@sprynet.com writes:

I like the decals that are on my flaps. Not so good at night.

Good Evening John,

Right on! Those are much more accurate than the gauge they used on the newer airplanes. I always set mine by looking at the flap first and then checking to see what the gauge reads. You can always use a flashlight at night if your confidence in the timing method slips.

Happy Skies,

Old Bob

[ARTICLES/20000608_230625_msg09370.tex]

Flying "Agressively"**Mon, 15 Nov 1999 21:52:28**

In a message dated 11/15/99 7:44:52 PM Central Standard Time, jfg@sylvania.sev.org writes:

Who of you out there would actually fly a V-tail aircraft, with a history of structural in flight airframe failure, to put it as one of you did, "aggressively"??

Good Evening Jeffrey,

Since I am the culprit who admitted to being an aggressive pilot, I guess it is up to me to comment. I think the important thing is to understand not only what the airplane is capable of but what ones own nature is!

If the aggressive pilot recognizes that characteristic of his/her nature sufficiently early to realize that it could be a problem, the problem ceases to exist.

My point was not that one would intentionally exceed any limits applied to the aircraft, but rather that aggressive personalities need to be more aware than others that caution and control of that aggressive personality is required.

As far as your statement: "a V-tail aircraft, with a history of structural in flight airframe failure" is concerned, the V-tail has a lower rate of in-flight air frame failure than many other airplanes. It is, in fact one of the safer airplanes available. The straight tail Debbies and stretch Debbies have an even more exceptional record and the design is to be commended, but that does not make the V-tail dangerous. Once again, any aircraft, not just the Bonanza, should be flown within the standards specified.

My Stearman is less likely to come apart due to encounters with poor technique than my Bonanza, but I'll still take the Bonanza for going places!

Happy Skies,

Old Bob

[ARTICLES/19991115_215228.msg10627.tex]

Flying a Proper Pattern**Thu, 8 Feb 2001 13:36:20**

In a message dated 2/8/01 12:50:23 AM Central Standard Time, gvasick@firstworld.net writes:

”After takeoff, climb on the extended runway centerline to within 300 feet of pattern altitude. At this point, you can continue straight ahead or make a 45-degree turn to the left (to the right if the airport has a right-hand pattern). If you will be departing to the right, wait until you are at least pattern altitude plus 500 feet before making a right turn, and be sure to advise on the CTAF.”

This seems reasonable to me.

George Vasick

Good Afternoon George,

Sounds reasonable to me as well.

There is something here that I think should be mentioned.

While there is a lot of confusion as to exactly what constitutes a proper pattern, I believe the pattern is still set by the owner/operator of the airport.

The FAA makes recommendation via the AIM and ACs, such as you quote, but the operator sets the procedure in which is then reviewed by the FEDs. I don't recall all of the precise language and procedures involved, but it is my recollection that the FAA neither approves or disapproves the pattern submitted. If they think it is outlandish, there will likely be discussions until there occurs a meeting of minds.

My opinion is that we should NOT try to force a standard pattern on all operators, but encourage everyone to realize that there may be variations that are a good idea due to local conditions that are not readily apparent to we itinerant operators.

I think poorly planned right turns out at a low altitude that could interfere with a pattern commonly used at an individual airport are ill advised. But there may be local conditions and procedures, of which I am not aware, so it behooves me to expect the unexpected.

Air traffic separation is a cooperative affair. Rules won't make it safe, people will. Standard procedures help, but vigilance and expectation of the unusual make it safer still.

Happy Skies,

Old Bob

PS And please don't expect all traffic to have a radio!

[ARTICLES/20010208.133620.msg03139.tex]

Flying a Proper Pattern**Sat, 10 Feb 2001 08:57:59**

In a message dated 2/10/01 1:35:04 AM Central Standard Time, esoteric5121@earthlink.net writes:

I thought I remembered being told (by an OOOLLLDDD CFI) almost 20 years ago, to always consider it a box around the runway, although we almost always enter on the downwind leg, conceivably, one could enter on the upwind, although most never do....was this wrong info?

Good Morning Paul and All

I mentioned this the other day but I will repeat it again.

The pattern is set by the local airport folks. There is no pattern that is the official FAA pattern.

They just make suggestions and will interfere only if the one chosen by the operator is deemed to be unsafe. Many operators have designated patterns that are designed to accommodate situations and aircraft which are peculiar to their individual operation.

I agree that a standardized procedure world wide would be nice, but let us not forget that we all need to be vigilant regardless of where we are operating.

A turn into traffic should not create an accident if we are all looking about as we should. (I'm not recommending it though!)

What we consider to be the absolutely best way to make a pattern is not likely to be what many other conscientious and careful pilots think is the best.

The "best" pattern is extremely dependent on the aircraft being flown and the operating environment in which it is being operated.

Communications at non towered airports are always suspect.

When you transmit, there is no way to make sure that all other aircraft in the vicinity hear what you say.

Communication only occurs when both people are listening.

No such interplay is required at a non towered airport.

Happy Skies,

Old Bob

[ARTICLES/20010210.085759.msg03360.tex]

Novel Method to Stop**Sat, 17 Jul 1999 21:14:45**

In a message dated 7/17/99 7:37:26 PM Central Daylight Time, Mavitor@aol.com writes:

I landed one rainy day and hydroplaned off the end. My neighbor cluck clucking said why didn't I use the differential thrust and spin the airplane around 180 degrees and then add power to stop it? I didn't think of that. He said he had done it twice in his E55 Baron, and his wife backed him up. BTW the houses and hangers were within 100 feet of the runway.

Good Evening Mike,

The maneuver you describe was commonly discussed in hangar flying sessions during W.W.II, specifically for use with the DC-3 and C-46. When I started flying the DC-3 in 1951, it was still considered a viable technique to have in one's bag of tricks.

I never saw the maneuver performed, but do believe I read of it being used by a DC-4 pilot once. I think it was in Alaska, but am not sure.

The major condition that most agreed was required for this to be safely done was a very slick runway surface so that excessive side loads would not be encountered.

There is more than one way to skin that cat!!

Happy Skies,

Old Bob

[ARTICLES/19990717_211445.msg06150.tex]

Operational Procedures**Mon, 26 Feb 2001 13:11:52**

In a message dated 2/26/01 11:06:18 AM Central Standard Time, tturner@vol.com writes:

sort of thinking that produced the "war emergency training" of WWII, but I/we taught/teach a technique that seems to work well for the majority of pilots. Individuals may of course choose to expand their techniques.

Good Morning Tom,

No argument at all!

I often end up with less than full flap on approach in many aircraft.

It All Depends!

On some airplanes during some conditions the use of full flap on the approach can be beneficial, but it is rarely required.

I just wanted to point out that retracting the flaps will not always result in a loss of performance. That is one of the Old Wives Tales that I like to refute.

Teaching a procedure that works for the folks and the equipment involved is not necessarily catering to the "war time expediency" brand of training, provided the students are not given inaccurate information as to the reasons behind adopting the procedure that is recommended.

Many of the procedures which were utilized in the everyday operations of the airline for which I worked, did not give us the absolute most optimum performance that was available, but they were procedures which were easy for the average crew member to remember and use. Those procedures were then demonstrated to the FAA. After the FAA gave their blessing, performance numbers were developed while using those modified procedures and the new performance numbers were the ones we used to routinely operate the airline.

Every now and then, a situation would develop where there was a need to get a little more performance out of the airplane than the "Canned" numbers would allow. When that happened, a special procedure was adopted, approved and used for just that particular problem. Needless to say, such things only happened when there was a major economic advantage to be gained.

An example would be takeoff weights at Denver in the summer time for La Belle Caravelle. On a hot day, we couldn't carry enough fuel to make Chicago with enough folks on board to make the trip worthwhile and still meet the stock accelerate/stop distances required after an engine failure.

Since the runway at DEN was relatively long, it was reasoned that the airplane could go to a speed well above the standard V1 speed and still stop on the runway remaining.

We could use less flap and be able to get a better rate of climb once airborne than with the standard flap in the event we had to shut one down.

Not only that, but by going to a higher speed on the ground than was optimum for the flap configuration we used for takeoff, we could lose an engine and use the extra speed to maintain altitude while the gear retracted. By the time the gear was up the speed would be near the speed required for the configuration we had and away we would go!

V1 would be well above V2.

The upshot was that we had a procedure called the Special Two Degree (or something near that, I don't remember exactly) Flap Takeoff At Denver Procedure.

The limiting factor was the approved tire speed. Our tires had a speed limit which was either 180 mph or 180 knots, I think it was mph, but don't remember that for sure either.

We would go into a chart and determine the airspeed at which we would have a ground speed of 180 considering the temperature and the forecast wind. I believe we used something like half the forecast wind for planning purposes.

From there we would determine the new V1 to be used. That then led us to another table which told us how heavy we could be and still be able to get the gear up in time to meet the required climb gradient with the reduced flap and one engine shut down.

Similar, though not as extreme procedures, were developed for reduced flap takeoffs in other equipment as well, but none were as dramatic as those used for the Caravelle.

Happy Skies,

Old Bob

[ARTICLES/20010226.131152.msg04656.tex]

Required Equipment for IFR Flight**Wed, 5 Jan 2000 11:54:15**

Good Morning All,

There has been a ton of information on this subject already and John Whithead had an early explanation that covered the legal requirements quite well so I wasn't going to comment further until Eric Poole pulled my chain!

From Eric Poole:

"This is one of any number of reasons why I have to disagree with Old Bob when he says you can replace so much other stuff with a GPS."

My position is one of educating the group as to what can be done, not what any individual should do.

All that is required for IFR flight in the United States National Airspace System is a navigation device pertinent to the route to be flown and communications capability along that route.

That leaves it up to we aviators to determine what we need for any individual flight.

For most IFR flight in the lower fortyeight, one VOR will do the job for navigation and one 720 channel comm will suffice. As a practical matter, many fewer channels would likely work as the controllers are quite cooperative in assigning a frequency which you have, but the FEDs have stated that they MAY assign any of the frequencies of the 720. The other forty frequencies in your 760 channel set are currently used for "Company" uses.

If I were planning an IFR flight with nothing more than the bare minimum equipment available, I would operate so as to always have a VFR alternate. Getting by with just a VOR would restrict the number of airports that I could use for a destination but would cause few problems enroute except if I wanted to fly in those areas which require a transponder.

If I add a transponder there is almost nowhere in the US that I could not fly IFR. My destination would not even have to have a VOR approach provided that I name an alternate that does have one which I could execute with the single VOR.

Now let's look at this a little further. If I add an ADF, DME, ILS, and a GPS, I could add the capability of arriving at my non VOR equipped destination when somewhat less than VFR conditions prevail.

Just what capability I would have would be dependent on just how much of the equipment installed in my aircraft was working.

How many flights do any of us make where the weather is less than VFR (1000/3) at our destinations?

I am sure that, for my operation, I could complete at least 95 percent of them as planned with nothing but a single VOR! Your mileage may vary.

If you wish to add a little more IFR flexibility, you can add more capability per dollar by adding one IFR approach approved GPS than with any other single expenditure for new equipment. What you can do on the used market is dependent on your scrounging ability!

I don't think you have ever seen me recommend that anyone take out any equipment from their aircraft that is still operating and/or provides a unique service to their circumstance. As an example, if you fly regularly to Canada or South America, you might want to have an ADF. It is required for IFR flight in northern Canada and is handy down south. If you plan to fly in those areas only VFR, it is a different ball game.

The GPS is a legal and safe substitute for the ADF and DME in the US National Air Space. It does require a current datacard to be used for that purpose.

If you are planning a flight to Greater Podunk International with a non GPS equipped aircraft and all of the approaches there require the use of a DME, what do you do if the DME quits?

Well, it depends!

If the weather is above the local vectoring minima, advise the FEDs and press on! If you can't get visual by the vectoring minima, you divert to your alternate.

The same thing goes for me if I am charging along in my single VOR, single GPS machine. If the GPS quits, or my card is out of date considering my approved airplane flight manual supplement, I either get visual at the minimum vectoring altitude or go to my alternate. At least ninety five percent of the time, my flight wouldn't be affected in any way!

Many others have commented on the practicality of flight with an out of date datacard.

It would take a very unusual combination of circumstances to make me cancel a trip due to an out of date card.

John Galt and others have commented on the poor performance of Jeppesen and the need for another competitive source.

It is my not so humble opinion that Jeppesen service has been gong downhill for several years.

Competition would be nice!

So far, the competitive products that I have looked at did not provide a service that I felt was cheap enough to put up with the lower quality product.

John feels that Jepp has a monopoly on the navdata card service. That may be so, but it is a natural monopoly in that no one else seems to want to provide the service!

There is nothing to stop anyone from entering the field. Why don't some of you young whippersnappers take up the gauntlet and provide that competitive service?

Considering the low number of cards currently purchased by we users, I doubt if it is a money maker for Jepp!

Happy Skies,

Old Coot Bob

[ARTICLES/20000105.115415.msg00249.tex]

Routing/Clearences and Aircraft Heading**Sat, 26 Aug 2000 10:19:58**

In a message dated 8/26/00 8:09:04 AM Central Daylight Time, Txgroup@home.com writes:

Not having the experience most on this list have, I have been filing "A" flight plans using published sids,stars and airways. So far I have not embarrassed my self too bad grin

bob stephens

Good Morning Bob,

It sounds to me as though you are doing just fine!

Keep up the way you have been doing things and gradually add direct requests as you gain experience with the system. In most cases, the controllers actually prefer that you fly random routes. It helps the overall system work more efficiently.

I use my GPS as the primary source of navigational information almost all of the time. Most often, I will use the DUATS generated low altitude airways when I file, but I list my flight as a /G. I find that downline direct clearances are generally offered before I even ask for them. I like to have a flightplan on file that is consistent with the FAA preferred routings plan. While they are not heavily used all of the time in all parts of the country, it gives me a written plan to default to should my equipment fail or the GPS system be deactivated for some reason.

On longer flights, I will often have a specific routing other than a direct course that I would like to fly for operational reasons. That may be due to a desired pressure pattern flight, weather avoidance, terrain considerations or merely for sightseeing. In any case, I will choose points along that route to have handy when I do request direct routings other than the low altitude airway which I have filed. I find that it is sometimes advantageous to evaluate how many times a direct route will go in and out of a particular center airspace when flying along the edge of center boundary. I try to make my routing one which will take a minimum amount of coordination between two adjoining centers or sectors.

If I am flying an airplane that does not have an approved IFR GPS installed, I file the slash letter that is appropriate for the equipment that is installed in the airplane. No cheating of any kind.

It does sometimes help to add in the remarks section that you have a VFR GPS or Loran aboard. Or you could just say that you have direct flight capability. Unfortunately, all of those remarks do not always make it to the controller who is handling your flight. Procedures for handling the remarks vary from center to center and even vary among the controllers who are transferring the data.

I do have a problem with using the wording 'heading' for any other purpose than to

describe the way you are pointing the flying machine.

A line between two points is a course, not a heading. The course made good is a track, not a heading.

If the controller assigns me a heading, I will hold that heading until I am cleared to do otherwise. To do anything else could compromise the controllers planned spacing. If you adjust the heading to make good a desired track, you are not complying with the controllers instructions. If the controller tells you to maintain a heading until able to proceed direct, then you can adjust the heading to maintain a track which will follow your course to the next waypoint as soon as you have the waypoint loaded and checked for reasonableness. It is appropriate to advise the controller when your are capable of, and do decide to, proceed direct rather than fly the heading originally assigned.

It is not unusual to have a controller ask what my heading will be to a waypoint to which I have requested a direct routing. I always answer with the statement that my INITIAL heading will be XXX.

The heading to maintain a track will change not only with speed and wind, but with magnetic variation and northerly (in this hemisphere) convergence errors.

The magnetic delineation of a course will vary along that direct course due to variation and divergence factors.

Be careful how you use the term heading and question the controller as to their meaning when they use the term. If you wish to make some remark in the flight plan document when you file concerning a course you intend to fly, be sure to delineate it as a course and not as a heading.

Happy Skies,

Old Bob

[ARTICLES/20000826_101958_msg12608.tex]

Routing/Clearances and Aircraft Heading**Sat, 27 Jan 2001 20:44:31**

In a message dated 1/27/01 6:25:08 PM Central Standard Time, KR2616TJ@aol.com writes:

Interesting. I always reply with course rather than heading. Which the controller knows anyway from what you are saying. Sort of defeats the exercise I guess. Maybe I should reply, Course 066, heading 09? g

Interesting, I was thinking the same thing today on my flight back home. The winds were pretty strong. I just read about controllers trying to figure out the winds in order to give you headings in this months IFR (which I highly recommend). The controller in Cincy turned me a couple of times and I used the GPS to cross reference the compass and DG. I ended up settling on the ground track. Now, my question, am I messing with the controller here?? What do you think Scott?

Dana Overall Richmond, KY

Good Evening Dana and All,

I guess you all know my feelings about the legality of flying direct via the controllers authority while navigating via IFR or VFR GPS, but there is a comment I would like to add to the discussion.

We all tend to be a little loose with our definitions. When you are asking for, or accepting, a clearance from an Air Traffic Controller, it is important to make sure that you are both on the same wavelength.

The words Heading and Course have very different and distinct meanings

Should the controller tell you to maintain a heading of 270 degrees for vectors to Podunk City, the heading is to be held until you hear otherwise. I think we will all agree on that.

If the controller clears you direct to Podunk City and asks what your heading will be, there is some room for confusion. My answer to that question is always some version of the following. "Bonanza N20318 is proceeding direct to Podunk City. My initial heading will be 250 degrees to track 270 which is the current course to Podunk City."

Unless you are directly north or south of your destination and there is no change in variation along your course, the course angle will change as you fly along the great circle from your present position to Podunk City. Of course, the heading required to hold that course will change not only due to convergence errors and magnetic variation, but because of changes in wind and speed.

If the controller tells you to take up a heading of 270 and proceed direct to Podunk City when able, you are cleared to determine the track to Podunk City from your present

position and change the heading to follow that track as soon as you have the information available.

If you request a heading of 270 to Podunk City, what is it that you want to do? Are you asking that you be allowed to hold a heading of 270 degrees? If that is so, how long do you intend to hold that heading?

If a controller told me to take up a heading of 270 degrees and proceed direct to Podunk City, I would consider that to be an improper clearance because I would have been asked to do two conflicting things. That would elicit a query from me to ascertain precisely what he wanted me to do. It might take this form. "Ok, Bonanza N20318 is cleared direct to Podunk City, I can proceed direct at this time. Do you need me to hold that 270 for traffic or can I proceed direct now."

There are two basic rules, both of equal importance. Always tell the truth. Make sure you and the controller both have the same interpretation of what you are expected to do.

If in doubt, ASK!

Happy Skies,

Old Bob

[ARTICLES/20010127_204431_msg02018.tex]

T&B vs. Turn Coordinator**Mon, 18 Sep 2000 18:05:44**

In a message dated 9/18/00 2:41:01 PM Central Daylight Time, jlfisher@flighttech.com writes:

To me the TC made it simple because I could see what the wings were doing, I didn't have to watch a wiggling stick and convert that to wing attitude. The ball was still telling me the information I need as to whether I am skidding or slipping.

Good Afternoon Joe,

I am sure you are comfortable with what you are doing or you wouldn't be doing it. Just remember that the Turn Coordinator does NOT tell you what the wing is doing. It will NOT tell you if they are level or not.

If the airplane is in perfect rig, perfect trim and if it is not turning, the wings are likely to be level, but if there is some force which makes it either desirable or necessary to fly other than with the wings level, the TC will not show the true position of the wing.

All it is capable of determining is if the airplane is rolling or yawing. If the airplane yaws, the TC will show the wing as being down whether it is or not. If the airplane rolls it will show exactly the same indication as it would if the aircraft yaws.

There is absolutely no difference in an indication of a roll or a yaw on the TC.

The TC will show roll or yaw, but it will NOT show wing position.

I realize you are currently operating a single engine airplane, but I would like to mention a case in which the TC would show the wings as level and yet they would not be so.

If you are flying a twin, single engine, and have determined that the best performance in your current configuration is with the dead engine carried five degrees high, the TC would show wings level anytime that the aircraft is not turning or rolling. If you were flying straight ahead, the wing was five degrees high and the airplane was not wobbling from side to side, the TC would show a wings level indication.

The method you are using to determine whether or not the wings are level is to watch your TC until it shows no yaw or roll and then you assume that the wings are level. In most cases, that will be a reasonable assumption, but it does not emphasize what I feel is the most important feature of maintaining complete control of the aircraft.

That is: Stop the turn and you will have the best chance of surviving long enough to sort things out.

The vast majority of us will never be in that panic state where we are not sure which way is up. We train and practice regularly to assure that we don't get in such a predicament. I trust that you never will and I certainly hope that I never will, but it does happen and I am sure that all of those to whom it has happened felt that it couldn't happen to

them.

There have been very few accident reports that I have read where I had not made a similar mistake, but in more favorable circumstances. I hope if there is one thing I have learned is that if it can happen to anyone, it can happen to me.

No one needs to know how to make a crosswind landing if he or she can be certain that they never have to land in a crosswind.

No one needs to be able to determine which instrument has failed if they never have an instrument failure.

No one needs to consider how they will handle panic if they never encounter panic.

Happy Skies,

Old Bob

[ARTICLES/20000918.180544.msg13683.tex]

Tail Wiggle**Mon, 26 Jan 1998 18:05:18**

Good Evening Ernie,

In a message dated 98-01-26 16:06:51 EST, you write:

Feet come off the floor on the decent for manuevering, but I don't use much rudder input to keep the ball centered until I get up to or greater than standard rate turn banks.

Yeh, I know I am something of a nut on using the rudder but I really do think it helps dampen any swinging tendencies and that aileron does just the opposite, it makes the wiggle worse. I always figured that on most airplanes, not just the Bonanza series, that keeping my feet on the rudder pedals makes the rudder a fixed surface and therefore doubles the amount of vertical surface that is dampening any yaw from whatever source.

We stopped to see Jim Younkin at his shop in Springdale Arkansas a little over a year ago and he told us he had developed a yaw damper for his Mr. Mulligan. Since he was the brains behind the Century autopilots, I expected to see an electronic marvel on the aircraft. What he showed us was a device that merely held the rudder from moving through a unit with adjustable tension. He could release it at will or adjust the tension so he could override it as necessary. He said it made a tremendous difference in the stability of the airplane. The cost was nil, just some scrap aluminum and a couple of pieces of leather held together with a few screws and bolts.

He told us he was planning on using the same system on his Mullicoupe.

I don't pretend to be any better at dampening the swings than the next guy but I have had many friends comment that my Bonanza does not seem to swing as do most other Bonanzas that they have ridden in.

I think the spring interconnect on the Beech provides something of what Jim has done, but input from the aileron to pick up a wing causes drag which acerbrates the yaw and makes things enough worse that even the additional stability gained from the somewhat stiffer ruddervators or rudder can't overcome the additional yaw caused by the aileron input.

In the late forties there was a little mimeographed sheet of instructions that was handed out to Bonanza salespersons concerning methods of alleviating any yaw which might develop in choppy air. It was suggested that the airplane be flown using just a little bit of cross control, a little bit of rudder and a little bit of opposite aileron.

The theory was that such a procedure would create a little drag and stop the wiggle the way a drogue line stabilizes a boat. I think the improvement was just from not letting the ruddervators move!!

That is what I have taught for the last fortyfive years and those who I am able to convince seem to make it work.

What say you?

Bob

[ARTICLES/19980126_180518.msg00532.tex]

Tail Wiggle**Tue, 27 Jan 1998 09:19:34**

Good Morning Bill,

In a message dated 98-01-27 00:58:44 EST, you write:

If one applied this thinking to the sides of the fuselage, then there might be a 3-9" range through with the tailcone could oscillate before forces rise and push the fuselage back toward streamline.

Thoughts all you aerodynamicists out there?

I certainly am not an aerodynamicist BUT! I have always thought the wiggle on the Bonanza is primarily a function of the slab sided fuselage. It seems that every slabsided airplane I have ever flown has the same characteristics only with varying periods of oscillation. It certainly could be that there is an area of displacement that the fuselage could wiggle in before the lift characteristics made the nose swing the other way, but the action of the Beech airplanes seems to be almost instantaneous.

One airplane that I have noted would fly comfortably sideways is the Cessna 195. You can cross control a little bit and the thing will just sit there. Without any change of trim, move it over to a small cross control in the other direction and it will sit at that position. The ball can be a sixteenth of an inch or more out of the center without the airplane wanting to straighten itself out.

The other factor is the taper of the wing. The forward moving wing increases it's lift in relation to the aft moving wing and that of course increases the drag. That might cause the extreme stability of the Beechcraft even if there was a breakout effect on the fuselage.

It has always seemed to me that a Bonanza (even one out of trim) will exhibit an immediate desire to get back to it's trimmed condition if displaced. If there were a dead area with slight fuselage yaw, wouldn't the airplane just sit there like the 195?

The 195 has some taper to the wing also, but doesn't seem to exhibit the same stability.

I feel that the Bonanza does not wiggle due to any lack of stability but due to the extreme inherent stability of the design with relatively light damping.

I do feel that if I spend almost all of my attention to dampening the yaw I can do slightly better than just holding the rudders from moving.

The procedure I use and have taught to others with varying success, is to pick only one side to work with, not both. If the nose swings to the RIGHT, I apply a small amount of RIGHT rudder. It is going to start back on it's own due to the extreme stability of the design. All it needs is a little dampening of the return swing. Along with the rudder I apply a little left aileron to reduce the wing drop from the nose swinging to the right. As the nose returns to neutral the pressures are released.

If the nose swings to the left I wait for it to go to the right and then correct as before.

I may well be kidding myself that it works, but it seems to me it helps. Just holding the rudders from moving and resisting the temptation to use the aileron seems to work almost as well and is a lot easier!

I have to put in a small aside here. (Well maybe not so small!)

In the spring of 1968 I was checking out as a Boeing 720 captain and the company I worked for was recommending a yaw damping procedure that was different than the one Boeing used. Our company procedure was to use a whole lot of control wheel input so as to get major spoiler input with a relatively small aileron effect. The Boeing recommendation was the same as the one I had been teaching my Bonanza students only the motion was slow enough that it was relatively easy to work both sides.

The company approved of either, but my instructor was a believer of the company method and was pushing me to use it. During my check ride with the FEDs I was given the unusual attitude recovery. The instructor really got the old Boeing wiggling. I used the normal Bonanza technique and it stopped in one oscillation. The instructor said I must have been peeking and said to make sure my head was down and eyes closed and not to peek and he really worked at wiggling the old cow around and did several iterations to get my senses confused. When I was given the airplane, same deal, stopped in one oscillation. You could tell the instructor was getting peeved. Finally the FAA check pilot who I had never met before and who had no idea of my background, spoke up and said: "You can spot those Bonanza pilots every time, they never have any problem with swept wing yaw." I found out later that the inspector had a Bonanza himself and he used and taught the same technique as do I.

Before I leave this I must mention that Boeing changed it's mind and went to the spoiler method as the recommended recovery technique the same as my company did. The problem was that if one hit the wrong rudder during the recovery effort the airplane had a tendency to roll on it's back and sling off an engine or two. The spoiler recovery technique didn't work as well but was more forgiving. Doesn't seem to be a problem with the Bonanza.

I have relatively little experience with different electronic yaw dampers. I installed one on my airplane about eight years ago and have flown with it some 1200 hours. Seems to work fine. When I installed it, I noted with dismay that if the nose swings to the right, the yaw damper inputs left rudder. I called the factory to see if this was the way it was designed and was told yes that is what they intended.

After test flying the installation I did feel that it worked OK. I timed the rudder inputs and found that the input is slow enough that the rudder isn't effective until the nose has swung back the other way. In other words, it is one half swing behind what I would be doing were I flying it by hand (or FOOT?).

Maybe all it is really doing is holding the ruddervators from swinging? In any case, it works! (Jim Younkings deal is a LOT cheaper).

Didn't someone say that one experiment is worth a thousand theories?

What say all of you?

Happy Skies,

Bob

[ARTICLES/19980127_091934_msg00545.tex]

Tail Wiggle**Sat, 18 Sep 1999 10:53:57**

In a message dated 9/18/99 7:54:00 AM Central Daylight Time, RSBELOVICH@aol.com writes:

I was taught that manual yaw dampening of a Bonanza can be accomplished by putting one's foot over both pedals. I have found this technique works pretty good, until my foot begins to tire.

Do you know of any other techniques for manual yaw dampening?

Good Morning Bob,

The method you have been taught is one that works well.

The first thing to consider is, "why does the nose wiggle?"

The Bonanza has a tapered wing and a slab sided fuselage. These two characteristics provide a very strong stabilizing input when the aircraft is displaced from straight flight, so strong that the nose generally will swing beyond straight ahead when the natural directional stability of the airframe corrects for any adverse displacement.

The more vertical component there is to the tail feathers, the more that correction effect will be dampened.

Forget the V tail for a minute and just think about one of those funny looking inverted T tails that are mounted on so many of the worlds aircraft. Let's also eliminate the spring interconnect of the controls from our thoughts.

If the tail of the aircraft is displaced from the faired position and the rudder is free to swing, there will be little or no stabilizing effect from the rudder. If the rudder comprises half of the area of the vertical surface there will be approximately half as much stabilizing effect with a free swinging rudder as there would be if the rudder were held in a fixed position.

Just fasten the rudder pedals so that they can't move, and the dampening effect of the tail surfaces is increased dramatically.

Next, consider the aileron independently.

If the nose should make an adverse swing to the right and left aileron is input as an effort to correct that swing, the adverse yaw induced by the differential action of the aileron will initially add a force that will cause the nose to be displaced to the right for an even longer amount of time and add to the adverse wiggle. Then, as the nose does respond to the force of the taper wing and slab sided fuselage, if the aileron is placed to neutral, the adverse yaw which had swung the nose further to the right will be eliminated and the nose will swing even harder to the left than it would have had no aileron been input. Were right aileron input at that time, the wiggle would be made even worse.

So the easiest way to reduce any undesired wiggle is to lock the rudder pedals and keep your hands off the aileron!

If just that were done, we would have many fewer upchuckers in seats 5 & 6!

Now, if your psych is such that you just have to be involved in the control of the aircraft, there are some things that can be done to improve slightly on the technique of just locking it up and leaving it alone.

When the Bonanza was first delivered, there was a little sheet of suggested demo techniques that was distributed by Beechcraft to their dealers. In that document it was suggested that the aircraft be flown slightly cross controlled during flight in turbulent air, that is hold a little right aileron and a little left rudder or vice versa.

That was described as providing a little drag which would stabilize the flight in the same manner as would trailing a drogue from a boat. Note that their suggestion was to hold that input solid, and not to attempt corrections!

If you want to be involved even more, pick one way or the other to work on. That is, decide to correct swings to one side and not the other. Let us say we will attempt to dampen any swing of the nose to the right, but we will ignore the swings to the left.

When the nose goes to the right, input a little right rudder. We already know that the natural stability of the airframe is going to bring it back to the left, so all that is required of us is to slow down that leftward swing by a small judicious application of right rudder.

That small right rudder input may drop the right wing just a bit, should a little left aileron be input to keep the wing from dropping excessively, fine, that will add a small additional right turning force which will help dampen the return swing to the left.

The method described in the last few paragraphs is exactly how the current crop of electronic yaw dampers control the aircraft except they don't add the little bit of aileron. (That isn't one hundred percent true, as a little bit of improper aileron force might be applied by the interconnection of the controls, but if one is hand flying the aircraft the undesired input from the yaw damper will likely be resisted by the pilot and if the autopilot is connected, that undesirable input will be countered by the roll servo.)

The timing of the input to the rudder servo is such that when the nose is displaced to the right, a LEFT rudder input is commanded, BUT, the yaw damper is slow enough to react such that the rudder is not effective until the nose has swung back to the left and the left swing return, not the right one which initiated the input, is dampened by the action of the yaw damper!

The yaw damper is thus one half wiggle behind the method suggested earlier in this lengthy dissertation!

Trust me!! The yaw damper will do a better job than even the most attentive pilot the vast majority of the time.

Nevertheless, just placing your feet on the rudder pedals and holding them still while resisting any urge to input aileron will provide almost as good a ride as will the electronic yaw damper and it is a whole lot cheaper!

The absolutely worst advice that can ever be given to any pilot is for them to fly the Bonanza with their feet on the floor and let the interconnect take care of the rudder.

If a pilot is to use only one of those two controls, aileron or rudder, it would be best if it was only the rudder.

The wiggle characteristic is not limited to aircraft equipped with V tails. There were some independent evaluations done by somebody a few years ago which showed that the model 33 had slightly better dampening characteristics than the 35 but that the 36 wiggle was almost the same as the 35. There is more vertical component to the 33 than to the 35 tail. The 36 has as much vertical component as the 33. The tail is the same distance from the wing, but the propellor is ten inches further forward so it provides a destabilizing effect that results in wiggle characteristics approximately equal to a late model 35. The early 35s had less surface area mounted at a slightly different angle and therefore slightly less vertical component.

I don't have documentation of this testing and so can't point to an authoritative source. I am hoping that one or more of the participants to this list are aware of that source and will let us all know where it is!

Happy (hopefully, wiggle free) Skies,

Old Bob

[ARTICLES/19990918_105357.msg08602.tex]

Tail Wiggle**Tue, 26 Sep 2000 20:16:11**

In a message dated 9/26/00 3:18:15 PM Central Daylight Time, parks@ithaca.edu writes:

One of the characteristics of this aircraft that I am not wild about is it's tendency to yaw in turbulence. Much of this yaw can be taken out by putting pressure on both rudder pedals.

Good Evening David,

We would like to welcome you and your wife to the list.

I would hope that you are a member of the American Bonanza Society. It certainly isn't required, but there are many benefits of such membership to a Bonanza owner. If you have not already done so, it would also be a good idea to get the CD that ABS offers which contains all of the newsletters ever issued and a whole lot more information pertinent to the operation and maintenance of your Bonanza.

There have been many conversations on this forum concerning the Bonanza wiggle. Your method of holding the rudder pedals from moving helps a lot. There are other things that can be done as well.

The main thing is to think heading, not roll, and use the rudders to hold a heading, not the aileron. Finally, if the nose yaws to the right, DON'T give it left rudder to bring it back. The Bonanza wiggle is a function of the extreme stability built into the airplane. It will bring the nose back on it's own. In fact, it will bring the nose back too fast and your reaction should be to add a little right rudder to dampen the return swing.

Got that? If the nose swings to the right, use a little right rudder to dampen it's inherent return. Be sure to avoid any aileron input and ninety percent of the wiggle will be gone.

Having said that, I do have an S-Tec yaw damper and find it quite useful. It isn't any better, and maybe not as good, as a well schooled Bonanza pilot, but it never gets tired or distracted and does a very good job. The trouble is that it is rather expensive and it does add weight where the Bonanza does not need it!

Once again, welcome aboard!

Happy Skies,

Old Bob AKA Bob Siegfried Ancient Aviator

[ARTICLES/20000926_201611_msg14080.tex]

Tail Wiggle**Thu, 16 Nov 2000 10:09:55**

In a message dated 11/16/00 7:25:38 AM Central Standard Time, MikeM86949@aol.com writes:

They both have the "fishtail" which can be controlled by holding my feet on the rudders. But the V35B definitely seems to fishtail more. Now the F33 is longer than the C33 but that would improve it, right?

Good Morning Mike,

I haven't looked up the specifications to see what Beech or Raytheon says is the length of the C33 or the F33, but I am confident that the only differences in length between the two has to do with appendages to the airframe. Such things as spinners and tailcones. The length of the airframe itself is the same for all of the 35 and 33 models from 1947 on to the bitter end. The top of the swept back rudder on the 33 series extends back somewhat further than do the tail feathers on the "real" Bonanzas making any representative 33 longer than any similar appendage equipped 35.

The Model 36 Stretched Debbie is ten inches longer in the airframe, but that distance is all forward of the wing and since it sticks the nose out further, it is a destabilizing factor. The distance from the wing to the rearmost point of the fuselage structure, without a tailcone and discounting rudder overhang, is the same as serial D-1 delivered in 1947.

I don't have any scientific data to back up my opinion and I am prejudiced toward the real Bonanza, but my perception has been that the 35s do have a wiggle if the pilot tends to fly with his/her feet on the floor instead of those little metal things that clutter up the front floor.

The 33s have the same wiggle, but I feel it is slightly dampened as compared to the 35s. The Stretch Debbie seems to me to wiggle about the same as a Bonanza, but at a slightly lower frequency.

All three aircraft, the Bonanza, Debonair and Stretch Debbie are slabsided and have tapered leading edges on the wings. Those characteristics make the airplane so directionally stable that when the nose is displaced in yaw, for whatever reason, the effect of that highly directionally stable force will yaw the aircraft back so fast that it swings beyond neutral. That is the source of the wiggle. It can be dampened by adding more vertical surface or by actively opposing the adverse yaw.

More vertical surface can easily be added to all of the aircraft by merely holding the rudder pedals from moving. That effectively allows more fixed vertical surface to oppose the wiggle.

Dynamically activating the rudder to oppose the swing and stop the wiggle is much more complicated and can easily deteriorate into a bad pilot induced oscillation.

The electronic yaw dampers that are available do an admirable job of damping the

wiggle, but are expensive and add considerable weight.

I have described my method of manual yaw damping many times before, so I won't repeat it here. Just remember that it can be minimized by keeping the rudder from moving and resisting the urge to try to fly the airplane with aileron. If only one of the two, rudder or aileron, is to be used, it should be the rudder, NOT the aileron.

Happy Skies,

Old Bob

[ARTICLES/20001116_100955_msg16327.tex]

Touch & Go's**Mon, 16 Oct 2000 09:58:52**

In a message dated 10/16/00 7:10:08 AM Central Daylight Time, tturner@vol.com writes:

On sufficiently long runways, when the pilot has landed without using too much runway, and when there is no traffic behind me to rush the reconfiguration, I have no problem with stop-and-goes as a means of speeding up the training process.

Good Morning Tom and All,

First, just a small comment on the above paragraph. I assume you meant for the above technique to be used at a tower controlled field.

Since I am one of those throwbacks who still regularly operates a no radio equipped airplane, I like to emphasize that any operations at a non tower controlled airport should be conducted with the thought that there might well be traffic of which you are not aware regardless of your diligent and correct use of the Common Traffic Advisory Frequency!

As I read through this weeks accumulated messages, I note that the Touch and Go controversy has once again reared it's ugly head.

I thought we beat that to death a year or more ago!

As you know, I am in your camp when we discuss touch and go operations. I see absolutely no training benefit for using the technique.

For primary or transition training where the student is attempting to assimilate attitudes, closure rates, pattern planning, flares and all of the multitude of little things that make for a good approach and landing, I feel that the landing should be completed, the aircraft should be taken clear of the runway and the preceding approach and touchdown debriefed either by the pilot him/herself when solo or by the instructor when one is aboard.

It has been my experience that more actual beneficial training will occur per hour of time spent when doing it that way than when the emphasis is on how many landings can be performed per hour.

When the only reason for making the landings is to comply with the rather useless FAA requirement of three bounces before carrying passengers, there could be some justification, provided that the qualifying pilot really does not need the training or the practice landing.

Even if that is the case, it has been my experience, when I was operating a fleet of training aircraft, that the engines lasted longer and had fewer cylinder problems once we had eliminated the routine use of touch and go landing from our operation.

The flight training time to train to proficiency did not increase at all. In fact, there was some evidence that the students were achieving proficiency in less time even though fewer landings were involved. The time spent contemplating the last arrival and the next departure more than made up for the fewer landings per hour.

I never do a touch and go if there is any other practical way of handling the situation.

I do think there is benefit in training to make an aborted approach, but that is whole different subject!

Happy Skies,

Old Bob

[ARTICLES/20001016_095852.msg14901.tex]

Touch and Go's**Fri, 27 Aug 1999 20:15:46**

In a message dated 8/27/99 7:22:59 AM Central Daylight Time, tturner@vol.com writes:

Personally (opening myself up for criticism, to be sure), I do not do touch-and-goes with students in retractable gear airplanes. This is the main reason I do not.

Good Evening Tom,

For what it's worth, I don't do touch and goes in ANY airplanes, J-3s included. I started that policy when I was running a 141 school and we were not getting our Musketeers anywhere near TBO.

After establishing the no touch and go policy, we easily made TBO with all of our trainers.

Some of the students and instructors complained at first, but after a few months, most all agreed that the time spent during the taxi back to evaluate the last time around the field was worth more than the extra landing or two per hour that could be gained from a T&G.

If anything, the students progressed faster after we eliminated the touch and goes.

Been doing it that way for at least twenty-five years now. Works great!

Happy Skies,

Old Bob

[ARTICLES/19990827_201546_msg07415.tex]

Touch and Go's

Sat, 28 Aug 1999 02:03:59

In a message dated 8/27/99 8:40:04 PM Central Daylight Time, rcb@appsig.com writes:

Why was that?? A take-off is a take-off, so why would the engine care whether there was a longer pause for the taxi back vs the touch n go?

I don't really know, but it worked! I think it was because the engine had a chance to stabilize at a warmer temperature while taxiing back than it had during the glide just before landing. That is merely conjecture on my part though. We still did training for go arounds and that has to be the worst case of all for the engines, from a cooled down glide immediately to takeoff power. The number of go-around was very few in relation to the number of normal landings and I guess that made the difference.

Happy Skies,

Old Bob

[ARTICLES/19990828_020359_msg07433.tex]

Use of Flaps

Thu, 27 Jan 2000 16:37:54

In a message dated 1/27/00 12:58:55 PM Central Standard Time, rcb@appsig.com writes:

A former BPPP instructor, Pat Groves, advised me to extend the flaps to half or more if I were going to maneuver below 90 kts in my F33A. In other words, don't go below 90 kts without some flaps.

Bob Briggs

Good Evening Bob,

If you read what I wrote earlier, you will find my recommendation. I would determine the maneuvering speed for the weight that exists by using 150 percent of the stalling speed. That is a very conservative maneuvering speed. Some folks recommend maneuvering speeds as low as 130 percent of stalling speed. For most Bonanzas most of the time, even clean, the airplane would be safe at 90 knots. Some of the heavier 36s would require some flap to maintain the 150 percent criteria. Your airplane at 3400 pounds has a clean stalling speed of 53 knots power on and 64 knots power off. I would say that you could safely maneuver clean most of the time, though I would personally use some flap to fly below 90 knots.

Don't just take my or any one elses recommendation. Look up the speeds and determine the speeds for yourself!

There is a vast difference between light and heavy weights.

Happy Skies,

Old Bob

[ARTICLES/20000127_163754_msg01872.tex]

Use of Flaps

Thu, 17 Feb 2000 15:00:06

In a message dated 2/17/00 1:26:09 PM Central Standard Time, jtsmall@onramp.net writes:

Good location imho. In thinking this through setting in the cockpit it seemed to me that putting them further out makes for less head swiveling during a critical time of the flight. However the further out the less visible during night and IMC. Now that you've found this location to work for you I'm going to put mine there.

Good Afternoon John,

I don't want to mislead you. My current airplane does not have markings on the flap, it has a gauge. I never bothered to put the markings on airplanes of my own when I did have aircraft which had originally been so equipped.

That is just where I placed them if folks wanted them!

I rarely use the gauge on the one I have now.

I extend my flaps for takeoff by looking out at the left outboard flap track area.

When the trailing edge of the main portion of the wing lines up with a sight line between my eyes and the screw in the center of the big round washer located on the flap on each side of the flap track, the flaps are at ten degrees (my normal takeoff setting).

If I want twenty degrees of flap, I will roll the aileron to full right and position the flap so that it's upper surface is parallel to the left aileron upper surface.

On that very rare occasion when I might want to use full flap for takeoff, it's a no-brainer!

For in-flight flap use, I extend the flaps by feel.

I rarely use anything but full flap except when I am shooting an instrument approach. I will then extend them so that the combination of drag and desired airspeed will require a power setting with which I am happy. That is done strictly by evaluation of the conditions that prevail!

Not much help I guess, but that's the way I do it!

Happy Skies,

Old Bob

[ARTICLES/20000217.150006.msg03073.tex]

1.3 AIRMAN-SAFETY

Airframe Ice

Tue, 9 Dec 1997 02:09:31

Hi PeterO

In a message dated 97-12-09 00:55:53 EST, you write:

Does anyone have any icing wisdom they might share (other than "stay out of it") especially those with hot props etc?

Just a couple of comments to start things off.

The condition in which you picked up your ice is a common place for relatively rapid accretion. Right in the tops of strato cumulus clouds and temperature near freezing. The last twenty or thirty feet before breaking out on top is often the only ice in the cloud.

It is one thing of the things to consider if you are in cloud a thousand feet or so below the tops and picking up a little ice. The old admonition, "if in doubt climb, you can always come back down." may not be the best alternative. One should evaluate whether or not the climb rate at the altitude necessary to get on top will withstand a considerable increase in ice accretion rate as you pass through the last hundred feet or so of cloud.

Another thing we were taught in the days of the DC-3 was that we could expect the most rapid ice build ups during flight with temperatures between 25 and 35 degrees F. Remember that the ram air heat rise on the OAT probe at Bonanza cruising speed and OAT near freezing is 5 or more degrees F, so an indicated OAT above freezing may well mean a free air temp below freezing. When the air is below 25 degrees F, the cloud is most likely ice crystal and not as likely to cause a rapid build up, though supercooled water droplets may occur below zero F in some rare cases.

The highest accretion rates are generally in cumulus clouds near mountains or rapidly rising terrain. It doesn't last long but can build up very fast! Stratus and stable clouds tend to have the ice in specific layers and changing altitude will usually help. It is not unusual to climb out of one cloud deck into another without noticing that you are doing so unless the temperature is monitored. The "top of cloud" icing effect may be encountered during that time.

When flying in the lee of lakes in the midwest, a change of twenty or thirty miles to parallel the lake shore, but further away will often eliminate the ice. An example: If east bound trips ahead are icing up over Cleveland, flights that go over Akron will often be ice free. Sometimes the opposite is true. The most accurate statement that can be made about ice is that "ice is where you find it". Forecasts are notoriously inaccurate and most icing is rather localized, either vertically or horizontally. The best way to find out about ice is through the experience of OTHERS. Unfortunately for we Bonanza drivers there are not a lot of professional pilots flying equipment with similar flight characteristics any more. When the airlines were flying DC-3s and the big corporations had Twin Beeches (Model 18s that is) it was a lot easier to get good advice on where and how to handle

the ice.

If you could locate one of the aviators who flew the Twin Bonanzas around California picking up canceled checks for the Bank of America, he could probably tell you ten times as much as one of the kids who has been flying a turboprop or jet around the area for the last twenty years. There is nothing like the local knowledge gained flying a daily scheduled operation in a specific area.

Ice is deserving of all the respect it gets. I have never flown airplane that I would fly in ice continuously. The absolutely best ice hauler was the DC-6, DC-7 series with hot wings heated by gas fired heaters. The newer jets have rather poor anti-ice capability, but they have performance so it is not needed. Get out of ice if you can. The general aviation airplane has a lot of capability but you need to keep a sure way out.

A good grade of ice repellent on the prop does every bit as much good as hot props. BUT you have to remember to put it on. It does nothing for the wings. It may help getting the ice off after you have landed, but I have never been able to discern the difference on airfoil surfaces where I applied the repellent as against those where I didn't. I use it on the gear doors and such too, but I don't know if it is helping or not.

I guess that is enough rambling for this evening. Who's next?

Bob Siegfried

Ancient Aviator

[ARTICLES/19971209.020931.msg02664.tex]

Airframe Ice**Fri, 19 Dec 1997 06:43:14**

Good Morning Paul Bruce,

In a message dated 97-12-19 00:25:30 EST, you write:

The plane has no other de-ice other than hot props, and my mechanic assures me that this will "Only assure that both engines will be making full power when we hit the ground" in icing conditions. So I am confused,...

Just a little more about ice protection. I remember a few years ago someone ran some icing tests on general aviation aircraft and gave some quantitative numbers as to the effectiveness of various types of anti-ice/de-ice equipment.

I felt at the time and still feel that putting numbers on the result was a little simplistic as there are too many variables to make direct comparisons.

Having said that, the gist of the report was that having clean props was about twenty percent of the solution. The report seemed directed toward refuting the notion, which was rather prevalent at the time, that if you kept the props clean, you could handle the rest.

The bulk of my experience with booted airplanes was as copilot on DC-3s and DC-4s. The captains with whom I flew generally felt that the boots weren't much good and the results that I observed tended to bear that out.

We tried to wait till the ice was just the right thickness so that it would break off and fly away and not just stick to the boot as it expanded or become so thick that the boots wouldn't expand at all.

Occasionally the ice would build up over the boots such that there was a hollow space when the boot deflated.

I have since learned that to get maximum effectiveness from boots, the manufacturer states that Icex (or other boot dressing) should be applied to the boot within a few hours of the intended operation in icing conditions and that the dressing must be reapplied after a limited time in precipitation. That was not done on the airline for which I flew. It is possible that dressing was applied during some maintenance check and I didn't know about it, but I rather doubt they were ever dressed.

That undoubtedly had something to do with the relative ineffectiveness we observed. Modern high pressure and chord wise boots are surely much better and all would work better with dressing.

All in all we operated the booted airplanes so as to minimize exposure to ice, just as I do my Bonanza. The DC-3 has a slightly better power to weight ratio and a little higher wing loading than the Bonanza. It also had supercharged engines so we did a little better at altitude. I never saw a captain who elected to stay in the ice. We took action

to get out of the situation including cancelling the trip and "training" the passengers (put 'em on the train).

The DC-6 has hot wings and it handles the ice the best of any airplane I ever flew. I have had six or seven inches of ice on the unprotected portions of the airframe and the speed would drop off thirty or forty knots but the old hummer would just plug right along.

We still tried to avoid the ice.

Incidentally the Convair 340 had hot wings also, but didn't handle ice well. It used heat exchangers from the engines for wing heat while the DC-6 used gasoline fired heaters.

All of the jet transports that I flew used hot wings, but most did not have as extensive anti-ice capability as the DC-6/7 series. The 727 had electric heaters on the tail surfaces at first but they were soon deactivated and we avoided ice. I have forgotten the limits we were stuck with, but the main way we handled ice was to stay out of it. With the power available in the jets, it is much easier.

Another major factor that helped us in handling ice was the attitude of the air traffic controllers. When we asked for another altitude we got it. There was never any inference that we didn't belong there!! I don't mean to chastise the present ATC people, they are always very helpful and cooperative and traffic is much heavier now, but there was still a different attitude toward the airliners than I found when flying my Beech.

I guess that's my rambling for this morning!

Happy Skies,

Bob Siegfried

Ancient Aviator

[ARTICLES/19971219_064314_msg02826.tex]

Airframe Ice and OAT Ram Rise**Thu, 12 Oct 2000 09:21:47**

In a message dated 10/12/00 12:55:23 AM Central Daylight Time, spindel@mindspring.com writes:

OK, if the temperature rise caused the OAT probe to read +3, would not the rest of the airplane that received impact air, such as the wing leading edges, also see the +3 and remain ice free?

Stuart Spindel A&P IA Baron E-55 (IO-550 Powered)

Hi Stuart,

That sounds good, but it doesn't seem to happen that way!

Ice commonly forms when the OAT is just a little above freezing and it doesn't seem to make a difference whether you are in the tops of a cumulus layer or beneath the cloud flying through freezing rain.

In the DC-3 days, my airline told us to expect the heaviest icing conditions when the temperatures were between 25 and 35 degrees F indicated OAT. The Ram Rise on the DC-3 was about the same as a Bonanza and ram rise was the reason we were given.

I am aware that there has been an awful lot of research done in the last fifty years and the scientists obviously have a lot more data than was available back then, but we did fly in the conditions conducive to ice all of the time. The numbers seemed to work very well.

Happy Skies,

Old Bob

[ARTICLES/20001012_092147_msg14694.tex]

Backup T&B**Fri, 6 Aug 1999 14:23:39**

In a message dated 7/23/99 8:11:16 PM Central Daylight Time, Mavitor@aol.com writes:

I am still thinking about the venturi idea.

Good Afternoon All,

John Miller, 93 year old current Bonanza pilot, had a venturi rigged up on a board that would fit in his side vent window. It was plumbed to a turn and bank, not one of those worthless turn coordinators, and provided him with system which was totally isolated from all other systems in the aircraft.

For many years I carried a T&B with three nine volt "B" batteries taped around it in a manner so that the batteries made a base on which it could rest on top of the glare shield. Worked like a charm!

The only proviso is that one must take the time to learn how to fly rate instruments, like us old geezers had to do long, long ago, instead of attitude!

Happy Skies,

Old Bob

[ARTICLES/19990806.142339.msg06715.tex]

Bird Strike**Thu, 4 Dec 1997 15:01:19**

In a message dated 97-12-04 13:52:31 EST, Joe Gerardi N8095J wrote:

I think it's more a matter of fate or bad luck when it happens. We all hope it won't happen to us, and chances are it never will...

It would seem that should be true. You might like to know that a local pilot hit two Mallards on separate occasions four months apart with his V35B. In both cases the skins ripped open and the birds ended up intact inside the wing and ahead of the spar. It was the left wing both times. The first hit right at the stall warning vane and the second was about a foot outboard. The first was just at level off at around 2000 feet agl and the second in cruise at a similar altitude.

I have had several bird strikes over the years but the one that was the most significant was a strike that occurred just west of South Bend Indiana at ten thousand feet. I flew out of the side of a cloud and was just barely on top after exiting the cloud.

Just as we broke into the clear I hit a bunch of Mallards which had evidently been circumnavigating the cloud on top of the overcast. (Ya gotta watch that VFR on top)

There was a major loss of power on number three engine and a partial loss on number one. I feathered number three and monitored number one carefully. After I landed at ORD the mechanics found two complete birds inside the air intake on the number two and some damaged pushrod housings on number one. They counted some 135 positive strikes on the airframe. I don't know what that type of a strike would do to a Bonanza!

This has nothing to do with this thread, I just thought I would tell the story!!

Old Bob

[ARTICLES/19971204_150119.msg02629.tex]

Closing Door In Flight**Tue, 31 Aug 1999 00:27:24**

In a message dated 8/30/99 11:07:30 PM Central Daylight Time, hgp@madaket.netwizards.net writes:

Is it indeed *possible* to close the door in flight

Good Evening,

Yes, it is possible, but I don't recommend it. If you open the left side storm window, slow down and do a little fish tail you can get the door to swing enough that you can get it closed. Personally, I am afraid that the door gets bent a little each time you try it and I prefer to just leave it alone and return to land.

If I had just taken off from someplace where it was not practical to return and it was very cold and a long way to a suitable landing spot, I might give it a try. If the small trim piece above the door is removed, you can get a better grip. If things are really serious, the upholstery at the rear of the door can be loosened as well to provide a handhold on the structure of the door.

That would obviously be a little difficult to do if you are alone in the airplane.

Incidentally, I used to do door pop training with all Bonanza transitions, but I quit doing it about thirty years ago because I felt that damage was being done to the door. Hard to prove, but it seems that the door began to get somewhat harder to close and didn't fit as well on airplanes that were used for a lot of training.

I now just discuss it thoroughly and highly recommend that no one close the door except the pilot flying the airplane, regardless of the qualification of the person in the right seat.

Happy Skies,

Old Bob

[ARTICLES/19990831_002724_msg07684.tex]

Cranking Down the Gear**Tue, 31 Aug 1999 10:53:31**

In a message dated 8/31/99 8:39:21 AM Central Daylight Time, epoole@scoot.netis.com writes:

It was an interesting experience. Trimmed for about 90 knots, start cranking, crank 10 turns and retrim, 10 turns and retrim, etc. (actually I found that retrimming after every 10 turns wasn't really necessary).

The first 38 turns or so were a breeze, then I found that for the next five or six turns I practically needed a crowbar to make it turn, then the rest was fine again.

Good Morning Eric,

I guess it depends on you interpretation of hard to crank!

I don't find the effort unreasonable but I do fly it a little slower, 80 knots or less with my V35B, 80 mph or less with the older airplanes.

I don't care for the retrim method. The way that works for me is to get it all trimmed at the speed I have chosen, then add enough power so it initiates about a 500 fpm climb at that airspeed. I then start cranking and, as the gear comes out, the aircraft returns to level flight. As the last few turns do get harder to crank, I slow it down till it is just above stall. That seems to help.

Happy Skies,

Old Bob

[ARTICLES/19990831_105331.msg07681.tex]

Electrical System Failure**Tue, 2 May 2000 11:15:18**

In a message dated 5/2/00 9:04:31 AM Central Daylight Time, ajw@CYBERNEX.NET writes:

All that I have read says that if you lose electrical in a Bo best plan is to drop the gear early while you battery is fresh. The Bo flies just fine with gear down and you'd rather get to an airport with your gear down and locked then discover that you don't have enough juice left to do the job.

Good Morning Allen,

Why waste electrical power on something that you can do manually?

The gear can be cranked down successfully if you are familiar with the procedure and keep the speed down low while you are doing it. The electrical power that it takes to put the gear down may be the electrical power that you would need to keep the airplane under control during instrument flight or for some other flight critical purpose.

While a Bonanza at lower elevations and lightly loaded flies fine with the gear down, performance can be poor at high altitude and high weights. There is also a possibility that engine cooling could be a problem. Fuel consumption will be higher and range will be reduced.

I have had several generator and alternator failures over the years and there has always been enough power left on arrival at my destination to lower the gear, but I have also had problems other than electrical supply that have necessitated manual extension of the gear. It is not a problem.

I think you should put a little more thought to your plan.

As always, it depends!

Happy Skies,

Old Bob

[ARTICLES/20000502_111518_msg07515.tex]

Electrical System Failure

Wed, 28 Jun 2000 09:10:07

In a message dated 6/28/00 1:57:38 AM Central Daylight Time, DirkDeJonghe@compuserve.com writes:

Having two alternators certainly helps. However, one of my electrical failures was due to the voltage regulator cropping out. Having half a dozen alternators would not have made a difference.

Good Morning Dirk,

Each alternator has it's own regulator. They do, however, both feed the same electrical system! The failure of the primary regulator should only take out the primary alternator, but an internal short could affect both.

About thirty years ago, we had one of our instrument trainer Beech Musketeers that incurred a total electrical failure due to one of the straps falling off something (I think it was the generator, might of been a battery strap, I don't remember for sure), shorting against the frame and knocking out the whole shebang. A second generator or alternator would not have helped in that instance.

It was out on a night cross country and being used by three of our line boys who were working to gain experience for careers as professional pilots. The weather was generally three to four hundred feet throughout the area. They had already shot a couple of approach and landings to different airports when the failure occurred. We made it a practice to have all of our airplanes which were flown IFR equipped with a separate antenna to be hooked up to a Bayside portable Comm unit which was carried on all actual IFR flights. That, along with a flashlight and three heads, helped to save the day.

The boy sitting in back held the flashlight, the guy in the left seat flew via the vacuum powered Horizon and DG, and the guy in the right seat got on the Bayside to contact the FAA.

The center was able to pick them up on primary radar and they were vectored to Chicago Midway Airport where they shot an ASR approach to about a three hundred foot ceiling.

They had a lot going for them, not the least of which was the multiple crew.

The Musketeer holds sixty gallons of fuel and burns about nine gallons per hour. They had been out about an hour and a half when the failure occurred, thus had about four and a half hours of fuel on board.

They probably had enough fuel to reach an area of good VFR weather, but I don't recall the details. Having the Bayside and being within easy range of Midway made it fairly easy to get safely on the ground.

The gyros being powered by a source other than the primary electrical system was

imperative.

There was a Northeast Airlines Convair that had a complete electrical failure when a wrench (or something) which had been left in the electrical compartment fell against a primary buss and wiped out the entire electrical system, including the emergency buss. The Convair at that time had all electrical instruments and there was nothing left for the crew to use.

They were on top of an overcast with ceilings of four or five hundred feet near Long Island Sound when it happened. The sun was approaching the horizon and they did not have enough fuel to make it to VFR conditions. An attempt was made to let down through the overcast by noting the position of the sun on the windshield and trying to hold it there during the down through procedure. It worked long enough so that they were not in too bad an attitude when they came out the bottom and were able to get the aircraft right side up without hitting the water of the Sound. They headed toward the shore and recognized enough to get headed to LGA. They got there after sundown and landed. Nobody saw them until they were on a taxiway headed toward the terminal. Somebody complained to the tower that there was an unlit airplane on the taxiway.

A more complete preflight might have caught the cracked strap on our Musketeer and a better clean up after maintenance would have precluded the Northeast incident.

Nothing is perfect and we can "what if" any system to failure. I like the second alternator because I have had several alternator failures, but then again I have had several engine failures as well, and I no longer have a second engine!

I think the idea of an internal battery in the Garmin was a great idea, I wonder why they dropped it in the newer sets?

As I said before, we each have to decide just what is our own level of comfort, but looking at what has happened to others and gaining an insight as to what can reasonably be done helps a lot!

Happy Skies,

Old Bob

[ARTICLES/20000628_091007_msg10287.tex]

Emergencies and Backup Systems**Fri, 28 Jan 2000 20:13:20**

In a message dated 1/28/00 4:12:39 PM Central Standard Time, jtsmall@onramp.net writes:

Interesting observation. I had not run across it before. This suggests a false sense of security?

Good Evening John,

That may be or maybe it is just too much complication to handle when things go to pieces. Sometimes just having the basic minimum to work with allows full attention to be placed on those minimum devices!

The FAA encourages us to call them when we are in trouble. I am sure that on an overall basis, that is a good idea, but I think we should emphasize that the aircraft must be flown first.

In competition glider flying, most contestants have noted that they just can't do a superior job of working a thermal and talk on the radio at the same time. The concentration required to hold that center of maximum lift is too great to spend any brain power trying to communicate.

I wonder if Itzhak Jacoby might not have had a better chance of survival had he had no need to communicate?

For What It's Worth.

Happy Skies,

Old Bob

[ARTICLES/20000128_201320_msg01958.tex]

Emergency IMC Descent**Wed, 5 Jul 2000 16:25:01**

In a message dated 7/5/00 2:14:25 PM Central Daylight Time, bgosnell@prodigy.net writes:

The fun part was to not touch the control wheel at all and let the aircraft stabilize back to 90 Kts after the spiral recovery. I thought it was going to stall but just as I was preparing my stomach for the stall the nose dipped back down. After several oscillations it went back to 90kts....and had lost some altitude.

Good Afternoon Brad,

I normally do the demonstration at whatever is normal cruise for the airplane on the assumption that would be the configuration in which the pilot "lost it." I will use quite steep bank angles, up to 60 degrees occasionally, if things are going well and the student is receptive, but I normally start off with something around thirty degrees. Even with the steeper banks, there never seems to be any need to use pitch. I have come within ten to fifteen knots of the redline on occasion, so turbulence could be a limiting factor.

Years ago, before the FAA required any instrument training for any pilot certificate other than the ATR, I would teach the technique as a method to get through an overcast if inadvertently stuck on top. For that, we would trim the airplane up for a comfortable 'power on' descent. The student would then be taught to touch nothing but the rudder and hold the turn needle in the middle (with the rudder only) until they saw the ground.

It was amazing. The bank would rarely reach ten degrees and often would be held within five degrees of level. Who knows how well anyone would do for real, but it was fun to teach!

When I soloed, spins were still a required maneuver for a private pilot so all of the training airplanes spun quite predictably. We were taught that if we were ever caught on top with no way to get down or with only very small holes in the overcast, to put the airplane in a spin and keep it there until we saw the ground. Hopefully the ceiling would be high enough so that one could effect a recovery from the spin!

There is more than one way to skin a cat.

Happy Skies,

Old Bob

[ARTICLES/20000705_162501_msg10599.tex]

Emergency Landing: Gear Up or Down?**Mon, 25 Jan 1999 17:07:19**

Good Evening Carmine,

In a message dated 1/25/99 3:22:42 PM Central Standard Time, diamondlil@diamonddil.seanet.com writes:

I believe the military require gear down on ground emergency landings. Shearing the gear off dissipates a lot of energy that otherwise would be transmitted to aircraft occupants. Cheers Carmine Pecoraro

I do believe that is the current thinking of our armed services. I also think that it is very difficult to establish a "best" solution to the question.

The current military position makes sense when the gear is relatively frangible as it is on most of the current crop of fighters and even on the larger tankers and transports.

When the landing gear is fastened on a little more securely as it is in the Bonanza, I think the potential for ripping up the airplane is a lot higher.

The structure on our favorite machine is likely to be badly ripped and bent if the landing gear digs in and starts tearing the wings apart.

I have seen a number of Bonanzas landed gear up either intentionally or accidentally and they have never torn apart unless they struck things such as trees, posts abutments and such.

Of the airplanes that I have seen landed gear down following an engine failure, most have had either no damage due to the excellent landing site chosen or extreme damage including ripping the wing/s bad enough to spill fuel. Thus far, the ones that I have been closely associated with have not gone over on to their backs, though I would think that is a possibility if the ground is extremely soft such that the nose digs in.

It would appear that the gear is fastened to the rest of the airframe so solidly that it does not come off or bend and absorb energy in the manner of current military aircraft.

I try to make a decision based on the landing area available. My default mode would likely be gear up unless I had some information about the landing area that would convince me otherwise.

In the three instances that I have had complete power failures in a Bonanza, I was able to land on airports. Definitely a "gear downer" for me! I have been fortunate enough that the precautionary landings that I have made following "developing" engine difficulties have also terminated on an airport or private landing strip. (As an aside, when I have a situation where I am not too confident in the reliability of the engine, I will make a power off landing and possibly end up a little long on my touchdown. I don't always make a power approach, just most of the time!)

The only time I have landed with the gear not completely down was after the failure

of the nose gear to extend and my decision in that case was to land with the mains extended.

Every case is different. Study the results of what others have done. Whatever decision you make is the right one for you. Do it and don't sweat it!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990125_170719_msg01147.tex]

Endurance and Evaluating One's Limits

Fri, 23 Jun 2000 12:03:00

In a message dated 6/23/00 8:43:42 AM Central Daylight Time, tturner@vol.com writes:

We had a mandatory eight hours "off" before beginning an alert tour, which meant we could go until 11 p.m. on night and start up another 32-hour shift. We usually got two or three nonconsecutive days off a month.

Good Morning Tom,

Sounds like your Air Force duty rigs were about the same ones we used for international flying! It always amazed me that our domestic rules, which weren't all that tight, gave us so much more rest and had so many more restrictions than the international rules!

My longest common "duty day" these days is typically a visit to my daughter who lives in Delaware. We depart C24 at six AM, fly three and a half hours to Dover, spend the day and then head back to C24. That generally takes about four and a quarter to four and a half hours. The arrival at home is generally around ten or ten thirty at night.

That adds up to something like a sixteen to sixteen and a half hour duty day, eighteen hours or so from bed to bed.

I find that to be an easy comfortable day. I get to fly my nice little Bonanza over to have a pleasant and relaxing visit with my daughter and her family. We then leave before we get too boring to the youngsters and enjoy a nice relaxing evening ride home!

Having a good autopilot and modern navigation equipment aboard makes for easy operations and being able to arrive at home with four or five hours of fuel on board takes away any stress for the arrival.

The amount of rest needed by an individual is variable. One of the rules by which we in the aircarrier industry operated was that if anyone felt that they were being asked by the rules to fly beyond their comfort level, the operation should be shut down and rest be obtained.

However, even though the right to stop and relax is guaranteed to every individual, sometimes the opportunity just doesn't exist. With that knowledge in mind, it behooves us all to evaluate just how our individual systems work and develop a means to be able to cope with those long duty days that will be presented to all of us on occasion.

The biggest problem occurs with the unusual occurrence. The only answer to being able to handle the unusual is to have worked through as many possibilities as can be discerned to develop procedures that will make the unusual routine.

That is evidently what the Air Force was trying to accomplish with the "extraordinarily strict, by-the-checklist, demand-and-response procedures for everything, which we were literally taught to perform without thinking."

Unfortunately, that type of thing still doesn't cover the unexpected unusual situation!

When the non preconceived unusual situation occurs, the only action that I know to take, is to tell yourself that you are at minimum capability and to recognize that fact when you evaluate the action to be taken.

I have developed quite a few little things that work for me and feel quite comfortable doing the routine acts of flying an airplane during a normal airline fifteen or sixteen hour day. Beyond that, I feel that I have found the way that works for me to handle those unexpected abnormalities that do occur to almost all of us.

While it all comes back to the same thing we constantly tell our students, "Learn what your limits are and stay within those limits," there is also the thought that we should be constantly evaluating what those limits are and developing methods whereby we may safely expand those limits.

Happy Skies,

Old Bob

[ARTICLES/20000623_120300_msg10011.tex]

Engine Failure and Risk**Wed, 20 Jan 1999 20:16:18**

Good Evening Bob,

In a message dated 1/20/99 4:57:18 PM Central Standard Time, newmanb@erols.com writes:

Hello Bob - I understand your rationale. But what about if you have an engine failure on approach while in that full flaps high power / high drag configuration?

Could be a BIG problem!!

I answered this question in an earlier comment as follows:

There has been a mention of what to do in case of a power failure. I am afraid that I fly my airplane with the thought that the engine won't quit and if it does, take whatever action is available to me at the time. I have had numerous engine failures in single engine airplanes (three in Bonanzas) and do not mean that the potential should not be considered, just that other considerations seem to be most important to me the vast majority of the time. My approaches are planned to be power approaches at least 99 percent of the time. Certainly the airplane would be flown in a vastly different manner if it is to be operated so as to allow a no damage landing following an engine failure.

I too was trained to be always prepared to handle an engine failure and for many years I felt guilty about the large number of times that I found myself relying on the engine. At my current stage in life, I find that I am quite comfortable with the risk.

I have noted that most accidents are caused by the airplane being flown in a manner that is less than optimum for the conditions that prevail and that very few accidents are caused by an unannounced failure of the power plant. Insurance statistics seem to back up this rationale. I still get a little queasy flying on instruments at night over mountainous terrain, but I do it anyway. That doesn't mean that I think everyone should take the same risk, just that I find the benefits to be such that I am willing to accept the risk.

To each his own!

Happy Skies,

Old Bob

[ARTICLES/19990120.201618.msg00909.tex]

Failed Attitude Indicator**Thu, 27 Nov 1997 21:19:06**

To Mr. Mark Kolesar,

You probably have more information than you want on this subject but I can't resist one more comment.

I think George Braly's system of back up is a good one, but is it any more reliable than just making sure that your competency flying the airplane on Needle Ball and Airspeed is up to snuff?

Flying the airplane without an artificial horizon is not particularly difficult to do but it does take more than just a few minutes of practice. When the Bonanzas were first put on the market, very few were equipped with a "full panel". All came from the factory with a needle and ball instrument and some had a directional gyro, but very rarely did one see an artificial horizon. We flew them regularly IFR just as we do today. I installed an electric T & B as a standby to my vacuum one and thought I had a fantastically well equipped airplane!

Somewhere in the mid fifties the FAA mandated a full panel for IFR flying and we all had to comply. Until the small gyros became readily available, some of us had to forego IFR flight. The cost of the equipment and the difficulty of installation was considerable.

I personally can't stand the "turn coordinator" that has been substituted for the needle and ball these last few years. It is easier to learn to use to a minimum standard but a proper needle and ball, once mastered, provides a means of comfortably controlling ANY airplane.

It is best if a failed attitude indicator is covered while flying partial panel. Our long standing and hard won habits will try to make us correct for the false indications. Other than that proviso, it really isn't bad.

Spend the few hours of practice it takes to gain the proficiency necessary. It's a lot cheaper! Having the knowledge and capability to fly with needle, ball and airspeed is VERY comforting to ones soul.

One airdriven Attitude Indicator and one electric T & B, what could be simpler and cheaper.

Yours,

Bob Siegfried

[ARTICLES/19971127_211906.msg02550.tex]

Failed Turn Coordinator and T&B's**Sat, 24 Jun 2000 12:56:48**

In a message dated 6/24/00 11:20:10 AM Central Daylight Time, jtsmall@onramp.net writes:

Does this mean that the HSI and TC had both failed? Surely not.

Good Morning John,

As long as we are speculating on very little, if any, fact, suppose the Turn Coordinator had been failed for some time and not noticed?

One of the reasons that I am so enamored of the Turn needle as opposed to the Turn Coordinator, is that the turn coordinator does not serve as easily as a device to be included in the normal instrument scan.

We all hope that our procedures include checking either a TC or a T&B as we are taxiing out prior to departure, but I can tell you from personal experience that, at times, those things that I absolutely always do, don't get done. Checklist or no checklist.

If the turn coordinator had failed a flight or two before the last flight. It could conceivably have not been noticed. A failure of the attitude instrument, followed by an attempt to use a TC that had failed earlier would be a very difficult situation for anyone, regardless of his/her experience and skill level.

I have found failed TCs and failed T&Bs on my airplane and on others that I was operating. I have never been certain of how long they had been failed before I noticed the failure.

I am sure many of you will say: "It could never happen to me."

Well, I hope you are correct, but it has happened to me and I have found failed instruments in airplanes in which I was merely a passenger or instructor. The owner was generally unable to honestly tell me if the unit had been operating before the subject flight or not.

Regular use of a rate of turn gyro as an adjunct to the attitude gyro will aid in picking up a failure of the turn instrument as well as a failure of the attitude gyro.

The two generally accepted rate of turn instruments are the Turn Coordinator and the old fashioned 'Turn Needle combined with a Ball Inclinator' instrument. The TC cannot differentiate from a yaw or a roll and therefore does not give as positive an indication of the rate of turn as does the T&B.

I know that nobody bothers with glancing at either of those instruments much anymore, but utilizing either one in a normal scan would catch a failure.

Monitoring the rate of turn does give helpful information that can add to the smoothness and precision of a normal turn with almost no wasted scan motion.

The Turn needle provides faster and more positive indication of the actual rate of turn than does a TC.

They are both made by the same manufacturers, use similar, if not identical, components and provide a similar rate of failure or reliability.

The use of a TC in lieu of a T&B by Dr. Jacoby was unlikely to have been a significant contributor to that accident.

But I still want my T&B in a prime spot on my panel where I will be encouraged to use it for every turn I make.

That is the best checklist there is!

Happy Skies,

Old Bob

[ARTICLES/20000624.125648.msg10055.tex]

Failure Modes and Backup Instruments

Fri, 3 Mar 2000 13:14:37

In a message dated 3/3/00 9:28:40 AM Central Standard Time, epoole@scoot.netis.com writes:

No, thanks, if things start going on holiday in that cockpit I'll take every bit of help I can get.

Good Morning Eric,

There had to be a lot going on in Itzhak's cockpit. Most of which, we will probably never know.

This is in no way meant to imply any action or lack of action in the subject accident, but it does bring up a salient point.

One of the most difficult things in accident investigation is to try to figure out what the pilot was doing and even what he might be thinking. That is why we have cockpit voice recorders along with parameter recordings of the physical operation of the aircraft. It has now been proposed that cameras be placed in the cockpit in an attempt to comprehend the problems faced by the aviator.

Even with all of this technology, there is still a large gap between what we know and what we would like to know about how we react to various failure modes. One of the current problems is to understand just how the decision is made as to whether or not something has failed and what is the appropriate action to take following that failure.

The current trend toward multiple backup systems means that there is another level of decision making that is inserted into the equation. If you have two artificial horizons, how do you determine which one is correct? The only way that I know of is to evaluate the rate instruments and then draw a conclusion as to which is correct. If you should happen to have three artificial horizons, the decision could be made by simple multiple failure probability analysis, but it would still take time and want to be verified by an analysis of the rate instruments.

If the failure is one which, after recognition, requires a pilot/operator action to initiate corrective action, the situation is even worse.

As an example, I have a Century I as a back up roll autopilot. If my pneumatic system fails, I can turn on the Century and it will fly the aircraft quite well. BUT, I have to first determine that there has been failure, decide what that failure was, then if using the back up autopilot seems to be the best course of action, turn it on. That scenario assumes that I am not in any way confused as to what has occurred and I know from experience that I am often confused when failure occurs. The more equipment I have, the more failures are possible. The more options I have, the more analysis necessary before a proper decision can be made.

It isn't easy for anyone, regardless of training, experience or equipment.

The more simple the transfer can be made and the greater confidence one has in the back up system the more likely it is to result in a comfortable outcome.

The beauty of the Turn needle is that nothing else even looks remotely like it. If it used in everyday instrument flight for simple things like trying to make every turn a standard rate turn, confidence and familiarity can be maintained.

I agree, it isn't intuitive, it does take training and who really needs standard rate turns anyhow!

Nevertheless, it is the instrument in which I feel I can have the greatest confidence in a confusing situation.

It's failure mode is simple, if it wiggles it is working, if it doesn't wiggle it is not working.

Still my favorite last ditch decision maker!

Happy Skies,

Old Bob

[ARTICLES/20000303_131437_msg04140.tex]

Frozen Pitot Tube**Wed, 20 Oct 1999 10:46:49**

In a message dated 10/20/99 8:50:19 AM Central Daylight Time, flyinglo@email.msn.com writes:

Dear Old Bob, As I recall, if your pitot freezes over, it locks in your present indicated airspeed. Then you wouldn't know it was locked in until you, say started descending, and instead of your airspeed increasing, it would stay at the former cruise speed, right? Jerry. J35.

Good Morning Jerry,

It depends!

That was one common indication, but the pitot lines weren't required to be tested as they are today. If the system were properly tight, the airspeed indication would sometimes stay where it was. However it wasn't uncommon for it to slowly decrease and on some occasions it would slowly increase. I think, but don't know for sure, that temperature changes in the non-flowing air in the lines from the pitot to the instrument were causing the increases and leaks were causing the decrease.

If the lines were really tight, the airspeed indication would increase as altitude was increased and decrease as altitude was decreased.

It wasn't hard to note the iced over pitot as we were expecting it as a normal thing in icing conditions.

Happy Skies,

Old bob

[ARTICLES/19991020.104649.msg09518.tex]

Gear Up Landing: Paved or Turf Runway?**Tue, 21 Sep 1999 23:57:52**

In a message dated 9/21/99 10:12:00 PM Central Daylight Time, epoule@scoot.netis.com writes:

Do you put it on the asphalt or on the grass?

Do you set up for "landing assured" and then try the old routine of stopping the prop and kicking it horizontal with the starter, or do you just let the insurance company have it?

Good Evening Eric,

Strictly personal opinions and my reasons therefore.

I would land on the asphalt unless it was known to me to be badly cracked and full of potholes. Even then I would only land on the grass if it was known to me to be smooth as a billiard table and very hard surfaced. I would rather take my chance of some greater damage to the belly and nose bowl and reduce my odds of digging in and losing control of the aircraft. I think the possibility of fire is less on the asphalt with a controlled landing than it would be on the grass if the aircraft dug in and swerved or flipped.

Either landing would likely be successful though. The Bonanza lands gear up quite safely.

I would also land with the flaps retracted to reduce the possibility of the nose digging in. Once again, gear up, flaps down landings with Bonanzas are eminently safe and successful. Not a big deal either way.

I would elect to land with the engine fully operational. Magnetos on, electrical system hot and fuel to the engine. I think most people screw up the approach and cause problems when they try to shut down. I would rather have as normal an airplane as possible for maximum control of the aircraft right down to the touchdown and I would be too busy maintaining what control was possible to mess around with the engine controls after touchdown!

Once again, the incidence of fire occurring is almost non existent in the Bonanza when a planned belly landing is executed.

As far as damage to the engine is concerned, My local overhaul shop told me that he has never had a crankshaft fail a prop strike inspection when the engine was running at touchdown. The ones that have failed the examination have all been stopped, not rotating, or at least, not being driven at all when they contacted the ground. His theory is that the last couple of power pulses before stoppage occurs even out and distribute the stresses throughout the crankshaft. His theory, not mine!

Thems m' plans!!

Happy Skies,

Old bob

[ARTICLES/19990921.235752.msg08703.tex]

Gear Up Landing: Paved or Turf Runway?**Sat, 11 Mar 2000 02:13:58**

In a message dated 3/10/00 10:58:07 AM Central Standard Time, swo49@hotmail.com writes:

With all the bonanzas and barons that land gear up on runways and are fixed, if this ever (I pray NOT) happens to me - I am going for the runway.
Steve

Good Morning Steve and All,

I agree with Steve,

For a Bonanza, an intentional gear up landing on a hard surface will almost always be safer and cause less damage than one made on sod.

I would choose the smoothest hard surface around and land with normal power. Definitely NOT with feathered props.

That is the way I did it when my nose gear refused to extend and I was/am very pleased with the result.

The same week that I had my incident, there was a Piper twin out on the west coast which had lost a nose wheel. Main gear and nose strut were down and locked. The only abnormality was the loss of the nose wheel itself. The guy feathered both engines and went for a dead stick landing. It was poorly planned and executed and the maneuver resulted in the loss of an airplane when the absolutely worst case if he had done a normal landing would have been a possible collapse of the nose strut. On good smooth asphalt, chances are the nose strut would have merely been ground down a bit. I don't know if any passengers were on board, but putting all passenger and movable weight in a position to place the CG at the aft limit would not have been a bad idea. If the flaps would either have not been used or retracted immediately after touchdown and full back stick held, damage could have been minimized.

Once again, I would vote for a hard surface and a normal powered landing. Why make a simple problem into a complicated one?

Happy Skies,

Old Bob

[ARTICLES/20000311.021358_msg04569.tex]

Gear Up Landing: Paved or Turf Runway?**Sat, 11 Mar 2000 12:24:26**

In a message dated 3/11/00 10:20:29 AM Central Standard Time, stutzman@stutzman.com writes:

I did my gear-up on a long hard surface runway at a rural airport. If I had to do it intentionally again, I would do it the same way. If I was at a busy metro airport with no option of going somewhere else, I might give a bit more thought to the grass.

Good Morning Frank,

I couldn't agree more with the thought that the major damage is likely to be done by the recovery crew.

I chose a short runway that was not in use at the time and landed so as to stop at a spot that would not interfere with airport operations. I had also made arrangements to have my maintenance people out on the airport to do the recovery. The airport people were not allowed to touch anything, and nothing was done to the airplane until the maintenance supervisor and I had agreed to the procedure.

Damage control is an extremely important part of the equation.

The only case that I have personally been involved with where a landing on other than a hard surface did less damage than a landing on a hard surface was when a friend of mine made a precautionary landing due to worsening weather. He shut down the engine, Did the slipping bit and got the prop stopped. (It was one of the early wooden props, they stop easier.) He nudged it to horizontal with the starter and then landed gear and flaps up in a muddy corn field when the corn was about two feet high. After the weather cleared, the landing gear was lowered and the airplane was moved to a nearby road and flown home. They washed the belly and repaired an antenna or two. Very unusual conditions and a very sharp aviator!

Most sod landings end up with substantially more damage than on a hard surface. The potential for very bad damage and loss of control is much higher.

Happy Skies,

Old Bob

[ARTICLES/20000311.122426.msg04576.tex]

Gear Up landing: Flaps Up or Down?**Sat, 11 Mar 2000 16:14:03**

In a message dated 3/11/00 1:49:25 PM Central Standard Time, swo49@hotmail.com writes:

Bob:

On those flaps, keep them down? Retract them? The V-tail in a recent ABS magazine I think had the flaps down and the damage was not that bad - so it looked. Steve

Good Afternoon Steve,

It all depends! On every one that I have seen that landed with the flaps down, there was considerable nose bowl damage. On one when where the pilot had forgotten to lower the gear and made a nice full stall landing, the pitch down after the flaps touched was enough that it didn't just grind away the keel sections and nose bowl, it bent the structure where the keels attach to the fuselage. That may not have looked like a lot of damage but it was very extensively damaged internally. So a flaps down belly landing will get the flaps, likely damage the wing structure where the flaps are attached, and do serious damage to the nose bowl and keel structure.

A full belly landing with the flaps up will damage the belly. It may get one or both of the inboard doors. Depending on the number and placement of antenna, sometimes the main gear doors aren't damaged at all. The nose gear doors fair about the same as the mains. They are usually damaged, but not always. The belly is generally easier and cheaper to repair than the flap, keel and nose bowl combination.

For a landing with the main gear down and the nose gear up, it is pertinent to consider the possibility that there might be better elevator authority with the flaps up. That has to be counterbalanced against the knowledge that the approach will be less normal and therefore have a greater possibility of being mishandled. Tough call. The approach could be made using flaps and then retracting them after main gear touchdown. I don't like that as it introduces another abnormal handling characteristic. My suggestion would be that unless the pilot is very comfortable and rather well experienced at flying the airplane using no flaps, that full flap be used when the nose gear is up. I used no flap and I did end up a little higher and faster on the approach than I had planned which meant that I had to reduce the throttle more and work a little harder to have the speed where I wanted it at my planned touch down spot. Had I really screwed up, I still could have gone around which was why I never shut down the engine.

Happy Skies,

Old Bob

[ARTICLES/20000311.161403.msg04594.tex]

IFR Flight Risk**Fri, 19 Jan 2001 12:30:56**

In a message dated 1/19/01 9:19:43 AM Central Standard Time, cgalley@qcbc.org writes:

Here is one for the IFR people to think about:

[The Canard Aviators's Mailing list]

re "IMHO the best instrument set-up is still mostly vacuum driven from a vacuum pump with one directional gyro being electrical. (Either the DG or the Turn needle)" and "Have Fun, Fly Safely" - Al Fink.

Hard IFR on one engine with no radar, no de-ice, and no real instrument redundancy (an electric turn co-ordinator won't hack it in anything but very still air) is a formula for shredded fiber glass and a short life.

Good Morning Cy,

The examples your friends present in opposition to IFR flight with minimum equipment could be extended to any flight at all.

There is a risk in flight.

If man had been meant to fly, he would have been given wings.

Haven't we all heard that before?

If no one flies there will be no aviation accidents.

We who do fly all have to make our own decisions as to whether or not the benefits to be derived are worthy of the risks involved.

If no one flies at night or on instruments there will be fewer accidents under those conditions!

The fact is that single engine, single pilot, single radio, single instrument power source IFR flight has a very good safety record when compared to the safety record of any other single pilot IFR flight.

That is why the regulations still allow it!

There is no statistical evidence to support the conclusion reached in your message.

Now, I certainly don't think you, or anyone else, who is not comfortable accepting that risk should run out and start doing it, but I don't think it is valid to claim that what you, or anyone else, considers to be an unacceptable risk should be banned for others unless the risk to the general public is such that they need to be protected from us.

The Jacoby and Carnahan accidents may force some restrictions on general aviation

flight because of the risk to the general public. Have you noticed that both of those flights were conducted in aircraft that had a high degree of redundancy?

I have been actively flying IFR with minimum IFR equipment for 51 years. I don't know how much equipment Johnny Miller has in his Bonanza, but he has been flying single pilot IFR for close to twenty years longer than I have.

There are many others who have learned to operate IFR in the last couple of years who are also using the same system safely and efficiently to the lowest weather minima allowed.

It doesn't take experience, but training and competency is required. It helps to be able to stay inside your own and the equipment's capabilities.

I have a theory, totally unsupported by adequate data, that some of our recent problems have occurred because there was too much equipment available to the pilot and that resulted in confusion as to how best to handle the situation. Sometimes, simpler is better.

I challenge your friends, or anyone else, to show that minimum equipped single pilot light aircraft have a worse safety record than those that are loaded with gadgets.

Intuitively, it would seem that more should be better, but it just doesn't turn out that way.

The airlines and corporate fleets have developed an enviable safety record. They generally have a two pilot or larger crew complement and, in the case of the airlines, have many restrictions on their operation.

I doubt if there is any way that we could ever attain the same safety level in our small GA aircraft, but that doesn't mean the risk we take should be prohibited.

I am afraid your friends have taken the attitude that "I don't want to do it so you shouldn't either."

What happened to all of the rugged individualists?

Happy Skies,

Old Bob

[ARTICLES/20010119_123056.msg01226.tex]

Is a VFR Bonanza Pilot Safe?**Thu, 9 Nov 2000 21:57:29**

In a message dated 11/9/00 8:23:43 PM Central Standard Time, esoteric5121@earthlink.net writes:

I resent any implication that a VFR Bonanza pilot is somehow not as safe as an instrument rated Bo pilot as someone had implied earlier in this thread.

Good Evening Paul,

I agree whole heartedly!

Safety is a function of how well an individual flies within his/her capabilities.

Fancy equipment can provide equivalent safety in tougher conditions, but the safety of the flight is the same in a Piper J-3 as in a fully crewed 747 as long as the risks are properly evaluated and contained by operational constrictions.

The capability to fly IFR makes it easier to maintain that safety while maintaining a schedule.

I know many folks who have been flying actively for fifty years or more in high performance single and multiengine airplanes who have maintained an excellent safety record.

I think it is a lot easier to maintain that level of safety if one flies IFR, but as long as it is maintained, that is what really counts.

Happy Skies,

Old Bob

[ARTICLES/20001109_215729_msg15970.tex]

Itzhak Jacoby NTSB Factual Report**Sun, 25 Jun 2000 18:35:46**

In a message dated 6/25/00 4:44:18 PM Central Daylight Time, CRFLYSH35@aol.com writes:

Hi how can I get to read factual report on Jacoby accident? Charlie Reilly

Good Afternoon Charlie,

Do you want something beyond what Bob Newman published on this forum?

The address he gave is: http://www.nts.gov/aviation/NYC/lnarr_00A039.htm

A copy is printed below.

Old Bob

NYC00FA039 HISTORY OF FLIGHT

On November 26, 1999, about 1053 Eastern Standard Time, a Beechcraft S35, N8992M, was destroyed when it impacted a building in a residential area. The certificated airline transport pilot and the two passengers received fatal injuries. In addition, two individuals on the ground received serious injuries, and 25 received minor injuries. Instrument meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed. The personal flight departed Linden, New Jersey, about 1049, and was conducted under 14 CFR Part 91.

A review of air traffic control (ATC) communication tapes revealed that after departing Linden, the pilot contacted New York Departure Control. He was instructed to turn left to a heading of 010 degrees, and to maintain 5,000 feet. A few seconds later, the controller revised the clearance, and instructed the pilot to maintain 2,000 feet. Thirty-four seconds after that, the controller instructed the pilot to turn left to a heading of 270 degrees, to which the pilot did not reply. The controller reissued the heading, but there was still no response.

The controller made two more attempts to reestablish communications. After the second attempt the pilot responded, "I have a problem." The controller inquired about the problem and the pilot responded, "I had a gyro problem momentarily. It looks straightening now. I must of had water in the system." Twenty seconds after that, the controller radioed "...continue the right turn all the way around... correction you're in a left turn now." The pilot responded "yes sir... left turn climbing to niner thousand." The controller stated, "stop your climb at two thousand, turn left, left turn heading two seven zero." The controller then asked the pilot if he was ok to navigate. The pilot responded, "I think I have a problem." The pilot then requested a climb. The controller instructed the pilot to maintain 2,000 feet and requested the pilot's current heading. The pilot responded, "...looks like zero three zero." The controller then instructed the pilot to turn left to 270 degrees, to which the pilot did not respond. The controller reissued the altitude and heading. Still there was no response. The controller then

radioed "niner two mike I need to be acknowledged please." The pilot replied, "I have a problem." This was the last recorded transmission from the accident airplane.

Examination of radar data showed a target, using the accident airplane's assigned transponder code, heading east at an altitude of approximately 900 feet, when the pilot first reported a problem. Over the next 2 minutes, the target's ground track changed from east, to north, to northeast, to northwest, and then back to north. In the last 30 seconds of radar data, the target reached a maximum altitude of 2,800 feet and a 161 knots of airspeed, before beginning a descent that reached approximately 10,000 foot-per-minute.

The accident happened during the hours of daylight. The wreckage was located 40 degrees, 43.807 minutes north latitude, 74 degrees, 12.152 minutes west longitude, and about 220 feet elevation.

OTHER DAMAGE

Approximately 18 buildings received varying degrees of damage. The damaged ranged from broken windows to structural. Three of the buildings were condemned, and then demolished. The City of Newark estimated the property damage to be approximately \$1,150,000. In addition, approximately eight automobiles were damaged as a result of the accident. Four of them were destroyed with the remaining seven receiving varying degrees of impact and fire damage.

PERSONNEL INFORMATION

The pilot held an airline transport pilot certificate with an airplane single-engine-land rating. In addition, he held a commercial pilot certificate with ratings for airplane multi-engine land, single-engine-sea, and glider. His last Federal Aviation Administration second class medical certificate was dated November 1, 1999. On the medical application, the pilot reported 5,800 hours of total flight experience, with 120 hours in the last 6 months.

Two pilot logbooks were examined. The first one was a conventional logbook that started on January 1, 1992 and ended on December 4, 1998. In the previous "total box" at the beginning of this logbook was an entry for 2,253 hours. Over the 7-year period covered by the logbook, the pilot logged an additional 1,764 hours of flight experience. The second logbook examined was computerized. It started on January 1, 1999, and the last entry was on July 5, 1999. During this period, the pilot logged 155 hours of flight experience. The combination of the two logbooks indicated the pilot had a total flight experience of 4,172 hours, with 1,308 hours of that in actual instrument conditions. Witnesses reported that the pilot was actively flying to the date of the accident.

METEOROLOGICAL INFORMATION

The weather observation for Newark International Airport, Newark, New Jersey, at 1051, was 2-1/2 miles of visibility, light rain and mist, 600 foot scattered, 1,300 foot broken, temperature 61 degrees Fahrenheit, dew point 59 degrees Fahrenheit, and an altimeter setting of 30.02 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

Oriented south to north, the debris path was approximately 760 feet long, and for reference purposes was divided into 1-foot increments called stations. Station 1 was an impact mark on the southwest corner of the roof of an abandoned three-story brick building. Approximately 50 percent of the roof and 50 percent of the third floor were consumed in the post-crash fire. On the third floor, melted aluminum was found below the initial impact mark. On the northwest corner of the roof, which was not consumed by fire, were sections of the airplane totaling about 120 pounds. After the brick building, the debris path continued to the north primarily along the left side of a residential street. It then crossed a road at station 420, a parking lot at station 480, and then another road at station 580 before ending at station 760.

Both propeller blades were located near station 335. Both blades had separated from the propeller hub, and both displayed chordwise scratching and leading edge gouging. In addition, both blades were broken into two sections. The fracture surfaces on the blades were consistent with overload, with the leading edge portion of the fractures consistent with tension, and the trailing edge consistent with compression.

The engine was separated from the airframe and was located at station 349. All six cylinders displayed evidence of impact damage, and approximately 80 percent of the crankcase had been compromised revealing the inner workings of the engine. An examination of the engine revealed no pre-impact failures or malfunctions. Both the primary and standby vacuum pumps had separated from their respective engine mounts. An external and internal examination of both units was preformed on scene, and no pre-impact failures or malfunctions were identified.

The main wreckage was wrapped around a telephone pole at station 385. It comprised approximately 30 percent of the airplane's overall mass, and included portions of the tail, floorboard, cabin area and cockpit. The dimension of the main wreckage area was approximately 8 feet by 8 feet, and less than 2-1/2 feet high. Fracture surfaces for both the wing roots and tail section were consistent with overload.

Flight control continuity was verified for approximately 90 percent of the airplane, and no pre-impact failures or malfunctions were identified with the system. Continuity of the vacuum system plumbing could not be verified because of impact damage.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot, by Dr. Lyla E. Perez on November 27, 1999, at the Medical Examiners Office in Newark, New Jersey.

According to the autopsy report, the pilot died from multiple extensive traumatic injuries. In addition, the report stated that the pilot had 2.84 (mg/l) of butalbital in his urine, (1.28 mg/l) in his kidney, and 1.44 (mg/l) in his spleen.

Two toxicological tests were performed by the Federal Aviation Administrations Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma, on heart, kidney, lung, muscle, spleen, urine, and body tissue samples taken from the pilot. According to

the test results, 3.239 (ug/ml, ug/g) of butalbital was detected in muscle, 1.887 (ug/ml, ug/g) of acetaminophen was detected in urine, and 102.488 (ug/ml, ug/g) of salicylate was detected in urine. Blood samples were not available for examination.

The FAA Toxicology and Accident Research Laboratory performed a study that compared muscle and blood levels of butalbital in post-mortem specimens. The laboratory reported that blood levels were higher than muscle levels in every individual tested, on the average 1.52 times higher.

According to the Journal of Analytical Toxicology, "blood and plasma concentrations of butalbital (from Fiorinal) was determined in a small group of healthy volunteers. After single oral doses of 100 mg of the drug, butalbital was quantitated by high-performance liquid chromatography with ultraviolet detection. Typical blood concentrations of butalbital peaked at 2.1 mg/L and declined to 1.5 mg/L at 24 hours."

According to the pilot's private medical records, he received a medical examination on February 16, 1976. During the examination, it was noted that he suffered from migraine headaches, and that he was using Fiorinal (a barbiturate, aspirin, and caffeine drug) to control the pain. Over the next several years, the pilot continued to be examined for migraine headaches, and his Fiorinal usage continued to increase.

On July 16, 1989, a telephone consultation was conducted by a nurse. It was noted that the pilot was suffering from "severe migraine" headaches, and that Tylenol or aspirin provided no relief. The pilot "refused to come in for an evaluation." He just wanted a refill that would last until morning when he could call an internist. It was also noted that the pilot was taking one Fiorinal every 4 to 6 hours. After July 16, 1989, there was no record of the pilot ever being evaluated for headaches.

According to pharmacy records, the pilot was dispensed over 6,000 tablets of Fiorinal or the generic equivalent from 1992 to October 1999. The records also indicated that in 1999, the pilot was dispensed 800 tablets of Fiorinal or the generic equivalent.

On the pilot's last FAA medical application, he stated that he was not taking any prescription or nonprescription medication, and he had never suffered from severe or frequent headaches. A review of every FAA medical application on file for the pilot, revealed the same statements as above.

According to The 1999 Physician's Desk Reference, "Fiorinal (butalbital, aspirin, and caffeine) is indicated for the relief of the symptom complex of tension (or muscle contraction) headache. Evidence supporting the efficacy and safety of Fiorinal (butalbital, aspirin, and caffeine) in the treatment of multiple recurrent headaches is unavailable. Caution in this regard is required because butalbital is habit-forming and potentially abusable....The most frequent adverse reactions are drowsiness and dizziness."

According to the October 1999 FAA Guide for Aviation Medical Examiners, a history or presence of any of the following conditions would preclude the issuance of a medical certificate: migraine headaches, migraine equivalent, cluster headaches, chronic tension headache, or conversion headaches.

In addition, the publication stated that, "...pain, in some conditions, may be acutely incapacitating. Chronic recurring headaches or pain syndromes often require medications for relief or prophylaxis, and in most instances, the use of such medications is disqualifying because they may interfere with a pilot's alertness and functioning. The Examiner may issue a medical certificate to an applicant with a long standing history of headaches if mild, seldom requiring more than simple analgesics, occur infrequently, and are not incapacitating, and are not associated with neurological stigmata." This exact same language is used in the September 1996 FAA Guide for Aviation Medical Examiners.

TESTS AND RESEARCH

On December 27, 1999, the RAPCO standby clutch assembly was disassembled and examined under the supervision of a Safety Board Investigator at RAPCO's facility in Hartland, Wisconsin. The engine-side of the clutch displayed rotational scoring consistent with a momentary impact, and the vacuum pump side did not. In addition, electrical and mechanical continuity for the clutch assembly was verified. No pre-impact failure or malfunctions were identified.

Three gyros, and two gyro cases, were examined by the Safety Board's Material Laboratory. The vacuum driven gyro from the attitude indicator displayed rotational scoring. No rotational scoring was observed either on the horizontal-situation indicator's (HSI) vacuum driven gyro, or on the turn coordinator's electric driven gyro. In addition, static marks consistent with no or little rotation were observed on the HSI gyro housing. The turn-coordinator-gyro housing was not recovered.

ADDITIONAL INFORMATION

The wreckage was released to the owner's insurance company on March 18, 2000.

[ARTICLES/20000625_183546_msg10102.tex]

Lighting Strike

Wed, 23 Aug 2000 11:00:03

In a message dated 8/23/00 12:04:14 AM Central Daylight Time, raven@tminet.com writes:

I'd like to hear that story.

Any of you ancient aviators get hit by lightning flying a Bo?

Good Morning Bill,

I have never had a static discharge in a light airplane, but Bill Embury, of the WBS and Southwest Bonanza Society, had a strike while flying in cloud on the way to a WBS flyin at Twin Falls, Idaho, a few years back. If I recall correctly, there were some marks on the prop and a few exit marks (entrance marks?) on the tail cone. The airplane looked pretty normal, but his insurance company wanted the engine and prop torn down for inspection.

I think he wrote the experience up for the WBS newsletter.

Those incidences were fairly common in the piston days, especially in the midwest and before we got airborne radar.

One time, after a pretty impressive blast in the cockpit, we had a call from the flight attendants who reported that a blue ball of fire had traveled the length of the cabin right down the aisle.

After a discharge, we would check the radios and such for damage and press on. The maintenance people often found light bulbs that had exploded and holes in some of the control surface edges. Occasionally, there would be a bearing in a hinge that would be burned out and destroyed, but I never had anything dangerous occur.

I just gotta tell you about my very first trip as a Captain!

It was 1957 and I was flying a Convair 340 from Cleveland to LaGuardia. While in cloud, near Youngstown, Ohio, we experienced a pretty potent lightning strike. Within another thirty seconds or so, we flew out of the weather and were back in nice clear skies. I checked the compasses and radios. All seemed normal. I turned off the seat belt sign, called the company to report the strike, sat back and wrote it up in the logbook.

The copilot and I then just enjoyed the flight.

About twenty minutes later, the cabin to cockpit interphone rang. When I answered the call, it was one of the stewardesses. In a very terrified voice, she asked what was going to happen?

Since I thought everything was just fine, I had no idea what she was talking about! She said that it sounded like the airplane was coming apart and that she and the passengers had been afraid to move ever since the loud bang which had occurred back when we

were still in the clouds.

Now, present day thinking is that the Captain should stay in the cockpit during unusual events and send another crewmember back to see what is going on, but since that was not then the policy, I went back to the cabin to see what was happening.

I found that the HF antenna had been cut off near the point at which it fastened to the tail. The HF radio had checked out normal as the fastening at the tail was just an insulator. The antenna was beating against the left side of the aircraft and it was making a terrible racket.

I tried to assure the folks that there was no problem and that we would encounter no difficulties on our landing at LGA. I did advise the company of the problem and didn't use reverse on landing so as to assure that the antenna wouldn't get caught in the prop. I had asked for equipment, just in case, and we stopped on the runway to allow a maintenance person to cut off the remaining antenna before we taxied to the gate.

So, my first trip as Captain and I had to file an irregularity report!

Happy Skies,

Old Bob

[ARTICLES/20000823.110003.msg12469.tex]

Loss of Airspeed Indicator/Heated Pitot Tube**Wed, 20 Oct 1999 08:43:59**

In a message dated 10/19/99 11:33:59 PM Central Daylight Time, sderrick@tnstaafl.net writes:

I'm looking for a heated pitot and mast. I don't believe you need a heated on for IFR cert though.

I fly my BE35 IFR with a cold pitot. Though I pay real close attention to the OAT if I'm in the wet.

Scott

Good Morning Scott and Gord,

For What Its Worth; Beech called the unheated pitot tube installed on the early Bonanzas an "Ice Resistant Pitot Tube." The first couple of thousand hours I flew in Bonanzas were in aircraft with that tube and I did find it to be ice resistant. While flight in cloud in a Piper Pacer or Cessna 170 would result in a loss of the pitot indication almost immediately after noting any ice anywhere on the airframe, such was not the case on the Bonanza. I would often pick up an eighth to a quarter inch of airframe ice before I lost the airspeed.

In those days of yore, very few light aircraft were equipped with heated pitot tubes. Our flight training and conditioning was such that the loss of airspeed indication was not only tolerated, but expected and the flight was conducted accordingly. Proper attention to power settings, the attitude instruments (if installed) and the remaining rate instruments made the operation acceptable.

I would like to make some further comment.

Autopilots were not available and attitude gyros were rare, we developed rather good scans and utilized partial panel a lot.

BUT, we had very little to do except fly the airplane!

The low frequency range took very little tuning and that tuning was done mostly with the ears. Navigation was also via the ear and our transmitters were so weak that we rarely had to communicate. There were no VORs, few ADFs and no Flight Management Computers to take our attention away from flying the airplane.

These are different times and the problems are different. While I think all of us should be able to control the airplane comfortably after the loss of the pitot tube information and on a basic partial panel, my current airplane has an autopilot and I find it difficult to fully use the full complement of flight aids available today without using the autopilot.

Just remember, if you do lose your airspeed, the first priority is to fly the airplane!

Happy Skies,

Old Bob

[ARTICLES/19991020.084359.msg09513.tex]

Loss of Control - Stop the Turn!**Fri, 28 Apr 2000 20:58:47**

In a message dated 4/28/00 7:21:36 PM Central Daylight Time, jtsmall@onramp.net writes:

Have I missed the point of the T&B vs the TC?

Good Evening John,

Your thoughts are on the right track but you have the functions confused.

The T&B responds only to yaw. The turn coordinator has the canted gyro and responds to both. The beauty of the turn needle is that it tells you when you are going straight. If the airplane is not turning, you won't get in trouble. If John Kennedy and Itzakh could have stopped their turns, they would be with us today. Admittedly, if the wings are level and the airplane is coordinated, it should not turn. but if something has it out of balance (like an engine out) you can still get in trouble with the wings level. I repeat! Stop the turn and you will survive.

Happy Skies,

Old Bob

[ARTICLES/20000428_205847_msg07257.tex]

Loss of Control - Stop the Turn!

Thu, 11 May 2000 01:42:39

Good Morning All,

If anyone is interested in another opinion concerning the validity of stopping the turn to avoid bad things, check out the article by Paul Soderlind on AvWeb at <http://www.avweb.com/articles/spiral/>

He advocates using rudder only to stop the turn. I agree whole heartedly, but contend that the best instrument to use to determine that the turn is stopping is the good old fashioned Turn Needle!

Paul suggests cautious and gentle use of the rudder.

I wouldn't worry about being too gentle if things are going some place in a hand basket. Just shove on that rudder and get the needle back in the center.

Stop the turn and you will survive!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/20000511.014239_msg07991.tex]

Loss of Control - Stop the Turn!**Tue, 4 Jul 2000 18:25:25**

In a message dated 7/4/00 11:45:16 AM Central Daylight Time, jtsmall@onramp.net writes:

Guys, I'm still having a little trouble fundamentally understanding this truth. I was always taught to keep the wings level and you will survive. Nothing about the nose other than to keep out of a dive with rapid build up of speed.

Good Evening John,

Obviously there is a big difference of opinion as to whether the primary emphasis should be on wings level or not turning.

I am a strong believer in making the emphasis on stopping the turn. I don't care whether the airplane is coordinated or not and I don't care if the wings are level.

If the airplane is not turning, you won't get in trouble.

My reasons for thinking this way are partially directed toward multiengine aircraft, but even on a single, if something happens that causes asymmetrical drag, stopping the turn will still give the pilot the best chance to sort things out.

The guys who came within 60 some feet of planting a 747-400 in San Francisco had their wings level but were turning off course toward much higher terrain.

Even more than the asymmetrical drag possibility, the simplicity of just stopping the turn seems to fit better with all of the non conventional back up emergency sources of information. If one wants to try to use a GPS or compass as a source of maintaining emergency control, it is stopping the turn that will tell you things are OK. How will you tell that the wings are level by looking at a GPS? How can you tell the wings are level by looking at a DG? How can you tell the wings are level by looking at a magnetic compass?

You can tell whether the airplane is turning by looking at an ADF pointing to a station some distance away. What will the ADF tell you about how level the wings are?

When I was a lad, I was taught that if I ever got stuck on top of an overcast without instruments, one way to get it safely down through that stuff was to head toward the sun and mark the spot where the sun was on the windshield. Maintain the sun in that position during the descent and survival was possible. That is totally a function of not allowing the airplane to turn. Who cares whether the wings are level or not?

Trying to level the wings to stop the turn is an unnecessary extra step. You first level the wings and then look to some sort of a heading device to see if the turn has stopped. I consider that to be a waste of effort that just might be the trigger that upsets the entire apple cart.

When all h— is breaking loose, most of us need something simple that we can hang our last hopes on.

Make your mind think turn, not level!

The change to attitude flying instead of rate flying came upon us during WWII as one of those war time training expediencies.

It was seen as a way to produce pilots who could get the aircraft over the target as long as everything was working OK. If they lost their attitude instruments, they could always bail out! Rate flying takes longer to learn than does attitude flying, no question about that. However, it is my contention that those who have learned to maintain control of the aircraft via rate instrument flight are more likely to adapt to an unusual failure scenario than are those whose proficiency is based on attitude flying.

It is rather like those who learn to fly on tail wheel equipped aircraft and those who have flown only trigrigear. The ones who learn on a tailwheel equipped aircraft experience little if any difficulty transitioning to trigrigear. The trigrigear trained ones, depending on how they were taught to fly the trigrigear, will often experience considerable difficulty transitioning to tail wheel equipped machines.

I don't know any pilots who are proficient in rate flying who have any difficulty flying attitude. Many who are proficient in attitude flying find it difficult to utilize only rate instruments.

I teach and strongly endorse the use of rate instrument flight as the basis from which to transition to attitude based flight.

Think TURN!

Happy Skies,

Old Bob

[ARTICLES/20000704_182525_msg10524.tex]

Loss of Control - Stop the Turn! (Demonstrating)**Wed, 5 Jul 2000 13:06:57**

In a message dated 7/5/00 10:57:20 AM Central Daylight Time, bgosnell@prodigy.net writes:

Some time ago several on the list were talking about recovery from spirial using only the rudder. I tried this and it was a little nerve racking seeing the slip so great during a high performace manuver. I felt that this sort of recovery, expecially during a time of emergency you would want to do it as quick as possible and and in as coordinated fashion as possible. Why is it that all you rudder recovery guys think this is the way to go?

Brad...

Good Afternoon Brad,

I think something has been lost in this discussion.

A coordinated recovery would be my choice anytime, but if that were not working, the rudder use to stop the turn would take precedence.

The demonstration that it can be done with rudder alone is supposed to be a confidence builder to help a totally non instrument qualified pilot realize that there is a way, though a very uncomfortable way, to get the airplane into a safe flight regime by the use of nothing but a control that will stop the turn.

When making the demonstration, it is best to not get the aircraft into too violent an attitude before executing the recovery technique. It also helps to make the input steady and not too abrupt. It will be found that just pushing hard enough on the rudder to stop the airspeed from increasing is hard enough to start with. Completely stopping the turn can take a fair amount of time without lessening the effect to be noted.

Obviously, some airplanes can handle a greater displacement more comfortably than others. Aircraft with interconnected controls do it a lot nicer than those not so equipped.

Still, if all else fails, stomping on the rudder will work and it puts the petrified aviator on the course of stopping the turn which is the thing that is most likely to assure survival of the aircraft.

The emphasis on the turn is the important thing. By having the student not use the control column, he/she is less likely to add the back pressure too soon which is the action which will place the aircraft in that dreaded grave yard spiral.

For a knowledgeable instrument pilot who is capable of recognizing the incipient spiral, a coordinated roll to level using rudder and aileron is always preferred. Even judicious and pertinent application of pitch is desirable provided the pilot is aware of what is happening.

The "stomp the rudder" procedure is a last ditch effort for the pilot who is scared to

death and completely disoriented.

It will work, but is certainly not the best method of recovery. It does, however, beat the devil out of just pulling back on the stick!

Happy Skies,

Old Bob

[ARTICLES/20000705_130657.msg10587.tex]

One Main Landing Gear Won't Extend**Fri, 16 Feb 2001 18:20:02**

In a message dated 2/16/01 2:22:51 PM Central Standard Time, epoule@scoot.netis.com writes:

If you get into a situation where the nose and one main gear extends but the other one won't, are you better off landing that way, or retracting the gear (if you can) and landing gear up?

Good Afternoon Eric,

Forty years ago, I would have said that you should retract the rest and land gear up.

That was the recommendation of most authorities, both airline and military in those days.

Today those same entities generally recommend getting down everything you can and landing that way.

A friend of mine landed his Travelair with the right main up and the rest down in the early sixties. He did not notice any difference in sound or feel when he extended the gear and, of course, those wonderful Beechcraft gear warning devices showed that the transmission shaft had turned as far as it is supposed to and that the nose gear was not up.

He landed on a one hundred foot wide hard surface runway. The airplane did not leave the hard surface even though he had no idea his aircraft was not in a normal configuration. The right wing looked pretty wrinkled, but when we took the weight off of it, the wrinkles came out and the wing checked out OK.

Based on that experience and in conformity to most modern thinking, I believe I would opt for putting down any gear that I could and landing intentionally the way my friend landed accidentally!

Incidentally, back in those days, many authorities also recommended that gear up landings be done on sod. Unfortunately, many who tried that ended up on their backs or with the airplane breaking up badly due to structure digging into the ground.

Most authorities now recommend landing on the smoothest hard surface you can find and I agree with that philosophy.

One more complicating thought.

My friends problem was caused by the same problem that ended up as an AD on the uplock roller. There was a rash of such happenings at the time.

I heard shortly thereafter of a case where the tower had told a pilot that one of his mains was not down. The pilot cycled the gear. The gear came down and locked.

Normally I would recommend that if anything goes wrong with the bonanza gear, that it not be cycled. Unlike a hydraulic gear, that rarely helps and could easily tear things up badly.

In the subject case, the uplock roller hung up and would not move out of the way to allow the gear to extend. The tube which pushes the gear down buckled. When the gear was cycled, that straightened the tube back out again. The bending motion hardened the material enough such that the next time the effort was made to extend the gear, the tube managed to shove it off the roller and down it went!

Seems like something of a million to one shot.

I don't know if I would want the ends of that bent tube punching around inside the wing so close to the fuel tank and all, but in that case, it worked.

I would probably land with one gear down and the other up rather than try to cycle it.

I would definitely go for the hard surface.

Happy Skies,

Old Bob

[ARTICLES/20010216_182002.msg04019.tex]

Partial Panel**Mon, 1 Dec 1997 18:57:28**

Good Evening Ernie,

In a message dated 97-12-01 16:25:21 EST, you write:

I had my CFII do that on my last ICC and after covering everything up, but the ARGUS 3000 I was able to keep control somewhat jerkily. I was under the hood

so we weren't sure if the sunlight shadows were helping me, but I was sweating blood trying to keep things going.

I trust you are not putting flying with a "complete" partial panel in the same category as keeping oneself right side up with a GPS or a magnetic compass heading south.

While I do suppose practice with such procedures would definitely provide improved performance, I rather doubt if anyone could ever attain the proficiency that ALL can reach with a "needle, ball and airspeed".

Remember that up until the middle fifties, we were not allowed to use the Artificial horizon and the DG during training and for the flight test. As I am sure has been noted many times, we who did that are a long way from being supermen. It really isn't that hard! BUT, it does take some practice.

I think that one of the reasons that partial panel has attained such a bad reputation is the proliferation of the turn coordinator. It just does not present the information in a manner allowing comfortable and precise instrument flight. The old style needle instrument does.

I guess I am beating a dead horse, I seem to be on the losing side.

Happy Aviating to All,

Bob Siegfried

[ARTICLES/19971201.185728.msg02585.tex]

Post Accident Blues**Sun, 05 Dec 1999 12:06:05**

In a message dated 12/5/99 10:42:50 AM Central Standard Time, jtsmall@onramp.net writes:

But strangely, for the first time in my life I find myself not much wanting to fly. I just can't seem to shake either the violence of Itzhak's accident or its implications for IMC operations.

Good Afternoon John,

That is a natural reaction when we find someone involved in an accident who we feel had a competency equal to or greater than our own. "If it happened to him, it could happen to me!"

The military learned early on that it was important to get the students back in the air as soon as possible following an unfortunate occurrence.

You need to do likewise!

Remember that Itzhak's accident is statistical insignificant considering the thousands of flights that are regularly completed successfully by fat old men like me and thousands of young and eager new aviators.

The risk is acceptable to most and manageable by all.

I would suggest that you reaffirm your ability to fly the aircraft using whatever source you feel is the proper one for you to place your reliance on.

I am of the opinion that simpler is better and I don't care for redundant instrumentation that is not used in normal flight. I think that one should regularly include whatever turn instrumentation is installed for true flight purposes, not just to see that it is working.

We do best what we practice!

Instead of making a twenty degree banked turn to the left by the use of your Attitude gyro, try rolling into that turn with the gyro, then checking your TC or T&B to see that the turn is at standard rate. If it is not, adjust the bank with the attitude gyro until the turn rate is at standard rate.

Sure, standard rate isn't all that important most of the time. The airspace limits are based on us making a standard rate turn (modified by certain autopilot and flight guidance limitations) but at the speed we are flying we will stay within the limits almost all of the time with a nice comfortable twenty degree bank. Using thirty degrees will always meet the requirements in a Bonanza, even if your are on the redline!

But if we try to always make the turns at standard rate, the TC or T&B will become part of our normal scan and it will be much easier to use it to pick up a failure of the attitude gyro or to fly the airplane in the partial panel configuration.

I would suggest that you try to arrange your instrument panel in a manner so that the instrument you use for primary heading reference is not powered by the same source that provides your primary roll control.

In my Bonanza, I have an electric HSI and a pneumatically powered attitude gyro.

My Pacer has the old AN style pneumatic powered Directional Gyro and Artificial Horizon installed. Since those are from the same source, I really work hard to keep my electric T&B in my normal scan and I use a handheld GPS mounted on the control wheel all of the time to monitor my "track made good." I feel very comfortable that I would pick up any failure of the pneumatic system early on.

I would suggest that you do some hood time soon to gain back the confidence that you need to comfortably use your airplane.

The addition of more instruments and standby systems that have to be checked to see if they are working does not seem to me to be what you need to increase your confidence in the suitability of your airplane for your intended use!

One of the things I like best about my standby alternator is that it takes no action on my part for it to be put in service. If the voltage falls below twenty-six volts for any reason, the standby comes on the line. When I get the time and things are under control, I can reduce the load to what the unit is designed to carry. It will stand a substantial overload for a few minutes at least.

Get back to those Happy Skies!!

Old Bob

[ARTICLES/19991205.120605.msg11648.tex]

Recognizing Failed Instruments**Wed, 5 Jul 2000 19:19:48**

In a message dated 7/5/00 5:58:41 PM Central Daylight Time, epoule@scoot.netis.com writes:

On Wed, 5 Jul 2000 BobsV35B@aol.com wrote:

If my primary attitude instrument should fail, I don't think I would be flying IFR very long after that failure, so the idea of having two T&Bs each powered by a separate source seems a little nicer for my "last ditch" purposes.

If one of them fails, how do you determine which one it is?

Good Evening Eric,

That is relatively easy.

The only failure mode that I have ever experienced has been for the T&B to refuse to wiggle. The needle just stays in the center.

A quick and light stab at the rudder will show the wiggle or no wiggle.

The one that wiggles is correct.

Even if a failure occurred such that the needle stuck to one side or the other, the one that was wiggling would be the one that was working.

I have had failures of artificial horizons where the failed unit continued to show roll indications, but was showing one wing twenty or thirty degrees low when the aircraft was actually level.

The indication of a failed TC should be almost as apparent as the indication of a failed T&B. It wouldn't wiggle either, though to me, the lack of a wiggle is more prominent for the T&B since it only reacts to yaw and not to roll.

Most, but not all, T&Bs are more lightly dampened than most TCs. The wiggle then shows up more prominently.

Happy Skies,

Old Bob

[ARTICLES/20000705_191948.msg10611.tex]

Recognizing Failed Instruments

Tue, 19 Sep 2000 10:49:16

In a message dated 9/19/00 12:26:55 AM Central Daylight Time, jtsmall@onramp.net writes:

I am not following your reasoning on this part. It seems that if two AI's are not agreeing one knows immediately that he has a problem, and not later when he's entered a spiral dive.

It could be we're getting into a rate vs attitude method of primary instrument aircraft control? If so it is reasonable to expect many of us who are taught mostly on attitude to be having some difficulty with the change over to rate based flying.

-jts Arlington, TX

Good Morning John,

It is not unusual for an attitude instrument to fail in such a manner that it still moves but is inaccurate in its indication. No doubt that most of us would recognize that situation as abnormal and consider it to be a problem to be solved.

The next step would be to decide if we were going to use attitude instrumentation, rate (performance) instrumentation or both to arbitrate.

A complicating condition might be that the pilot has already mentally accepted the information from the failed instrument as the correct information. That can induce a state of confusion. It is that state of confusion or incorrect analysis which can lead to an input to the controls that will aggravate the situation to the degree that there is not time for recovery.

My search has been for a method that I felt I could latch onto as my last ditch, lay it all on the line, solution should I ever be in that situation when nothing is adding up.

If I install two artificial horizons and they do not agree, I have to determine which one has failed.

If I install two T&Bs and they do not agree, I have to determine which one has failed.

In the case of the horizons, if there is another complete panel and possibly a copilot to monitor that panel, the resolution is relatively easy to determine and accept. But, if I am by myself and have only the one panel with two attitude instruments, chances are that it will take some conscious thought to evaluate other instrumentation and determine the failed instrument. I would probably revert to the performance instruments to evaluate the condition, but that may well be a reaction based on my past experience.

Carrying this a bit further (Honest, I will get back to the T&Bs later) If our engineers can design an instrument (or full time autopilot) which absolutely cannot fail we could use it as that fall back instrument in the manner that flight in the Air Bus is now

accepted. The Air Bus designers feel that the pilot is the entity most likely to make a mistake and therefore give the aircraft the right to make the decisions as to how it will operate. (A simplification, I know, but not too far off the mark) If we have such a "non fail" instrument, we would have no need for any backup!

Back to the T&Bs.

If I have two T&Bs mounted side by side, it would be hard to see one without seeing the other.

Since I have never seen a failure of a T&B where it still wiggled following that failure, I think the instrument that was still wiggling would intuitively be the working instrument to almost anyone.

If neither one was wiggling, a tap on the rudder should bring one or the other to life. If that doesn't work, it is going to be bad day!

The preceding statements concerning the T&B can be applied to the TC as well. It is basically the same instrument with similar failure modes and responses. The only difference is that the gyro is canted so that it responds to both roll and yaw inputs. I suppose a case could be made that since the TC has a couple of more moving parts and those parts are slightly more massive, there is a slight statistically greater chance of failure for the TC than for the T&B.

My complaint about the TC concerns the fact that it does respond to both roll and yaw along with the presentation that leads so many aviators to use it as a roll control device instead of a heading control device.

Since it responds to both roll and yaw, you have no way of knowing for sure what it is telling you without reference to other instrumentation. I prefer the single-mindedness of the T&B.

I also feel that the concentration and flight control thought should be directly on control of heading and not on the secondary method of controlling the heading by first controlling the roll.

There is no question that using roll is how almost all of us control the heading. After we fly for a few years or even a few hours, that becomes intuitive. The problem becomes when we are highly stressed. I think that our minds should be programmed to think heading and not roll. The current rash of incidents and accidents involving aircarrier aircraft are consistently showing a lack of heading awareness in modern aviators.

Should we go back to teaching IFR flight as a rate based endeavor? I don't have strong feelings one way or another, but I do teach a lot of rate technique because the instrumentation we currently have available to most of us supplies a lot of useful rate information. We should be trained so the use of that information becomes intuitive and does not require thought.

How do I fly my airplane? I fly attitude and monitor my flight by observing the rate instruments. Isn't that what you do too?

I do not carry a parachute yet I know that wings do fail. I suppose that there may become a day when I will have that acceptance of risk concerning instrument failure.

Right now I am at the stage where I feel that providing two T&Bs will give me a level of confidence in my back up flight capability such that I am willing to fly IFR without a parachute!

Incidentally, I have not yet installed the second T&B. I had two in my early Bonanzas, but as the years went by, I gained confidence in the basic reliability of the instrumentation available and I eliminated the second T&B.

After Itzahn's accident, I have been rethinking my backup philosophy and realize that I might well have had the same difficulty as did he.

It appears to me that it is quite likely that he decided things were just not adding up. He did what he had always told his students to do. Forget everything else and concentrate on the TC and the heading instrument until you get things sorted out.

That is what I have always told myself to do and that is what I teach my students.

It appears that his TC and HSI had both failed.

I have decided to go back to the duplication of that last ditch instrument.

I know of no other instrument which is as low cost and as easy to interpret failure with as is the T&B.

Happy Skies,

Old Bob

[ARTICLES/20000919.104916.msg13721.tex]

Recognizing Failed Instruments**Wed, 20 Sep 2000 19:21:35**

In a message dated 9/19/00 12:06:08 PM Central Daylight Time, jtsmall@onramp.net writes:

I still wonder why the compass did not bail him out.

Good Afternoon John,

Have you ever tried to determine the heading by just a magnetic compass in anything less than a relaxed smooth air atmosphere? In the northern hemisphere, I suppose almost anyone could make a reasonable descent down through a cloud deck by heading south and carefully monitoring the magnetic compass as long one had time to set things up while comfortably in the clear and think through the problems about to be encountered.

I, for one, wouldn't even think of trying to use a magnetic compass, especially those little things we have in our Bonanzas, as a basis for determining whether my turn was stopping or accelerating in anything other than such a situation. I doubt if Itzhak's state of mind was such that a magnetic compass would have attracted his attention.

It appears that his TC and HSI had both failed.

Yes, that's what the article said. If the TC fails, does it still wiggle and therefore be more difficult to isolate failure than a T&B?

As Stuart stated, the T&B is almost certain to fail to a neutral position.

I would say that it is most likely that a TC would also fail to the neutral position. It has a couple of more pieces to fail than a T&B, but it is still unlikely that a failed TC would show other than a non rolling, non yawing indication. If it was wobbling, that would mean that the aircraft was either yawing or rolling and the TC was working.

Itzhak's TC was likely showing a "wings level" indication and not wobbling at all.

The failed HSI would be showing a stable heading and reinforcing the "no turn" indication of the TC.

A very difficult situation to sort out anytime, let alone right after takeoff into relatively low weather.

Gads! Has my AI failed? I had forgotten I was in a turn! And then I thought, am I in a spiral dive?

You did a good job of scanning the instruments and arriving at a proper interpretation of what the airplane was doing, but as I understand your situation, the autopilot was flying the airplane and giving you a few moments of relative calm in which to determine what had failed.

Had the failed gyro been the one which was providing the roll sensing for your autopilot,

the situation might well have been quite a bit more stressful with less time available for analysis.

I don't think I ever caught the TC as it is now located to the left of the secondary AI and I am not accustomed to scanning that location. Try as I might I have so far been unsuccessful in bringing it back in my basic focused scan

-jts Arlington, TX

This is a major problem with any equipment that is intended to help us determine failure in the instrument being used by either the controlling human pilot or the autopilot. If we don't use it regularly, it takes even longer to recognize and correct for a failure.

In the days of yore, when the system required timed turns, even those who were equipped with that fancy artificial horizon would regularly scan the rate of turn instrument and adjust the angle of bank so as to maintain that time honored standard rate turn. That requirement forced us all to bring the rate instrument into our attitude based flight control scan all of the time.

While a TC is a little more difficult to use than a T&B to determine standard rate, it will do the job if the flight is well coordinated. The problem is that few of us ever look at it anymore. That is one of the reasons that I intend to add the large T&B back to my primary panel. I found that I am not using my small T&B as much as I formerly did and that bothers me.

You have described the process you went through of checking various instruments to determine what had failed. Your procedure was fine, but don't you think it would have been easier to determine failure of a turn instrument, either a T&B or a TC, than it was to determine which attitude gyro had failed? You had to look at supporting instrumentation to make that determination. A side by side comparison of two TCs or two T&Bs should show intuitively which one was working with no need to evaluate supporting devices.

All of the above is strictly conjecture. Just like you, I have always managed to pick up failed horizons by evaluation of other instrumentation. The same goes for failed turn instruments. Everything else was always working and the guilty party was easy to spot.

It may be that adding any dual instrumentation is overkill and confusing, I am really not sure, but if I have to make a decision between two instruments as to which of two like instruments is telling me the truth, I think it would be easier and quicker to determine the operating instrument when using T&Bs than with any other instrument available.

For What It's Worth!

Happy Skies,

Old Bob

[ARTICLES/20000920_192135_msg13780.tex]

Risk and Additional Pilot**Sat, 22 Jan 2000 12:23:41**

In a message dated 1/22/00 7:46:24 AM Central Standard Time, epoole@netis.com writes:

Why is that? I would think it would be a safety advantage if nothing else. If anything happened to you, your wife or other right seat passenger, if he/she had any flight experience at all (including a Pinch Hitter course), could probably use all the help he/she could get.

Good Morning Eric,

I suppose it is primarily a matter of philosophy.

The scheduled air carriers in the contiguous 48 have a much better safety record than do we single engine, single pilot operators. We can add certain components of the air carrier operating philosophy and we may advantageously affect the resultant safety equation.

I personally think that the most productive additional factor that can be added to any flight operation is another qualified pilot. I think that will add more safety than a second engine, deicing, supercharging or anything else you can think of!

BUT, I think the single pilot, single engine combination meets my requirements adequately.

One of the things I like most about the flight control setup of the Bonanza is the ability to make it a strictly single control cockpit. No control wheel, column or rudder pedals in the way of my right front seat passenger to interfere with their enjoyment of the flight.

Folding down the rudder pedals and placing the rug on top provides a place for all sorts of paraphernalia which my most common right seater likes to haul along. If I deprived her of that storage space, I would hear about it in no uncertain terms!

So, for me and my operation, rudder pedals that had brakes and could no longer be stored out of sight would be a major detriment. If I were evaluating a purchase, the cost and trouble of removing them would be included in my deliberations.

Incidentally, there was a time some sixty years ago when it was illegal to have a set of controls where a non pilot could reach them unless the airplane was under the command of a licensed flight instructor.

That is why the J-3 Cub, Fairchild 24 and most other airplanes of the era have removable control sticks at the non pilot station. The throw over column of the Beechcraft Staggerwing and the Bonanza are outgrowths of that regulation.

Times and philosophies do change over the years. Not all of us change with them.

Happy Skies,

Old Bob

[ARTICLES/20000122.122341.msg01291.tex]

Risk and Comfort Level**Fri, 23 Jun 2000 22:58:11**

In a message dated 6/23/00 9:39:08 PM Central Daylight Time, jtsmall@onramp.net writes:

Bob I wonder, did you find this preferable to executing the procedure alone as you do now in the example to your daughter's house that you gave?

Good Evening John,

I think the addition of another qualified pilot is the single greatest improvement to overall safety that can be added to the aircraft.

On an overall basis, I think that a single engine, single instrument source, single electrical power source, single radio equipped airplane with a second qualified pilot will have a lower statistical chance of having an accident than the most redundantly equipped single pilot multiengine aircraft.

My spouse is not a qualified pilot. In fact she does not fly at all and has no interest in being involved in the operation of the aircraft. She will watch my fuel gauges and tell me when to switch tanks because she doesn't like the lack of sound which occurs when I run a tank dry!

Beyond that, she knits and sleeps.

I have established many procedures and techniques for single pilot operation that I hope help me toward the level of safety that I could achieve with a multiple person crew.

Is the level of safety adequate?

It meets my level of comfort.

Would I prefer a multiple pilot crew?

Absolutely!

Happy Skies,

Old Bob

[ARTICLES/20000623.225811.msg10035.tex]

Safety and Design Philosophy

Wed, 5 Jul 2000 11:23:27

In a message dated 7/4/00 12:12:35 PM Central Daylight Time, jtsmall@onramp.net writes:

Old Bob, with the apology of repeating myself, this is the part I don't understand why ... why this approach? Why is it inherently superior to the way Eric and I were taught? I do understand what it is that you have said and it would help me to understand the why.

Good Morning John,

While I hope I have answered your question adequately in other posts, there is one more view point I might add.

There currently rages an argument as to whether we should make a machine that the operator cannot possibly be injured using or whether we should make a more efficient machine which requires training to be able to avoid operator injury. (Fortunately or unfortunately, our present litigious society drives us toward the former, possibly less efficient, system.)

One of the prime examples is the AirBus philosophy. The airplane is designed with the idea of giving the pilot as little manual capability as possible. Redundancy is rampant. In order for the pilot to directly fly the airplane without the autopilot being involved at all, so many systems have to be deactivated that the aircraft approaches a dangerous configuration.

The theory is that the human is more fallible than the machine so we must not let the man make the decision as long as the machine is operating.

The Boeing philosophy is a little different. They agree that the machine is less likely to make a mistake, but allow the pilot (operator) to revert to manual while the safety devices are still engaged.

The decision as to what and how much automation to use is left to the operator.

The argument over what is prime, attitude information via an attitude indicator or attitude information by the operator's analysis of the rate instruments is a facet of that same philosophy. If you assume that machines will always be better than humans, you load the aircraft with multiple redundant attitude devices. To carry that argument further, you would need at least three attitude instruments and they would have to contain a device that could automatically determine if one has failed by some sort of a comparison system. We had such devices on the early autoland autopilots.

You will note that when those who have two attitude indicators are asked how they can tell which one is working properly in the case of a disagreement, they will refer to indications on a rate instrument, usually some sort of heading indicator, to make the decision. So they may think they are using a redundant device when they are really

only providing a back up which can be used AFTER they have discovered a failure by monitoring a rate instrument.

One more emphasis on a point I tried to make earlier, but which seems to have been disregarded by all.

Having the wings level does not guarantee the aircraft is not turning. That will only be true if the aircraft is in trim and all components are working properly.

We all realize that coordinated flight is almost always more comfortable and more efficient than uncoordinated flight.

Stopping the turn is paramount in gaining control of the aircraft.

Stopping the turn by leveling the wings MAY work.

Stopping the turn by centering the Turn Needle always works.

Hope that helps!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/20000705.112327.msg10570.tex]

See and Avoid**Sun, 21 May 2000 12:03:19**

In a message dated 5/21/00 1:15:13 AM Central Daylight Time, jtsmall@onramp.net writes:

Good morning? Bob, does the 295 display obstructions and their elevations? I was informed yesterday that it (and the 195) does not? I now wonder does the Skymap IIIc?

I was stunned by this as it is one of the most important features to me on the AirMap 100 (Jeppesen database). I cannot image flying direct without this capability. Airways, no problem ... but direct it is a must for me.

Good Morning John,

I see that your question concerning the 295 has been adequately answered by others, however, I find your comment concerning going direct very interesting.

I suppose my attitude is at least partially a result of so many years of flying before all those electronic aids were developed, but I don't think I would place an awful lot of reliance on any information source to keep me clear of obstacles at low altitudes (a relative term of course) and at IFR altitudes I rely on the Jeppesen sector altitudes.

If I am flying down where TV towers and their supporting wires are likely to be sprouting, I want adequate visibility so that I can 'see and avoid.' Any database (including the sectional charts) that shows the towers is likely to be at least six months old when I am using it.

Towers can sprout a lot faster than that!

Notams help, but it is very difficult to check all of the low altitude information for a trip of any appreciable length.

I know of very few obstacles that are more than 2000 feet AG, so my rough rule of thumb is to tell any passengers that they should be watching for towers as well as airplanes anytime we are flying at less than 3000 AG. If I am solo, I try to remind myself to add that factor to my exterior scan for traffic.

I guess what I am saying is that exterior vigilance is the only way to avoid hitting things anytime we are flying in visual conditions. I like having the extra information about known obstacles readily available whether it is provided by a sectional, Jepp chart or electronic device. I would like to have it on my moving map, but it is never something to be counted on!

Happy Skies.

Old Bob

[ARTICLES/20000521_120319.msg08421.tex]

See and Avoid**Sun, 21 May 2000 13:45:47**

In a message dated 5/21/00 11:24:04 AM Central Daylight Time, bgwells@uswest.net writes:

Bob,

TV/Radio towers are a problem. I minimize the problem by flying IFR "I follow roads" method. Less chance of a tower sprouting up directly over a highway perhaps. Moving maps that have highways depicted is a great feature.

Good Afternoon BG Wells,

That helps, but I have seen supporting wires that crossed a major highway. It is the wires that worry me most. They are very difficult to see and I know of no way to spot them other than to locate the tower and then figure the wires are out at around a forty-five degree angle. They are usually steeper than that, but if I stay the same distance from the tower as it is high, the odds are good that I will miss the wires. When I was a student, my instructor told me that I should stay down in the valleys and away from high points when flying in marginal weather. He said that radio towers (this was before TV) were always placed on high spots and you didn't need to worry about towers when flying along the road in the bottom of a valley. It was only a couple of years later that I was delivering a J-3 to a customer in northern Wisconsin. While following a highway down a valley in marginal weather, I came upon a radio tower that was just a couple of hundred feet from the road and right down in a valley between some hills that were at least three or four hundred feet high. So much for the "towers are always on the hills" theory!

Our California friends are all familiar with the feeling of tranquility they occasionally have when buzzing merrily along up and down the coast on top of all the clouds. It is always something of a shock when a tower is observed poking it's way above those nice smooth cloud decks. Even more unnerving is to be flying at 3500 feet northeast bound VFR on top just east of Columbia, Missouri and suddenly see those two TV towers sticking out the top of a completely flat and tranquil overcast.

Knowledge of their position is great, but there is nothing quite as good as looking out the window.

Happy Skies,

Old Bob

[ARTICLES/20000521_134547.msg08427.tex]

Single Verses Twin**Fri, 28 Jan 2000 23:54:43**

In a message dated 1/28/00 10:29:09 PM Central Standard Time, bgwells@uswest.net writes:

Is a twin engine airplane twice as likeley to loose a engine as a single engine airplane ?

Good Evening BG,

Do we wish to discuss this factually or facetiously?

If we only consider failures caused by problems internal to the engine, I would say that a twin has twice the probability of failure as a single. However, most failures are caused by other factors. Fuel starvation, either lack of, or mismanagement thereof, is a large issue. What about improper operation of the engine and it's controls?

Other than just the number of engines, are there differences in the way multiengine pilots operate?

Does the added complexity of the multiengine airplane lead to more errors of operation? If more errors do occur, do they lead to incidents or accidents?

Looks like a couple of months worth of arguments to me!

Happy Skies,

Old Bob

[ARTICLES/20000128_235443_msg01981.tex]

Standby Equipment**Sat, 1 Jul 2000 04:52:13**

In a message dated 7/1/00 2:32:13 AM Central Daylight Time, DirkDeJonghe@compuserve.com writes:

I am a bit worried when a pilot would rely on a piece of electronic equipment to get him out of a partial panel situation. This is separate from having a separate standby source for air or electricity.

Good Morning Dirk,

No argument at all from me!

I can't understand why all pilots don't maintain a good partial panel capability. The fact is, I think one of the reasons so few do maintain that capability is the lack of honesty of the TC.

BUT, that doesn't mean we should not consider what other equipment IS capable of doing.

Reliance is one thing, using what you have is another.

When we are totally confused and have no idea what is going on about us, it would be nice if there was something that might save our tails.

There is a good possibility that JFK, Jr. may have been OK if he had been flying a sixties vintage Mooney with a PC unit. It would work best if it were on all of the time the way the Mooney was set up. It is a lot tougher to activate it once you are in trouble.

I know that we all think that we will never be in that sort of a situation. However, it has happened to very experienced pilots as well as some young folks who are still on that steep learning curve!

The PC and Constant Copilot idea never caught on with the flying public and maybe that is just as well. I don't know.

I have never been in a situation where my T&B failed during a critical time. I have trained myself to have such extreme confidence in that instrument, that if it failed and I didn't catch the failure, I might lose it as easy as JFK did.

One of the few things I THINK I have learned is: It can happen to me!

I like to keep things simple. That is not just to reduce the chance of a pilot induced error. Simple is also, generally, cheaper.

The answer that I like best is to have two T&Bs, each powered by a different source, but that doesn't mean I won't fly with less!

Flying is still a calculated risk.

Happy Skies,

Old Bob

[ARTICLES/20000701_045213.msg10420.tex]

Stopping The Turn with a T&B**Sun, 2 Jul 2000 00:22:35**

In a message dated 7/1/00 1:00:22 PM Central Daylight Time, epoule@scoot.netis.com writes:

So, level the little airplane with the ailerons and kick the ball into the center and you should be going straight ahead. Then all you have to do is monitor the altimeter and VSI to make sure you're level.

Good Evening Eric,

Lot's of things will work to some degree. The technique you describe obviously works for you. That's fine, but I think your method is backwards.

I teach a different philosophy. It my thought that the rudder should be primary for stopping the turn and the aileron should be used to attain coordinated flight. That means that you stomp on the rudder to put the TC or the T&B in the center of the instrument and you use the aileron to maintain coordination or put the ball in the middle. I want the student, regardless of his/her experience, to be thinking 'turn'. Not wings level. I could not care less whether the wings are level. What I want to see is the turn stopped. Coordinated or not the turn should be stopped!!

No turn, no graveyard spiral, no problem.

Happy Skies,

Old Bob

[ARTICLES/20000702.002235.msg10441.tex]

T&B Verses Turn Coordinator Verses AI**Fri, 2 Feb 2001 11:01:31**

In a message dated 2/1/01 10:22:31 PM Central Standard Time, HWatson712@aol.com writes:

However, for most pilots, the AI will give more information in a quicker manner than needle, ball and airspeed.

Bob, how about an electric AI and your battery operated turn needle mounted on the glare shield?

Good Morning Hal,

I consider the two comments above to address totally different situations.

The second one first.

The battery powered T&B is an effort to handle that situation where everything goes black at once. A full and sudden electrical failure in an all electric airplane. A fairly direct and simple problem, generally easy to handle if it occurs under good flight conditions. If not, then the potential for the other situation is there!

The first!

That is more a matter of HOW we fly instruments rather than what we use TO fly instruments.

First, I have no data or statistical information to back up the following theory, it is merely a result of my observations over the last twenty or thirty years.

I perceive more instances of airplanes being lost due to an inability of the pilot to operate the aircraft in those years than I remember in the first half of my flying career.

Those airplanes that were lost tended to be much better equipped and have had a greater amount of redundancy in both number of instruments and sources of power than was common earlier.

Prior to 1954, all applicants for an instrument rating could be required to fly the entire flight check without the benefit of any artificial horizon or directional gyro. The inspector could allow the use of those instruments for certain portions of the approach if the aircraft was so equipped and he/she so desired.

After that time, the "full" panel was allowed, but "partial" panel was still considered a very important skill and was given considerable attention throughout the students training.

The rules said that all turns during an instrument approach must be made at standard rate or thirty degrees of bank, whichever came first. (I think that is still true today, but someone will tell me if I am wrong.) Consequently, students were taught to roll into

some suggested angle of bank and then to check the turn needle to see if standard rate was being maintained.

Since the rate of turn instrument was such an integral device in the establishment of every turn, it was generally given a position on the panel where it was easy to include in the basic IFR scan.

Over the years that abomination of a rate instrument called the Turn Coordinator was introduced and the emphasis on maintaining a standard rate turn was replaced with an emphasis on maintaining some arbitrary constant angle of bank.

I have no idea if the TC contributed to the change or not. Maybe it was just coincidence, but it always seemed to me that the damping characteristics of the T&C made it less useful as a means of establishing standard rate. But that is really a whole 'nother argument.

In any case, the rate of turn instrument began to be regarded as something to use if the attitude gyro failed rather than something to be used in normal flight to monitor whether or not the attitude instrument was providing proper guidance.

To my way of thinking, that was when the seeds were sown.

We are now reaping the harvest.

If the rate instrument (be it one of those terrible TCs or the beautiful and reliable T&B) is included in the normal instrument scan, any irrational behavior of the attitude instrument is much easier to spot early enough to effect an appropriate realignment of the instrument scan to preclude the operator losing control of the aircraft.

The issue, as I see it, is not so much of what instrument is used as a backup for what other device, but as to how that instrument is integrated into the operation of the aircraft.

First, if one continues to include the turn instrument in his/her scan to determine whether or not flight is being conducted utilizing standard rate turns, that serves to develop a scan that comfortably and effortlessly aids in constant evaluation of the attitude instruments.

Secondarily, it allows the operator to maintain a comfortable proficiency in the use of the rate of turn instrument.

In my own experience, I found that after I took my T&B off the floating panel and placed it immediately to the right of my rate of climb, I tended to not use it to verify that I was using standard rate turns as much as I should.

I also used a 2 1/4 inch instrument to save space.

I think that was a mistake as well.

From what I have read of the NTSB's investigation of Dr. Jacoby's accident, it appears that his attitude gyro was working just fine.

The problem appears to have been a failed TC and a failed HSI.

Itzahnk was a well trained and experienced pilot. While I never flew with him, those who have all verified his competency. It is likely that his TC had been out of service for some time without his having noticed it. Considering where my T&B was located in my center panel, I figured that could happen to me just as easily as it happened to him.

That is why I want whatever instrument I am going to rely on for my last ditch effort to be one that I also use every time I fly the airplane, not just something that I will switch to when the primary attitude gyro fails.

After Itzahnk's accident, I decided to move my little T&B up to the spot where Beech had the clock and put a standard sized T&B two instrument spaces to the left of the primary heading indicator which places it directly under the 2 1/4 inch instrument.

If I don't find myself using it all of the time as a monitor in that position, I will move it back to the position where I think it really belongs, immediately to the left of the heading indicator.

Happy Skies,

Old Bob

[ARTICLES/20010202.110131.msg02562.tex]

Throttle Stuck Open

Wed, 16 Aug 2000 16:18:30

In a message dated 8/16/00 11:14:33 AM Central Daylight Time, craphael@sirus.com writes:

Pilot said he could not get throttle to close on descent. Engine manifold pressure was at 25" (possibly throttle cable seperated) , brought rpms down, slowed enough to get flaps down. Still too fast, he shut engine down prior to landing, and landed short of runway. Landed to right of ILS & MIRL eqpt. to avoid further damage. Night flight, local.

CER

Good Afternoon CER,

I know it's too late for your friend, but if it happens to anyone else, you should consider just adjusting the power by using the mixture control. The engine may or may not run real smooth, but it should be controllable and the power will be there if you need it!

Happy Skies,

Old Bob

[ARTICLES/20000816_161830_msg12229.tex]

Use of GPS as Backup Instrumentation

Sat, 4 Mar 2000 16:22:55

Good Afternoon All,

I took a friend along as a safety pilot yesterday and experimented with using the Garmin GPSMAP 295 as an instrument to keep the airplane right side up.

It worked better than I thought it might!

The way we did it was as follows.

I took along a table cloth which I draped over my head so that I could see nothing but the GPS 295. I blocked out all of the instrument panel.

The idea was to see if I could keep the thing from getting into a graveyard spiral if the airplane was in good trim for level flight when the instruments were lost.

We set up for about a 170 knot cruise at 6500 feet. I got under the table cloth and the airplane was put into a well developed graveyard spiral to the right. I was given the airplane and did nothing with the pitch, I just tried to stop the turn and let the airspeed and altitude do what came naturally. That was relatively easy except that I wandered a bit from side to side while trying to hold a constant heading. The capability to hold a heading became better as I practiced. There was no difficulty getting out of the spiral and the speed never exceeded the redline. We came nowhere near close to stall. I must have applied some pitch up force during the recovery, even though I was trying to stay neutral, as we ended up at about 7500 feet after straight flight was established. I then practiced making 90 and 180 degree turns. We tried the same thing to the left with similar results. I then set the 295 up to show altitude as well as the heading and messed around holding both altitude and heading via the 295. Not real smooth, but workable. I would imagine that with some practice it could be a fairly practical thing to do.

Now, this was all strictly in good weather where I was able to be relaxed and had nothing else to do except keep the airplane right side up. I didn't have to talk to anyone or worry about hitting anything. I don't imagine it would be so easy to do for real.

I also tried the same thing using the track indication from my panel mount GPS. Even though the response to heading change was faster with the panel mount, I found it quite a bit easier to keep the airplane under control using the HSI style presentation on the 295. I would imagine that is because of the familiarity I have with that style of heading presentation.

I intend to make the same experiment in a slower, less slippery airplane.

I would be very interested in hearing how anyone else has made out trying the same thing!

Happy Skies,

Old Bob

[ARTICLES/20000304.162255.msg04179.tex]

Verifying Instrument Operation

Fri, 2 Feb 2001 13:54:36

In a message dated 2/2/01 12:05:47 PM Central Standard Time, hgp@madaket.netwizards.net writes:

FWIW, I was taught to test the T&B (or TC) while taxiing before any flight where IMC is anticipated by taxiing left and right and observing the movement on the T&B.

Regards,

Howard

Good Afternoon Howard

Excellent and proper technique.

I would imagine that Itzhak taught that as well.

Unfortunately, we all, every now and then, don't do that which we "Always Do"!

There is nothing like regular and every day use of the back up equipment (and practice in it's use) to assure that it will be available when we need it.

That is why I feel the use of the turn instrument, regardless of type, should be a normal part of our instrument flight, not just considered as back up equipment.

Happy Skies,

Old Bob

[ARTICLES/20010202.135436.msg02580.tex]

Water in Static System and Instrument Failure**Wed, 7 Feb 2001 00:14:07**

In a message dated 2/6/01 7:17:34 PM Central Standard Time, esoteric5121@earthlink.net writes:

How did Itzhak get water in his system? (if he did at all) Why is there a drain? condensation only?

Good Evening Paul,

I am not sure that he did have water in his static system.

I do think that the most likely way for water to get into the static system is via condensation, providing a drain for service is a good idea and it should be relatively easy to find! It would take quite a bit of water in my static system before that water would interfere with the indications on the altimeter or airspeed. The hose descending down to the bolt which plugs the tube is long enough to act as a sump that would hold three or four CCs of fluid before it blocked anything. In the eleven years I have owned this airplane, I have never removed the bolt as there has never been any fluid in the sump.

It has been some time since I read the NTSB report for Itzhak's accident. My recollection could be way off base, but I believe he just said that he thought he might have gotten water in the system without specifying what system he was talking about.

I don't know how he would know that there was water in the static system even if there was.

On top of that, a mere loss of airspeed or altimetry should not have been difficult to handle for a pilot of his experience and training.

My recollection is that he thought his attitude gyro had failed and that it was most likely working normally.

He evidently relied on what he thought was his most reliable instrument, the TC and backed it up by checking his primary directional aid, the HSI.

If they had both failed, which seems likely as I read the report, he had an almost unfathomable problem.

His accident is why I want to go back to carrying two T&Bs.

Happy Skies,

Old Bob

[ARTICLES/20010207_001407_msg03002.tex]

1.4 AIRMAN-TAKEOFF

Adverse Yaw Induced By the Differential Action of the Aileron**Wed, 31 May 2000 10:07:12**

In a message dated 5/30/00 10:58:09 PM Central Daylight Time, farrarwd@tca.net writes:

There is a whole 'nother factor here which I hesitate to bring up, but proper use of the aileron to take advantage of the drag produced by differential action of the aileron will aid tremendously in holding almost any aileron equipped airplane straight. Too bad it is no longer emphasized in training and rarely used by Bonanza pilots.

Old Bob,

Would you please elaborate on the above statement? Thanks

Good Morning Will,

I was referring to that phenomenon often referred to by flight instructors as the "Adverse yaw induced by the differential action of the aileron."

Right aileron induces a yaw to the left and vice versa. A natural and intuitive reaction for all of we 'kiddie car to automobile' trained aviators is to apply right aileron to help steer the airplane if we run out of right rudder. That right aileron will make the airplane turn to the left and just make a bad situation worse. The correct thing to do is to input left aileron. We call that "Advantageous use of the adverse yaw" when flying the Twin Beech and other aircraft which have relatively light rudder authority and strong ailerons that have not yet been screwed up by the engineers so as to reduce the yaw induced by the differential action of the aileron.

Spoiler equipped airplanes react differently and the strength of the 'yaw' steering force is dependent on many things, so it takes some investigation to decide when and how to best use the force.

I wrote an article on this some years ago which was published in our Twin Beech Society newsletter. Join the Twin Beech Society and we will send you the back issues which contain that, along with other boring stuff about Twin Beeches and Staggerwings. Or, better yet, join us in Tullahoma, Tennessee October 18th through the 22nd for the Staggerwing Museum Foundation and Twin Beech Society annual Convention. This year it is being called a Beech Party. Owners and enthusiasts of all aircraft produced by Beechcraft Aircraft Corporation are cordially invited to attend.

I could send you a copy of the article on Adverse Yaw via E-mail if you would like.

Just let me know.

Happy Skies,

Old Bob

[here is the article]

ADVANTAGEOUS USE OF ADVERSE YAW

July 10, 1997

This discussion has to do with positioning the airplane flight controls to aid in the directional control of the aircraft while on the earths surface (ground or water).

Most of us were initially introduced to the effects of adverse yaw in conjunction with making a coordinated airborne turn in an airplane. The airplane turns by being in a bank. To bank the airplane one would normally input aileron in the direction of the desired turn. Lo and behold that old nemesis of coordination, "adverse yaw induced by the differential action of the ailerons," swung the nose in the wrong direction and we were taught to apply rudder with the aileron in the direction of turn to counter that yaw during the time the aileron was displaced from neutral.

The next time the yaw effect was introduced was when we were taught crosswind takeoff and landings. Most instructors would tell us we should use aileron into the wind so as to "keep the wing down." While that is certainly a desirable result, it is not the most important aspect of such control usage in all of our airplanes. In many older aircraft it tends to be the most effective force available for good directional control while on the ground.

Remember the downward displaced aileron increases the lift and therefore increases the drag of that wing, the upward displaced aileron decreases the lift and therefore decreases the drag. It is the change in induced drag from the production of lift that is most important and not the profile drag of the displaced surface. (The profile drag can be a major force at times, but that is another subject.)

Holding the aileron into the wind (for whatever reason) takes pretty good care of directional control in the crosswind situation, but many pilots don't seem to be aware of the benefit to be realized by using the yaw in our favor while operating into the wind or nearly into the wind. If you are rolling down the runway and running out of right rudder, how many of you would think of applying LEFT aileron? It is definitely not intuitive and yet it is the proper response in aileron equipped aircraft. (Airplanes using spoilers for all or part of their roll control will react differently.)

Judicious use of this steering force may be used anytime you are having directional control problems with rudder alone. It works in Bonanzas, Barons and Cessna 180s as well as older aircraft. The action might not be as great, but it still helps. With the right hand rotation of our propellers in this country, we tend to run out of right rudder more often than left, but the effect is there in either case.

It is not unusual for an instructor to tell a student that in a crosswind situation, full aileron should be applied into the wind and then as the takeoff roll commences, the aileron input should be reduced to a more moderate amount. That procedure is not a bad one for many aircraft, but if it is used in a Fairchild 24 with a right crosswind, you may run out of right rudder before any appreciable speed has built up! The Fairchild has

such a strong yaw induced by the differential action of the ailerons that it will overpower the effect of the rudder,

While instructing in the Beech model 18, I have noted during takeoffs with a slight right crosswind, the pilot will often start off with a pretty good amount of aileron into the wind and as the airplane builds up speed, he (or she) finds quite a bit of right rudder necessary. This usually happens about the time the tail is being raised and the gyroscopic effects of the propellers are being added to the left turning force. The instinctive reaction of most people is to put that steering wheel further to the right which gives even more left turning force and, of course, more right rudder is needed. BAD SCENE. The problem was too much right aileron to start with. We, as a group, are so used to turning the steering wheels of our ground bound vehicles in the direction we wish to turn, that it takes a lot of guts the first time to lay in (in this case) the LEFT aileron. Suffice it to say that anytime the aileron and the rudder are heavily displaced in the same direction, something is wrong!

A technique that I have used to demonstrate the effectiveness of adverse yaw steering is to pick a nice day, preferably with 12 to 15 knots of wind right down a nice wide and long runway, with no obstacles close by, and after obtaining a ground speed of 25 or 30 knots, throttle back to maintain that ground speed, then have the student roll in full aileron to the right and note the turning tendency to the left. As soon as the effect is apparent, full left aileron is applied and, of course, the airplane returns to the straight and narrow. (Caution must be used in tailwheel equipped airplanes to prevent the development of a ground loop situation.) The Twin Beech, DC-3, Stearman, Staggerwing and other airplanes of that era are the ones that show off the best during this demo, (the Fairchild 24 is the best of all) but I have also used it effectively in the DC-6 and DC-7 and to a lesser degree in the Boeing 720, (The Boeing 727 uses a much greater amount of spoiler in relation to the aileron and it steers like a car on the ground, it is important to understand the characteristics of the airplane you are flying.)

In applying the aileron for directional control it should be used deliberately and with planning. It is not intuitive for most of us and needs to be thought about.

If you are losing the airplane, certainly go ahead and make a rapid input to "save the day" but don't fan the stick or wheel back and forth as you would the rudder, use the aileron as a major directional force to be increased or decreased deliberately. Use the rudder as a trimming device and fan it all you want!

Just remember, right aileron will steer the airplane to the left and left aileron will take it to the right.

One instructor with whom I discussed this says he tells the students to steer toward the crash!

What are the disadvantages of using adverse yaw for directional control?

Well, nothing is free. It causes drag, that is how it steers, by holding back on one wing. On some airplanes in critical performance situations it can be a significant factor.

Some jet transition programs teach their students to use little or NO aileron into the wind because it may cause enough drag so that the aircraft will not meet the performance numbers listed on the chart.

Occasionally you might note a maximum demonstrated crosswind figure that seems awfully low. You may even have experience that the airplane is relatively easy to handle in higher winds.

The limit may have been established because the stronger winds weren't available for the test.

At other times it was established because the test pilots found that with the published wind, the aircraft was at the limit of its aerodynamic control capability.

Another possibility is that the deterioration of acceleration using aggressive crosswind control was so great that the takeoff performance was severely impacted and the decision was made to limit the amount of crosswind that the airplane should be operated in so as to retain better numbers to publish in the sales brochures!

That still doesn't make it illegal to exceed the demonstrated crosswind numbers, but it does emphasize the point that you must understand where they came from and, especially on the modern spoiler equipped aircraft, what the drag and directional control results of maximum control usage will be.

Most of the modern jet aircraft use some amount of spoiler for roll control. Depending on the mix between aileron and spoiler input while in the takeoff configuration, the directional advantage of using aileron opposite to the turn may be lost and, in some cases, the aircraft will steer like a car.

Another less sophisticated problem occurs on soft fields. If the surface is soft enough that the wheels are sinking in and there is some difficulty in getting the airplane rolling, it's possible that the additional down load (or lack of lift) on the wing with the upward deflected aileron may cause the wheel on that side to develop considerable additional drag and give the aircraft a turning moment in the wrong direction!

Even on a hard surface there will be some amount of increased rolling friction due to the higher load on that wheel.

I realize that this is kind of a quick overview of only one area of control use on the ground. What about sailing a seaplane up to a pier? What about taxiing, taking off or landing any aircraft on glare ice? What about the effect of the controls in a downwind situation? All of these subjects and many more are worthy of further discussion. Perhaps we can do so at another time.

Bob Siegfried

Phone: 630 985-8502 FAX: 630 985-0340

DIFFERENTIAL POWER

By Bob Siegfried

Today we would like to talk about a technique that might be a little controversial – differential power for directional control during a landing roll out.

This is a technique that was used extensively in the thirties and forties by Twin Beech and DC-3 pilots but which fell into disfavor later on.

In a strong crosswind, a pilot would carry zero-thrust or just a little more power on both engines until about 10 or 20 feet in the air, and then at the time he would normally close both throttles, leave the upwind power alone and slowly close the downwind throttle.

It seems to work best to shoot for a tail-low wheel landing. The tailwheel should be a foot or less in the air at touchdown and then a little "rock up" of the tail used just after touch down and before lowering the tail wheel to the ground.

The power should be adjusted during the rollout to about the amount that would be carried to properly taxi in the amount of crosswind present.

Some increase in power may be necessary after touchdown, but throttle input should be steady and deliberate and not jockeyed back and forth. Use sufficient power so that the rudders are free and available for minor directional corrections.

Of course, FULL aileron should be held into the wind.

You will find that very little if any additional runway is used with this procedure. There is still a fair amount of drag produced by the aileron input into the wind (the adverse yaw effect) and by the idling downwind engine. The upwind engine is developing a forward thrust, but it is being used mainly to counter the turning force induced by the wind blowing against the side of the aircraft and that seems to create sufficient drag such that the overall deceleration forces are still quite good.

What are the disadvantages?

Well, for one thing, if the differential power is introduced too early you will be turning the attempted landing into a single engine approach!

The differential power should be used for correction primarily on the ground, not in the air.

The reason for initiating the asymmetry in the air is to get a little feel for what it is going to take and to have the engine slightly "spooled up" so as to get a faster response rate from that engine if additional power is necessary.

There might also be a tendency to allow the downwind engine to drop a little when the power is reduced, thus setting up a potential for a downwind drift.

Remember that the airplane will perform and handle better on single engine with the dead engine carried a little high. The same philosophy applies during this procedure. Carry the downwind engine a little high.

Most instructors agree that during initial multi-engine training it is best to teach the use of the engines together at equal power on both to avoid the tendency to fight the engine

with brakes, etc. Later in the training cycle, differential power for taxiing is introduced, and hopefully the trainee will eventually be able to maneuver the aircraft in most any wind condition without the use of brakes.

The "engine only, no brakes" taxiing technique should be second nature and thoroughly understood before differential power is used in the landing procedure.

The differential power may also be used in very strong crosswind conditions for takeoff, but only while the aircraft is on the ground. By fifty or sixty knots the engines should be at equal power.

If any of you have any further insight into the advantages or pitfalls of these techniques, please let us hear from you. The more input we have, the better off we all are.

Thanks for listening.

Bob Siegfried Ancient Aviator

[ARTICLES/20000531_100712.msg08922.tex]

Takeoff in an A36**Thu, 8 Jun 2000 10:56:40**

In a message dated 6/8/00 8:59:08 AM Central Daylight Time, elivermo@ktc.com writes:

My procedure is to lock brakes, run up to full power, release and rotate about 75 knots. The plane is a TNIO 550 A-36. I have not tried to use flaps on takeoff.

A couple of the departures have not cleared the trees by enough to satisfy me.

Any ideas?

Good Morning Ed,

You haven't mentioned your weight. The 36 has a rather large allowable useful load so the V_x and V_y will vary quite a bit from light to heavy.

I don't have the data for the 36 available to me, but as a general rule you should determine the V_x for the configuration chosen, then rotate at a speed that would allow you to reach V_x immediately at lift off. Depending on the rate of acceleration, that is about three to five knots below V_x .

If your airplane has the twenty-eight volt electrical system. I would recommend that the wheels be stowed in the wells as soon as you are solidly airborne. With a fourteen volt system, it might be advisable to leave the gear down until the obstacle is cleared. That is dependent on how far the obstacle is from the liftoff point. At ninety knots ground speed, and with a low voltage system, you will travel about 2000 feet while the gear is in transit. About 700 feet with the 28 volt setup.

The gear develops more drag while in transit than it does extended, but it is a lot less drag when hidden in the wells.

The performance available can be dug out of the charts if you have them available or, you can find out for yourself!

Flaps will reduce the speed at which V_x and V_y occur. Whether they will aid in clearing an obstacle is dependent on the amount of power available above that needed to maintain level flight in the takeoff configuration, the distance to the obstacle and other such data.

I would suggest that you try to locate another airport that is about the same height above sea level and with a much longer runway.

Load the airplane to the average conditions at which you expect to operate and do some tests. Try it with different amounts of flap and with the gear down and with it retracted early. Try to note your altitude at specific distances along the takeoff path.

Try some speeds a couple of knots lower than the calculated speeds and a couple of knots above those speeds. Try it at both V_x and V_y

Remember, the best rate of climb will always occur with the flaps and the gear retracted.

Whether the angle of climb will be better with flaps or clean is dependent on the wind, load and power available.

I like to use ten degrees of flap in most average load and average obstacle conditions. I have used as much as full flap when lightly loaded and in a high drag surface condition such as tall grass.

At least, it's an excuse to go fly the airplane!

Happy Skies,

Old Bob

[ARTICLES/20000608.105640.msg09333.tex]

Use of Flaps**Fri, 27 Aug 1999 19:33:25**

FENTRESS,JIM P. (HP-FtCollins,ex1) wrote:

Which makes me wonder, what on earth were the flaps doing in the "down" position on takeoff, if not from a T&G?

I don't think in my POH, or in the Flying the Beech Bonanza book, is there any situation with a reason to take off with flaps down. I understand from other reading that one *can* set the flaps to partial and obtain some benefit, but in general they mostly increase drag...

Good Afternoon Jim,

This is somewhat off the subject, but there are times where the use of flap for takeoff can be useful which are not listed in anybody's POH. Whether or not the flaps could be useful is dependent on many things, some of which are the length of takeoff surface available, the drag produced by rolling on that surface and the power available to fly the aircraft.

Jimmy Doolittle used full flap on his B-25s for the takeoff from the aircraft carrier when he bombed Tokyo.

One of the major carriers of the US had a DC-6B stuck in the mud of a small sod field some years ago and their engineering department provided the crew instruction as to how to get that aircraft out which called for a full flap takeoff. The airplane was airborne in less than 800 feet!

The airplane had fifty gallons in each of the four main tanks and was very light, but it worked like a charm.

I had occasion some thirty years ago to do some test flying on a DC-3 where we were determining minimum unstick speeds at various weights and full flap was one of the configurations investigated. We had that hummer airborne at around fifty knots, it was scary but it flew!

I have found that I have never had a Cessna 180 or 185 so badly stuck in the mud that I could not get it moving by using full flaps and full power. As it gets moving the flaps can be retracted somewhat, but unless it is very heavy or at an altitude where the power is limited, the thing will get off in a reasonable distance even with the full flap still extended.

I think that if I was faced with a situation where the surface was marginal, either due to roughness or high drag and I had a major surplus of power, I might at least consider the use of full flap for takeoff, even in a Bonanza!

As is true of so many things in aviation, IT DEPENDS!

Happy Skies,

Old Bob

[ARTICLES/19990827-193325.msg07407.tex]

Use of Flaps**Sun, 23 Jan 2000 02:15:37**

In a message dated 1/23/00 12:53:19 AM Central Standard Time, Ernie_Ganas@email.msn.com writes:

BTW, you may not get many answers on this since some have very strong feelings that using flaps on take-off is illegal.

Good Morning Ernie,

Just to provide an argument! A comment or two.

The FARs are permissive. If it is not prohibited, it is legal. That doesn't mean that one could not be charged as 'careless and reckless' if a bad call results in an incident!

I don't see anywhere in any of my manuals that says that I cannot use flaps for take-off! That includes full flaps if my analysis of the situation determines that full flap is appropriate for the task at hand.

The desirability of flap is dependent at least on the amount of power available, the length of the takeoff surface, the condition of that surface and the weight of the aircraft. There are likely other factors that should be considered, but It is too late at night or too early in the morning for me to think of them just now.

When might full flap be desirable? If the weight is light and the power available high, full flap may provide the shortest ground run on a hard surface or be the only way to get airborne on a muddy surface.

There are other times when the power is low (very high altitude) and the load sufficiently high that the airplane will not fly at all with the flaps out, but would fly with a long enough run if the flaps were up.

The highest rate of climb available at any weight or power combination will be with the flaps up, but the best angle may be better with some flaps extended, under certain power and weight conditions.

It depends!!

Happy Skies,

Old Bob

[ARTICLES/20000123_021537_msg01396.tex]

Use of Flaps

Sun, 23 Jan 2000 11:36:46

In a message dated 1/23/00 2:01:03 AM Central Standard Time, bgwells@uswest.net writes:

Does anyone have there POH's available to verify this. I am just wondering when it started showing up in the POH's not if the action is valid or not for use.

Good Morning BG,

In my copy of the straight 35 manual, the use of 10 degrees of flap for takeoff is mentioned. There is also a chart showing takeoff distances with that flap.

Incidentally, the 35 only used 20 degrees as full flap even though it had originally been designed to use 45.

In the G35 manual, twenty degrees of flap is suggested for use "For a minimum run takeoff".

Happy Skies,

Old Bob

[ARTICLES/20000123_113646_msg01427.tex]

Use of Flaps**Tue, 7 Mar 2000 23:09:10**

In a message dated 3/7/00 9:45:09 PM Central Standard Time, rvand@rica.net writes:

John, I am with you, but being so new to this I can only share what I have read, for close obstacles use flaps on take off. Bob

Good Evening Bob,

You really cannot make a blanket statement about how much flap will provide the best obstacle clearance. You must describe an exact set of conditions and then go to the charts and figure out which will do the best job.

At very high elevations and high weights, a flaps up takeoff may be the only option.

At low altitudes and very light weights it is possible that a full flap takeoff would clear a twenty foot obstacle in a shorter distance than any other method available.

There are a few positive statements that can be made.

The rate of climb will always be better with the flaps up.

The airplane will fly slower with full flaps than in any other configuration.

It will also develop more drag with full flap than with any lesser flap.

If the power to rate ratio is favorable enough to allow a considerable rate of climb at those very slow airspeeds, the angle of climb might be the steepest under the full flap condition.

You have to check the charts!

Happy Skies,

Old Bob

[ARTICLES/20000307_230910.msg04417.tex]

Use of Flaps/Short Field Takeoff**Tue, 7 Mar 2000 08:57:06**

In a message dated 3/7/00 7:27:51 AM Central Standard Time, rvand@rica.net writes:

Flaps are there any preferences for 10, 15 or 20 degs? Which creates more drag during climbout and subsequently should be raised first, Flaps or Gear I have hear different opinions.

Good Morning Bob,

There are those who will tell you that any use of flap for takeoff is illegal. Plenty of information concerning that argument is in the archives. Which comes up first, the flaps or the gear is also controversial.

If I were flying a J model off of your strip in the conditions you describe, my normal technique would be to use ten degrees of flap. Gear retraction would be initiated after a positive rate of climb had been established along with an increase in speed of at least five knots above the lift off speed. In gusty or turbulent conditions, I might wait a little longer before initiating gear retraction. I would retract the flaps when I felt that all obstacles were going to be adequately cleared and with at least fifteen knots above the lift off speed.

When the gear is retracted, the main gear doors will open and an increase in drag is likely. The higher the angle of attack (not the pitch attitude), the higher the drag increase. If there is an obstacle extremely close to the takeoff point which requires flight at the absolute most optimum speeds to be cleared, there is an outside possibility that it could be cleared more easily by leaving the gear down. That is a rare case. Most of the time you will have a lot more altitude at the end of the runway if you retract the landing gear as soon as it is safe to do so without settling back to the runway. I do not subscribe to the theory of leaving the gear down until it is no longer possible to land on the remaining runway, I would prefer to have all of the altitude possible in the event of an engine failure. Many experts will disagree.

Any amount of flap may be used for takeoff including full flap. The optimum amount to be used is a function of the runway surface condition, the length of the surface available, the weight of the aircraft, the power available and the obstacles to be cleared. The rate of climb will always be higher with the flaps up, provided the airplane is flown at the best rate of climb speed for the existing weight. The best flap to use to clear an obstacle takes a lot of calculation.

I just like the way it feels and the visibility I get with ten degrees of flap.

Does that help or confuse the issue?

Happy Skies,

Old Bob

[ARTICLES/20000307_085706.msg04376.tex]

When to Retract the Landing Gear

Sat, 29 Jan 2000 11:47:04

In a message dated 1/29/00 10:08:35 AM Central Standard Time, epoole@netis.com writes:

At 12:42 PM 01/28/2000 -0800, John Deakin wrote:

As soon as I comfortably can after pulling the gear up. Which I do as soon as I'm positive I won't contact the ground.

Don't you follow the rule about leaving the gear down until you can no longer land on the remaining runway?

Good Morning Eric,

I hope you don't mind my jumping in on a question directed toward John. I am eager to see what his answer will be, but in the meantime!

My first inclination is to say "What rule?" But, I won't do that! That is a procedure that is recommended by a lot of people and if it is the way you like to do it, why not?

I don't like it and I do have a reason. The gear is nothing but drag once you are airborne. The airplane will climb at a higher rate with the gear up than it will with the gear down. If the engine quits during takeoff anywhere except in the very first stage of the procedure, you will have more altitude if you raise the gear than if you leave it hanging out.

There is an increase in drag as the inboard doors open. If you are at a very high angle of attack, the increase can be quite dramatic, but that increase in drag is much less of a problem as the angle of attack decreases.

If I were departing from Leadville at max gross weight in a straight model 35 that is still equipped with the E185-1 engine and the wooden prop, I would want to accelerate at least ten MPH from whatever speed I left the ground before attempting to retract the gear. Not only that, but I would stay right down in the ground cushion until the gear was safely in the wells.

With my V35B at sea level and average weights, I suck the gear up as soon as I am solidly airborne. It takes four seconds from down to up! Now, what do I consider solidly airborne? Off the ground, an acceleration of at least a couple of knots and a rate of climb established. The slower it is accelerating, the longer I wait to put away the rollers.

I may have mentioned this before: But, it depends!

If the runway is available for landing when the engine quits and I decide that putting it out is better than landing gear up, there is plenty of time to put it back out. The only thing you don't want to do is to change the direction while it is operating. Wait till it is all the way up and then throw it back out.

While I always want to consider the possibility of the engine quitting, if I really thought it was going to quit often, I wouldn't fly it! My normal approach is a power approach. If the engine quits I will end up short of the runway. On many runways, that will be a bad accident. I fly at night, on instruments, over water and rugged mountains. I really don't think worrying about the gear being up or down is a biggie in the overall scheme of things!

Happy Skies,

Old Bob

[ARTICLES/20000129_114704_msg02013.tex]

1.5 AIRMAN-TRAINING

BPPP**Thu, 9 Apr 1998 13:43:57**

Good Afternoon All,

Just a little more comment on the BPPP. While I have never attended one, I have spoken to many participants and I have not had any negative reports.

It would seem that it would be an excellent way to gain a lot of knowledge in a very short time period. For busy people with adequate funds it is undoubtedly a very good deal.

I have hopes that some day my financial and time constraints will align themselves so that I might participate in a BPPP. I am sure I would gain from the experience, but don't feel I should quit flying till then!

To say that one is a less competent pilot if he or she has not taken the course is a little presumptuous. I dare say that I could locate a fairly large number of aviators without the benefit of BPPP training who are every bit as competent as the average graduate of the course.

Can't we just say that it is a very good benefit available to the ABS member and recommend that it be utilized by those who desire to do so without implying that those who elect to train themselves in a different manner are less safe?

A weekend cram course is convenient, immersion training does work. So does constant and steady study by an individual so inclined.

The important thing is that the individual pilot be interested in constant improvement and sharpening of his/her skills.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980409_134357.msg01908.tex]

Dual Brakes

Fri, 9 Jul 1999 12:50:06

Good Morning All,

Both Steve Oxman and Phoenix Aviation Inc. have asked about information concerning adding dual brakes to their aircraft.

I have no help to offer concerning the availability of the kit, but I would like to comment on the desirability of adding that component to the airplane.

If you have a flight instructor who refuses to give training in the airplane without dual brakes, get another flight instructor!

If the folks at Phoenix Aviation have an examiner that refuses to give flight checks in an aircraft without right side brakes, I would consider looking for another examiner. If it is your local FAA that is making that a requirement, it is a much bigger problem. The local FSDO has a lot of power and if they make a stupid rule, it is almost impossible to get it changed. I hope that is not the case in Phoenix!

There is a substantial history of training having been conducted in the Bonanza (and many other aircraft) that were not equipped with the dual brake system. In the late forties and up into the fifties we often trained students from scratch in the Bonanzas with no brakes and no dual control column.

The position of the control arm in the center allows one to exercise control over the pitch and the basic stability of the Bonanza combined with the interconnection between the rudder and the aileron is so good, that the aileron input is not all that important.

The use of the brakes was taught to the student in an uncongested area as the first element of learning to fly.

The requirement to have the dual column came along not because there was any evidence that there was a problem instructing in the Bonanza, but because some rule maker in DCA decided that any airplane that was used for training must have fully functioning dual controls.

Some of the field inspectors who had been giving flight checks in Bonanzas without dual columns felt that the Bonanza with rudder pedals available and the column in the center met the requirement, but others did not agree.

The upshot was that first the FAA inspectors were ordered to not conduct flight tests without a dual column and then later on, that same "advice" was given to the designated examiners.

There was never a need shown.

The same situation has occurred with the dual brake situation, but I don't believe the FAA has leaned on the inspectors and the examiners as hard about the brakes as they have the dual column.

The dual column isn't too bad as you can take it out and revert to the single column without messing up the airplane. Not so for the brakes. Once they are installed, they are there whether you need them or not.

I think the ability to fold the pedals down out of the way to give that entire space to your right seat passenger is a tremendous advantage of the Bonanza line. I would not want to give up that capability on my machine.

I didn't comment when Phoenix Aviation made the request as I figured they may have a FED problem. When Steve inquired, I felt I should at least make my thoughts known.

I rather hope that Bill Hale will let us have the latest official position as he is much closer to the FAA problem due to his association with the BPPP program.

How about it Bill?

Happy Skies,

Old Bob

[ARTICLES/19990709_125006.msg05831.tex]

Dual Brakes**Wed, 26 Apr 2000 12:45:33**

In a message dated 4/26/00 11:04:12 AM Central Daylight Time, jtsmall@onramp.net writes:

Is there a recent FAA interpretation of an existing reg that there can be no dual training in Bonanzas and Moonies that are without dual toe brakes? Has this affected anyone here?

Thanks.

Good morning John,

This has been bouncing around for at least the last thirty years. Any instructor has the right to refuse to give instruction in any airplane that he feels is not adequately equipped for the mission at hand.

Most instructors (and pilot examiners) are happy to give instruction and flight checks in aircraft without dual brakes.

There is no FAA regulation prohibiting dual training in aircraft without dual brakes.

If you are involved in an incident which could in any way be construed as having been caused or made worse by the lack of dual brakes, it is likely the FAA will include reckless operation in the list of things they attempt to hang on the poor flight instructor. It is amazing that anyone is willing to give flight instruction at all considering the current litigious flavor of our country!

Still — !?!?

Happy Skies,

Old Bob

[ARTICLES/20000426.124533.msg07098.tex]

Dual Yoke

Wed, 21 Jan 1998 18:49:06

Good Evening Bob Briggs,

In a message dated 98-01-21 17:13:10 EST, you write:

What's the rationale for a dual yoke rqmt? Has anyone ever had an accident due to lack of a dual yoke?

I have never heard of anyone having problems giving dual in the single wheel, throwover Bonanzas, Travelair and Barons.

I did it all the time before the FEDs started to say they didn't like it.

I have taken many students from absolute initial training to all different licenses including instrument, multiengine and even ATP. I never saw a problem and up into the sixties, I never had a FED who refused to give a check ride in the airplanes equipped with only a throw over column. Somewhere in the early sixties the FEDs did start requiring duals for the checkride with them but it was still up to the individual examiner for DEs.

Each year they seem to get a little nastier about it but I never heard any justification sited. Just somebodys idea of how it should be done.

Happy Skies,

Bob Siegfried

[ARTICLES/19980121_184906.msg00430.tex]

IFR Flight Instruction**Mon, 17 Nov 1997 10:27:15**

To Skip Weld 6049E,

The message quoted here from Kelli Gant V35B N3DX is one of the best comments I have ever seen on this forum.

I believe that the same is true for the short schools to get to the check-ride. When your life depends on understanding and experience, you want a strong foundation to fall back on.

Even if ones flight training has been very well done, lots of actual and spread over a long enough time to encounter many variables, the attainment of the instrument rating is a little like the first solo, there is still a long way to go.

I feel that the ideal situation would be one in which everybody had a chance to spend a couple of years riding right seat in a Twin Beech (Model 18 that is!) or DC-3 on a scheduled operation of at least 75 or 80 hours per month. Even flying that sort of operation in a jet, turbprop, or very high performance piston doesn't expose one to the same conditions that we Bonanza/Baron/TravelAir folks drive around in all the time.

Unfortunately , NOT a practical solution for most!!!!

The move that Kelli made to take his instructor along on a trip where there was a reason to go and some "schedule pressure" was present is an excellent idea.

When I was actively instructing, I encouraged my students to gain similar experience. Especially AFTER the instrument rating was obtained. Whether it was riding with a VERY experienced friend or with an instructor, just watching how an "old timer" handles things is great experience. You don't need to fly, just watch!

I especially note Kelli's reference to the partial panel time. The "needle, ball and airspeed" regime still works and it helps a lot with full panel smoothness and precision. I have a personal hate of the turn coordinator and think that they should all be removed from the panel, smashed with a large hammer and replaced with a "real" turn and bank, but that is another story! Even partial panel with the turn coordinator is better than none at all.

Press on!!

Yours,

Bob

[ARTICLES/19971117.102715.msg02408.tex]

Instrument Training/Flying the Compass**Fri, 28 Nov 1997 09:43:19**

In a message dated 97-11-28 09:08:25 EST, you write:

That is the mag compass. For those of us in the northern hemisphere, just turn south on the mag compass.

Good Morning Ray

Yes, that is a good point. There are many little things like that which have been shuttled into the background since the FEDs streamlined instrument training. Flying the compass and all of its quirks and capabilities was a large part of the course when we were teaching needle ball and airspeed!

The stability and emergency possibilities of the compass on southern headings in our part of the world along with the lead and lag required to roll out on specific headings was not only a portion of the written test, but proficiency in that use was required to be demonstrated on the flight test.

I rather like teaching that and a lot of the other little tricks of the trade that we enjoyed some years ago, but then again, I like to teach my students spins!

It has been demonstrated by the military and civilian flight training establishments that adequate pilots can be produced using the present methods. I guess we can't argue with success. I believe I have stated previously that I feel the instrument rating is about like the first solo, an important step, but there is still a lot to learn.

When I first started instructing instrument flying, we used the forty allocated hours to teach one how to climb, descend and turn. Then how to bracket the beam and orient oneself on the range station. Turning to a southerly heading in case of failure of the T&B was about the only emergency there was to teach besides how to tell airspeed by RPM or the change in engine sound.

Were those really the good old days? I remember them fondly, but prefer the equipment we now enjoy.

Thanks for bringing it up.

Bob

[ARTICLES/19971128_094319_msg02556.tex]

Productive Flight Training**Thu, 18 Nov 1999 12:59:04**

In a message dated 11/18/99 8:09:25 AM Central Standard Time, HemOncMD@aol.com writes:

Thank you for the comments. I am aware that it is not something that I HAVE to learn, however, it would be nice to get a complete training while I am getting instrument rated. I find the process of learning new things very challenging and satisfying by itself. (One of the main reasons I went on to learn flying in the first place!)

Good Morning Rajesh,

It is gratifying to see someone truly interested in learning and not just tacking on a rating. That's great!

I do think that one needs to be careful that the training time is spent in a productive manner. I also believe that training should be to teach functions which will serve to enhance the students knowledge and not just be oriented toward passing the check ride. The competency test is merely one small, though significant, step along the path of becoming a competent and knowledgeable user of the National Airspace System.

We instructors have a tendency to teach that with which we are familiar combined with points that we think are important for the students future success.

I recall that I had an early Frasca simulator at my flight school in the late sixties which still had the capability of training one to use the low frequency range. I gave my students the option of learning that procedure even though there were few, if any LF approaches active in the USA. I did not charge for the time, so a lot of my students took advantage of the opportunity. I imagine they figured that the free simulator time made it worth listening to an old guy reminisce about the good old days!

I still think that the time spent was productive even though the procedure would never be used. It provided time spent at establishing situational awareness (long before the term was in vogue) in a manner that they would never be tested on.

Once the old Frasca died, I no longer had the capability of teaching "True Fade, Close In, Parallel or Bisector" orientations. I continued to challenge my students by exercises of holding at a fix made up of two radials while utilizing only one VOR and doing similar things with one ADF and a fix defined by two bearings. It may not have much practical application, but I feel it helps develop those desirable characteristics we generally refer to as the ability to think on our feet!

Enough old guy rambling. Just enjoy and continue to be a student, regardless of the hours in your log book or the ratings on your certificate!

Happy Skies,

Old Bob

[ARTICLES/19991118.125904.msg10744.tex]

Stall and Spin Training**Tue, 6 Jan 1998 09:55:50**

In a message dated 98-01-06 08:16:42 EST, you write:

Good Morning Ron, W. Webb and All,

Does practising stalls with this "center the ball before the stall" technique teach you how to recover from an accidental stall—when the ball is likely to not be centered? IMHO, the answer is NO. Bo pilots need to understand how to properly recover from the enthusiastic stalls that a Bo can regularly produce in certain configurations—such as when flaps & gear are extended. My observation has been that many Bo pilots have as their biggest problem the reflex action of using the aileron to recover from such stalls which, of course, does nothing but aggravate the situation—most of the time.

Reminds me of a fellow instructor back in the late forties who argued that we should never teach stalls. We should just tell people not to get slow and don't stall the airplane! I rather liked doing stalls and spins and didn't agree with his premise. Over the years I have remained an advocate of stall and spin training but have at times bemoaned the fact that stall training has become another precision maneuver to be flown in a very exact manner to produce the desired result.

I agree with W. Webb that accidental stalls are not likely to occur with the aircraft in stable level or stable turning coordinated flight, however I also agree with Ron that training should be done to show that coordinated flight will produce a less violent reaction by the aircraft. I think both of you will agree that inappropriate use of the aileron will seriously aggravate the stall in a Bonanza.

While I still think that stall and spin training is important in initial pilot training, I am not so sure that we should be doing stalls in the Bonanza. We don't do spins do we? Why should we do stalls?

Some years ago I did some flight testing for the installation of a pod mounted radar on the Bonanza. After doing that on a couple of different airplanes, I decided that I would NOT do training that required stalls in an airplane so equipped. The response was too unpredictable. I also avoid stall training in airplanes equipped with tip tanks. Both Beech and Piper lost airplanes and crew doing tests in tip tank equipped airplanes. Why do them? I wouldn't own an airplane without tip tanks. I just approach stall training in the airplane very carefully.

I am beginning to think my friend of fifty years ago may have been on the right tack.

I wouldn't eliminate stall training, but I think it should be oriented toward convincing people to stay away from stalling the airplane, not convincing them that they can recover

from a low altitude stall occuring on a dark and stormy night while on a low altitude circling approach.

The Boeing 727 has atrocious stall characteristics. We were told that if we ever got into a "deep" stall that the only recovery possible was to roll inverted, let the speed build up and then roll it right side up. The Boeing pilots told us it would take a minimum of fifteen thousand feet to recover.

I will gaurantee you that I never stalled a 727!!!

Maybe it is time to separate the training airplanes from the "go places" airplanes and quit doing stalls in the Bonanza class airplanes!

What say all of you?

Happy Skies,

Bob Siegfried

[ARTICLES/19980106.095550.msg00124.tex]

Stall and Spin Training**Tue, 6 Jan 1998 16:58:50**

Good Afternoon Tom,

In a message dated 98-01-06 15:44:24 EST, you write:

PPS—has anyone come across a certified angle-of-attack indicator for Bonanzas or Barons? My Navy-trained friends love 'em!

It is my recollection that Safe Flight Inc., the stall warning people, certificated one in the early fifties right after they did the stall warning device. I don't have any recollection of why it didn't catch on. Maybe it was priced too high. I have flown airplanes with angle of attack indicators and they are nice. I have noted that the current crop of Navy pilots are crazy about them. It must have something to do with the way they are trained to use them. We all think that the way we were taught turns out the best pilots!

As to separating the training airplanes from the "go places" airplanes, I envision a bare bones V-Tail (35) or inverted T-Tail (33) set up as a trainer. Minimum weight in the tailcone. No tip tanks, no radar, no heavy four bladed prop etc. Even though the CG might be in the same place, an airplane with the weight distributed out towards the extreme ends handles differently and recovers differently than one with the weights more centrally located. It would be nice if it were certificated for spins but that wouldn't be absolutely necessary, I would just like to know that it will recover nicely if an accidental spin develops.

I don't get in any airplane and spin it with the abandon I did fifty years ago. When we were spinning the trainers every day, if one started to develop some funny reactions we wrote it up, the rigging was checked and soon it was back on the line as a nice predictable airplane. You might get in a Cub, Champ, Luscombe or Cessna 120 tomorrow that hasn't been spun in forty years. It may well have been through a half dozen rebuilds since last spun! The spin characteristics could be totally different than what that airplane had fifty years ago.

I am sure you are aware that the Beech 19s and 23s had their spinning approval rescinded. We had a couple of them in our flight school that had some very wild excursions that were never explained. I can see why they decided to quit spinning them.

An airplane that is used regularly for flight training at the edge of the acceptable envelope is much more likely to have predictable results and that is what I want to fly when demonstrating unusual maneuvers and recoveries.

My airplane has three six pound servos, a two pound yaw damper sensor, strobe amplifier, ELT, Strikefinder antenna and I don't know what else back in the tail cone.

Up on the nose is a four blade prop that weighs thirty eight pounds more than the one it replaced. The CG is fine but I doubt that a Bonanza has ever been spun with that weight distribution and I don't intend to be the test pilot that finds out how it works!

The same thinking applies to the tip tanks, I know the airplanes were spun as part of the approval process but everything I have read tells me that recovery is more difficult with the mass distributed further out on the spinning arms. Why stretch your luck?

I agree whole heartedly that most of us need practice and re-enforcement of our basic flying skills at the outer edge of the envelope. I like doing stalls and spins, but then that is one of the reasons I have my Stearman. Remember when Marion Cole was giving dual in his Aerobatic Debbie? It would be nice if someone set up something like that again. I am sure he knew just how that airplane would react every time and if things started to change, he could get it fixed!

Maybe that would be a good project for you Tom?

Happy Skies.

Bob

[ARTICLES/19980106_165850_msg00142.tex]

Teaching the Radio Range**Thu, 8 Jul 1999 21:50:55**

In a message dated 7/8/99 6:57:43 PM Central Daylight Time, Best401k@aol.com writes:

Bob S. should I take you up on some low freq. radio range work?

Hi David,

As recently as thirty years ago, when I was teaching my sons to be instrument pilots, I had an early Frasca Trainer which still had the low frequency range capability. I did use that capability to help the boys get their situational awareness thinking process established. We all felt it did that job quite nicely! If you can find a Frasca or a Link that is still using the crab on the table and has the tone generator still working, I still remember how to teach it! While my old Link Trainer Instructor certificate was long ago merged into the Advanced Ground Instructor certificate, It would be fun to teach it to a young whippersnapper like you.

Happy Skies,

Old Bob

[ARTICLES/19990708_215055.msg05813.tex]

1.6 AIRMAN-WORKATC

”Direct” Routing**Mon, 20 Dec 1999 22:25:56**

In a message dated 12/20/99 8:51:40 PM Central Standard Time, Bonanza58@aol.com writes:

Acquire a handheld GPS and you can legally go direct just like the big boys and you will always know precisely where you are.

Bob.... Would you mind expanding on this some. Didn't know my handheld GPS was legal for anything. Regards, Larry

Good Evening Larry,

When you go direct in the contiguous 48 NAS, you are generally operating on the controllers authority, not yours.

That is true whether you are using an INS, IRS, Omega (now out of service) Loran or GPS.

The major thing is to not tell lies about what you are doing. Don't file a slash letter that is not consistent with IFR approved equipment that is actually aboard your aircraft.

They really don't care how you stay on course, just that you do!

I like to file a course that I could follow on my own with the legal IFR equipment on board. I know many who even file for the direct course from departure to destination with nothing more than one VOR and a handheld GPS. I think that is stretching things a bit, BUT, remember that it IS legal for you to plan and fly a DR course all of the way across the US if you can find a controller that will let you do it!

You can't shoot an approach for which you do not have equipment. You can't use a handheld as a substitute for a required DME fix or a required ADF function. You can, however, answer a query as to your position by stating that you think you are about 2.2 mile from PODNK intersection. If you were to be asked how you knew that, tell the truth, but I have never been asked!

I suggest that you file a regular airway, or at least a course such as direct PIA, direct STL, direct MEM. That would be something that could be flown reasonably with nothing more than a VOR. Then once you are airborne, ask for direct to your destination or wherever else you would like to go. If the controller asks what type of navigation equipment you will be using, tell him/her that you have a VFR handheld GPS or whatever it is that you are planning to use.

from19991220_223755_msg12156.tex

The controller will often ask you what heading it will take to get you to the position to which you have asked to go direct.

Be sure to use a phrase similar to this: "My initial heading Direct XXX will be XXX degrees." The heading that it takes will vary as you head across the country. If you tell the controller you are going to hold a heading, you are expected to hold that heading until you are given a clearance to do something else, whether it holds you on the desired course or not. Another clearance which could be issued would be for the controller to give you something like this: "Maintain a heading of XXX till able to proceed direct". As soon as you get your handheld set up for the spot you are going to, you can go ahead and follow the course.

I haven't had a controller ask in the last ten years or more!!

It may be helpful to add in your remarks section that you have VFR GPS available.

Unfortunately, that information is not consistently passed on to the controllers at all centers, so the controller may or may not have the remarks you file.

No cheating, no winking, no subterfuge required. Just tell the truth and press on!!

If the controller can handle the direct flight, you will get it. If it doesn't fit, you won't!

Happy Skies,

Old Bob

[ARTICLES/19991220_222556.msg12155.tex]

”Direct” Routing and Aircraft Heading**Thu, 30 Apr 1998 10:56:45**

Good Morning BEECHDRIVR

In a message dated 98-04-30 09:40:36 EDT, you write:

The best way to use VFR only GPS in IFR is to Request ”heading of xxx until recieving yyyVOR” Seems to work every time and is legal since you are presumably navigating by holding a heading.

I think this would probably work in actual practice but there is one technical problem that might occur. The controller expects you to hold the heading assigned and not change that heading without clearance to do so.

Remember, you have requested a heading, not a track. If you request direct, you are requesting a track.

Separation from other aircraft is sometimes based on that heading. If you are still six or seven hundred miles away from the VOR and you start tracking to it, it is likely that your heading will change substantially due to winds, great circle course, changing variation and the like. It would not be expected that you could receive the VOR until you are within a couple of hundred miles of the site. Should you elect to change the heading before that time, you should check with the controller for permission to do so.

In the days before GPS, we many times requested a certain heading to FARMM intersection, a feeder fix for ORD, from as far away as the west coast. If we intended to change that requested heading along the way, we always asked permission to do so. On occasion we would be told to hold the subject heading for another fifty miles or so due to traffic assigned a parallel heading to the one we had requested. You will also note that quite often when one is on a ”heading till able” clearance, the controller will ask if you can receive the station yet. If unable, he/she may well assign an adjusted heading. In addition we always told the controller when we were receiving the station and proceeding direct. I don’t know if that was actually required, but it seemed to be appreciated by the controllers.

I still think it is easiest and safest to tell the controller the absolute truth and see what you can negotiate. It works for me!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980430.105645.msg02207.tex]

Alternate Means of Identifying a Fix**Thu, 30 Apr 1998 13:10:09**

Good Morning Bob Briggs,

In a message dated 98-04-30 11:59:42 EDT, you write:

You can always ask the controller to approve an alternate means of identifying a fix, such as radar or VOR DME combination.

This has been another one of those ongoing discussions and in many actual cases, the controller will issue clearances which he/she has no authority to do. Unintentional and probably very safe but still not within the controllers authority. Without digging in to the manual for the appropriate references it is something like this. There are certain fixes where the controllers RADAR position can always be substituted provided his RADAR has been qualified for the use. I believe substitution of a RADAR fix for an outer marker or outer locator is one of those blanket uses.

When there is a RADAR fix noted on the chart, it is allowed any time the RADAR is operating. In addition, there are RADAR and VOR/DME fixes that have been checked for accuracy and are available to the controller for his use which are not published for our use.

If there has not been a flight checked approved substitution for a fix the controller does not have the authority to make the substitution on his own. This information was provided to me when we were trying to get the FAA to provide RADAR fixes to substitute for the DME fixes which we have on our approach to my home airport.

I believe this to be a fairly accurate representation but as with all things in a regulatory environment, there is always room for interpretation.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980430.131009.msg02216.tex]

Chapter 2

AVIONICS

2.1 AVIONICS-ANTENNA

”Blade” Style Antennas**Mon, 23 Feb 1998 19:10:06**

Good Evening Mickey,

In a message dated 98-02-23 18:08:01 EST, you write:

I’ve seen several airplanes with blades on each side of the empennage below

the control surfaces. Is that a nav antenna? Any good?

The installation of blades for the nav antennas was part of Mike Smiths mods.

I have Dorne Margolins (sp?) mounted in the position Mike recommends. The position and angle are rather controversial.

Mine are mounted between the aft bulkhead and the one immediately preceeding it. They are oriented to be parallel to the bottom of the fuselage, not with the line of flight. That is where Mike said they produced the lowest drag. I mounted mine low enough that I could put spars between them for adequate stiffness and still clear the tail mechanism. Placement is critical. Many others argue for the blades to be installed faired to level flight. I installed them originally because I was told that my RNAV unit would work better with blades than with the more common ”V” antenna.

It did seem to help and they work very well however I also ran new cables throughout and properly grounded all antennas which had not been done at the factory. I am currently feeding both VHF nav units and both glides slopes from the single set of blades. Works great but it does reduce redundancy.

The position vacated by the old factory rams horn was perfect for the GPS antenna.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980223_191006.msg01121.tex]

”Blade” Style Antennas Installation**Wed, 8 Jul 1998 09:48:19**

Good Morning Tim Freeze,

In a message dated 98-07-08 05:28:22 EDT, you write:

I am interested in removing the flying V antenna from my P35 and want to put one of the blade type Nav antennas on the fuselage sides. I know Smith Speed Mods used to do this. Does anyone know the location for the antenna or could measure the location on their plane.

When I decided to eliminate the flying V on my airplane, I made the effort to measure the location of the blade antennas on several Mike Smith installations.

While the plane of the antennas was always parallel to the bottom surface of the belly at the position of the antenna, the location varied as to the fore and aft and vertical dimensions. The most common seemed to be with the base of the antenna mounted half way between the rear bulkhead (Station 272) and the next to the rear bulkhead (Station 256.9) with the latest installations being most consistent.

The vertical dimension varied between two and three quarters of an inch to as high as four inches from the bottom of the fuselage. The later ones were closer to three inches from the edge of the bottom of the side skin panel than four.

I settled on three and one quarter inches up from the bottom edge of the skin centered between the bulkheads though I raised the leading edge up one sixteenth of an inch because I thought it looked better. When I had it completely parallel to the bottom, the visual effect was that it looked slightly nose down in relation to the bottom skin.

The Mike Smith installations that I looked at did not tie into any of the stringers or bulkheads of the fuselage though others did. I saw some as much as a foot further forward than the Smith mods. Mike’s all had a single flat doubler rolled to fit the side skin and glued in place. They were not tied in to the associated stringers. I was not happy with the stiffness of those installations and I didn’t like the ones into the stringers either so I made small spars to fit between the antennas and used the same type doubler as Mike had, but with an anti-peel rivet located at each corner of the doubler. The spars will only work if the antennas are placed low enough to clear the ruddervator mixer assembly. Mine clear by a half inch or more.

I did run into a gentleman from Oregon who had a gorgeous airplane that he had worked on very hard to make it as fast as possible. It had the Mike Smith mods put on before he obtained the airplane and one of the changes he made was to put the tail mounted blade antennas up to line of flight instead of the way Mike had mounted them. He felt that it resulted in an increase of one MPH.

I asked Mike about it and he said his were positioned based on flight and tuft testing and he felt the parallel to the bottom orientation was best. I sure don’t know who is

correct, but the spars won't work if the antenna is placed parallel to line of flight and I do like my spars!

One other potential problem.

Some FSDO's will not approve the installation without at least a DER engineering analysis.

I would make sure that your radio shop or other installing authority has some assurance they will be approved before you start cutting metal.

Mine have worked great for eight years. I originally installed them as I was told they would make my RNAV unit work better. the system definitely worked better after the blades were installed but I did add all new antenna cables for the blades and my DME antenna and I made an effort to properly ground all of the antennas as the radio manufacturers recommend. The Beech factory had not prepared the surface of the skin prior to mounting the antennas any where near as well as recommended by the various radio and antenna manufacturers.

The spot where the V antenna was removed made the perfect location for my GPS antenna.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980708_094819.msg03532.tex]

”Blade” Style Antennas Installation**Sat, 29 Jan 2000 07:16:58**

In a message dated 1/29/00 1:29:54 AM Central Standard Time, jtsmall@onramp.net writes:

Good grief. It is just the opposite of mine! Castleberry’s in Austin did them. We were able to install a doubler as well. Mine angle up when the Bo in on the ground presumably so they will be level in flight with the nose slightly down.

Good Morning John,

The proper position is controversial!

If the antennas were mounted any higher or not parallel to the bottom skin, my spars would interfere with the mixer mechanism.

One of the reasons I went with the Mike Smith position was that I don’t like the idea of adding doublers in the tail area. The FAA recommends and most people do try to tie in the doubler with a stringer and/or bulkhead. That is considered good practice.

I think that it changes the distribution of stresses in the tail and that is an area in which I don’t want to change anything if I can keep from doing it.

Mike Smith used a very small doubler which does not extend to, or fasten to, any other structure. However, that left his antennas rather flimsy and wiggly. I made spars which are mounted transversely to the fuselage and fasten the two antennas together. I was careful to make them just fit so that there is absolutely no pressure in any direction on the skin or the structure other than the air loads imposed by the antennas. With the spars making the two antennas act as one structure, there is no possibility of any twisting motion at all. The loads are strictly in shear to the skin. I didn’t use any doubler on the first one. My local FED said he liked what I had done, but thought there should be something there just to conform to standard practice. I now use the small Mike Smith style of glued in doubler, but I add a three-thirty-seconds rivet in each corner to provide anti-peel protection. On at least one of the Mike Smith installations I have seen, the doubler has separated from the skin.

Happy Skies,

Old Bob

[ARTICLES/20000129_071658.msg01997.tex]

”Blade” Style Antennas Verses Flying ”V”**Wed, 8 Jul 1998 10:23:24**

Good Morning Eric Poole,

In a message dated 98-07-08 09:46:29 EDT, you write:

Does anyone know what if any difference the blade nav antenna should make over the Flying V in terms of cruise speed?

I don't know about the speed, but it should be a measurable amount. Mike Smith claims that the biggest improvements can be made by cleaning off the top of the fuselage. He would eliminate everything up there if possible.

The location of the Beech combo NAV/COMM flying V is especially bad as it is right at the leading edge of the fuselage profile, probably the worst place it could be as a drag producer.

I have also been told that it is in a position that causes considerable audible noise in the cabin as well as picking up electronic interference from the plastic windshield when flying in precipitation.

While the blade antennas don't have a particularly high gain, (no better than the V) they have a much better distribution pattern which is why they work better with the RNAV units.

Cockpit covers are easier to fit too!

And it is a perfect spot for the GPS which is not affected by the windshield precipitation static! Too bad no one is as yet providing a flush mounted GPS antenna. I think it could be done now that five degree masking is fairly universal.

All in all, there appear to be many reasons to get rid of the monster on top of the fuselage.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980708_102324.msg03535.tex]

"Blade" Style Antennas Verses Flying "V"**Wed, 28 Jun 2000 09:25:23**

In a message dated 6/28/00 8:17:19 AM Central Daylight Time, Ron@Koyich.com writes:

Howard Petersen typed:

The "Blade" antennas do have an anomaly though..they are 4 times more sensitive to VOR signals off the side...perpendicular to the line of flight.

Be interested in where you get these figures, Howard. You state them like they're fact, but where do they come from?

Ron

Good Morning Ron and Howard,

I am stepping into an area well outside my expertise here, but I have been told that the advantage to the blades is that they have a very consistent pattern all of the way around. As I understand the situation, the gain on the "V" antenna is stronger (better?) but not as even all the way around. The V was meant to be omni directional, but nothing is perfect.

The more even distribution of the blades is supposed to give a signal that is easier for the RNAV computations.

I also like the blades resistance to ice accretion. Besides, putting them on the tail freed up an excellent location for my GPS antenna!

Happy Skies,

Old Bob

[ARTICLES/20000628_092523_msg10292.tex]

Antenna Installation**Mon, 20 Dec 1999 21:46:14**

Good Evening Ed,

In a message dated 12/20/99 8:22:15 PM Central Standard Time, jfseis@pilot.infi.net writes:

Monday Evening 12/20/99

Old Bob,

I looked at the P-35 today and tried to visualize exactly what you explained in such great detail regarding the antenna installation. The questions I still have are:

1. The two bulkheads that the antennas are mounted between are the same ones that the stabilizer mounts to - right?

That's true!

2. The "spar" that you fabricate actually goes from one side of the plane to the other - right?

Again correct.

3. I assume that the "spar" connects to the mounting screws - one at the front and one at the rear - right?

Almost! I use one spar at the front and one at the back. They do fasten to the mounting screws. All four screws are used.

4. The "doubler" that you used is one similar to ones normally furnished with antenna kits - mounts on the inside - right?

Right again!

5. How much bigger is the doubler than the antenna - I would normally make one about an inch or two longer and wider - OK?

Yes, I don't let it touch the existing bulkheads or stringers, but make it fairly large.

6. What would you make the "spar" from - maybe .032 - 2024T3?

I use .040.

7. I didn't really look at possible interference with the cables - any there?

The spars are close to the mixers. As I recall, there is about one half inch, or maybe only a quarter inch clearance.

I appreciate the patience and the help!!

Always a pleasure!! I make the spars in three pieces. A fitting to attach to each set of screws and then a U channel to tie the two opposing fittings together.

I mount the mixer on one of the spars and put lightening holes in them also. I put grommets in the lightening holes and coil the balance cables through those holes.

I have a friend who is a much better metalsmith than I. He uses my spar idea, but makes the spars out of one piece of aluminum.

I fasten each end fitting to the attach holes in the skin with the doubler in place but without the blades. I then mark, drill and Cleco the pieces together and remove them for riveting.

My effort is to fit the spars so that there is no bending in or out of any of the existing components of the aircraft. Hopefully there ends up no change in any of the stress distribution paths.

There have been about a dozen done that way that I know of and so far, no complaints!

Best Regards, Ed Smith N5158C @ PVG

Happy Skies,

Old Bob

[ARTICLES/19991220.214614.msg12152.tex]

Optimal Antenna Location**Thu, 13 May 1999 23:12:05**

In a message dated 5/13/99 8:21:27 PM Central Daylight Time, jtsmall@onramp.net writes:

Of course the com on the belly will be useless for ground transmission but I don't think this is an issue really. Not with two coms.

Good Evening John,

I certainly have no expertise on electronics, but I do have some experience with various antenna locations.

On my current airplane, I located the primary comm antenna on the belly as I figured that it would work best when airborne. The backup unit is on the top just aft of the cabin area.

I had figured I could use the number two for all ground communications, if required. As it worked out, the number one (belly antenna) works fine at least ninety percent of the time when I am on the ground. There are certain ramps where it doesn't seem to work too well, and I believe those few places have a lot of reinforcing wire in the concrete. It has not been a problem.

I wanted one antenna on the top of the airplane so that it would be available in the event of a belly landing, either at an airport or out in the boonies.

I try to keep the top of the airplane as antenna free as possible. Mike Smith cleaned everything off the top in his efforts to go fast. Said that the whole cabin top was an area that needed to be kept clean.

I do have the GPS antenna in the spot where the old rams horn unit was placed by the factory. I don't think there is a better location on the airplane for the GPS.

I think you would be happy with the performance of an antenna mounted on the belly.

Happy Skies,

Old Bob

[ARTICLES/19990513_231205.msg04636.tex]

Optimal Antenna Location**Fri, 14 May 1999 09:07:27**

Good Morning John,

Yesterday I wrote:

I located the primary comm antenna on the belly as I figured that it would work best when airborne.

In a message dated 5/14/99 12:16:00 AM Central Daylight Time, you wrote:

How did that work out? Is it the best primary location when airborne? Do you recommend the bent wire style or the bent solid type?

The bottom location seems to work fine, though I can't really tell any difference in performance between it and the one mounted on the top. I suppose there is some loss of signal strength due to the bottom one being a bent antenna where the top one is straight.

I would like to eliminate all of the stuff on the top as suggested by Mike Smith. The airplanes really look nice with absolutely nothing up there and the "go fast" boys claim it helps!

I have considered trying to build a retracting VHF antenna to be used for those situations where the top mounted antenna would be required and have it buried the rest of the time.

Mike has an STC (now held by BDS, I would imagine), that eliminates the top mounted cabin airscoop and replaces it with a NASA scoop in the maintenance access door located on the left side of the fuselage just ahead of the empennage.

If someone would come up with a flush GPS antenna and an approved retractable antenna for the ELT, (some are now mounted so that the antenna is in one of the back windows, but I don't care too much for that), we could have a completely clear cabin top!

I have had experience in the past with wire whip antennas vibrating under some icing conditions. Not always, just in some few isolated instances. The ones I am using now are Dorne Margolin solid blades. The small ones, with a solid base and plastic covered rod element, not the big 747 type! They have given no problems at all, though I am sure others are just as good.

Happy Skies,

Old Bob

[ARTICLES/19990514_090727_msg04647.tex]

Optimal Antenna Location**Mon, 13 Mar 2000 01:03:57**

In a message dated 3/12/00 1:31:39 PM Central Standard Time, jtsmall@onramp.net writes:

If up front I was informed by Jim Hughes (ABS Mag avionics column) that this location was a poor choice by Beech because it radiates down onto the radio stack. The top of the stack is the one position that is generally not shielded and so creates feedback. By inference I suspect this is also a less desirable location for a traditional com antenna and so I relocated com1 to the belly, leaving com2 on top just forward of the tail. For cosmetics I relocated the Loran C antenna mid ship on top.

Good Evening John,

I agree that the location on top of the cabin is a terrible place for a VHF antenna of any kind, but it's not so hot for a LF one like the Loran either!

The place where Beech put the combo antenna is the best place on the airplane for a GPS antenna. Save it for that!

Happy Skies,

Old Bob

[ARTICLES/20000313.010357.msg04672.tex]

Optimal Antenna Location**Sun, 10 Dec 2000 09:23:25**

In a message dated 12/10/00 4:23:27 AM Central Standard Time, Ron@Koyich.com writes:

I'd still put one antenna on the top of the aircraft for use on the ground. Put it back further than the flying V was, and put the GPS antenna where that one was. If you only have com antennas on the bottom you're bound to run into situations where you cannot communicate well with ground control a some airports.

Good morning Dirk and Ron,

May I second Ron's suggestion?

When I installed blade antennas in lieu of the factory top cabin mounted monster monstrosity V antenna, I used Dorne Margolin blades on the tail to feed both nav units and two glide slope receivers.

To replace the comm component of the old V, I placed a Dorne Margolin bent antenna on the belly.

That has worked reasonably well, but there are occasions when ground communications with the belly antenna are less than ideal and, for those occasions, I am glad I retained the factory installed secondary comm antenna on the top of the fuselage. More about that later.

The belly antenna has problems on the ground not just because of line of sight difficulties, but if you happen to be located on a concrete ramp which contains a lot of re-enforcing steel bars, they may absorb too much of the transmitted signal to provide a viable output.

My airplane came from Beech with a second comm antenna mounted about four and a half feet aft of the cabintop V unit. When I made the major antenna change, I removed that antenna with the intent of checking for proper ground and replacing all of the existing antenna cabling. I was surprised to find that Beech had done nothing specific to assure that the antenna was properly grounded. On some of the other factory mounted antennas, there had been some preparation by the use of one of those little circular brush units to assure adequate grounding. The secondary antenna had no such preparation applied. I removed the paint in the area and applied the clear Alodine solution as recommended by both Beech and most antenna manufacturers.

I am at a loss as to why Beech didn't follow their own recommendations on the second comm antenna. I assume that, since the second antenna was an option, the installation was done at some time other than when the primary antennas were installed and/or by less qualified and conscientious persons.

I don't have to use that standby comm with the top antenna often, but on some occa-

sions, I would be totally unable to communicate on the ground if I had only the belly antenna.

Incidentally, I placed the GPS antenna where the big old V had been and it works beautifully. It would probably be better if that area was left completely void of any protuberance if speed is of the essence. Most speed gurus feel that the entire cabin top should be kept clear of any additional devices of any sort. I obtained the highest quality small GPS antenna that was available, but it would be better if a flush one was available!

Happy Skies,

Old Bob

[ARTICLES/20001210_092325_msg17463.tex]

2.2 AVIONICS-AP

3 Axis Autopilots

Wed, 23 Feb 2000 01:06:17

In a message dated 2/22/00 11:07:37 PM Central Standard Time, ltemplet@slip.net writes:

I'm not clear on what the difference is between a 2-axis autopilot with yaw dampers and a 3-axis autopilot. Isn't the yaw damper just another way of controlling the third axis?

Good Evening Larry,

I don't consider myself an expert on autopilots, but I will try to present my perception of the difference.

The yaw damper is a single axis device which often just keeps the ball in the middle. In some cases it will keep the aircraft in a displaced mode selected by the pilot. More later.

The three axis autopilot handles the controls as would a human pilot. It inputs rudder as required to correct for adverse yaw induced by the differential action of the aileron and stuff like that.

The B-720s that I flew were equipped with a full three axis autopilot which did all of the above. In addition, it had a rather rudimentary yaw damper. It's only job was to stop any dutch roll which developed. The action of that yaw damper was very much like any of the GA yaw dampers that I have flown. If it was on while you hand flew the airplane, it would oppose any effort to slip or skid the airplane. Like the Bonanza, the 720/707 series of Boeings had a tremendous amount of directional stability but were somewhat lacking in vertical surface to provide yaw damping. The very first version of the airplane had a much shorter vertical fin than the one normally seen. Within a few months of the introduction of the type, an extension was added to the top of the vertical fin and all subsequent versions were produced with that taller fin. It was still something of a wiggler, especially if the aviator tended to use the aileron excessively. The dedicated yaw damper would do a good job of stopping the dutch roll, but it made the thing fly like a Mack truck instead of a nice responsive machine. Just like a Bonanza, judicious use of the rudder made for a much nicer flying aircraft, but the yaw damper did an acceptable job of providing a reasonable ride. Unfortunately, misuse of the rudder would put it on it's back, but that is another story!

The yaw dampers on the 727 and the 737, along with most of the yaw dampers on later Boeings, would stop the yaw if one developed, but the neutral point about which that yaw was stopped was displaced in accordance with the amount of yaw that the pilot wanted to hold. In other words, if you wanted to make a wing down crosswind landing, you could hold the required rudder to give a stable slip and the yaw damper would stop any dutch roll or yaw that would develop, but leave the slip input alone.

With the later style of yaw damper, it could be left on full time and not interfere with

the pilots control of the aircraft in the manner that he/she desired.

Reading what I have written, I don't think I have explained it very well! I guess the key is that the yaw damper is a single purpose device, where the rudder channel of the full three axis autopilot has functions coordinated with the needs of control as required by the total autopilot. If the autopilot is designed to make a wing down crosswind autoland, it would need a third axis to get the wing down. If there is no reason to fly in a cross controlled situation, there is less reason for the third axis.

In addition, if the airplane has little tendency toward dutch roll, the normal three axis autopilot can handle things reasonably well. If it has a high tendency toward dutch roll, it is advantageous to have the stabilizing effect of an active full time yaw damper such as those found on the newer Boeing aircraft. That very sophisticated style of yaw damper lessens the need for the third axis on the autopilot.

That may be all wrong, but that is the way I see it!

Happy Skies,

Old Bob

[ARTICLES/20000223_010617.msg03391.tex]

Autopilot Coupled to GPS

Wed, 26 Apr 2000 09:17:08

In a message dated 4/26/00 7:36:36 AM Central Daylight Time, wings@inetnebr.com writes:

I currently have a Trimble A2000 GPS and King HSI. The HSI is coupled to the auto pilot but the GPS is not. This works good for flying vectors on approach but not a good system for long cross country flights.

I have decided to have a 430 installed and I know that you can fly the VOR and GPS on auto pilot with the 430 but does anyone know if the bug could still be used on auto pilot? I would not want to lose that feature. If anyone has this particular set up I would appreciate hearing from you.

Thanks bob v

Good Morning Bob,

If your Trimble 2000A was not hooked up to allow autopilot tracking, that was a major error by the installer or an effort to lower the cost of installation by a minuscule amount!

Most installations include a switch to allow the A/P to track whatever is on the primary CDI. Since in your airplane, the primary CDI is probably your HSI, that is how it should have been set up.

All it really takes is a properly placed double pole, double throw toggle switch. A couple of ten dollar lights can be added to show which source has been selected. For several years, some of the local FSDOs were forcing the installation of a relay which would switch the primary CDI (in your case, the HSI) back to the Primary VHF Navigation Receiver any time an ILS frequency was selected on that receiver. That relay was often driven by a fairly expensive combination switch/light. Using the relay, switch and light arrangement instead of a double pole, double throw toggle switch could add anywhere from five hundred to a couple thousand bucks to the cost of installation depending on the quality of the components and how much the install shop wants to make on them.

I can't speak for all autopilot installations and you don't mention which one you have, but I have never seen an installation where the autopilot bug could not be used as you desire when properly selected on some sort of autopilot control unit. Every autopilot I have ever seen has had such a controller.

A bit of further information. S-Tec has a magic box which will allow a more sophisticated feed from the Garmin 430 to be used for guidance in lieu of the common practice of following the CDI. It will allow more precise tracking and computes intercepts which help compensate for wind and speed. Pretty slick and relatively low cost. Should be less than a thousand bucks installed. I would spend money on that, but I wouldn't go for the relay deal. It's a waste of money.

Happy Skies,

Old Bob

[ARTICLES/20000426.091708.msg07079.tex]

Autopilot and GPS Resolver

Fri, 28 Apr 2000 09:27:28

In a message dated 4/28/00 7:16:37 AM Central Daylight Time, swo49@hotmail.com writes:

When I am connecting the 430 to the AP via the GPSS, is not the resolver issue mute?

Can I not have the AP follow the GPS info directly?

Good Morning Steve,

These are two separate issues.

One is how does the set know which course to fly.

The other is what method does the autopilot use to follow the desired course.

The information as to which course is to be followed must come from somewhere. It can be supplied automatically or selected by the pilot. There has to be a method for the pilot to input the data whether it is via the resolver interface such as Garmin and King/Honeywell use, or selection via the panel unit as the other manufacturers provide.

I have not used a 430 and don't know just how much automation the FAA let them put into the operation. I would imagine that on an approach, all of the courses are selected automatically. On the early Garmin and King units, the set would tell the operator what course was to be used and the operator would then set that course via the resolver interface. Trimble, Northstar and II Morrow just let the set do it all by itself, but allow the operator make a change if so desired.

Most current autopilots either get their steering information from the CDI or use the same signals which would drive a CDI. That is generally a plus or minus five volt (or thereabout) signal with plus being one way, minus the other and zero when the thing was going the way the box desires.

What the GPSS does is add more information concerning speed, rates of closure and a bunch of other parameters which allow a very nice smooth intercept and tracking performance.

If you use the raw data from the left and right steering needle outputs, the airplane will wiggle back and forth trying to null out those little voltages. That's why the wing levelers have the sensitivity adjustment on them. It is one method to try to make for a little stability. The more sophisticated autopilots add in a heading reference. The voltages derived by a displacement in heading are combined with the voltages from the track displacement. The techie tries to adjust all of the pots so that tracking is reasonably smooth and that is what we use.

The GPSS adds in all of those magic things that the GPS is able to tell it and provides

a much more stable and direct signal to the autopilot. I am not familiar with the algorithm S-Tec is using, but I would imagine they get enough data from just the GPS stream that heading is not one of the required functions to be considered for stabilization of the autopilot signal. That is just another one of my totally uninformed non-engineer perceptions though.

With the nice stable information that can be developed by the S-Tec GPSS unit, there is no necessity for the heading input. The autopilot can steer directly from the GPS signals.

Also, how would the new electronic (Sandel) HSI's work in this set-up?

All the Sandel does is provide a fancy display of data derived from other sources. I don't know the exact mechanics of how they provide the resolver function, but it is functionally the same as the King KCS 55A system. If the GPS set needs a resolver function, the Sandel can provide it.

One more thing, even though the autopilot can track the GPS signal without setting the course in the window, the presentation of the HSI will not be correct if the desired course is not entered therein.

Remember what I said earlier about tracking with a wingleveler that does not use the heading information? Same deal. In some ways, the HSI is a detriment when using GPS. I still like mine, but I am not sure I would install one if I were starting over.

Happy Skies,

Old Bob

[ARTICLES/20000428_092728.msg07213.tex]

Backup Wing Leveler**Wed, 26 Jan 2000 15:39:39**

In a message dated 1/26/00 1:30:39 PM Central Standard Time, Mavitor@aol.com writes:

It depends.

How True!!

I rather like the idea of a back up wing leveler ready to help out if confusion reigns. The Mooney had it, I believe they called it Positive Control, Piper and Beech both offered it for a while. One or the other called it a Constant Copilot. For some reason, the public didn't like it and it ended up kinda disappearing from the scene. I have a Century IA that I would imagine would suffice for that purpose, but I rather doubt that I would be sharp enough to get it on in time to prevent a disaster. By the time I realized I was out of control, it would probably be too late!

It seems to me that the best thing is to have an instrument in which you have absolute and complete confidence. If a turn needle is moving, it is working. If it doesn't move at all, it has failed. Simple and easy for me to understand.

One of the reasons I prefer a T&B to a horizon for a back up is how difficult it is to tell which one of two horizons is telling the truth.

As I mentioned a few days ago, I had two T&Bs in my early Bonanzas. One vacuum and one electric. Never had an artificial horizon in a Bonanza until the FAA (or was it still the CAA?) required it around 1956.

The more different back ups and systems you have, the easier it is to get confused. The simpler the better.

I thought the Brittain autopilot was a great solution when it first came on the scene. The ability to use it after an electrical failure was/is a great feature. Unfortunately, the greater load that it puts on the air system causes the air pumps to fail sooner!

I certainly understand the reasoning to use what you have to it's greatest advantage!

If I were buying new, I would seriously consider all electric.

Happy Skies,

Old Bob

[ARTICLES/20000126_153939_msg01773.tex]

Backup Wing Leveler**Fri, 30 Jun 2000 22:08:58**

In a message dated 6/30/00 12:27:30 PM Central Daylight Time, foosej@oz.net writes:

If you loose the A/P and or HSI, A/I, etc., will the yaw damper, which is independent of the other stuff, keep the wings level?

Good Evening John,

I'm afraid that won't work. All the yaw damper will do is make sure that your graveyard spiral is well coordinated!

I don't know precisely what mechanism is used, but I believe it is a dampened pendulum that senses a wiggle in the same way the "Ball" inclinometer senses a wiggle.

The T&B and the TC are forcing a stable gyroscope to be displaced against a spring and that is what shows the turn.

The "Constant Copilot" or Mooney "PC", "Positive Control" I think they called it, would keep the airplane out of a spiral, but I believe they both used a canted gyro.

The trouble with both of those is that it would take a lot of guts to let go of everything and let the airplane do it's thing. Maybe guts isn't the right word. We work so hard to develop habits that don't need thought. The condition that puts one in a graveyard spiral is not a well thought out and rational condition!

So far, the best answer seems to be training and practice. But nothing is perfect and there will be accidents.

My number two son tells a neat story about a fellow who wrecked two airplanes (and lived through both!) because he thought the gyros had failed when they hadn't! The first was a jet fighter and the second was a Turbo Commander. He flew military fighters and professionally for many years before things were finally figured out. The last time he thought the gyros had failed was in a Lear. He had a copilot who did know what was going on and told the rest of the pilots what really had happened.

Like I said before, there is nothing quite as nice as a competent multiple pilot crew.

Happy Skies,

Old Bob

[ARTICLES/20000630.220858.msg10409.tex]

Brittain Industries

Wed, 16 Aug 2000 16:33:33

Good Afternoon Ron, Rodger, Hal and All,

Once again, the list has come through!

Brittain Industries 3266 Sheridan Road Tulsa, Oklahoma 74115

918 836-7701

It appears that Gerry, or Jerry, Walters is the guy to contact.

My oldest son bought an S35 Monday which has a Brittain in it. He wants to, at least, get it checked to see if it is practical to repair before installing something else. I haven't used one in at least twenty years, but they were nice units back then!

Thanks again to all!

Happy Skies,

Old Bob

[ARTICLES/20000816.163333.msg12230.tex]

Brittain Maintenance

Tue, 28 Nov 2000 00:03:57

In a message dated 11/27/00 3:21:15 PM Central Standard Time, denniswolf@worldnet.att.net writes:

Where can one get this beast worked on?

Thanks,

Dennis Wolf

Good Evening Dennis,

The B-5 can be repaired by Brittain Industries in Tulsa, Oklahoma.

This subject was heavily covered on this site within the last couple of weeks. I don't have the address or phone number, but it was listed by others. My oldest son had his Brittain B-4 completely rebuilt about a month ago and it works just as advertised.

If someone else doesn't come up with the address and/or phone number, I will try to get it from my son.

Happy Skies,

Old Bob

[ARTICLES/20001128.000357.msg16817.tex]

Brittain Maintenance**Tue, 28 Nov 2000 09:42:24**

In a message dated 11/28/00 3:43:37 AM Central Standard Time, Ron@Koyich.com writes:

Mr. Gerry Walters Brittain Industries Tel: +1-918-836-7701

Good Morning Ron.

Thanks for the phone number for Gerry Walters.

I spoke to my son last night about his B-4 and he affirmed that it is working very well. While it doesn't have all the fancy capabilities of the modern units, it is performing all of the functions that it's sales brochure and operating manual say that it should and doing those functions very well. It holds altitude, tracks the VOR or GPS, can hold a magnetic heading and make standard rate turns.

Gerry had it for a week. He pulled every unit out of the airplane, rebuilt or replaced every component and replaced most, if not all, of the plumbing. Gerry also made a couple of flights with my son to adjust the unit in the aircraft. That was all for a cost of less than \$1100. His 'over the phone' estimate for rebuilding the unit was 1200 to 1800. It is refreshing to see a job come in below the estimate.

I did receive the charts you sent, sorry I haven't replied sooner. Very interesting and I hope to find the time to respond more completely.

Thank you very much.

Happy Skies,

Old Bob

[ARTICLES/20001128_094224_msg16828.tex]

Brittain and Tactair Autopilots**Wed, 1 Nov 2000 22:56:49**

In a message dated 11/1/00 9:07:43 PM Central Standard Time, falconaviation@home.com writes:

Hi gang, questions? I would like to install an autopilot in my ole girl? Do the brittain and/or tacair need stc's, or can they put in because of the type certificate?

Mike Bourget C-GFPG 49 Bonanza

Good Evening Mike,

My quick perusal of the TCDS shows the Tactair T-1 listed as eligible for certification on your airplane. There are no references to any of the Brittain's for the A model.

I am reasonably confident that Brittain does have an approval though, and, if you were to go to the trouble of installing one, I am confident that the paper work would not be a problem. The son of the individual who was the driving force behind the Brittain autopilot is still actively maintaining them. I imagine he has all of the necessary approvals.

There is a young man in the Cincinnati area who is doing the same thing with Tactair units.

My oldest son recently purchased a 1965 S35 equipped with a Brittain B-4. He took it out to Tulsa and had it completely gone over by the current owner of the Brittain autopilot design. It is working fine now and I imagine it will be usable for several years, however, it has few of the characteristics that we have come to expect from modern autopilots.

Had it not already been in the airplane, I doubt if he would have had one installed.

He has told me that he expects to replace it when finances will allow, but he wants to get everything else set up to his liking before he pops for a modern autopilot.

I think the cost of installation would be such that it would be cheaper to buy one of the new modern light weight units than it would be to put in a Tactair or Brittain, even if you got the autopilot free.

I don't have any particular unit to recommend, but if it were me, I would look for a single axis roll unit that uses a canted gyro as a stabilization device. I would add to that some sort of an altitude alerter to tell me when I was about to get off my altitude. I think that would be the most economical and light weight means to gain automatic flight capability.

If you are not comfortable without an autopilot that will maintain altitude, that will almost double the cost and weight of the installation.

I find that modern winglevelers are good enough that a Bonanza will maintain altitude quite well if it is properly trimmed and in reasonably smooth air. The tracking capabilities are excellent, especially when they are following a GPS signal. While I do like having altitude hold, I am comfortable monitoring altitude manually and an altitude alerter would wake up even an old guy like me if I started to wander off.

Obviously, on my airplane the canted gyro would have to be mounted somewhere on the panel where I could reach the controls, but out of my normal line of sight!!

Happy Skies,

Old Bob

[ARTICLES/20001101_225649_msg15605.tex]

S-Tec and Century IIB**Tue, 20 May 1997 21:29:28**

To Frank Kelly,

About autopilots – I have a brochure I picked up at Sun 'n Fun that has the following phone numbers for S-Tec—800 872-7832, 817 325 9406, FAX 817 325-3904 (There is a note that the area code will change to 940 around June 1, 1997. Internet address – www.s-tec.com

I don't consider myself an expert on autopilots, but I do have some S-Tec equipment in my Bonanza. I installed a PSS-60 pitch unit with altitude preselect and couplers, electric trim, auto trim. and yaw damper in my airplane in 1991. They have been very reliable with no service required in the 1000 plus hours I have used them. I fly with the autopilot on at least 95% of the time. Disgusting but true. I have flown with various King autopilots and I really like the one I believe they call the KFC 200. I bought the S-Tec 'cause it was about \$8000 cheaper!

The only thing I don't like about it is that it doesn't have an altitude anticipator circuit. When the aircraft is rolled into a standard rate turn, it will lose 40 or 50 feet before the correction is put in then when it is rolled out it will gain about the same before it puts in the correction and gets back to its altitude. My autoplot mechanic told me that King was the only lightplane autopilot with the anticipator feature at the time I purchased mine. There may be others now.

It really isn't too bad. It's about like flying with a student that is a little slow on his scan. About the time you are getting ready to make a hint that maybe he should look around, in comes the back pressure. For the \$8000 difference I can put up with it.

I use a Century IIB for roll control. It uses the horizon for reference while the S-Tec uses a canted gyro. I personally prefer the displacement control of the horizon over the rate based canted gyro. Different strokes for different folks!

You asked for a personal opinion and that is all this is.

Bob

[ARTICLES/19970520_212928.msg00911.tex]

S-Tec and Century IIB**Mon, 8 May 2000 09:40:27**

In a message dated 5/7/00 11:54:40 PM Central Daylight Time, Ernie.Ganas@email.msn.com writes:

Use an STEC AP it uses the electric TC as its primary roll input

Ernie Ganas

Good Morning Ernie,

You are correct, and that is one of the options. However, many autopilot experts feel that an attitude based roll autopilot is superior to a rate based roll autopilot.

At the time I installed my current electronics suite, I talked to S-Tec because theirs was all electric. It was one of the S-Tec engineers who explained the difference to me. He recommended that I retain the Century IIB that I already had and add the S-Tec PSS pitch coupler, altitude hold, altitude preselect/warning, electric auto/manual trim and yaw damper units.

It was his opinion that the IIB was an operationally superior unit to the one they used, but that their canted gyro based sensor was cheaper and more reliable.

I retained a Century I that I had so as to provide the more reliable canted gyro as a back up to the IIB. The rest of the stuff was set up to be able to be used with either roll unit.

There are a couple of issues that complicate adding an S-Tec roll unit in lieu of my IIB. I like having the capability of using altitude hold without the primary roll unit and the folks at S-Tec with whom I have discussed this within the last year or so tell me that their current boxes are not certificated for that type of operation. I think I could get it approved, but I am still looking for another solution.

S-Tec is definitely still in the running if I can't come up with a better attitude based solution!

Thanks for the comment.

Happy Skies,

Old Bob

[ARTICLES/20000508.094027.msg07812.tex]

S-Tec and Century IIB**Mon, 3 Jul 2000 09:07:32**

Jack wrote:

We have recently had a failure of the Turn Coordinator in our F33C and our S Tec 60 - 2 would not turn on. The test lights would light, but it would not engage in any mode. Could it be that the S Tec is smart enough to sense the proper operation of the TC???

Good Morning Jack,

The Turn Coordinator IS the sensing device for the S-Tec autopilot. If it has failed, you have no autopilot. If it doesn't have the sensor, it IS smart enough to let you know!

As you may be aware, I do not care for the canted gyro as a flight instrument, but I think it is perfectly adequate for a stabilization device for a low cost autopilot. That is what most of the low cost autopilots and wing levelers now use.

The S-Tec folks have developed their whole line around that type of stabilization. It works well in that application and is very reliable and economical. But, everything fails eventually.

Having the autopilot use the same instrument that we fly by reduces the redundancy of the system.

If the autopilot is using the same instrument that we consider our primary "last ditch" instrument it can be particularly disconcerting!

The King and the top of the line Century autopilots use the horizon as the primary sensor. If you lose the horizon, you lose the autopilot.

My airplane had a Century IIB roll unit and a Century I wingleveler installed when I bought it. That was a fairly common Beech factory installation of the day.

The beauty of that is that if the Century IIB fails, you still have the wingleveler as a back up.

I wanted to retain that capability, but I didn't want that TC on my panel! I moved the TC, which is the sensor for the Century I, over to a position above the glove box. That way, I can still reach the controls, but it is out of my normal line of sight.

I then installed a proper T&B in my normal scan area.

The Century IIB will become unusable if either the attitude gyro or the heading gyro fails. The Century I, just like an S-Tec, will become unusable following the failure of the TC. If all of the above fail, I am confident I could fly the airplane adequately via the T&B. If that is no longer usable, I guess it just wouldn't be my day!

I have practiced using just the GPS. It can be done, but would take some more time

and practice for me to gain the confidence that would make it as comfortable as partial panel with a T&B.

In the days of yore, we would practice holding a heading of south with just the compass. No gyros of any kind available. It could be done, but I put it in the realm of one of those things that can be done when under the hood and with a safety pilot on board. I don't know if I could hack it for real. The GPS thing is easier for me than flying a southerly heading on the compass, but neither is as comfortable as flying the T&B.

I am sure that there are conditions that would overload any of us regardless of the equipment we have available.

Happy Skies,

Old Bob

[ARTICLES/20000703_090732.msg10471.tex]

Solid State Sensors**Sat, 14 Apr 2001 10:27:37**

Good Morning All,

A couple of years ago, we had a rather complete discussion concerning solid state attitude indicator devices.

At that time, they seemed to be used primarily in air carrier style and priced back up attitude instruments. The cheapest I saw was around \$25,000.00. I believe B.F. Goodrich has one that sells for around \$45,000.00.

During my wandering around at Sun 'n Fun, I came upon the autopilot unit being built by Jim Younkin strictly for homebuilt aircraft.

For those of you who don't know Jim Younkin, he was the lead designer, inventor and all around autopilot guru for EDO and then Century during their heyday.

After retirement, he turned his attention to building replica aircraft and doing fabulous restorations.

A couple of years ago, he became frustrated with the lack of availability of state of the art autopilot equipment to be used in his replicas and restorations.

He has designed, and is now manufacturing, a new line of completely solid state units to meet that need.

I spoke with him and looked at the units he has available

They look great!

The servos are about one-third the size and no more than half the weight of the ones used on my S-Tec.

The complete three axis stabilization device is mounted within a standard sized instrument case which also includes all of the computational devices including the vaunted GPSS style intercept capability. All control functions are on the face of the instrument. No gyros in the conventional sense at all. Nothing to mount other than the panel control unit and the servos! He is developing a DG style indicator, which he hopes to have available this fall, that uses the solid state position sensors to provide heading.

The prices are approximately half what S-Tec is getting for the same capability and a little less than Century's lowest.

I would hope that the manufacturers of certificated autopilots are at least studying the technology so that we may eventually gain the use of such modern equipment.

Did any of the rest of you see Jim's stuff at Sun 'n Fun?

I think I understand how a ring laser device works, but these things are just some sort of a chip which senses rotation. One is placed in each axis or plane, — pitch, roll and

yaw.

Rumor is that each sensor is less than fifty bucks when purchased in reasonable quantity.

Can any of you electronic experts enlighten us as to how this stuff works?

If it were approved for we poor spam can drivers, I would have ordered one at Sun 'n Fun!

When I asked about getting something like that certificated for my Bonanza, Jim showed me something he made up which attaches to the control column on his Twin Comanche. He just lays it on the back seat of his airplane until he wants to use it. It clips between the two control shafts with plastic clips, and he snaps a little arm to one of the control wheels to provide roll capability. He showed me the unit and it looked easy to do.

I was so excited I forgot to ask if he has worked out anything similar for pitch and yaw!

I suppose that isn't practical for a dummy like me, but the devices he has available for homebuilts look wonderful.

Check it out at: www.trutrakflightsystems.com

Happy Skies,

Old Bob

[ARTICLES/20010414.102737.msg07696.tex]

Which Autopilot?**Fri, 17 Sep 1999 12:26:18**

In a message dated 9/17/99 9:04:55 AM Central Daylight Time, jgarner@netwiz.net writes:

So the question... If you where installing a new AP in your plane which one would you choose?

I would look closely at the S-Tec equipment.

Their devices are not as sophisticated as the Allied Signal stuff and use a canted gyro for stabilization instead of an horizon as does the King and the more expensive Century models.

I have had an S-Tec PSS 60 with autotrim, yaw dampener, approach coupler and altitude preselect installed in my Bonanza since 1991 with absolutely no service required in over 1700 hours of operation. The yaw dampener did not work when first installed, but it was replaced immediately with a new unit and that has worked fine ever since.

The S-Tec stuff is not exactly leading edge technology, but it appears that the simplicity has paid off in high reliability.

I do have some Century equipment as well, and while I think the units I have do their job very well, getting any service from Century has been an unpleasant experience.

It has been slow and incomplete requiring that things be sent back repeatedly until they were finally fixed.

I don't have any recent experience with Allied Signal stuff.

Hope that helps!

Happy Skies,

Old Bob

[ARTICLES/19990917_122618_msg08566.tex]

Yaw Dampener Operation

Sun, 20 Feb 2000 23:33:08

In a message dated 2/20/00 9:45:06 PM Central Standard Time, swo49@hotmail.com writes:

I have just installed the S-Tec Yaw Dampener in my K-35. I have a few questions on its use:

Good Evening Steve,

Here goes!

1. The small trim control that is a part of it, it seems to be very sensitive in adjustment, is yours that way? How do you use this control?

I would say that it is sensitive, but I don't find it objectionable. I generally adjust it in small increments of a couple of degrees of rotation at a time until the inclinometer ball is steady in the center.

I don't adjust it often, sometimes not for several flights. If I note that the ball is not in the middle, I give it a small tweak, then give it a few minutes to settle in.

I doubt if it varies an eighth of a turn for years at a time.

2. Do you use the on or auto position? Do you ever have it on for takeoffs or landings (not withstanding what the manual says)?

With very few exceptions, I keep it in the auto position. I don't like the feel of it when I am hand flying the airplane. Having said that, I have to admit that I have had it on and not noticed it was on until I was in the landing approach and started to drop a wing for a crosswind landing. The rudder resists my effort and I realize I have forgotten to turn it off! I guess it isn't all that bad!

I never intentionally have it on for landing and I certainly would not have it on for takeoff!

3. At altitude, is it always on in your plane?

Not always, I generally use it only when the autopilot is on, but I probably fly with the autopilot on at least ninety-five percent of the time!

In moderate to heavy turbulence, I generally fly with the autopilot on, but I ride the controls to dampen it's inputs. Worse than that and I turn it off and just try to minimize the control inputs.

When I click the autopilot off, it goes off as well, automatically, but I will occasionally turn the yaw damper to the manual on position during those very rough conditions.

My ego still tells me I can do a better job myself if I am really working at it. I like to

keep in practice.

But I would buy it again.

Happy Skies,

Old Bob

Thanks, Steve

[ARTICLES/20000220.233308.msg03247.tex]

Yaw Dampener Worthwhile?**Sat, 18 Sep 1999 01:20:37**

In a message dated 9/17/99 1:42:34 PM Central Daylight Time, jtsmall@onramp.net writes:

yaw dampener, approach coupler

How much to you use and/or recommend these two features?

Thanks.

-jts Arlington, TX

Good Evening John,

I use the yaw dampener about 90 percent of the time I am flying. I have it wired so that it is normally in use any time the autopilot is in use and I use the autopilot at least ninety per cent of the time I am in the airplane. Probably more! The approach coupler does not get as much exercise, though I use it any time I am shooting an ILS either in actual conditions or for practice. The only time I fly an approach by hand is when I am taking a check ride.

When I was gainfully employed, I tended to fly approaches by hand whenever our operations specifications would allow me to do so.

Now that I am unemployed, I find that I tend to use the autopilot a lot more than I did in "the good old days." I suppose that is because I paid so much money for it that I want to get my money's worth!

I do not tend to use the yaw dampener if I am not using the autopilot though it does a nice job even during a hand flying session. I feel that I can do as good a job as the yaw dampener IF I have nothing else to do. Should I be heavily worked so that my mind and attention are on something besides dampening the yaw, the dampener will do a better job than I!

Dampening the yaw is a technique that takes considerable practice and it is not intuitive. It must be taught and practiced. I would say that if your finances can stand it, the yaw dampener is a very worthwhile addition. If you have more time than money, learn to do it yourself and keep out of situations where you will be so busy that you cannot handle the yaw yourself!

Happy Skies,

Old Bob

[ARTICLES/19990918_012037_msg08591.tex]

Yaw Dampeners and Big Iron**Tue, 22 Feb 2000 21:28:02**

In a message dated 2/22/00 8:08:28 PM Central Standard Time, jensco@wireweb.net writes:

Well Old Bob, with due respect I will tell you that the B720, B707, DC8 and early B737's all use the Sperry SP30AL or its derivative. That means Pitch, Roll and Yaw Control from individual computers, servos and accelerometers. This autopilot uses an integral yaw damper incorporated into the rudder boost package that may be used separately or in conjunction with(series) the autopilot. Having had a personal relationship with all the equipment mentioned, on this I speak the truth.

Jim N.

Good Evening Jim,

Well, young Jim, I have never flown the 707, but I do have a type rating in the aircraft. I have flown left seat in all the others listed along with the SE 210, B-727, B-767, B-747 and DC-10 plus a bunch of piston types. I don't have any idea what brand of autopilots were in any of them except that the 737 was the first one I flew which had a two axis autopilot backed up by dual yaw dampers. I don't think anyone had earlier 737s than we did! I certainly can't say whether the airline I flew for had any different equipment on board than did the ones you flew, but I will guarantee that the question was one which was used on the oral exam for the type rating. Otherwise I would never have known!! On this I speak the truth!

Happy Skies,

Old Bob

[ARTICLES/20000222.212802.msg03372.tex]

2.3 AVIONICS-APPROACH

Marker Beacon Receiver Required?**Wed, 7 Jun 2000 17:24:05**

In a message dated 6/7/00 4:01:26 PM Central Daylight Time, stutzman@stutzman.com writes:

I'm working on my IFR ticket as well (about to go take the written). From what I have read so far, is the marker beacon receiver actually required for the ILS? Having it inoperative doesn't affect your minimums (I understand it once did). You need some way of identifying the outer marker, but that can be done other ways (approach dependant though).

Good Afternoon Frank,

The marker beacon has always been considered to be a portion of the ILS, though there are many ILS approaches that do not have an outer marker due to difficulty in finding a site on which to place the marker transmitter. In those cases, there is always a designated means of checking the point at which a marker would otherwise be located. In addition, a radar qualified and equipped controller may tell a pilot when he is over that point. As you say, it is approach dependent, but there are a lot of ILS approaches where the controller will either be unable or unwilling to give you a check when passing the outer locator site. If you have an ADF and if there is an NDB located at the outer marker site, that may be substituted for the marker beacon. I think that if you filed an IFR clearance which included a plan to execute an ILS approach that required a marker beacon and didn't have marker beacon on board, you would liable for a careless or reckless citation. Probably wouldn't happen unless there was an incident.

I think that, considering the price of a marker beacon receiver, it would be a reasonable addition to Jerry's airplane if he wants to take the training in that airplane.

That doesn't mean that conditions could not be found where a marker beacon receiver would be unnecessary for an ILS approach.

Happy Skies,

Old Bob

[ARTICLES/20000607.172405.msg09276.tex]

Sandel and GPS display**Wed, 27 Dec 2000 15:26:46**

In a message dated 12/27/00 11:55:35 AM Central Standard Time, Best401k@aol.com writes:

When the map is displayed on the Sandel you still get the CDI along the bottom and the G&is on the right side with my current settings. So I don't feel compelled to switch the map off while flying an approach.

David

Good Afternoon David,

Some people seem able to concentrate on both the CDI and the map at the same time.

I have found that I require that my full attention be on the CDI when flying a tight approach. For me it is easier if the moving map is elsewhere, but that is why both options are available.

For those of you who are capable of using both at the same time, that option is there. For guys like me, that have to work a little harder to keep things centered, we can have a full uncluttered view of the needles. Isn't the new stuff wonderful?

Happy Skies,

Old Bob

[ARTICLES/20001227_152646.msg18454.tex]

2.4 AVIONICS-ENGINE MONITOR

CHT Probes**Fri, 13 Nov 1998 12:51:15**

Good Morning Eric Poole,

In a message dated 11/13/98 9:48:44 AM Central Standard Time, epoole@scoot.netis.com writes:

Not at all ... we got the Tanis system and, later, the JPI700 engine monitor, and all we had to do was trade the JPI screw-in probes back to them for a set of spark plug gasket sensors. No extra charge, and no particularly unusual extra effort putting them in.

I didn't even mention the use of spark plug gasket sensors for the CHT temps as I dislike the installation so much.

Sparkplug gaskets should be replaced often. The recommendation is that they be replaced with new every time the plugs are removed. If they are not replaced, they should at least be annealed to soften them for proper sealing. That will eventually make the gaskets too thin and then they MUST be replaced.

The use of spark plug gasket sensors means they either will rarely get replaced or they will eventually not seal well. I have owned engines on which I had one or two spark plug gasket heat sensors mounted and always made arrangements to eliminate them as soon as possible.

I know that many people have used them for many years with no difficulties, but since there are other (in my opinion better) options, I would not install them on my airplane or recommend them to others.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981113.125115.msg06912.tex]

CHT Probes

Wed, 12 Jan 2000 13:41:33

In a message dated 1/6/00 10:12:43 AM Central Standard Time, ottis_cameron@yahoo.com writes:

Bob JPI makes a CHT Adapter probe that allows use of the Tanis heater in the thermo well - its really slick - It gives you the true CHT and lets you use the Tanis heaters. List price is \$75

Good Afternoon Otis,

The adaptors work well, but I still think I would go with either the band heaters or the valve cover heaters. Seems to me that either would supply more even heat than the Tanis probes in the CHT wells. In addition, you will still likely need some place for the factory cylinder head temp probe. That is where I would use the adaptor. At seventy five bucks a crack for the adaptors, the bands or the valve cover gasket heaters might even be cheaper!

Happy Skies,

Old Bob

[ARTICLES/20000112.134133.msg00674.tex]

Insight Verses JPI**Sat, 20 Jun 1998 12:33:54**

Good Afternoon Ed Mabry,

In a message dated 98-06-20 09:31:29 EDT, you write:

Any suggestions or recommendations from the group?

I have the GEM system along with a Shadin fuel flow unit in my airplane and it works fine, however it seems to me that JPI has been much more aggressive in improving their units than have Insight and Shadin.

Gem does not provide fuel flow information but JPI offers that option.

There are also some advantages to JPI for installation in aircraft with limited panel space. With the use of one instrument for multiple functions, there is some difficulty with getting all of the information displayed at the time you want to see it. Takes some time to learn how best to manage it, but I still like the JPI best.

My current recommendation to most people is to go with the JPI.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980620_123354.msg03207.tex]

Insight Verses JPI Verses Shadin**Wed, 3 Feb 1999 13:00:56**

Good Morning John,

In a message dated 2/3/99 11:41:08 AM Central Standard Time, jtsmall@onramp.net writes:

JPI was a breeze to deal with. Real people, real answers, real service. At least for now.

That has been my experience with JPI also. In some ways I like the Shadin/ Insight setup better, but I really like working with the JPI folks better than Insight and MUCH, MUCH better than dealing with Shadin.

The Shadin technical people seem very helpful If I can get to them. It is the folks in the sales end that are so hard to deal with.

Happy Skies,

Bob Siegfried Ancient Aviator

PS I have had pleasant relations with the Electronics International folks also.

[ARTICLES/19990203.130056.msg01842.tex]

JPI Reset Problem**Mon, 22 Jun 1998 13:47:25**

Good Afternoon Curt Powell,

In a message dated 98-06-22 13:32:24 EDT, you write:

added a JPI to my H-35 about a year ago. Works quite well. Only problem I have seen is that sometimes when I switch on my landing lights, it resets the JPI. Anyone have any ideas what the problem could be?

Sounds like a voltage spike, If you have the precision voltmeter function you might try watching it while you switch on the landing lights or try hooking up a good Simpson analog volt meter. They are usually easier to catch a spike on than the Flukes or other digital meters. I don't consider myself qualified to discuss electrical systems deeply, but I would think there might be some problem in the voltage control circuitry causing a voltage spike and that can knock out sensitive little computer programs such as the JPI. Most such units do have an overvoltage protection circuit built in to protect it from such spikes though. Have you checked with JPI to see what their thoughts are?

Happy Skies,

Bob

[ARTICLES/19980622.134725.msg03233.tex]

2.5 AVIONICS-INSTRUMENTS

AN Style DG**Tue, 23 Jun 1998 11:59:07**

Once again to Paul-79B,

I meant to comment on the gyro, but sent the previous tome too soon!

In a message dated 98-06-23 05:59:26 EDT, you write:

The DG is the horizontal rotating type and will have to be ditched over the side

If you are describing an AN gyro of WW II vintage, don't be in a hurry to ditch it unless it is not working properly. They are vastly higher quality than anything available today and it is much easier to fly precise headings than with the newer small upright face units. The fact that it turns like a compass is a little disconcerting at first, but I fly both types regularly on instruments and find no difficulty switching back and forth. They are different enough looking that you tend to fly each as it is meant to be flown. The major problem is that there are no parts, even bearings available to repair them and not too many technicians who know how to do so. Of the few shops that will repair them, many do no more than clean out the dirt and repaint them before sending them out as an "overhauled" unit. If you can find a competent instrument person willing to open it up, clean and oil it, (If they are willing to do so, they probably will not put their name on it or even give you a receipt. I would offer cash and not expect any paperwork) they can be excellent instruments. If it is definitely on it's last legs, I would replace it with one of the newer units, but look it over carefully first.

Happy Skies,

Bob

[ARTICLES/19980623_115907.msg03267.tex]

Compass Rose and Swinging a Compass**Sun, 28 May 2000 10:30:27**

In a message dated 5/28/00 9:10:50 AM Central Daylight Time, glenno@sgi.com writes:

Jack Hirsch wrote: Turned out I had to use the same technique on the rose because it was not correctly aligned with magnetic North - learned the hard way, finally reverted to the nautical way, plotted results, and discovered compass rose painted on ramp was off by a lot.

Good Morning Glenn and All,

Compass roses will only be accurate on the date chosen as the base date for the declination used. I know the declination in the USA has changed as much as four and one half degrees in the last forty years or so, possibly even more somewhere. If you are swinging a compass on a compass rose that was laid out very accurately during WWII it can be quite far off today!

That is one of the reasons why the courses as delineated by our VORs don't always match the courses given by our GPSs. The VOR courses were labeled when the VOR was installed, but the declination has changed. The course still goes to the right place, it's just that the magnetic courses listed are no longer correct.

The Agonic line was running through Goshen, Indiana when I first learned about such things. It is now about half way between Chicago and Moline, Illinois.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/20000528.103027.msg08829.tex]

Desirability of DG**Tue, 4 Jul 2000 19:13:47**

In a message dated 7/4/00 4:49:54 PM Central Daylight Time, MikeM86949@aol.com writes:

Recently I was on a flight (my airplane, a friend flying) where the DG went south taxiing out for departure. We both agreed, no big deal. We covered it up and went on our way.

So how can someone say that a DG is more important than an attitude indicator (of which I have 2)?.

Good Evening Mike,

Well, my first three Bonanzas had a DG but no attitude gyro at all. I flew them IFR all over the country and never felt the need for an artificial horizon. I had dual T&Bs, the required rate instruments and that nice stable, but non-required, DG.

Now what does that mean as far as what is more important, the DG or the horizon?

I would have to say that it depends!!

I found the DG very helpful. It was a lot easier to turn to a heading than to make timed turns. The timed turns worked, but the DG was easier and faster to use.

If it was still legal to fly without a "full" panel and I had a choice of either a DG or an attitude gyro, but not both, I would still take the DG.

Happy Skies,

Old Bob

[ARTICLES/20000704_191347.msg10528.tex]

Digital Tach**Sun, 21 Sep 1997 15:26:06**

Bill Fleming,

Check with Horizon Instruments, Inc , Fullerton, Ca – 800 541-8128,

I have not yet installed one, but it looks like an easy installation and all reports have been very favorable. Electronics International also has an approved digital tach that seems to work well. The owner of E.I. is a Mooney devotee and all of his approvals are in Mooneys first! The guy who owns Horizon is a Bonanza type so you know where my prejudices are.

The E.I unit has a higher threshold for time recording to start (I think it's 1300 RPM) than the Horizon one. Both of them record time at straight clock rate when above the trigger RPM so you don't get the variable time recording as you do with a mechanical tach. (Most Beech tachs record at 2375, higher RPMs show more time and lower RPMs log less than actual.)

I don't believe the E.I. unit has any "diagnostic" capability but I haven't checked recently.

Incidentally, some of the digital tachs on the market only read to the closest 10 RPM and others are accurate to one revolution per minute. The guys that have the 10 rpm limit say that it is better because the gauge doesn't jump around with small variations in RPM. I like the more precise ones - BUT - Different Strokes For Different Folks!!

They are nice to have.

Yours,

Bob

[ARTICLES/19970921_152606_msg01773.tex]

Electronic Tach**Fri, 25 Jul 1997 08:45:40**

Hi Eric,

I don't have a copy of the specs on the Electronics International tach with me just now but my recollection of a conversation I had with them at Sun N' Fun this year is that it is approved as a replacement tach.

The presentation has a digital readout in the center of the instrument with a series of small lights arranged in a circle around the periphery of the instrument, these provide an analog presentation by lighting up clockwise as the RPM goes up. I believe the digital is accurate to the nearest 10 RPM and the timer records when above 12 or 13 hundred RPM. As I remember the unit also has a flight timer function and also will record the highest RPM reached during a flight.

I installed one of their volt/ammeters a few years ago and the address I have for them is 12620 S.W. 231st Place, Hillsboro, OR 97123. Phone: (503) 628-9113 I am not sure that is current, but it should be worth a try.

The Horizon Instruments 2 1/4 inch unit has what I consider to be a nicer looking analog presentation as well as the digital and I think theirs is accurate to one RPM. The last time I checked it was not certified as a replacement instrument only as supplementary though the manufacturer claims some have been approved on a "local" approval basis.

The Horizon unit records time from engine start to engine shutdown. They claim that is an FAA requirement and that the EII unit does not comply with the rules! Oh well, check with them and see what they say.

Just as an aside, I purchased a Horizon 2 1/4" instrument a couple of years ago but have not yet installed it because I am waiting till they get it approved. I will probably buy an EII unit and stick it in some time this year if Horizon doesn't get theirs approved soon. I prefer the time NOT being recorded at idle. Whether that is proper or not I am not sure but I like it better. Mickey Mouse reasoning isn't it?

Both manufacturers also have a manifold pressure gauge in the 2 1/4 size. If you decide to install that you would have to find someplace for a small fuel pressure gauge calibrated as required by your POH and the aircraft specs to replace the one in your combination manifold pressure and fuel press/fuel flow unit. There is some disagreement among various Feds and AIs that I have spoken with as to the legality of that modification. Check with your AI.

I went to the 2 1/4 inch instruments several years ago to free up panel space and am happy with the presentation but not with the quality of the mechanical tachs that I have been able to locate at reasonable prices. That's why I am going to change to the electronic units.

I have been quoted about a thousand bucks apiece for the units used in the current

production model 36s and the electronic ones are less than half that amount. You could probably find some used ones much cheaper.

Long answer for a short question.

Bye

Bob

[ARTICLES/19970725_084540_msg01364.tex]

Electronic Tach**Fri, 23 Jan 1998 18:44:29**

Good Evening Greg,

In a message dated 98-01-23 18:20:04 EST, you write:

I'm curious how the unit detects failed mags? Does it connect to the P-lead somehow (more wires through the firewall, or to the mag switch?)

What happens if you loose power?

Relatively easy installation. You eliminate the tach shaft altogether and connect a wire to each P-lead at the mag switch, a few more for power, ground and control and it's in!

If you lose power you lose the tach.

I'll bet you can set the power now within 50 RPM by the sound alone can't you?

No big deal.

Happy Skies,

Bob Siegfried

[ARTICLES/19980123.184429.msg00490.tex]

Electronic Tach - Recording Flight Time**Tue, 21 Sep 1999 00:12:47**

In a message dated 9/20/99 10:36:26 PM Central Daylight Time, newmanb@erols.com writes:

I think that would have been the right way to do it.

Best Regards,

Bob Newman Warrenton, VA 1968 Bonanza E33 "N917CE"

Good Evening Bob,

All of what you have stated is as I have found when I questioned both Horizon and EI about their method of recording the time.

It seems this is one of those areas where there are a lot of differences of opinion among various FAA entities.

There is a reasonable amount of precedence for using a strut switch to record flight and engine time, though even the legality of doing that is questioned by some of those folks who are here to help! The airlines have done it from takeoff to touch down for years!

There is also some discussion as to what RPM should be used as the RPM of record when computing the flight time.

If the engine is legal to operate continuously at 2700 RPM, why shouldn't a tach which records one hour after sixty minutes at that RPM be OK?

The one method that nobody disputes is correct, is to look at your watch and record the flight time in the engine and airframe log or other records. That is the way it was done before the advent of recording tachometers. There would certainly be nothing illegal about placing a recording tach (or just the hourmeter portion thereof) somewhere in the aircraft, including somewhere that it could not be seen from the cockpit, and using that indication in the same manner as most of us have been doing for many years for maintenance purposes.

An approved electronic tach could then be used without paying any attention to the hours recorded thereon!

Happy Skies,

Old Bob

[ARTICLES/19990921.001247.msg08669.tex]

Electronic Tach - Recording Flight Time**Tue, 12 Oct 1999 17:50:34**

In a message dated 10/12/99 3:42:24 PM Central Daylight Time, Txgroup@home.com writes:

This was my assessment as well. I am curious however on how EI can get away with a start setting of 1300 rpm, where Horizon starts at 800. This does not make sense that the FAA would apply different rules to two very similar products.

Good Afternoon Txgroup,

Not really all that unusual! Different folks at a different FAA office.

There is a lot of disagreement among the FAA personnel as to how engine time should be logged. Some are adamant that all time from engine start up to engine shut down should be considered as full running time.

Others are very happy with the method that most, if not all, airlines have used for as long as I have been around. They log the time from takeoff to landing. No taxi time counted, but the time in the air is full time regardless of the power used.

The recording tach is a relatively recent innovation. The Hobbs meter was used by many flight schools to record the time not only for rental purposes but for engine and airframe time as well. The kicker is that they often had TWO Hobbs meters installed. One that went on when the oil pressure came up and one that turned on with a strut switch when the wheels were off the ground. The renter or student paid by the oil pressure Hobbs and the maintenance was in accordance with the strut switch unit. All VERY legal!

Many helicopter operators accomplish the same thing with one Hobbs on the oil pressure switch and another on the collective.

Another factor is that tachometers can be purchased that record at many different RPMs. A case could be made that the engine is approved to operate at some maximum RPM continuously and that the tach should record a full hour only at that specific RPM. In the case of an IO-520 or IO-550 that would be 2700 RPM.

I know of no regulation that says that the airplane cannot have two tachometers. I also know of no regulation that requires that more than one tachometer be within sight of the pilot.

I personally like the Horizon tach the best of the lot. If I ever decided to install one, I think I would place it in the most usable position on the panel and relegate the mechanical tach to a position completely out of the way. Possibly not even on the panel and maybe not even in the cockpit.

I see no requirement that the Horizon time be used for maintenance purposes as long as some other method is available. That method could be as easy as using a log book and

making entries (isn't that an unusual idea?) or using a recording tach affixed elsewhere, like in the engine compartment!

Happy Skies,

Old Bob

[ARTICLES/19991012_175034_msg09335.tex]

Electronic Tach/ mechanical**Wed, 21 Apr 1999 16:43:15**

In a message dated 4/20/99 3:44:32 PM Central Daylight Time, jdeakin@avweb.com writes:

There is also a minor "hit" on total hours when an airplane is sold, but is 10% more time really gonna make that much difference in the price, or the desirability? I don't think so.

Good Evening All,

If the number of hours recorded are going to worry you, just install a Hobbs meter wired to the gear strut switch or a wind vane. It will then only log actual time in the air. Forget about tach time! Write the Hobbs time in the maintenance logs! There is nothing in any regulation that you must have any sort of time recording device on the airplane. Hobbs meters and recording tachs are for our convenience to avoid having to log every flight in the aircraft log. While there are some FAA types that will claim that full hourly time should be recorded from engine start to engine shutdown, there is considerable precedent in only logging airtime as do the airlines world wide.

Happy Skies,

Old Bob

PS I think the Horizon is a great unit, I also like the EI one.

[ARTICLES/19990421_164315.msg03951.tex]

IFR Flight Instruments**Fri, 12 Nov 1999 18:26:52**

In a message dated 11/12/99 4:03:33 PM Central Standard Time, Txgroup@home.com writes:

John, I ment that as a joke .

I have my clock on the yoke, and use my lap for the app plates. So far this works fine for me.

John Small wrote:

On Thu, 11 Nov 1999 18:23:45 -0600, Txgroup@home.com wrote:

Wear a watch g

Seriously, you find that adequate? However I don't think this satisfies the regs.

Well, now you two have given me an opening to reminisce a little.

Back in the late forties, I was instructing for a small Piper dealer and was the only guy there who had an instrument ticket. I talked the boss into allowing me to install a turn and bank in any airplane I was likely to fly at night or on long cross-countries. While it didn't quite fit the requirements for full IFR without a clock and rate of climb, I figured the T&B along with airspeed, a sensitive altimeter and a compass was enough that I could get by without a visual reference if need be. For time and timed turns, I carried a large pocket watch with a sweep second hand that was equipped with a nice metal fob on a fairly long strap. I could stick the fob behind the instrument panel or other convenient protrusion and the watch would hang dutifully on the panel to serve what needs I had. It even served as a secondary slip indicator.

Worked for me!!

Happy Skies,

Old Bob

[ARTICLES/19991112_182652_msg10531.tex]

Loss of Control, AP, and Turn Coordinators**Mon, 5 Mar 2001 09:47:41**

Good Morning Mike,

Since you asked, here is the comment.

In a message dated 3/4/01 2:23:34 PM Central Standard Time, Mavitor@aol.com writes:

I have the turn coordinator in my plane - it runs the B-1 AP.

Fact number one. Your AP has a standard Turn and Bank instrument mounted in a canted position so as to be sensitive to both roll and yaw. That provides an excellent, low cost, sensor to drive a simple autopilot.

Me and an instructor took it up one day and put the airplane in every unusual attitude (legal) to see if the AP would fly out of it. It did. Tried it in accelerated stalls - worked. I don't know what would happen if I got inverted. It didn't tumble at 90 degrees.

Fact number two. Since the Turn Coordinator is a development of, in fact just a repositioning of the case of, the standard Turn and Bank rate gyroscope there is nothing to tumble. It will work just fine inverted. The airplane would eventually recover, provided it doesn't come apart and there is enough altitude available.

That is one of the reasons it makes such a nice unit for the low cost wing levelers.

If TC are so bad - why do we got em?

We "do got em" because someone noted that the canted gyro would give an early signal of a coming turn by showing that the aircraft had rolled even before it yawed. On modern stable airplanes, especially those with interconnected controls, a control input to stop the roll should keep the airplane from turning which is the generally accepted "best" action to take to avoid entering into a "grave yard spiral."

The canted gyro was hooked to a little artificial horizon look alike airplane symbol to show a wings level indication when the aircraft was not rolling or yawing. In order to gain government approval for the new instrument to be used in lieu of the then standard needle style rate of yaw instrument, it was tested on a bunch of non pilots.

The result of that test showed that a non pilot would perceive that a turn had been initiated in less time using the TC than they would using a standard Turn and Bank instrument.

It seemed like a good idea at the time.

There are some of us who subsequently came to feel that the TC does not provide the type of input to a trained aviator which will aid him/her when a state of confusion exists in the pilots mind as to what is happening to his/her aircraft.

My current feeling is as follows. I have no way of testing the theory and it is mine alone.

1. The TC tends to make a pilots mind think in terms of wings level.
2. The Turn and Bank tends to direct the pilots mind directly toward a recognition that the aircraft is turning.
3. Stopping the turn is the most important factor in preventing the type of incident that claimed the lives of JFK,Jr., and Doctor Jacoby

Oh I know - pilots now days are not clever enough to fly with a T&B.

Mike, you are the only person that I have ever heard propose such a thing. I can't for the life of me understand on what basis you might have developed such a thought, but that has certainly not been my observation.

I have studied the actions of pilots closely for the last sixty years.

Pilots today generally have a much better general education and there is a much greater field of knowledge upon which to draw.

I would say that the pilots of today have a better chance of understanding the intricacies of flight than ever before and I feel that those who follow will do even better.

Happy Skies,

Old Bob

[ARTICLES/20010305_094741_msg05209.tex]

Mechanical Tach Indicator Error

Sat, 18 Sep 1999 22:05:12

In a message dated 9/18/99 8:36:32 PM Central Daylight Time, ajw@CYBERNEX.NET writes:

Suggestions and experience is appreciated from the group.

Good Evening Allen,

The one comment I would like to make concerns the consistency of the indication on mechanical tachometers. I have been using the electronic Prop Tach to check various mechanical tachometers for about nine years now. I have found that not only are they often quite in error, the errors are commonly nonlinear and are not even consistent day to day!

I strongly suggest that no adjustment be made to any governor without an electronic tach available to accurately determine the resulting RPM.

Happy Skies,

Old Bob

[ARTICLES/19990918_220512.msg08620.tex]

OAT Ram Rise

Thu, 25 Jun 1998 15:13:33

Good Afternoon Bob Briggs,

In a message dated 98-06-25 14:27:08 EDT, you write:

I'm going to have to fly through the same airspace at different airspeeds one of these days to see if my F33A's OAT thermometer changes like theory predicts.

Don't forget about Ram Rise. Your aircraft OAT reads two to four degrees centigrade higher than the True Air Temperature due to the speed of impact. When you are getting touchy about comparisons, it can be significant.

Happy Skies,

Bob

[ARTICLES/19980625_151333.msg03363.tex]

OAT Ram Rise**Fri, 29 Jan 1999 13:34:50**

Good Afternoon Bob Briggs,

In a message dated 1/29/99 11:45:58 AM Central Standard Time, rcb@appsig.com writes:

There is a theoretical rise in indicated temperature due to airspeed for a probe located in moving air. It is probably too inconsequential to influence the placement of a probe for general use, but some scientist trying to verify theory might want it in the slipstream.

This rise is substantial. It is why Outside Air Temperature (OAT) corrected to Ram Air Temperature (RAT) should be used when calculating TAS etc.

Take a look at the directions for your Jeppesen whiz wheel and it explains it all!

The rise for a normal Bonanza cruising speed is around three or four degrees Fahrenheit

[ARTICLES/19990129_133450.msg01437.tex]

OAT Ram Rise**Fri, 29 Jan 1999 17:51:15**

In a message dated 1/29/99 1:28:26 PM Central Standard Time, tturner@vol.com writes:

I assume your statement would be related to indicated air speed, and would be valid for an IAS somewhere in the 140-160 knot range.

Right on Tom!

My statement would have been better if I had said: "It is why Ram Air Temperature (RAT) corrected to Outside Air Temperature (OAT) should be used when calculating TAS, etc."

My Jeppesen whiz wheel shows that for an indicated airspeed of 150 Kn., the mach is about .234

The Ram Rise is about 2.5 degrees Centigrade at 142 knots and 3.5 degrees Centigrade at 168 knots. I'll let you convert that to Fahrenheit, but I think that is pretty close to 3 or 4 degrees.

The whiz wheel that I have is about forty years old and I do remember Ray Lahr, the designer of Jeep's wheel, stating that there were some minor errors in some of the calculations on his early effort but I would imagine that is closer than most of us would ever want.

Happy Skies,

Old Bob

[ARTICLES/19990129_175115.msg01455.tex]

Oil Pressure Gauge Line Restrictor**Thu, 9 Jul 1998 23:15:44**

Good Evening Bob Newman,

In a message dated 98-07-09 23:03:34 EDT, you write:

I am wondering if a skill person could weld a plug in the fitting, and drill it with a small drill. I would also welcome any other ideas on this.

I have not done it in the situation you describe, but in the past I have added a restrictor by tapping a fitting for insertion of a brass plug and then drilling the plug. Worked great but I am not sure if it would qualify as a minor alteration. I would be willing to sign it off as such, but I would check with the AI who handles your annual before proceeding. I would be hesitant to sign for a fitting that had been welded due to possible changes in the composition of the fitting material.

The restrictor sounds like a good idea to me.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980709_231544.msg03570.tex]

Panel Configuration

Sun, 24 Dec 2000 14:57:26

In a message dated 12/24/00 1:36:34 AM Central Standard Time, hgp@madaket.netwizards.net writes:

So, what does the brain trust of the BeechNet suggest?

Good Afternoon Ralph,

I think the panel layout looks very nice.

Naturally, I am particularly impressed with your choice of a T&B located immediately alongside of the Turn Coordinator, which I assume is the sensor for your autopilot. I would probably have located that turn coordinator under the rear seat alongside the roll servo and placed another T&B on the panel, but yours is undoubtedly a more rational solution!

The next comment I have is one with which I have not yet come to grips myself.

My current Bonanza has a KCS-55 compass system and I have been very pleased with the layout and usability, BUT!, I would not buy one today if I were outfitting an airplane for my own personal use.

Modern navigation is pretty well a To-To situation. The advantage of the HSI for spatial or situational awareness is mitigated by the modern moving map GPS units. We rarely, if ever, have to fly a heading 'til intercepting a radial, especially if we have navigation capability to fly direct to almost any intersection.

On those few occasions where that is required, we have the GPS moving map of the GX-60 to tell us where we are and how we are doing.

The UPSAT GX-60 GPS receiver does not require that abomination called a resolver which both the Garmin and King/Allied Signal/Honeywell units stick their users with.

With IFR sets from either Garmin or King, you are stuck with a resolver, so having an HSI is not an operational disadvantage, but it is still heavy, complicated and expensive.

It seems to me, that the only real advantage of having an HSI is to combine the CDI with the heading indicator and save one instrument hole.

That is very important, but it ends up being a very expensive extra hole in the panel!

I wish someone would build an instrument with just the raw data for the CDI on either an Attitude Indicator or a Heading Indicator. If that ever happens, I would never consider an HSI even if money and weight were of no consideration! It was a great idea forty years ago, but not needed today.

For use with a resolverless GPS, such as the UPSAT, Trimble or Northstar, the HSI becomes a bother, not an advantage. It adds extra unnecessary steps that are required

for the use of Garmin and King equipment, but that were engineered out by the other manufacturers.

For my pocketbook, the HSI would be left with other relics of the past. Not only would it save me money, weight and the need for remote mounted units, but it reduces the effort required to fly a GPS approach!

Just my opinion!

Happy Skies,

Old Bob

[ARTICLES/20001224.145726.msg18274.tex]

Panel Configuration**Sun, 25 Feb 2001 09:52:54**

In a message dated 2/25/01 7:23:41 AM Central Standard Time, flyinglo@email.msn.com writes:

Mike, how about the altimeter (to the 2nd hole to the right of the yoke column)? It's still going to be very visible. — Original Message —

Good Morning Jerry,

Would you mind if I put in my two bits worth while we are waiting for Mike to answer?

The altimeter may be OK there, not good, but OK.

You will find the altimeter wherever it is because you have a direct need for the information. I would try to keep it within one instrument space above or below and no more than two instrument spaces to the left or right of your primary direction instrument. That is the range of the easiest scan, but somewhere else will work for something that you will search for as hard as you will search for the altitude information.

However, you earlier spoke of moving your TC off the primary panel, that is what I would like to comment upon.

You may already know that I think you should junk the TC and install a proper Turn and Bank, but disregarding that, whichever gyroscopic turn indicator that you have in your panel should not be used only in the case of a failure of some other instrument.

It needs to be part of your everyday, ordinary, instrument scan.

It should be checked every time that you adjust the bank angle or are checking the status of your heading for any reason whatsoever. That way it will serve as a continuous crosscheck of the other instruments as well as help you to comply with the regulatory requirement concerning minimum rates of turn where those minimums are applicable.

Please keep the instrument in as primary location as it is possible to do, regardless of whether it is one of those wonderful, stable, useful Turn and Bank instruments or one of those lying, detestable, Turn Coordinators!

Even the TC is capable of saving your bacon if it is included in your normal scan.

Happy Skies,

Old Bob

[ARTICLES/20010225_095254.msg04522.tex]

Primary Engine Instrument Replacement**Thu, 23 Nov 2000 12:37:32**

In a message dated 11/22/00 5:00:11 PM Central Standard Time, KenV35A@cs.com writes:

Based on your lead comment, I followed up with a call to EI, Tel. # 541-318-6060, they have moved from Hillsboro, OR to Bend, OR. Lo and behold, EI has a line of Primary engine instruments under their STC, that are replacements for those gauges that the FAA has designated as mandatory. These primary gauges are CHT (on all aircraft equipped with cowl flaps) and turbine inlet (TIT) gauges. All digital display.

Good Morning Ken,

That is good to know!

Thanks for the effort. I have been using an EI loadmeter for the last ten years or so and have been very pleased with the quality of the equipment and the service I have received. If I were in the market for any new instrumentation, I would certainly consider their units.

Happy Skies,

Old Bob

[ARTICLES/20001123_123732.msg16611.tex]

Purchasing a T&B**Mon, 18 Sep 2000 15:10:22**

In a message dated 9/18/00 11:23:31 AM Central Daylight Time, raven@tminet.com writes:

As if by fate, my TC is now TU, and, after reading your position a few times it sank in...

I will replace my TC with a T and B!

Now, all I need to do is find a source for the T and B that provides a good quality instrument at a reasonable price. In the catalogs, the T and B is more expensive than the TC!

Can you provide any recommendations?

Good Afternoon Bill,

Unfortunately I cannot. My local instrument guru tells me that all of the relatively low cost T&Bs and Turn Coordinators are made by one manufacturer in Puerto Rico. The other manufacturers just attach their private label.

As is true of so many instruments today, the quality is nowhere near the quality of the equipment built for the use of our fighting men during WWII. Not only is the quality low, but the actual gyroscopes are smaller now than they were in the days of yore! The stuff going to the military today is so expensive that I can't even consider such a purchase.

When the Turn Coordinators were first put on the scene, if you looked behind the panel, you would see a standard T&B mounted at an angle. That was attached to a front plate device that connected to the autopilot, panel indicator or both. Since it took up substantially more panel space with the canted large gyro, there was an effort to minimize the size. That was done and the much smaller gyro is now mounted canted inside the can which is about the same size as all of the rest of our instruments.

I have never had one of the new ones apart, but am told that the new T&Bs and the new Turn Coordinators all have the same internal components. They are just oriented differently and hooked up to a different style display.

The last time I bought a new T&B, my guru ordered three of them. We checked them on his turn table and such, kept the best one and returned the other two.

I would establish a good relationship with a quality instrument shop and heed his advice. I don't remember what I paid for mine, but I do know that the price from the instrument shop was no more than what I would have paid at Aircraft Spruce and I gained his expertise on checking and returning the rejected units. I think it cost me around five hundred bucks.

I have a two and a quarter instrument in my Bonanza. I have purchased several of those

used for two to three hundred bucks apiece. I have had enough failures of those used instruments that I have decided to go with new full size instruments from now until something better comes along.

Sorry to bear such bad news, but my guru tells me that the current crop of T&Bs are no better or no worse than the current crop of Turn Coordinators. If you happen to get a good one they may run forever, if you get a lemon, they aren't worth trying to repair.

The best would probably be a surplus WWII unit that had never been used. It could be cleaned and lubricated by a local technician and would probably last a lifetime. Unfortunately, I doubt if there are any left! Who knows, nose around and see what you can find.

I haven't done much research on this myself. I have relied on my local instrument guru. He has always steered me in a pretty good direction, but he no longer deals with AN gyros and other older equipment. It isn't that he doesn't like them, it's just that parts and documentation are no longer available.

If you, or anyone else, is aware of a reasonable source of a quality T&B or Turn Coordinator at a practical cost it would be good to hear about it.

Happy Skies,

Old Bob

[ARTICLES/20000918.151022.msg13677.tex]

Purchasing a T&B**Wed, 20 Sep 2000 21:02:28**

In a message dated 9/20/00 6:44:42 PM Central Daylight Time, jtsmall@onramp.net writes:

I was thinking of backing this up with a smaller T&B by moving my clock but after what you have said about reliability I think not.

Good Evening John,

There are better T&Bs available than the ones I was using. The good full size ones are currently about 2400 bucks apiece. I have seen prices for new two and a quarter instruments as high as five grand. I may have been giving the little instrument an undeserved kick in the pants as I have been buying used ones at the flymarts. Since taking my instrument gurus advice and not bothering to even install any that don't sound smooth, my failure rate has been reasonable.

Incidentally, I asked today if there were any T&Bs or TCs available in the low price market that were better than those built in Puerto Rico. He told me that Mid Continent had purchased the Puerto Rican company and were now producing them in the USA. Quality appears to be reasonable.

Happy Skies,

Old Bob

[ARTICLES/20000920.210228.msg13789.tex]

Remote Compass**Sun, 24 Dec 2000 15:36:58**

In a message dated 12/24/00 2:22:24 PM Central Standard Time, MikeM86949@aol.com writes:

I agree completely except for one caveat. Having a remote compass drive the DG is very very nice. Especially in these old Bonanzas that get magnetized (like mine).

Good Afternoon Mike,

That is a good point.

However, I have generally been able to find a mounting spot for a compass that allowed me to get it adequately compensated. It occasionally has meant relocating something that was messing it up, but I have tried to keep a good working magnetic compass in the airplane so that I would have it available in the event of a power failure.

If all of the fancy toys are working, about the only need I have for the magnetic compass is to calculate how strong and from what direction the wind is blowing. The 'Track Made Good' on my GPS gives me all of the data I need to fly a course and if I use just a little knowledge of the general wind pattern, I can even set the DG based on the GPS good enough to shoot an approach.

Once again, the magnetic compass is fast becoming something we only need if we lose electrical power! On the DC-8 We had them mounted in the overhead panel and could only see it if we set up a little set of mirrors. It was considered strictly a device to be used in case of power failure.

Happy Skies,

Old Bob

[ARTICLES/20001224.153658.msg18280.tex]

T&B Verses Turn Coordinator**Fri, 3 Dec 1999 15:14:06**

In a message dated 12/3/99 12:23:48 PM Central Standard Time, jtsmall@onramp.net writes:

So I'm not confused, what's the difference between:

1. turn and slip (needle & ball)
2. turn and bank
3. turn coordinator

#1 has a roll gyro while #3 has a roll and a yaw gyro, right? Is #2 the same as #1, or the same as #3, or something entirely different?

Good Afternoon John,

Now if we are going to get precise and technical, I will have to beg off, but this is how I remember it in the time that I have been associated with aviation.

In the twenties and thirties (before my time!), there were turn indicating devices available. I have seen European models which had needles hinged at the top and presented turn information by the movement of the needle at the bottom. Most of the ones that I have seen that have been used in the USA had a needle hinged at the bottom and a wide needle which would line up with a "dog house" at the top of the instrument when the aircraft was not turning. Some of the manufacturers added an inclinometer within the instrument. That would be a turn indicator with an inclinometer provided internal to the instrument and I would suppose it should most correctly be called a turn and slip instrument. I do believe that was how they were referred to by the English, but in the USA, that was usually called a Turn And Bank. About the time of early WWII, someone got the bright idea of adding a couple of extra squares or dog houses to the side of the center dog house. Prior to that development, a standard three degree per second turn would be done by initiating a turn such that the side of the needle was lined up with the single dog house side. Adding the extra indices to the instrument allowed for a more sensitive instrument as the standard rate was then met when the needle was at the "double needle" turn position. Prior to that, a double needle width turn would give approximately six degrees per second but the pilot had to estimate when the needle was two needle widths away from the center index.

During WWII both types were produced and used. There were some iterations concerning two minute turn and four minute turn units and not all manufacturers were consistent in their use of the term. When the Jet fighters were first introduced there was a spate of T&Bs built with extra dog houses and other accouterments to adapt to the higher speeds but since the military was starting to train to attitude flying rather than rate flying, it became a moot point.

For several years the industry used almost exclusively the Turn and Bank Instrument with a single dog house at the center flanked by an index on either side which was located one needle's width away from the dog house. With the needle lined up with the index at the side, the aircraft would be turning at the rate of three degrees per second.

That is what I believe you are referring to as unit # 1.

Turn and slip or needle and ball is definitely more descriptive of the instrument, but it was referred to by most in the industry as a Turn and Bank unit.

Your question number two states turn and blank. Could that be a miss spelling of turn and bank?

Number three is referred to as the Turn Coordinator.

You further ask:

#1 has a roll gyro while #3 has a roll and a yaw gyro, right? Is #2 the same as #1, or the same as #3, or something entirely different?

All three have but one gyroscope. I believe what you refer to as 1 and 2 are the same.

Number three is the same as number one except that the gyro is mounted at an angle so that it is sensitive to both roll and yaw.

In fact, the first "turn coordinators" were standard T&B units mounted with the forward end higher than the rear. I mentioned this in my previous note on this subject. They were later adapted to show the artificial horizon style of presentation for use as a flight instrument.

If you will take a standard electric T&B and supply it with electrical power, you can demonstrate to yourself how this stuff works.

Hold the running unit completely upright with the fore and aft axis parallel to the earth. Then, without any bank input, rotate the unit in the horizontal plane. It will show a turn by displacing the needle in the direction of turn. The faster the rate of turn, the more the needle is displaced. Stop with the unit still perfectly level and the instrument will indicate neutral with the needle right in the center. Carefully rotate it around it's fore and aft axis without any right or left input and the needle will stay right in the center. It only responds to turn, not to roll at all!

Now tip the unit so that the forward end, the end away from the glass face, is about forty degrees above the back end. Try the same series of experiments as before, but with the front end elevated. It will still show a needle displacement when it is turned right or left. But, when it is rotated about a horizontal axis (that axis would now run from the top of the instrument at the face to the bottom of the instrument at the rear of the case and be parallel to the surface of the earth even though the instrument itself is tipped up) and the instrument will show the same indication for the rolling motion that it showed for the turning motion!

That is the beauty of the canted or inclined gyro. It is a much cheaper way to get information for a simple autopilot. But it doesn't differentiate between roll or yaw. That isn't important for the auto pilot function, but I think it is detrimental to good instrument flight.

If you repeat the experiment using a turn coordinator, but eliminate the canted test,

you will find that when you only introduce roll, it will show the same indication as if you had only introduced turn. If you roll it without any turn and then hold it still, the indication will slowly return to the indicated level position and yet the instrument will be rolled to the side. It is telling you a lie! The T&B will never lie to you!

I contend that the best reaction to a turn only excursion in flight is different from the best correction that should be applied for a roll only excursion and that is why I think the T&B is the better of the two for partial panel flight.

If the airplane doesn't turn, it is unlikely to get in trouble.

NO one EVER confuses a turn needle for an artificial horizon!!

Once again, I seem to be the only person in the country who feels this way and I may well be wrong, but I have tried to convince all who I care about, to learn to fly the airplane well by reference to the rate instruments and specifically while utilizing the classic turn needle which responds only to turn inputs.

The folks who learned to fly with the rate instruments had very little trouble adapting to the full panel. It is not true the other way around!

Folks who learn on tailwheel equipped airplanes have little trouble adapting to trigeared.

Attitude flying is rather like learning to fly on a tri-gear equipped airplane. It is cheaper and more time efficient, but I don't think it can ever be construed as better.

Happy Skies,

Old Bob

[ARTICLES/19991203_151406_msg11513.tex]

T&B Verses Turn Coordinator**Sat, 1 Jul 2000 11:34:20**

In a message dated 7/1/00 8:22:29 AM Central Daylight Time, newmanb@rocketmail.com writes:

Hello Old Bob - I find the TC to work fine for me for partial panel. Mine is quite stable. Something that concerns me is I observe some TC's installed which are nearly unusable because the bearings are set up too loose. The symptom is the little airplane is unstable and it thrashes about with even a little turbulence; making it rather useless.

Good Morning Bob

Even when the instrument is properly adjusted and working at it's peak. It still tells lies.

It cannot differentiate between a yaw and a roll. In fact, it was specifically designed to make the same indication regardless of whether the airplane has yawed or rolled.

The same characteristic makes it work very well as a low cost sensor for an autopilot. The trouble is, that the human aviator has a brain that works better if it knows what is going on.

The most important thing in attaining and maintaining control of the aircraft is recognizing when it is turning.

If the aircraft is properly rigged, everything is working perfectly and the TC tells you a wing has dropped, it is an indication that a turn may be following soon. But how do you know whether a wing has dropped or a turn has started? You don't! There is no way to tell which has occurred until information is gained from supporting instrumentation.

On the other hand, if a turn needle tells you the nose has turned, it has turned! There is no ambiguity. Why do I feel that is important?

The human needs to be thinking turn, not roll!!

It is the mind set of the receiver of the information that is important.

He or she should be thinking turn, not roll.

If the airplane does not turn you will survive.

I want an instrument that tells the truth, not lies.

Happy Skies,

Old Bob

PS I am not an instrument man, but I think you will find it is the dampers that are being adjusted rather than the bearings, but I could be wrong!

[ARTICLES/20000701_113420.msg10428.tex]

T&B vs. Turn Coordinator**Fri, 3 Dec 1999 12:32:54**

Good Morning All,

I returned last night to find some four hundred messages on my E-mail, most of them in some way related to the tragic crash in Newark.

My quick scan noted several references to back up instrumentation and at least one request asking how others have dealt with that quest.

A couple of folks noted my personal preference for a Turn and Bank instrument over the now almost universally used Turn Coordinator instrument.

I do have comments considering what has been done to provide redundancy but I want to discuss my reasons for choosing the T&B first.

To make sure we are all on the same track, the Turn Coordinator is a development of the T&B. The first units were used as a stabilization device for an autopilot developed by one of the major corporations. I believe it was ITT, but someone else may have better information.

That autopilot used a standard T&B mounted within the magic box of the autopilot, not on the instrument panel. I believe it was mounted at an angle of about thirty-five or forty degrees. By mounting the control box in the same plane as the level position of the aircraft, the T&B ended up in the "canted" or "inclined" attitude.

One of the tenants of mounting the standard T&B in the days when those were a primary instrument, was that it must be mounted so that the face of the instrument was in a vertical plane parallel to the vertical axis of the aircraft. This was necessary to eliminate, or at least minimize, the effect of roll on the instrument. The T&B was designed to tell the operator that the aircraft was turning, nothing else.

By mounting the instrument with the front end (the part toward the nose of the aircraft) above the back or face that we read, it became sensitive to roll as well as turn. I understand that it has been tried at many different angles. I am not sure what is currently used, but believe it to be somewhat less than forty-five degrees. Thirty-five or so is what comes to mind.

Someone felt that there might be an advantage to presenting information to the pilot in a similar manner and the Turn Coordinator was born.

Whether the airplane is rolled or yawed, the Turn Coordinator indicates something!

Seems like a good idea doesn't it? If a wing drops (roll) a turn is likely to follow. The canted or inclined gyro would give an indication to the autopilot or the operator to take action to stop the impending turn. Most of the early GA autopilots would use aileron for that purpose and viola, we had the early wing levelers!

One of the first things that bothered me about the early Turn Coordinators was the

following effect. If a takeoff was initiated immediately following a turn onto the runway, the Turn Coordinator would show a wing down indication even though the wheels were solidly on the ground and holding the aircraft in a very stable horizontally level position. A phone call to the manufacturer elicited the information that the unit was operating as it was supposed to do. In order to make the turn coordinator modification to the standard T&B usable, it was necessary to heavily dampen the response or it would wiggle too much to be usable.

Over the years, different manufacturers have used different amounts of dampening, but the Turn Coordinators still do not give as rapid a response to a yawing moment as do the T&Bs.

The next thing that bothered me about the Turn Coordinator was the presentation which was almost identical to that of the artificial horizon. I found that students often tried to make pitch corrections while watching the instrument for verification of their input.

This was not as big a problem for beginning instrument pilots as it was for very experienced ones who would take action by reflex borne from long experience rather than thought on what needed to be done!

After several years of using Turn Coordinators for primary training and for recurrent checks and training, I came to the conclusion that students who used the older T&B for training and in normal flight, had a lot less difficulty with partial panel on recurrent competency checks than did those who trained on and regularly used Turn Coordinators.

The T&B seems to take longer to learn to use, but gives better long term results than the TC.

NO ONE has ever mistaken a T&B for an artificial horizon! That often happens with a TC.

When the turn coordinator shows a "wing down" indication, there is no way to tell if the wing is down or a yaw has developed.

If the nose is not allowed to turn, the airplane will not spin in, spiral dive or grave yard spiral into terra firma!

Don't let it turn and, if the airplane is in trim, nothing drastic is likely to occur.

(As an aside, the argument could be made that if the wings are held level, nothing much is likely to happen either. Think about the 747-400 that came within 70 feet of scattering bodies and aluminum over San Francisco. He held his wings level, but because there was no rudder input, the spoilers were extended, the airplane was descending and the heading changed enough to take the aircraft off the track which was designed to take it between the hills. If that pilot had not allowed the airplane to turn, it would have been a non event whether the wings were level or not!)

I can't imagine any instrument being more reliable than the standard T&B, though I have had them fail.

It must be noted that I learned to fly instruments in the days when the use of an artificial horizon and directional gyro was not allowed on the flight test.

That resulted in most IFR training airplanes not being equipped with either of those attitude instruments.

Most small GA airplanes which were regularly flown IFR had either a DG or one of the stabilized compasses added to make rolling out on a heading easier. Other than that, we tended to use rate flying as opposed to the current method of attitude flying.

The military services during WWII equipped every airplane that was intended for IFR flight with a "full panel" and the airlines had used such a panel since well before the war.

Shortly after WWII, the military officially started to train their primary students in the attitude method of flight and somewhere in the late fifties or early sixties the FAA followed suite.

I don't know whether the old way or the new way is the best, but I do know that you can turn out an adequate instrument pilot using the attitude method in less time and therefore at lower cost than you can using the rate method.

I also know that instrument pilots who flew a couple of years and a few hundred hours on the T&B, rate based panel before the days when the government mandated the use of a full panel never have any trouble flying partial panel.

The same cannot be said even for very experienced pilots who have only flown partial panel during training and checking.

The most difficult thing is to identify the failure of the artificial horizon. It is also very difficult to fly partial panel when the failed attitude instrument is leaning over where it doesn't belong! Pasties or other cover-up devices are almost mandatory.

I would imagine that my confidence in the T&B is at least partially responsible for my hate of the TC, but I also feel that I gave it several years to convince me otherwise.

As to what has been used in the past as back up devices, John Miller, who will be 94 this month and still fly's his Bonanza IFR several hundred hours a year, told me about a device which he carried in his old C model. He rigged up a venturi on a board that was sized to fit in the pilot vent window. The venturi was connected by a rubber hose to a standard vacuum T&B which he then placed on the top of the instrument panel.

The first airplane on which I regularly flew Captain was the Convair 340. It was an all electric airplane, no air system at all! Northeast had one on which a wrench or some other tool had been left on the electrical compartment and it shorted out the whole shebang. All of the emergency and battery busses as well as normal things.

These guys were in a whole lot of hurt! Fortunately, they were on top in the late afternoon and had some time to think things out. They felt that they knew their position fairly well and I will shorten this dissertation enough to state that they let

down through a four or five hundred foot overcast and broke out over Long Island Sound. They recognized their position by landmarks along the shore, flew to and landed at LaGuardia. It was by then quite dark and no one knew they were on the ground until someone complained of an unlit airplane taxiing on a taxiway!

That bothered me enough that I took a twenty-eight volt T&B, taped three nine volt "B" batteries around it, equipped it with a switch and carried the thing with me in my flight bag. I could place it on the glare shield with the forward end setting on a coffee cup holder that Convair had conveniently supplied and I had a comfortable method of flying the airplane! Worked like a charm!

My first two Bonanzas had a directional gyro, but no horizon, That was the most common configuration before the Feds required a full panel. Both airplanes had come that way from the factory and were equipped with a vacuum T&B as well. I added an electric T&B and felt that I had as much redundancy as anyone could ever want!

My current airplane has only one airpowered instrument, the attitude indicator. That supplies the information for my number one autopilot. My number two autopilot is a turn coordinator that uses a canted gyro for information.

I feel very comfortable that I have sufficient back up for my type of flying. If I were to have a complete electrical failure along with a failure of the pneumatic air system on takeoff, I would probably lose the airplane. But if I were at altitude, I would get out one of my hand held GPS units and use it to tell me if I was turning or not. Given reasonable time to acclimate, I think it would be usable for going generally in one direction without losing control, but I don't think trying to comply with ATC instructions would be in my repertoire.

I have practiced keeping it right side up with just the panel mount GPS, but I have not yet tried it with the handhelds. My handhelds do not update anywhere near as well as my panel unit.

I do have a standby alternator that will come on the line automatically following a failure of the primary one. Hopefully there will never be a complete electrical failure, but it did happen to that Northeast Convair and to one of our Musketeer instrument trainers many years ago.

As to my personal minima, I fly to the FARs. I enjoy single pilot IFR and I like flying to low minima. Shooting an approach to minima is fun and if the approach is completed, it can be very satisfying. If a miss is required, that too can be a satisfying experience if you have plenty of fuel and places to go. Always the opportunity for a new experience. I have found that non completed trips often allow me to meet a lot of interesting folks at out of the way places.

As has been mentioned by many others, single pilot IFR is a lot different than multiple crew operations. Crew Resource Management is a neat catch phrase. What it amounts to for the single pilot is organization to see that one does not try to do too much.

I find that in my current aircraft, I have so many options that it is easy to divide my

attention to the point that I don't do a good job of flying the airplane. I must decide what functions I really need and let the others go by the board.

One thing at a time for me.

Younger folks might be able to do more, but I think simple tasks are all I want to do and not too many of those. If I am shooting a GPS approach, I may set up the VHF Nav for something else in the area, but I don't try to cross check unless I have a suspicion that something may not be going well and then it would likely lead me to initiate a miss to sort things out rather than trying to figure out what was going on that caused the discrepancy.

I do have dual glide slopes which I tune for all low ILS approaches. They are mounted side by side and I find them easy to cross check.

Remember that Personal Minima are just that! They are what works and feels comfortable for you

Well, I guess that is about all the space I am allowed for this week!

Happy Skies,

Old Bob

[ARTICLES/19991203.123254.msg11490.tex]

T&B vs. Turn Coordinator**Sat, 1 Jul 2000 14:04:41**

In a message dated 7/1/00 12:28:41 PM Central Daylight Time, jwhitehead@earthlink.net writes:

Then doesn't this relate to the previous question where you said the yaw damper would keep the graveyard spiral coordinated? What would happen if the yaw damper was doing its job? Wouldn't the TC then be showing a turn?

Good Afternoon John,

If I interpret your question correctly, yes, the TC would be showing an indication if the airplane was turning. Stopping the turn by using the turn coordinator works!

The TC shows the same indication when the airplane rotates around it's vertical axis as it does when it rotates around it's longitudinal axis

The yaw damper sensor reads only the displacement from neutral. It is basically the same as the indication of the Ball in an inclinometer.

If you performed a perfect barrel roll, the yaw damper would never be activated. The same is true if you are in a nice coordinated grave yard spiral. The yaw damper only acts to maintain "coordinated flight."

If one were capable of doing an absolutely perfect "slow" roll, the turn needle would never wiggle at all! The TC would show that the airplane had rolled, but it would give that information as an indication of a turn even though no turn had taken place.

During the "slow" roll, the yaw damper would be fighting the pilots inputs and attempting to convert the slow roll into a barrel roll. That would probably result in a dish out. Hopefully if you decide to try this in your Bonanza, you will do so with enough altitude to effect a comfortable recovery!!

Anytime the aircraft skids or slips, the yaw damper is activated. It couldn't care less whether or not the aircraft is turning.

Just as another point to ponder. If you are flying a multiengine airplane on one engine that performs best with the dead engine carried five degrees high, the turn coordinator will show "wings level" while the aircraft is in that stable "five degree dead engine high" flight. That is just what it should show, but the presentation tends to make people think 'bank' instead of 'heading' and that is one of my big gripes with the instrument.

The turn needle gives the information that is needed to keep the airplane under control with absolutely no ambiguity.

The TC requires interpretation to ascertain how it is being activated. In most cases it does not matter. Proper application of the controls to return the TC to the stable condition will work. But it is still telling lies!

Why not use an instrument that has no ambiguities?

Happy Skies,

Old Bob

[ARTICLES/20000701_140441_msg10434.tex]

T&B vs. Turn Coordinator**Mon, 18 Sep 2000 11:38:14**

In a message dated 9/7/00 7:47:21 PM Central Daylight Time, jlfisher@flighttech.com writes:

Congrats on the new Turn and Bank. I just put in a brand new Turn Coordinator. I get less confused with two little airplanes banking the same way in front of me.

Joe Fisher P-35

Good Morning Joe,

I strongly applaud Steve's decision to gain the safety of a Turn and Bank for his operation.

Maybe I have been less than clear when describing the reasons I feel the needle style Turn and Bank has so many advantages over the Turn coordinator, or is it just that you totally disagree with my thoughts?

You mention that you like to have both your artificial horizon and your turn instrument look the same during a turn.

I think that is one of the main reasons folks these days have so much difficulty flying partial panel when under extreme duress.

The Turn Coordinator just looks too much like an artificial horizon and yet it does not respond to control input in the same manner as does the attitude indicator.

Nothing else on the panel looks even remotely like a Turn and Bank.

You mention that you like controlling the bank with both a turn coordinator and the attitude indicator.

The bank isn't what gets the majority of us in trouble.

It is the turn!

No one ever got into a graveyard spiral without turning.

Don't turn and you will survive.

There is no argument that a properly rigged airplane with all components operating in a normal manner will go reasonably straight if the wings are kept level. But, if anything goes wrong that upsets that warm and fuzzy condition, all bets are off!

An engine out on one side or a gear door hanging open are just a couple of things that could occur to upset that applecart.

In addition to the oddball things that might go wrong, one should remember that if

we do succumb to vertigo, our minds and senses will not be operating in their normal smooth and rational manner.

We need something specific and simple to direct our attention to. That something should be specific to the thing that will give us the most time to gain our normal thinking capability.

My contention is that NOT TURNING is the single most important thing that should be on our mind.

Leveling the wings to stop the turn adds an unnecessary step to the thought process.

Leveling the wings is a means to stop the turn, but it is not the number one goal. Stopping the turn is that number one goal. Why should we add that extra step when our mind is already so bogged down? It is a time when we should be single-minded and concentrate on nothing but stopping that turn.

The Turn Needle shows nothing but turn. It is a single-minded instrument and fits very well into our single-minded purpose.

Just stomping on the rudder will stop the turn in most airplanes, but that is not the recommended method that most of us would suggest. Rolling and using the aileron, or other roll control device, is certainly the preferred method, but the mind should be set on stopping the turn and not just on achieving a wings level configuration.

The Turn Needle lends itself well to enforcing the single-minded concentration on the turn that that is so important in those often confusing moments just prior to and during that entry into a steep descending turn that has proved fatal to even some very experienced aviators.

I am sure there are many who feel that my strong recommendation of the use of a Turn Needle over the newer Turn Coordinator is merely a manifestation of an old timer who resists change. Anyone who knows me is aware that I have constantly championed the use of new improved methods whenever they become available. I think the GPS is better than sliced bread and I happily threw out a very nice LORAN when I realized how superior the GPS was to the LORAN.

When the Turn Coordinator was first offered it was in the form of a low cost method of providing a stabilization sensor for a low cost autopilot. I applauded the technology then and I applaud it now. I think it makes an excellent sensor for such a purpose.

When the Turn Coordinator was introduced as a panel instrument for use in place of the T&B, I added them to our training fleet with the thought that it would be an improvement.

However, subsequent events have led me to feel that they are not an improvement and are, in fact, a detriment to safety.

I don't think the instrument fits well with the way our human minds work when under those rare moments of high stress preceding loss of control incidents.

I became aware of these shortcomings while observing the action of pilots not in initial instrument training, but during recurrent training and requalification sessions.

Those who had trained initially on, and were still using, the Turn Needle seemed to do better on the surprise failures than did those who had been trained on, and were utilizing, the Turn Coordinator.

It was not uncommon to note an effort to apply a pitch correction while concentrating on the Turn Coordinator instead of referring to the appropriate performance instrument that should have been used.

That and other subtle deficiencies gradually convinced me that the use of the Turn Coordinator in lieu of the T&B was ill advised.

I note that some within the FAA, and many other experts in the industry, are now pushing to replace the Turn Coordinator with a standby Attitude Indicator. I think that too is a mistake.

It is not unusual for an attitude indicator to have a failure such that it will show a bank when the aircraft is not banked and yet it will still respond to a control input. The natural way to determine whether an attitude instrument has failed is to observe whether or not the aircraft is in a turn.

Nothing shows a turn better and more directly than a Turn Needle.

An ADF pointed to a station reasonably far away is a good back up as are any of the various gyro (or even the new solid state direction devices) stabilized turn indicators.

I imagine there will be a device developed which will do a better job than the Turn Needle.

If Burt Rutan has his way, we will have an autopilot on the airplane which will be so reliable and redundant that the human pilot will only direct it and not be required to fly the aircraft in the manner we utilize today. That goal is almost met by the new breed of Air Bus from Europe. All they do is command the autopilot and it sets the limits including one limit of no spiral dives allowed.

I was once petrified of the thought of full hydraulic controls with no cable back up, but after a few years of flying an airplane equipped with hydraulic controls and a cable back up, I found it relatively easy to accept aircraft that had no cable back up.

I imagine that someday I will be able to accept that autopilot which will be in total command, but I don't think it will be installed in a Bonanza in my lifetime.

Meanwhile, I have decided to add an extra T&B to my panel.

It is my personal opinion that Itzhak did exactly what I hope I would do when confronted with a confusing situation.

I think he noted that things were not adding up. He then reverted to what he felt were his last ditch, always tell the truth, instruments. His Turn Coordinator and his heading

instrument.

It appears likely that both of those had failed.

I have hope that by having two T&Bs mounted side by side, I will be able to recognize the failure of one.

I have never seen a failure of a T&B where the needle would still wiggle.

If one instrument is wiggling and the other is not, I think that would be the easiest differentiation procedure to accept that could be developed.

I don't imagine I will change your, or many others mind, with this discussion, but if even one more soul adds the extra safety of the T&B to his aircraft that Steve has attained, I will consider the effort worthwhile.

Happy Skies,

Old Bob

[ARTICLES/20000918.113814.msg13665.tex]

T&B vs. Turn Coordinator**Mon, 18 Sep 2000 23:29:42**

In a message dated 9/18/00 8:04:12 PM Central Daylight Time, jlfisher@flighttech.com writes:

I guess if we are in a flat skidding turn, the needle and ball will tell me that since the needle will be centered and the ball will be on one side or the other.

Good Evening Joe,

In a flat skidding turn, the turn needle would be deflected and showing a turn. The ball, if one is installed, would be showing an indication on the outside of the turn.

A Turn Coordinator, in the same condition, would show a wing down indication even though the wings were level. It would show the little airplane in a bank toward the direction of turn. The ball would once again be toward the outside of the turn.

But wait, is it telling me a flat skidding turn or a flat slipping turn? The TC would tell me that depending on which way the airplane is banked, wouldn't it?

By definition, the turn is a skid if the ball is to the outside of the turn. If the ball is on the inside of the turn, it is a slip.

The Turn Coordinator will always show a "bank" toward the direction of turn whether the aircraft is actually banked or not.

Another example to think about. If your airplane is capable of doing a nice strong airshow style knife edge and it is equipped with a Turn Coordinator, the TC would show a "wings level" indication throughout the entire length of the stable portion of the knife edge maneuver even though the wings might be in a "bank" as great as 80 degrees or more. The ball would be on the bottom side of the instrument or toward the planet earth.

Once again, the TC indicates only roll and/or yaw. If the aircraft is neither rolling nor yawing, it will show a "wings level" indication regardless of the bank angle of the wing.

Nothing is easy, is it?

Happy Skies,

Old Bob

[ARTICLES/20000918_232942_msg13697.tex]

Tumbling the Gyro**Tue, 24 Oct 2000 11:59:14**

In a message dated 10/23/00 10:26:16 PM Central Daylight Time, KR2616TJ@aol.com writes:

In a message dated 10/23/00 8:19:44 PM Eastern Daylight Time, tkeesling@mindspring.com writes:

How steep a turn can you make in a Bonanza before you "tumble" the gyro? 45 degrees? More than that?

In my commercial training, I had to do opposing 50 degree bank turns. I've had it past 60 a couple of times without tumbling. I haven't rolled my Bo, but there was some discussion a couple of months ago concerning just that. What do you aerobats have to say:-)??

Dana Overall

Good Morning All,

It depends on the gyros! Some are non tumbling and will allow rolls and loops without any problems at all.

Beyond that, there is some degradation of performance with age. I don't have any specific times or numbers to offer, but I have had gyros that seemed to be operating normally during routine flight which failed when maneuvers that were still within the sixty degree bank and 30 degree pitch limits were approached. When given a chance to erect, they continued to operate properly for normal flight attitudes. If nothing else, that would be a clue that they should be looked at by a technician.

Best to get the exact model and series numbers of your gyros and check with a knowledgeable instrument man.

Happy Skies,

Old Bob

[ARTICLES/20001024_115914.msg15290.tex]

Used Instruments**Mon, 15 May 2000 12:00:12**

In a message dated 5/15/00 10:30:01 AM Central Daylight Time, jtsmall@onramp.net writes:

From what Old Bob has said used T&B's are questionable. However I think your used RC Allen AI and my used AIM 305-1 AI does turn that cost/benefit analysis back toward the AI.

Good Morning John and Eric,

Used instruments of any kind are a bit of a problem.

The best defense against getting poor used instruments is to establish a good working relationship with a local instrument technician.

Many of the heavily advertised shops do little more than clean and lubricate an instrument that they then send out as overhauled. All it has to do is meet performance standards at the time they ship it out to you. It is easy to issue a guarantee. They will send you out another unit if you send the old one back until you get tired of taking the thing in and out of the airplane.

A good technician can tell the quality of the used instrument by inspection or sometimes just by listening to it run. It is well worth spending some money with a local instrument shop to develop that relationship.

I buy my used and new instruments through my local technician unless he advises me to order it from a supplier myself. That way, he is always available to evaluate the quality of what we receive.

The last time I wanted a new Turn Needle instrument, we ordered three, tested them all, then kept the best one of the three.

The two and a quarter inch turn needle that I currently have in my airplane is one that I bought at a Sun 'n Fun fly market and took to my local techie for evaluation. It sounded good to him and has been purring along for some six hundred hours so far. It has lasted the longest of any of the small T&Bs that I have had. The others were from mail order overhaulers before I saw the light!

Happy Skies,

Old Bob

[ARTICLES/20000515_120012.msg08166.tex]

2.6 AVIONICS-MISC

Avionics Advice**Wed, 24 Jun 1998 21:23:05**

Good Evening Paul,

In a message dated 98-06-24 14:11:04 EDT, you write:

So lets say I decide to hold onto the KX170B as a backup comms/nav
where should I go Thanks Paul-79B

You definitely need a glideslope for the flight training. If your pocketbook can stand it, a nice new KX155 or similar set would be nice. There is the possibility of getting one added to your KX170B but the cost would probably be pretty high and the units have not been manufactured for several years, so any that you purchased would be getting quite old. But! Ask around, you may find a steal and that could be the cheapest way to go!

I like Trimble's new NavComm set too but have no experience with it. I don't know what kind of a CDI they are using with it either.

I have a Terra set with Glide slope in my Piper Pacer. It is economical and has worked very well, but I am not crazy about the electronic CDI indicator. I guess it might be the wave of the future, but I am so used to needles that it takes me a few minutes every time I fly the airplane to decide when to "fly up" and when to "fly down"! I suppose if that were the only airplane I flew or if I flew it IFR more often it would become more comfortable.

I would steer clear of Narco equipment due to service difficulties so that leaves the new ones from Garmin and Trimble or the low cost Terra as options for the Allied Signal KX155. I can't recommend any over the other as I think they are probably all good sets. Try to look them over and see what your son thinks of them electronically.

The KX155 is very expensive but it does have a good service history and the new ones are well shielded for the GPS. I would not buy a used one if it was manufactured more than two or three years ago due to the interference problem. The rectilinear CDIs are nice to have but rather high priced so I wouldn't hesitate to use the top/side hinged units.

The next move would be to install the GPS and you really need to get out and look them over and compare the prices. You should have your KX170B transmitter checked for compliance with the requirements which became effective January of 1997. Many of the older sets need some modification to be legal. I am not sure of the status of the 170B but am sure that it is either OK now or the modification is relatively minor. Incidentally if you do decide to add a glide slope to the KX170B and use it as your one and only NavComm, I would not spend any money attempting to add flip flop tuning or other after market additions to the set.

I think it is time you do some shopping!

Happy Skies,

Bob

[ARTICLES/19980624.212305.msg03317.tex]

Avionics Advice**Thu, 25 Jun 1998 08:48:47**

Good Morning Dwaine,

In a message dated 98-06-24 23:11:01 EDT, you write:

What service difficulties? I have had two Mark 12Ds with GS for 10 years and have had to have service on one of them in that time. I didn't want to pay a local shop to educate them on the 12D so I shipped it to Narco in PA. \$175 later I had it back and 5 years later it is still working great along with its mate.

Precisely as you say, the local shops generally do not like to work on the Narco units. A few years ago, Narco cut off all of their dealers and would not discount parts or anything else to them. They wanted all sets sent to them for repair. It almost put them (Narco) out of business. They have since relented and are now actively seeking dealer participation but not all shops have responded.

If your needs are such that you can wait for repairs, Narco is not bad to deal with. I have a Comm 11 which I use as a ground Multicom station and it needed repair a couple of years ago during the "no discount" days. My local radio shop shipped it to Narco and the repairs were performed adequately and at a reasonable price within a decent time frame,

If your local radio shop recommends a Narco then I would not hesitate to buy one. It is advantageous to have a shop with which you feel comfortable. I have dealt with the same people for the past thirty plus years and it is nice to be able to stop in and have a loaner stuck in my airplane while my unit is being repaired. Not all shops will or can do that.

Most of the Mark 12s were (and still are) great radios. You might have noted that I suggested that Paul-79B at least investigate the possibility of having his early Narco with the Glide Slope repaired as the lowest cost alternative. Even if the transmitter were not serviceable, the Nav unit would provide what he needed and the KX170B has an excellent and current transmitter.

I just wouldn't recommend purchasing a set which your shop doesn't like. Incidentally, my local shop is once again dealing with Narco.

Bob Siegfried Ancient Aviator

[ARTICLES/19980625.084847.msg03339.tex]

Avionics Advice**Thu, 25 Jun 1998 11:47:14**

Good Morning Alan Bradley,

In a message dated 98-06-25 10:25:01 EDT, you write:

However, I think there is a certain amount of sour grapes here, as Narco is now a strong competitor in the repair business.

What you say is all very true.

I know that my prejudices are all affected by the fact that I have made my living in aviation since I was fifteen years old. It pains me to see small airports dying and the large airports discriminating against we small aircraft.

I personally try to arrive at the big high priced corporate oriented FBOs with capacity to take on at least twenty gallons of their high priced fuel as I am appreciative of the facilities that they provide. I normally try to stop at the little operators though, and once again, try to be in a position where I can take on a reasonable amount of fuel regardless of the price. It is somewhat the same situation with radio shops. If I am out on the road and run into a difficulty which I really want to have repaired before further flight, it is sure nice to have a small shop available. I know the empathy I have toward the small operator is at least partially due to my having been involved in that business for so many years, but it is also selfish of me in that I want them to be there when I need them!

The primary reason I carry dual NavComms is so that I won't have to delay a trip if one fails as I have found it difficult to obtain convenient service while on the road. I sure hate to see the situation get any worse.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980625.114714.msg03348.tex]

Avionics Advice**Mon, 17 Aug 1998 11:40:52**

Good Morning Tony,

In a message dated 98-08-17 10:13:12 EDT, you write:

Anyway since I am now going for new stuff in the panel...is there a better audio panel/marker beacon combo to put in...was going to also look into gps/comms...but want the second nav for ils approaches

Very sorry to hear about the theft. We really need a system whereby radios are tracked by radio shops to stop the sale and installation of stolen equipment.

Since you now are faced with replacement, I would strongly suggest that you look at the plethora of combination audio selector panels which are combined with a marker beacon and a high quality isolation amplifier.

PS Engineering has a very good reputation and they actually supply other manufacturers with their box which is then sold under other names. While I have no direct knowledge of the product, one of my sons has one and several friends also are so equipped. All reports have been complimentary.

I would suggest that you take the opportunity to go to one GPS and one NavComm.

Now that the FEDs have blessed the use of GPS in lieu of ADF and DME there really is little reason to have either unless you really like to listen to WGN or WBBM while heading home!

I do like the comfort of two ILSs complete with two Glide Slopes when the ceilings get down around two hundred feet or so but that is rather unnecessary.

There is something to be said for having a second VOR/ILS/GS unit as an aid to dispatch reliability. One VOR receiver is still required for flight in most of the lower 48 so if you have two onboard, you could still continue if one quit. (After placarding it as inoperative and making a log book entry of course.)

Hope things are going well otherwise!

Bob Siegfried Ancient Aviator

[ARTICLES/19980817_114052.msg04407.tex]

Avionics Advice**Thu, 8 Jul 1999 10:39:30**

In a message dated 7/8/99 9:27:17 AM Central Daylight Time, hgp@madaket.netwizards.net writes:

There shouldn't be any reason why you can't do IFR training with kx175's, etc. You should have a DME and ADF, though.

Good Morning All,

Please remember that neither an ADF nor a DME is required for instrument flying or instrument training.

An IFR approved GPS of at least enroute capability can be substituted for ALL DME functions and all ADF functions except a non-directional beacon approach that does not have a GPS overlay!

An IFR approved GPS can be purchased for a lot less money than an ADF and DME and if the approach approved version is chosen, provides hundreds of additional approach possibilities.

I would suggest that no funds be expended purchasing or maintaining ADF or DME equipment unless you just like to listen to the ball games.

Happy Skies,

Old Bob

[ARTICLES/19990708.103930.msg05770.tex]

Avionics Advice**Sat, 7 Aug 1999 13:00:34**

In a message dated 8/7/99 11:12:38 AM Central Daylight Time, hgp@madaket.netwizards.net writes:

I love my KNS-80 precisely because it is indeed so low tech – I can plant a vor most anywhere given a sectional chart and my trusty yellow AOPA plotter.

Between that and my wonderful Foster F14 Loran, I bet I can functionally do just about anything you young whippersnappers can do with a GPS (except for the GPS approach into San Carlos (SQL), that is).

Good Morning Howard,

I still have the KNS-80 in my airplane too. When it first came out, I couldn't believe we GA types could have such a wonderful piece of equipment. And for ONLY \$4000 1970 dollars too!

For twenty years I happily plotted courses and figured out how to place waypoints to provide direct navigation in the days before the FEDs decided to accept direct clearances on the controllers authority. Then in 1991 I installed my first GPS. Absolutely mindboggling!

An interesting feature is the cost comparison. The first Trimble IFR approach approved box came out in 1994. It could be installed and approved at that time for around six thousand bucks.

The list price at that time for a KNS-80 was eight thousand bucks. Most shops would sell you one installed for that figure, but if you ordered it on a new Bonanza with a factory installation, you would have paid the full eight thousand plus a couple of grand more for the installation!

Since Trimble decided to get out of GA, I haven't kept track of what the lowest cost IFR approach approved set sells for, but I know it is less than the cost of an ADF and a DME and directly competitive with big name producers VORs.

My big aim in life is not to convince everyone that they should run out and buy a GPS, it is to try to inform everyone that it can be the cheapest way to go IF you have the need for IFR capability and are starting from scratch.

As you mentioned, it depends!

If you want to execute a low approach to SQL, GPS is the only game in town. If I were based at Grass Valley, California, an IFR approach approved GPS would be on my must have list. To operate from Hayward, who needs it?

Happy Skies.

Old Bob

[ARTICLES/19990807-130034.msg06772.tex]

Avionics Advice**Mon, 20 Dec 1999 15:59:11**

In a message dated 12/20/99 2:21:53 PM Central Standard Time, dellis8000@earthlink.net writes:

Now that everyone's getting rid of their ADFs for GPSs, I'm assuming that the supply of used ADFs should be increasing. Does anyone out there have one you would be interested in selling? I'm looking for basic approach capability on a budget.

Thanks,

Don Ellis N2929V 35 S/N D-313

Good Afternoon Don,

Unless you can get an older set for nothing or close to it, I would recommend giving a pass to the ADF.

There are a few real good sets out there. The KR-87 is a tremendous unit. Should you find one of those cheap it might be worth the effort to get it installed. But if all you can locate is an old KR-85 with the separate sense antenna, I don't think I would bother.

I have a KR-87 in my airplane and I suppose I will keep it until it dies or I need the space for something else, but anything much older will cost a lot to install and maintain.

If your desire is to fly IFR on a budget, get one good VHF Nav Comm unit and a good handheld GPS such as the Garmin 195. They are on sale almost everywhere now because all of the "latest, finest and fastest" gadget buyers are getting the fancy color map equipped 250!

All that is required to fly IFR in the US National Airspace System is a single navigation unit pertinent to the route to be flown and adequate communications for flight along that route.

For practical purposes in the lower forty-eight, that means a VOR and a three hundred and sixty frequency communications unit. Add a transponder and you can go almost anywhere and shoot an approach to at least half of the airports in the country.

Acquire a handheld GPS and you can legally go direct just like the big boys and you will always know precisely where you are. You can't shoot an approach for which you do not have the equipment, but how often will that affect your operation?

Most IFR flying is done enroute. If the weather at your destination is above the enroute minima or at least above the RADAR vectoring altitude for the area, you can go to any airport you want IFR. If you file to an airport that does not have an approach which you are capable of executing, the only requirement is that you be able to name an alternate that does have an approach you can fly.

I love having an IFR approach GPS and the capability to do all of the things it can do, but if my budget wouldn't allow all of the fancy gadgets, I doubt if very many of my flights would be affected at all.

At the worst, it might be necessary to adjust a departure or arrival for a few hours or maybe even a day, but I don't think there has ever been a time when twenty-four hours would not have allowed a VFR operation at any airport I have ever flown to.

I think money spent on a Garmin 195, or equivalent, would add a lot more to your capability than would an old used ADF (I might bend a little if you could get a KR-87 with the latest style single unit antenna for about the same money as the 195!).

It doesn't really require all that much equipment to add a lot of IFR capability to your flying machine!

Happy Skies,

Old Bob

[ARTICLES/19991220_155911_msg12122.tex]

Avionics Advice**Wed, 5 Jan 2000 16:36:28**

In a message dated 1/5/00 3:04:32 PM Central Standard Time, HWatson712@aol.com writes:

This whole discussion convinces me that I will keep my King RNAV since it isn't date dependant, and I can do lots of innovative point-to-point things to get me where I need to be SAFELY and legally.

Good Afternoon Hal,

Thanks for the support! For what it is worth, I still have an ADF, RNAV, DME, dual glideslopes and such along with my IFR GPS. As long as I have the room, weight carrying capability, power to feed them and they are already paid for, I see no reason to throw them out! All of the stuff is fun to have, but if the budget is a little stretched, a little innovation and understanding of the system will provide a lot of operational capability with very little equipment!

Happy Skies,

Old Coot Bob

[ARTICLES/20000105_163628.msg00266.tex]

Avionics Advice**Sat, 22 Jan 2000 15:57:57**

In a message dated 1/22/00 2:25:18 PM Central Standard Time, wabpilot@yahoo.com writes:

In an F35? Even my beloved J35 didn't merit that kind of cash. You are looking at \$10,000+ in upgrades. Your airframe is at best worth \$50,000. All those upgrades will not translate into dollar for dollar increases in your aircraft's value.

Good Afternoon Alan,

I realize we all have different reasons for making whatever expenditures we make on our toys, but I buy radios and instruments that will allow me to operate my aircraft in the manner I feel is appropriate for me.

If I am flying my Bonanza or my Pacer IFR, the radio equipment that I install will be based on that need and not on the total resale value of the aircraft.

If ones steed of choice is a Cessna 140 or a Beech King Air and it needs to be flown IFR, shouldn't the choice of equipment be based on the use?

I think the Garmin 430 is an excellent choice for a minimum equipped IFR aircraft.

I'll bet I could find a fairly high number of folks around the country who are comfortably operating 1947 straight 35s in at least a sophisticated IFR manner as you utilize your A36. IFR is IFR!

Happy Skies,

Old Bob

[ARTICLES/20000122.155757_msg01339.tex]

Avionics Advice**Wed, 26 Apr 2000 13:04:03**

In a message dated 4/26/00 10:39:58 AM Central Daylight Time, stutzman@stutzman.com writes:

Chief Aircraft has a comparison of an all Apollo stack vs an all Garmin stack at

<http://www.chiefaircraft.com/Avionics/MfgAI/ApolloComparison.html>

Good Morning Frank and All,

I was unable to call up that page and cannot, therefore, comment on Chiefs position.

One thing that I have always opposed is the interface on all Garmin and King/Honeywell GPS units which requires the installation of a resolver to feed the heading information to the panel unit. I have considered that to be a totally unnecessary redundancy. However, the 430 presents a different situation from the rest of their units. Since it is a combination VHF Nav as well as a GPS one, there is no redundancy involved. The resolver is required for the VOR function, as it is for all VORs, and that means that no extra one has to be put in for the GPS function.

In any airplane that has an HSI, the resolver function is less onerous than it is in aircraft not so equipped.

My feelings would be to avoid any box that requires a resolver if I did not have an HSI. Right now that seems to mean only an Apollo box would be acceptable.

Trimble is not likely a viable choice and there are rumors that Northstar may be giving up the ghost. I sure hope that is not true. I liked the Trimble best and the Northstar second best so I guess that means that no one else agrees with me!!

If the aircraft is HSI equipped, the resolver will still mean extra cost, but not as much as if you don't have the HSI. Once again, both the Garmin and the King/Honeywell boxes require the resolver. All others (if there are any left) do not.

The 430 is the hottest selling box since the Mark 12 was introduced. You can't argue with success!

Happy Skies,

Old Bob

[ARTICLES/20000426_130403.msg07100.tex]

Avionics Advice**Fri, 28 Apr 2000 10:43:11**

In a message dated 4/28/00 9:09:29 AM Central Daylight Time, commwlthsls@msn.com writes:

I'm not totally versed on this but I understand that the Garmin 430 mated up with a CDI doesn't require a resolver.

Good Morning John,

It isn't a matter of it not requiring a resolver, it just doesn't need an extra one! Since the 430 has a VHF Nav as well as a GPS, there has to be a method of telling the VOR what radial the set wants to use. The same device is used to tell the GPS whatever information is required.

I also understand that the KI-209A does the same thing. I believe the GPSS takes an input from the Garmin 430. At least that's what I'm led to believe.

I wouldn't be at all surprised if the KI-209A will work just fine. Same thing, the set requires the course information to be used for the VOR radial. Same deal.

I believe all of the panel mount Garmin GPS receivers in current production and most of the older ones are equipped to provide the extra data that the GPSS unit needs to do its thing. In fact, I wouldn't be surprised if the old KLN 88 might not have the data, but it wouldn't be as stable. The stuff they use has been available on the 429 data stream from a lot of the older more sophisticated sets for many years. It wasn't until GPS started to provide the stuff in such a stable form that it became practical to use the information as S-Tec is now doing.

Happy Skes,

Old Bob

[ARTICLES/20000428.104311.msg07216.tex]

Avionics Advice**Fri, 19 Jan 2001 07:49:53**

In a message dated 1/18/01 10:44:01 PM Central Standard Time, stutzman@stutzman.com writes:

On Wed, 17 Jan 2001, Nick Stratford wrote:

My dilemma: Is this airplane worth spending big bucks on a full panel upgrade, or should I go for the bare minimum cost to bring back up to IFR standards.

Well, I'm about to drop about \$15K of avionics into my A model. Does it make sense? No. However, over the past 8 years of owning this plane I have already spent more in maintaining/updating/improving this plane than I could ever hope to sell it for. In for a penny, in for a pound :-)

Frank Stutzman Bonanza N494B (yes, the money-pit) Hood River, OR

Good Morning Frank,

I know the feeling!

However, I have never tied the investment in gadgets to the price of the airplane. It seems to me that the equipment I want in the airplane is a function of the use to be made of the airplane.

If it is to be flown intentionally IFR (and I generally want the capability to fly my airplanes IFR) it has to have at least the minimum equipment required by the FARs for IFR flight.

Beyond that, it depends on the area in which it is to be flown and the dispatch reliability that my operation requires.

Since navigational equipment pertinent to the area in which the aircraft is to be flown is required, I consider a VOR necessary for IFR flight in the lower forty-eight.

Beyond that, it is a function of dispatch reliability. An IFR Approach Approved GPS adds hundreds of possible approaches to the capability, but if one's flying doesn't require operation to minima below VFR minima, you can get by very well with just the VOR.

Two VORs means you can legally continue if one VOR fails, so that adds tremendously to the dispatch reliability!

And so it goes! We can rather easily justify almost any expense if we decide that our time has value and that we have a need to be someplace else other than where we are.

My Stearman has a transponder and a Turn and Bank. For cross countries, I carry a handheld GPS and handheld Comm. I don't intend to fly it IFR, but if I should ever stupidly get stuck on top of an overcast or do something else dumb which puts me in

cloud, that and my handheld Comm and GPS will get me safely on the ground where I can worry about the legalities later.

Our Piper Pacer has a VHF NavComm, transponder and Loran. It rarely gets far from home and that does allow IFR flight when required, but if one radio failed, it would mean that the remainder of the flight would have to be VFR or the radio would have to be repaired prior to continuing the trip. I do have an IFR Approach Approved GPS that has been sitting on the shelf awaiting installation to replace the Loran, but it seems I never get around to sticking it in the panel!

The Bonanza has old, but serviceable, equipment that will allow me to execute any approach that is available in the US except those which require special authorization (Cat II, VNAV and such) and the Microwave Landing System.

Most of the time I could get along just fine with what is in the Pacer, but I can rationalize the need to have the rest of the stuff quite easily!

If I had an A35 or even a straight 35, I think it would have about the same equipment as the V35B.

Happy Skies,

Old Bob

[ARTICLES/20010119.074953.msg01206.tex]

Avionics Advice - Garmin Verses UPSAT**Mon, 30 Oct 2000 17:14:26**

In a message dated 10/30/00 3:35:10 PM Central Standard Time, stutzman@stutzman.com writes:

FWIW, the installation costs of a GNS 430/530 is about half of an equivalent UPSAT stack. Also the UPSAT requires a grey code converter, while the Garmin does it directly.

This is according to my radio shop (Skyline Radio at Troutdale, OR)

Frank Stutzman Bonanza N494B Hood River, OR

Good Afternoon Frank,

My favorite radio shop also touts the Garmin over the UPS stuff. But I do think that anyone who is seriously in that market should read the essay written by someone at Chief Aircraft.

It can be found at: <http://www.chiefaircraft.com/Avionics/MfgAI/ApolloComparison.html>

IF I were in that market, and I am not, the MX20 would be at the top of my list. The unit is only eight inches deep and I do believe it could be mounted in the center panel with just a small modification of the glare shield. I just don't like the idea of a moving map all of the way over in the ubiquitous Beech canted radio stack.

Happy Skies,

Old Bob

[ARTICLES/20001030_171426_msg15500.tex]

Avionics Advice - Highly Integrated or Not?**Thu, 1 Feb 2001 22:36:26**

In a message dated 2/1/01 8:52:37 PM Central Standard Time, jack-taylor@bigfoot.com writes:

Bob, what are your thoughts about having all the things in one box as in the Garmin 430 or 530. Could one failure take out the GPS, Vor and Comm? Seems like separate units would be better. Jack Taylor

Good Evening Jack,

That has worried me as well, though techies have told me some thought has been given to that concern by Garmin. It would seem there must at least be a common power source.

The big thing the 430 has going for it is price. You get a lot for the dollar with all of the stuff they have in one box. They include the annunciators and the encoder serializer making the install simpler and cheaper. Somehow, they have convinced the FEDs that the annunciators way over on the right hand side in the Beech radio stack are adequately within the pilot's primary vision.

My leaning is toward an MX-20 for my next big expenditure, but no decision as yet.

The GX-60 and SlimLine 30 look good when used with the MX-20

Happy Skies,

Old Bob

[ARTICLES/20010201_223626.msg02500.tex]

Avionics Advice and HSI Desirability**Fri, 28 Apr 2000 12:25:03**

In a message dated 4/28/00 10:08:04 AM Central Daylight Time, jtsmall@onramp.net writes:

Would you not want an HSI as long as we have VOR's, regardless of the sophistication of one's GPS and other display avionics?

Good Morning John, (And Bob Stephens too!)

For me, it is always a balance between money, panel space and what it takes to get the job done.

The HSI is, for me, a "nice to have" instrument. I can fly no lower approaches or go anywhere with it that I cannot go without it. The principal advantage is that it frees up one panel hole. It also makes for an easier instrument scan. It certainly helps with situational awareness, but that can be had for a whole lot less money with any number of very good handheld GPS units. If money were no object, the weight and space were of no concern, I would probably have one installed.

If I were looking for someplace to spend money on Bob's airplane, I would first ask if he has tip tanks. For even routine cross-country style IFR, the extra fuel can be comforting and when the weather has really turned out much worse than forecast, it is always comforting to have lots of fuel on board. When I am executing an approach to minima, I don't want to be under any pressure that says I have to get in. It's awfully nice to be able to arrive somewhere with enough fuel on board to name a good solid VFR alternate and to have enough fuel to be able to stay around the desired destination for an hour or two without having to sweat it.

If I really wanted to add some electronic toys, I would be likely to add a low cost simple resolverless approach approved GPS. However, I think I would get more operational capability from the extra fuel.

VORs and ILSs are going to be with us for a long time yet. Should the DME or the ADF in Bob's airplane fail, I would look very seriously at replacing them with a GPS. The acquisition cost of the ADF and DME are about the same as the IFR GPS. The problem is that the maintenance of a current data card adds considerably to the cost of owning a GPS. The major recommendation that I would have for any newly minted IFR pilot is to spend some discretionary income practicing partial panel instrument flying and, as everyone knows, that means with a turn needle instrument, NOT a turn coordinator!

Happy Skies,

Old Bob

[ARTICLES/20000428.122503.msg07223.tex]

Bose Headsets**Wed, 28 Oct 1998 18:39:20**

Good Evening All,

In a message dated 10/28/98 5:07:13 PM Central Standard Time, aerome@onramp.net writes:

Now, Dr. Bose SHOULD be in the aviation business with what he initially charges for the sets and subsequent service. Just my opinion, never a cost to you, anytime!

For what it's worth, I purchased the Bose headsets when they first came out. They have never needed service, but I have received several free upgrades for the sets over the years. I had one power cord failure (Cigar lighter unit) and they sent me another one immediately, no questions asked and didn't even want me to send in the old one.

I did spend something to have them upgraded a couple of years ago. It wasn't cheap, I think in the order of \$90 per headset, but they were working OK before and I really didn't notice much change after the mod except I can't hear the radar stations anymore.

Each year at Oshkosh I ask for and receive a couple of new ear pad sets free. That means that all four of my headsets have new pads every other year. Don't know how long that will last, but I am getting something for the big bucks I paid to have the early active noise canceling headsets.

So far, I'm happy!

Happy Skies,

BobSiegfried Ancient Aviator

[ARTICLES/19981028.183920.msg06399.tex]

Bose Headsets**Mon, 24 Jan 2000 20:05:02**

In a message dated 1/24/00 2:15:07 PM Central Standard Time, elivermo@krc.com writes:

I'm thinking about acquiring one of the Bose noise cancelling headsets. How is everyone's experience with this unit? The one I'm considering would have a battery pack.

Ed Livermore

Good Evening Ed,

Just to add another datapoint, I have the antique version of the Bose. They are larger and heavier than the new X version. I have been very pleased with the performance. Unfortunately, they are not convenient to use in other aircraft due to the special plug requirements, but with the adapter hard wired, they are great! Our youngest son bought the new ones after trying my antiques. He likes the performance, but feels that the batteries are a pain. He plans on adding ships power capability soon.

Happy Skies,

Old Bob

[ARTICLES/20000124.200502.msg01617.tex]

CIR-10 ELT Battery

Fri, 21 Nov 1997 10:14:28

Hi Greg

In a message dated 97-11-21 05:39:10 EST, you write:

Any suggestions where I might locate one? The unit is a CIR-10. If I have to pay \$110, I'll be better off just replacing the unit, any recommendations for replacements if I need to do so?

Try Artex Aircraft Supplies, Inc. - P.O.Box 1270 - Canby, OR 90173 - Phone: (503) 266-3959 or (800) 547-8901, This is where I have been obtaining my batteries recently. They make them up and ship when you call and they have an excellent product knowledge. If anybody can supply one, they can.

Yours,

Bob

[ARTICLES/19971121_101428.msg02453.tex]

DG - Degree Hash Marks**Sat, 12 Feb 2000 09:50:32**

In a message dated 2/12/00 1:42:27 AM Central Standard Time, johnmills@sprynet.com writes:

R.C. Allen has 2 degree pitch markings. jm

George Wolf wrote:

I considered that when I put a new one in several years ago. I finally decided to get the one with the small hash marks (which is Sigma-Tek if I remember correctly). The reason was I felt they would make IFR easier to fine tune. I think it did.

Good Morning All,

Many, many years ago in a land far, far away there was an airline that was changing over from those nice big stable AN gyros, which read like a proper compass, to those funny looking little tiny three and an eighth inch ones, which had a funny looking vertical card, and on which all the numbers moved backwards.

Now there was major dissension in the land and turmoil was rampant. Some felt the numbers were too small, others liked the smaller scan distance which that allowed. Almost everyone complained because the thing turned backwards and didn't look like a real compass, but there were a few who felt the flat layout might help some of those new folks gain the "big picture" (I think the current buzz word for that is something like "situational awareness").

It came to pass that the powers that be decided the new flux gate directed gyros were going to stay.

Dissension continued though, as the unwashed masses continued the argument as to whether the new little bugger ought to have a hash mark every five degrees or a major mark each ten degrees with a minor mark each two degrees.

The argument over which configuration allowed the greatest precision of flight guidance filled the cockpits and dispatch areas with heated exchanges. Written materials were distributed and scientific evaluations supporting both positions were rampant.

In order to quell the unrest, the powers that be decided to poll the users and mark the instruments in the manner chosen by the majority of those who responded to the poll.

There were fifteen hundred persons eligible to vote on this momentous decision.

Sixty-six and two-thirds of those responding voted in favor of the five degree markings.

You guessed it, There were three voters!

Happy Skies,

Old Bob

[ARTICLES/20000212.095032.msg02801.tex]

DME Desirability**Fri, 2 Mar 2001 10:18:17**

In a message dated 3/2/01 8:38:57 AM Central Standard Time, msobota@phs-net.com writes:

My partners and I have decided to leave the DME in our Malibu for this reason even though we are having dual Garmins and an Avidyne installed. I opted for the clean look in the Baron getting rid of the DME. I doubt I will miss it much.

Mike

Good Morning Mike,

My feelings exactly. If you already have a good modern light weight DME and there is no weight or space problem, why not leave it installed? The same goes for an ADF. They have almost no value on the used market and I still like to listen to the AM stations occasionally!

For flight outside the US, there are some countries where the DME, ADF or both may be required by the local authorities.

However, for those aircraft owners who are starting from scratch, it is hard to justify spending any money for an ADF or a DME if the aircraft will be flown primarily in the USA.

For many of our group, the cost is not a factor, for others of us, it definitely is!

Even for those who can afford the extra equipment financially, there are considerations of space, power and weight.

It would be nice if Garmin could address the problems that do occur when trying to get by with "only" a single radio such as a 430 or 530.

I think all of us would be interested in hearing of any experiences you have as to how well you could get by with just one of those radios, and no other, in your panel.

Why don't you try a VOR DME approach and let us know how it works? Does the 430/530 give you distance information or does it just use the intersections directly?

Inquiring minds want to know!

Thanks and;

Happy Skies,

Old Bob

[ARTICLES/20010302_101817_msg05035.tex]

DME Desirability/GPS Replacement for DME**Wed, 28 Feb 2001 13:40:02**

In a message dated 2/28/01 12:09:08 PM Central Standard Time, sw049@hotmail.com writes:

Bob: Please help me - is this a case for having a "real" DME in the cockpit?
Steve

Good Afternoon Steve,

Put it this way. I wouldn't go out and buy a DME today.

BUT! If you have a fairly modern light weight one already installed and can afford the weight and space, why not leave it in?

On the other hand, if you have one of those eighteen pound NARCO antiques, I would get rid of it just as soon as I could afford an IFR approved GPS.

The IFR GPS can be used in lieu of the DME for all distance functions in the US National Airspace System. There really is little or no need for a DME if you have an IFR approved GPS

Since many of us are still getting along with only one IFR approved GPS, there are times when it is being used in lieu of a DME that you might also want to use it for some other purpose.

I find that I can generally use a little forethought and planning and still get everything out of the GPS that I want.

The decision by Garmin, King (General Electric) and UPSAT to place the location of the localizer associated DME transceiver sites in their database makes it even more convenient to eliminate the DME than it was before.

I wish I could get the folks at Trimble to do it as well. So far, they have refused to do so. I don't know what is happening to the Northstar. Any Northstar folks that would care to comment?

The distance derived from the GPS can still be used even though the DME site is not in your database. The method is listed in recent editions of the AIM. It takes some math, but it is legal. AOPA has a website explaining it as well.

Check it out at:

<http://www.aopa.org/whatsnew/newsitems/1999/991213gps.html>

If you have a Garmin, King/GE or UPSAT, the procedure is no longer required, but it is still available to the rest of us!

Any help?

Happy Skies,

Old Bob

[ARTICLES/20010228.134002.msg04834.tex]

DME Hold Switch/Dual GS**Thu, 20 Jul 2000 16:28:39**

In a message dated 7/20/00 1:31:23 PM Central Daylight Time, EChauza@aol.com writes:

Question 1—I have a DME switch that has a "Hold" position between the "Nav1" & "Nav2" switch positions. What does it do and how do I use it?

Question 2—I have 2 Collins CDI's with both having glideslope needles. Both are electrically tied together to 1 glideslope receiver on the Nav 1 radio. Was there a reason why Beech wired it this way?

Good Afternoon Ed,

The first one is easy, If you want to leave the DME on some station other than the one you need to navigate with, just select it in the normal manner on one or the other as appropriate. Then, switch the selector to hold. The DME receiver will remain selected to the last one that was channeled. If you then switch the selector to one or the other of the Nav sets, the DME will be channeled to match that frequency.

A common time when this is required is at the locations where a nearby VOR DME is used as the distance measurement for an ILS. You first select the VOR with the DME switch set to the same unit on which you are selecting the VOR. Once the DME is selected and identified, you switch the DME selector to HOLD, then tune the Nav unit to the ILS. All that the Nav 1, Nav 2 or Hold switch does is determine where the DME picks up the ground for it's tuner. Nav 1 and Nav 2 go to the respective sets. The Hold position is just open so that the set will not channel.

For the second I have no idea what was in the minds of the Beech folks unless they just figured it would be available in the event of failure of the number one instrument. Sounds like quite a stretch to me. I really like having full dual glideslopes, indicator and receiver. We fly them so close to the ground it is nice to have the cross check.

Happy Skies,

Old bob

[ARTICLES/20000720.162839.msg11162.tex]

Fluxgate Valve Mounting**Thu, 4 Jun 1998 17:40:26**

Good Evening All,

My fluxgate valve is mounted in the left wing. It had been in the wingtip but when the wing tip tanks were installed, the end tip rib was cut open to allow the unit to be installed on the bottom skin and then the rib was repaired (with very lousy workmanship I might add) thus making the unit non servicable. There was no way to adjust it and no way to get it out without unriveting the crummy repair and bending the rib again. I did disassemble the repair, take out the fluxgate and make a proper repair of the rib.

After that I made a flush patch type of plate to fit in the bottom wing skin on which I mounted the sender. I used no steel fittings or screws. Everything is either brass or aluminum including some homemade nut plates. It has been working fine for the last eight years and is very easy to adjust should the need arise. All that has to be done is to take out eight brass screws and drop the unit down about six inches where the adjustment can be made. I followed the directions given by Allied Signal as to mapping the area with a small compass and there was some interference from some of the wingtip wiring. I relocated that wiring to the leading edge instead of the factory position and the area became quite magnetically clear. I suppose it could be considered a minor alteration but I did list it on a 337 along with the repair I made to the tip rib.

Mine is located six inches inboard of the left tip rib and four inches forward of the rear spar.

I have seen some installations where there has been an access hole cut in the top of the wing and the unit installed on the bottom skin directly below the cutout. I suppose that would be a little easier to adjust but I didn't want to make the patch in the upper surface.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980604.174026.msg02983.tex]

Ground Station License

Thu, 25 Jun 1998 13:17:15

Good Afternoon John,

In a message dated 98-06-25 12:46:43 EDT, you write:

I know you have an FCC licence for that ground station, do you not?? Be careful out there!

Believe it or not I do! Cost me \$117 for a ten year license. That is one reason I sent the set to Narco. They had to certify that the tolerance was within the requirements for a ground station which are different than for the airborne use.

Happy Skies,

Bob

[ARTICLES/19980625_131715.msg03357.tex]

King KT-76C Transponder**Thu, 13 Jul 2000 21:14:46**

In a message dated 7/13/00 2:16:48 PM Central Daylight Time, epoule@scoot.netis.com writes:

It's a nice step up, but not that big of a deal. I definitely wouldn't trade in a working 76A plus \$1200 for one. But, my 76A was dead and they had the 76C in stock, and it was a direct plug-in, so I did it.

Good Evening All,

I looked at the 76C when it first came out and decided not to buy it on the recommendation of my electronics guru.

It is his opinion that the unit is not as well built as the earlier King equipment. I was told that they have had a lot of service and warranty repairs on the C. In fact, it was his recommendation that if my current unit should fail in a manner that made it uneconomical to repair, I would be better off with a used 76A.

I was told that the 76C is not the only King equipment that has low quality. The same is true of the newer KX-155s. It seems the older ones of five or six years ago are great, whereas the latest are a piece of junk.

For What It's Worth!!

Happy Skies,

Old Bob

[ARTICLES/20000713_211446.msg10902.tex]

LORAN as Backup Navigation System**Mon, 26 Jan 1998 13:30:06**

Good Morning Al (ADM)

In a message dated 98-01-26 11:17:57 EST, you write:

Sure is interesting! Also interesting was AVWEB's report indicating that LORAN will probably not go away, based on gov't agency recommendations. I've a relative that's pretty high up and active with DoD and he doesn't see Loran going away either. Maybe its time to grab one real cheap to use for a few years.

Could be! My problem with the Loran is that there are NO approved Loran approaches available to us. I understand that to get them approved would take a modification to the transmitting site and either different receivers or at least modified ones.

The only use currently approved is for enroute. I know also that my old IFR enroute approved Loran (1992 vintage), even though well installed with my airplane properly bonded and grounded, always lost signal in heavy precipitation.

I do not feel Loran is the proper back up. I would be much more inclined to feel comfortable with a base of widely spread VORs for backup enroute and some high precision ILSs at strategically located sites.

The current TSO C-129 GPS sets are approved for non-precision approaches at many more fields than any other type of approach.

The "enroute only" TSO C-129 sets are not much more expensive than the hand helds. Chances are they are cheaper than it would be to have a Loran updated to approach configuration even if that should occur.

I think the Loran should be allowed to die! It was great when there was nothing better, but there is a cheaper and better alternative available today.

I personally have confidence that our techies will solve the problems that GPS has. I do, however, feel that officialdom may have some problem in getting everything and everybody on the same track for some time to come. Consequently some sort of backup for IFR flight seems reasonable at least until the vast majority of people decide to embrace the system.

Until the majority of us go ahead and start using the system, the problems inherent therein will not be obvious. No amount of testing and field trials will duplicate the use the equipment will receive at the hands of we everyday users.

Happy Skies,

Bob Siegfried

[ARTICLES/19980126.133006.msg00528.tex]

LORAN as Backup Navigation System**Tue, 21 Jul 1998 09:09:39**

Good Morning All,

A few days ago, AOPA issued a press release concerning the retention of Loran. A portion is repeated below along with some of my comments.

What say all of you?

FREDERICK, MD - High-ranking managers from FAA, the U.S. Coast Guard and the Department of Transportation have decided the Loran-C navigation system should continue operation beyond the year 2000, supporting a long-standing AOPA position.

I know this brings cheer to the hearts of many, but I wonder if it isn't a harbinger of potentially very bad news for general aviation pilots.

Maintaining the current Loran system for a few years till the public gains more confidence in, and becomes adequately equipped with some form of space based navigation does little harm. I still think that money could be better spent elsewhere, but such is life.

The major problem concerns Eurofix.

It is my understanding (correct me please if I am wrong) that a major influence in the decision to retain the Loran system was pressure from the european community to retain the Loran system while they attempt to develop the Eurofix Loran/GNSS.

If the Loran system were to be shut down on it's original schedule, the Eurofix would be a dead deal.

Eurofix will provide the integrity and differential signal for the type of navigation that it is hoped WAAS and LAAS will provide.

So what is wrong with that?

The current Loran processors will not provide that capability. A minimum of a new processor will be needed along with a much more sophisticated antenna system, the so-called "H" antenna. It is much larger and more expensive than the current Loran antenna. In addition, much more extensive shielding and bonding of our aircraft would be required along with mandatory addition of a plethora of clothes grabbing and skin ripping static wicks.

As of this time, the proponents and potential manufacturers of this system have not been able to make it work to the level necessary for the proposed use. They hope to be able to solve the problems in the future!

It appears to me that this another of the French inspired digs at the Colonies. It makes as much sense for general aviation as did the METAR.

If Eurofix becomes the integrity and differential provider for GPS or another space based navigation system, it will be required for any IFR flight and will at least double the cost of operating in the IFR system.

WAAS and LAAS may or may not be the answer, but they are at least capable of much lower cost, lighter weight and less obtrusive addition to the aircraft. Space based ultra high frequency is the way to go. Low frequency is antique and should be dumped!

AOPA was hoodwinked on this one.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980721_090939_msg03796.tex]

Laser Gyros**Sun, 30 Jan 2000 13:52:07**

In a message dated 1/30/00 11:59:42 AM Central Standard Time, jtsmall@onramp.net writes:

Old Bob, what exactly are the laser gyros? Do they have a place in GA at some point? Do you see a day when all the instrumentation will be glass feed by electronics ... no mechanical instruments? If so, are you planning to move in that direction?

Thanks.

I think my answer to all of those questions except the first would be absolutely!

They are light, simple and reliable. There have been some that have been touted as being in the one thousand dollar range at current production rates. With high production they should drop in price at the rate computers have dropped. Andrew Corporation was developing one, but they sold it off a year or so. I asked a friend about it and he said the company they sold it to was still working on it, but there was nothing to report.

Hopefully some of our more technically knowledgeable participants will chime in with corrections on my feeble layman's description, but here goes!

The laser gyro works by sending a laser signal/light around a circle or triangle of mirrors and back on to itself. If the ring remains stationary, when the light is back along the original signal, it will still be in phase, but if the ring has been rotated, the signal will be out of phase by an amount that is relative to how far the ring has been rotated. With the two signals beat against each other the resultant frequency can be measure and related to rate of turn. You use one in each plane and all of the axis are covered. This stuff is passing through the ring at the sped of light and the rings sometimes have a total length of six inches or less. How they can measure such things equates to the same magic they use to figure a position via satellites!

Simple and elegant! I don't know if anyone is using the mirror system anymore. They may all have gone to fiberoptic rings. Anybody know?

Happy Skies,

Old Bob

[ARTICLES/20000130_135207_msg02080.tex]

Laser Gyros

Mon, 31 Jan 2000 14:29:40

In a message dated 1/31/00 12:35:29 PM Central Standard Time, johnmills@sprynet.com writes:

What makes the rings rotate? What axis do they rotate around? Are they floating loose? jm

Good Afternoon John,

Hopefully Jeremy will answer the magic questions, but I will try to get started on a clarification.

The ring laser gyros are mounted to the aircraft, generally all in one box in the electronic equipment bay. The rings don't move in relation to the aircraft at all. Only the Laser light is in motion and it just goes around that ring, then back out to be evaluated. One "gyro," or ring, is in a plane perpendicular to the yaw axis, one perpendicular to the plane of the roll axis and one perpendicular to the plane of the pitch axis. When the aircraft is yawed, or whatever, the length of time it takes for the light to get around the circle or "ring" is affected. I believe that on the early ones that used mirrors, the light was split by a prism and one half went one way and the other half went the other way around. When they got back together again, an analysis of the relationship of one half signal to the other half signal would be made. If they were both the same, no motion about that axis occurred. If there was a change it would be relative to the direction and speed of that rotation. All measured with Magic of course!

I understand that all of the newer units use a fiber optic wave guide and not mirrors. The basic principle should be the same though. The thing ends up with no moving parts and nothing to wear out!

I have seen a picture of one made for an automotive use that was the size of a baseball! Hardball no less!

There was a Japanese company that proposed using them for an INS style unit for automobiles. It was expected to sell for around a thousand bucks retail about ten or twelve years ago. The advent of GPS has pretty much killed the idea for the mass auto market, but there are still some low cost applications being investigated. If they ever find a mass market use, I am sure someone will adapt it for GA use.

There are some in the industry that are pressing for a requirement that some sort of Inertial Reference Unit be required before GPS can be used for primary and not just supplemental navigation. If that happens, and I hope it doesn't, there will have to be a low cost unit developed or we won't be flying IFR!

The IRU on the new airliners provides the data for all sorts of things besides the flight instruments. On the 767 it provides data to an indicator that tells the captain how fast the nose gear is traveling when on the ground. It determines how hard the brakes are

applied during automatic braking events, it navigates the airplane around the world for those unfortunate souls who aren't equipped with GPS and I am sure dozens of other things which I have forgotten or never knew.

Did I confuse things even more?

Happy Skies,

Old Bob

[ARTICLES/20000131_142940_msg02163.tex]

Laser Gyros**Mon, 31 Jan 2000 18:15:56**

In a message dated 1/31/00 4:31:32 PM Central Standard Time, johnmills@sprynet.com writes:

Old Bob/Jeremy: This is an intriguing piece of technology. Sounds as if it would need some high precision manufacturing techniques. No wonder it's expensive. Thanks for the information. jm

Good Afternoon John,

I wonder just how difficult that high precision manufacturing process really has to be?

I remember when Bell Labs first came out with transistors. They were a lot more expensive than tubes, but the products that could be built using them were so small and useful that industry went ahead and used those expensive oddities anyway.

Look where the world has gone since then!

If someone can just think of a use for the ring laser gyro that would make them one-millionth as ubiquitous as the transistor they would likely cost less than a buck or two in no time flat!

The one thing my old age has done for me is give me great faith in what industry can do if the need is great enough.

Happy Skies,

Old Bob

[ARTICLES/20000131_181556_msg02176.tex]

Marker Beacon Operation

Wed, 17 Jan 2001 09:44:29

In a message dated 1/17/01 8:13:08 AM Central Standard Time, iflyv35@hotmail.com writes:

HELP! I'm a little confused and would like for someone who understands this to please clarify it. I would think the OM, MM, and IM transmitters would be on different frequencies in order for the MB receiver to distinguish which marker you are flying over. If this is true, and 75MHz is the frequency for the OM transmitter, what is the frequency for the MM and IM transmitters? If you adjust the tuning slug in the antenna to peak on a 75MHz signal (for the OM), how does this affect the receiver's sensitivity for the MM and IM signals?

Good Morning Roger,

I hope that Ron Koyich or one of the other more electronically knowledgeable folks will give a better answer, but my feeble attempt follows.

The Marker Beacon is a 75 Mhz receiver. The carrier is modulated at what is basically an audio frequency that is different for the OM, MM and IM.

Different tones are recognized by a series of filters which then light the appropriate light.

Incidentally, the ILS localizer is also a "tone" differentiated signal. There are two "audio" signals transmitted. One is at 90 hertz and the other at 150. (These figures could be thousands of Hertz off as I am not much of an electronics techie, but the principle still applies.)

The signals are transmitted over a set of very highly directional antennas located such that one is on each side of the approach path.

The receiver has appropriate filters to send one transmission to the "Blue" side and the other to the "Yellow" side of the Course Deviation Indicator.

The localizer needle is an indication of the relative strength of the two signals.

The needle shows which signal is received the strongest. When the strength of both signals is equal, the needle is in the middle.

Basically, it works just like the old Four Course Radio Range, except that the electronics do the listening and evaluate the signal strength of each transmission instead of the pilot doing it by ear.

The system that Jimmy Doolittle used was a set of reeds which would vibrate at different "audio" frequencies. When both reeds were vibrating equally, he was on course.

There really is little that is new!

Happy Skies,

Old Bob

[ARTICLES/20010117_094429_msg01071.tex]

Northstar CT1000**Tue, 22 Feb 2000 21:59:05**

In a message dated 2/22/00 6:09:44 PM Central Standard Time, jds@oklahoma.net writes:

Anyone have any experience with the new Northstar CT-1000 (link below), or know anything about it? It looks interesting, but probably expensive. I'm trying to decide whether to try to link my IFR approach-certified Northstar M3 to something like the CT-1000, or to get a 430/530 or even a stand-alone Garmin GPS 295 for redundancy and back-up.

Good Evening Joey and All,

I have been watching in the hope that someone might have actual "hands on" experience with this unit.

I have hope that it, or something similar, will become available which would make it practical to utilize the JeppView CD for charts instead of the paper ones.

I looked at the unit at Sun n' Fun last year, but was disappointed in the size. The Jepp charts end up about half their normal size and that is tough for my old eyes. When I am doing training or taking my IFR proficiency checks, I normally print my approach plates from the JeppView CD so that I can get oversize plates. It sure is a lot easier to read. I hate to go to anything smaller. The price is a little steep for me as well.

I haven't evaluated the use of the unit for any other purpose though.

While I am discussing the JeppView disc, I find that it takes a lot longer for me to call up and print an approach plate than it does to get it out of the book, but I sure would like to be able to quit doing the revisions. I might miss checking all of the changes, but the savings in time would be great. Anybody gone to the disc in lieu of paper?

I also wonder where I would put the thing. My Garmin GPSMAP 295 still takes up about all the space I can spare and I think that screen is too small to be of much real use. It is fun to play with, but hardly a necessity.

I too would like to hear what others think about the CT1000.

Happy Skies,

Old Bob

[ARTICLES/20000222_215905.msg03377.tex]

Panel Configuration and Clock**Thu, 11 Nov 1999 16:28:28**

In a message dated 11/11/99 2:08:12 PM Central Standard Time, newmanb@erols.com writes:

Finally, Astrotech and Davtron both offer wheel mount chronometers, and panel mount as well. Is either a better choice than the other? Let me know what works, and what doesn't work, for you.

Good Afternoon Bob,

I would lean toward installing the clock in the control wheel. There is so little real estate on the panel, it seems a shame to waste it on a clock!

I also think that timing approaches is a rapidly disappearing requirement. All of the new RNAV style of approaches are being drawn without the need for any timing at all.

This will sound a little facetious, but if the approach plates are getting hard to read, you might consider using the JeppView system. You then print those plates you want and they are almost twice as big as the normal plates. Much easier to read.

I note that you still have the VOR heads mounted below the floating panel as the factory originally mounts them. I have always moved mine up to the floating panel and find that arrangement much more to my liking.

Happy Skies,

Old Bob

[ARTICLES/19991111.162828.msg10493.tex]

Panel Construction

Sun, 7 May 2000 16:56:57

In a message dated 5/7/00 1:34:26 PM Central Daylight Time, hgp@madaket.netwizards.net writes:

Is it OK to relocate a gyro instrument to a panel that doesn't have shock mounts?

Will the life of the instrument be affected?

Thanks.

Good Afternoon Howard,

No problem at all. Many aircraft have the gyros mounted in a non shock mounted panel.

I think I mentioned this before, but here goes any how!

Eastern airlines ran a test when they were flying the Martin 404. They found that, on the 404, instruments mounted on a panel that was not shock mounted had a longer service life than the same instruments mounted on the same panel with shock mounts.

Go figure!!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/20000507.165657.msg07770.tex]

Panel Construction**Mon, 8 May 2000 00:32:06**

In a message dated 5/7/00 11:20:05 PM Central Daylight Time, farrarwd@tca.net writes:

Say Bob, What airline did you fly for? Eastern? Did you know Howard Weant from Atlanta?

Good Evening Will,

No, I flew for United Air Lines from 1951 to 1989. The story about the experience Eastern had with the shock mount panels in the Martin 404 was interesting enough that it was published in Aviation Week or something similar.

It seems that the pilots had complained that the instruments were hard to read in turbulence. They decided to try them solidly mounted. Not only were the instruments easier to read, but they lasted a lot longer so the whole Martin fleet was changed to solid mount.

Happy Skies,

Old Bob

[ARTICLES/20000508_003206_msg07801.tex]

Panel Construction**Sun, 24 Dec 2000 17:29:00**

In a message dated 12/24/00 4:05:15 PM Central Standard Time, iflyv35@hotmail.com writes:

Have you ever seen a rigidly mounted flat panel installed in place of the formed floating panel? Eliminating the floating mounts at the bottom would also give more room for the two rows of 3-1/8" instruments.

Good Afternoon Rodger,

Yes, I have.

I think the shock mounts are another thing whose time has passed. If I were doing a new panel today, I would make it rigid and flat. You might even be able to accommodate three rows of four instruments each!

I would incorporate removable sections though. I like to be able to take a relatively small section out for maintenance purposes.

I have the floating panel in my current airplane setup so that floating panel with all components intact can be removed in about five minutes and reinstalled in about ten. The pneumatic system has "B" nuts, the pitot and static is attached with Poly Flo threaded couplings and is arranged so that only one line of each has to be removed to remove the assembly. There is a sixty pin "Cannon" plug for general electrical power and the usual connectors for the VOR, HSI and such.

It requires that I disconnect the 60 pin plug and thirteen other quick disconnect plugs and fittings to remove the panel.

Works like a charm and gives excellent access to the area between the firewall and the instrument panel.

Happy Skies,

Old Bob

[ARTICLES/20001224_172900_msg18292.tex]

Panel Construction**Wed, 28 Feb 2001 15:19:12**

In a message dated 2/28/01 1:15:37 PM Central Standard Time, doug@rds.com writes:

I think that's the closest to my ideal panel I've ever seen. Too bad I can't afford it. :-)

What do the rest of you think about replacing the floating and center panels with a single, flat piece?

...doug

Good Afternoon doug,

I like the idea of making new panels, but I would still have divisions to make it easier to take out in sections. I currently have my floating panel setup so that it can be removed, with everything still installed, in less than five minutes. It takes about ten minutes to put it back in.

That setup makes for much easier access to the space between the panel and the firewall.

I also wired up my radio stack with a cord long enough that the entire stack can be taken out and set on the wing with all of the antennas and leads still connected. Between that and the removable primary panel, maintenance is a snap.

I would strongly suggest that any new panels be made with such a capability in mind.

Happy Skies,

Old Bob

[ARTICLES/20010228_151912.msg04852.tex]

Reliability of Avionic Computers**Wed, 23 Feb 2000 14:31:06**

In a message dated 2/23/00 9:33:11 AM Central Standard Time, jtsmall@onramp.net writes:

Another issue ... would you trust your approach to a computer? That's all it is, a reconfigured laptop. How many times a day do you reboot Windows? Give me a paper chart anyway.

Good Afternoon John,

You are posing a lot of questions in the statement above. I trust my approaches to a computer almost every time I shoot one. The idea is, how reliable is the computer being used or what is the potential for failure? The GPS approaches are supposed to be evaluated based on an undetected error of position being possible no more often than once in every ten million selections or less. That is the number that is used in the approval evaluation.

As to the reliability of the paper chart, what would you do if it blew out the window? Or fell to a point out of reach? Are one of those possibilities more or less likely to happen in one out of ten million operations than an error in the electronics?

If the paper or electronic data is lost, I figure I would do the same thing I would if the airborne or ground guidance capability was lost. I would go to my alternate!

(There is the possibility of getting the information from another source via radio communications. Whether or not this would be an acceptable procedure is something to be discussed at a hearing. I know of no one who has gotten in trouble for doing it, but as always, it depends!)

Now I haven't seen a product which I would choose to use in lieu of paper charts, but I still have hope that something will come along.

The FAA has not been building new approaches at the five hundred per year rate that they had planned and some of the approaches they have drawn replace others that are canceled. Even so, there are still a lot of new pieces of paper to put in the book every two weeks.

When I retired eleven years ago, a full US Jeppesen coverage could be carried in four two inch binders. I currently have twelve two inch binders for the full lower forty-eight coverage. They are not quite full, but getting close.

I don't think paper will be practical much longer.

Either the data will have to be transferred directly to the equipment for each approach or we will have to find a way of displaying it reliably enough to utilize it for normal operations.

My current thoughts are leaning toward using the JeppView (or something similar) with

the onboard capability of reading and printing the charts.

I am a basic computer illiterate and have to rely on you computer wise folks on this forum to locate and evaluate the right equipment for providing that capability.

One thing I already know is that just calling the pages up on the JeppView takes a lot longer than it does to flip through the pages of a binder to find the appropriate plate.

There is a long way to go!!

Happy Skies,

Old Bob

[ARTICLES/20000223_143106_msg03434.tex]

Required Equipment**Sun, 9 Aug 1998 17:54:35**

Good Afternoon All,

With all of the talk concerning the price of access to the system I thought perhaps I might try to clarify my thoughts somewhat.

I am encouraging all of you who can afford to and/or have the need for a GPS to go ahead and purchase the one of your choice. The current crop are all very nice and have tremendous potential, BUT does every one NEED one?

If you are going to fly IFR in the National Airspace System, you are required by regulation to have radio gear pertinent to the area in which you intend to operate.

That has been interpreted to mean that you must have a VOR. No DME, no ILS, no ADF, no marker beacon. Not even a Transponder is required! Just a VOR and communications capability pertinent to the route.

Adding a Transponder will allow operations in almost all of the airspace in the lower 48 states.

There is no requirement that you have two VORs or two comm units.

Would that minimum amount of equipment add much to the operational capability of our aircraft?

I think just the ability to operate in the IFR system adds a tremendous amount of capability and flexibility to the GA airplane as a safe and efficient transportation tool.

However just being able to fly VFR is OK too IF you can adjust your schedule and your temperament to maintain proper safety while flying VFR.

Your destination airport does not have to have an IFR approach in order for you to file IFR. If it does have an IFR approach, you do not have to have equipment to execute that approach to file it as a destination.

If there is no approach available or you do not have the equipment necessary to execute the approach available at your destination, you must file an alternate regardless of the weather forecast for your arrival.

If you can get to VFR conditions either by flight at the minimum enroute altitudes or at a minimum vectoring altitude, that is all that is required.

It would seem that good preflight planning for operations with that minimum equipment should be the selection of an alternate that you would be able to find via DR procedures and weather at that alternate good enough that you would be able to find it with out exposing your flight to the potential of controlled flight into terrain.

Adding equipment beyond that minimum should give us greater flexibility in our oper-

ations, greater reliability or both.

If we do a good job of flight planning so as to stay within the limitations of our equipment, the safety of the operation should not change either positively or negatively with the addition of more equipment to our aircraft. More equipment just allows more possibilities.

A very high percentage of IFR rated pilots use that IFR capability primarily for flight through adverse weather encountered enroute and do not plan on executing approaches to anything much below VFR local conditions.

For that type of operation, the single VOR, single Comm equipped airplane is more than adequate. Adding a handheld GPS and a handheld Comm provides a very safe and usable transportation machine.

If your lifestyle and/or your personality requires you to arrive at a preplanned destination with a slightly higher degree of reliability, additional funds can be spent to allow the aircraft to have a higher capability of meeting those schedules. The additional cost can be almost as high as you want it to be!

My ego drives me to be able to execute an approach to an airport any time there is an approach there to be executed and I have therefore tried to keep my airplane equipped for most any eventuality. That has required the expenditure of a considerable percentage of my disposable income. I would like to have CAT II and CAT III capability but that is beyond my financial resources so I have had to pass.

Were the expenditures worth it? Probably not, I rarely have to be anyplace at any set time. I guess I still like the idea of making "schedule with safety".

So what is the point I am trying to make?

Analyze your own operation and purchase equipment as appropriate to your lifestyle and your individual satisfaction.

You can gain a tremendous amount of operational flexibility for some very small expenditures.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980809_175435.msg04159.tex]

Sandel HSI**Tue, 23 Mar 1999 12:30:49**

In a message dated 3/23/99 11:09:11 AM Central Standard Time, Mavitor@aol.com writes:

If I didn't already have it installed, I would not get one. I would put the \$ toward a slaved HSI.

Good Morning Mike,

If you are seriously thinking of an HSI, don't fail to look at the Sandel. AVweb gave it rave reviews. By the time you bought the full KCS-55 system the price would be in a range where the Sandel would be competitive.

It evidently can serve as the annunciator and control device for whatever IFR GPS you choose and will give RMI functions for an ADF, VOR or other antique equipment that might be in your airplane. I don't have any idea how good the moving map function is, but I plan on looking at it when we are at Sun 'n Fun.

If it weren't for the extensive rewiring necessary for the installation, the price would be quite competitive.

Were I starting a modern panel from scratch, it would definitely be on my list of things to consider and I am an old retired guy on a limited income. That means I'm CHEAP.

Happy Skies,

Skinflint Bob

[ARTICLES/19990323.123049.msg03200.tex]

Sandel HSI**Sat, 29 Jan 2000 23:56:17**

In a message dated 1/29/00 6:34:44 PM Central Standard Time, grahamh@gte.net writes:

Do you know what the new Sandel electronic HSI uses? I assume this is what everyone is referring to when they describe an "electronic HSI". An external gyro? Or a built in electric or vacuum gyro?

The Sandel has the capability of using most of the gyros that are currently available in the market place. I know of a couple that are fed by a KG102A, the same unit used in the KCS-55 system. I have been told that there is a Century unit which will work as well. I would imagine that various Collins and Honeywell stuff would work as well. I don't believe Sandel currently has a device of their own available to provide the required stabilization.

The KCS 55A that I have is an all electric system.

The Sandel is just a unit that provides a place to display all of the information which it derives from other sources. A neat unit, but one that contains no sensors of it's own.

Most of the current aircarrier aircraft have no gyros of any kind in the instrument panel. (except maybe for the standby horizon)! Somewhere in the belly or elsewhere there is a unit generally called a Three Axis Data Generator. That provides all of the data which is presented on the glass or mechanical instruments on the panel. Some of the TADGs have mechanical gyros and others use various forms of Laser gyros. Either with mirrors or light guide devices for the Laser

The Sandel is a step in that direction for we GA types.

Happy Skies,

Old Bob

[ARTICLES/20000129_235617.msg02045.tex]

Sandel HSI**Mon, 1 May 2000 11:29:02**

In a message dated 5/1/00 9:31:48 AM Central Daylight Time, swo49@hotmail.com writes:

Bob: Thanks for your valuable info. Saving a hole in the panel is good, also the stability of the direction information is good. I wonder if the Sandel electronic HSI does the knob turning automatically or not (afterall it is a computer controlled device). The auto-slewing is supposed to do something like the GPSS device, only "better" - I am not sure what that means. Anyone know? Steve

Good Morning Steve,

This is mainly supposition on my part, but I rather doubt the Sandel does any computation or modification of the signal.

It is my understanding that the Sandel is primarily a presentation device which takes the data from several sources and presents it in a very small space. It does have the capability of combining an ADF, VOR or GPS bearing with a signal from a compass source so as to derive an RMI style indication on the HSI. The GPSS takes additional data beyond the raw displacement information and uses it to smooth the process for the autopilot to follow the course. In order for the GPSS to do it's thing, a string of information called the ARINC 429 label 121 Bank Command and Label 312 Groundspeed data must be provided by the navigation source. Without that data, all any device can do is provide an algorithm, based on past experience, in an effort to smooth out the intercept and tracking capabilities. That is what all autopilot manufacturers have always tried to do.

The 429 stream has been used in the past by sophisticated air carrier style autopilots.

The use of a GPS navigator has provided the opportunity for S-Tec to build a device to provide that capability for we light plane types. It probably works better than the stuff we used in the high priced arena.

I have reasonable confidence that the Sandel allows us to have an HSI presentation without the necessity to twist the knob while following a GPS signal. If you have no HSI and have a resolverless GPS, there is no need to twist the knob either!

Buying the Sandel is rather like buying a KI-525 indicator. It is of no use without the compass, ADF, VOR and all the rest to provide the data for it to present.

Any help?

Happy Skies,

Old Bob

[ARTICLES/20000501.112902.msg07406.tex]

Sandel HSI - Bulb Failure**Tue, 23 Mar 1999 16:58:22**

Good Afternoon Howard,

In a message dated 3/23/99 3:10:44 PM Central Standard Time, you wrote:

My only concern with the Sandel is that you're SOL if the bulb burns out, sort of like the bulb burning out in your projector in the middle of a presentation.

I guess it depends on how many other things you take out when the Sandel is installed and how you conduct your flight.

On my airplane, I would still have the heading information on my KR-87 ADF indicator which is slaved to the flux valve. The GPS would be giving me the track made good. The VOR, ADF and GPS all would have their own presentations. The annunciator functions would also be merely repeating information available in another form elsewhere on the panel. Even the autopilot and coupled approach functions would still be available. My second VHF NAV set has both the localizer and a glide slope so they could be used to monitor a coupled ILS in the normal manner. I don't have a moving map right now anyway, so? Doesn't seem like it should be anymore than a distraction!

On the other hand, why would one need the instrument in the first place!

I guess it is just one of those nice to have things that are mainly an aid in our situational awareness quotient.

Sandel says the bulb has a 400 hour life and they suggest replacing it every 200 hours. I think that if I had one, I would replace it on an as needed basis. Just like the landing light.

For most of us, it would be pretty rare that the loss of the instrument would be anymore than an inconvenience.

I wonder if you can replace the bulb in flight.

I don't think most of us could. The unit must be removed from the panel to do so. If the cables behind the panel were long enough so that they could be pulled through and were not secured in a manner that would preclude that being done, I suppose it would be possible, but why bother?

That said, it looks like a **neat** unit. Between that and the Garmin GN430(?), fasten your seat belts...

Right now the Garmin 430 is the hottest selling piece of electronics in the industry. Many dual installations are being done with all of the old electronics being replaced by the two Garmin units.

Allied Signal stuff should be dropping precipitously on the used market. Anyone noted

the effect yet?

Happy Skies,

Old Bob

[ARTICLES/19990323_165822_msg03226.tex]

Static Wicks and Ruddervator Balance

Tue, 29 Dec 1998 12:20:50

In a message dated 12/29/98 1:02:52 AM Central Standard Time, alpine@alaska.net writes:

The reason for this rebalancing is that I just replaced both of the old magnesium torque fittings with the aluminum ones (also heavier) and added static wicks.

So, all this added weight and Kyle's mention of weight parameters has me thinking I might have OBESE Ruddervators. Any thoughts or comments would be appreciated.

Terry

Good Morning Terry,

I think you are on the right track with your balancing and whether or not your ruddervators are obese is an excellent question. Unfortunately it appears that very little data has been accumulated as to total weights and I agree that we should start acquiring that data.

At the present time, no one really knows what has been causing the problem and research is needed.

Meanwhile, I was wondering, why do you want the static wicks?

It is my feeling that static wicks don't do diddly as far as protecting the aircraft from a static discharge. The only other reason I know of to apply static wicks is to reduce the effect of static build up on HF communication and low frequency navigation systems such as Omega, LF and Loran. The only one of those still around is Loran and GPS is vastly superior to Loran and has no problem with static buildup on the airframe.

I would suggest removing the static wicks from the ruddervators.

If you still want static protection for the tail, check that the bonding straps from the stabilators to the ruddervators are in good shape. If you have a metal tail stinger, put the static wicks on that. If you still have one of the old fiberglass tailcones, run some aluminum strips inside it from the screw holes in the front toward the rear (on the inside) and install static wicks to them.

I personally don't think they are worth the trouble and have never had them on Bonanzas I have owned in the last 45 years.

I have flown other airplanes, Bonanzas and others, that were static wick equipped and, with the exception of better HF and Loran performance, have never seen the need.

For whatever a free opinion is worth, there it is!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981229.122050.msg07928.tex]

T&B Verses Turn Coordinator**Sat, 4 Dec 1999 13:17:26**

In a message dated 12/4/99 11:15:20 AM Central Standard Time, jtsmall@onramp.net writes:

A very interesting explanation. Under what circumstances IMC could this happen and be a serious problem?

Thanks.

-jts Arlington, TX Beech P35 (N519BD)

Good Morning John,

That explanation was not given to explain any specific action that might occur during IMC, but rather to demonstrate a condition wherein the instrument is not telling the truth. I am sure I could hypothesis a condition where the lack of definite information could lead to a problem. I do not, however, consider such explanations pertinent to the subject.

The point I try to make is that the classic Turn indicator always tells the truth.

The fact that the Turn Coordinator will lie to me leads me to have less confidence in what it is telling me.

It is very difficult to transfer to partial panel with a failure of the horizon. The pilot must have strong confidence in the instrument he/she is using to determine that the horizon has failed.

If the only instrument lost is the horizon, the easiest way to determine that it has failed is to determine whether or not the airplane is turning!

I have never seen a classic turn indicator fail in any other manner than to just quit and stay right in the center. If it is wiggling, it's working! The rate may be off, but it will be usable to keep the aircraft right side up.

Many others on this site have suggested multiple instrumentation be installed to provide the confidence required to avoid spatial disorientation.

Regular use of a classic Turn and Bank instrument in normal instrument flight will provide information as to the rate of turn and helps to smooth out attitude based instrument flying. While it isn't necessary to use it in that manner, such use will make it easier to gain the confidence required to rely on that instrument should the attitude instrument fail. Should the Turn indicator fail, the pilot would be more likely to note that failure if it was regularly used!

And it doesn't look like an attitude gyro!

If the airplane does not turn, it won't spin in or do other dastardly things that regularly

cause accidents.

There are many other devices in the airplane that can give an indication as to whether or not the airplane is turning, but an attitude gyro is not one of them!

Even the dastardly Turn Coordinator will tell us if we are turning or not, given sufficient time. The trouble is that if we are not in coordinated flight, a wing will be down while we are going straight and the "look's like a horizon" TC will show a "wings level" indication. Too confusing for me!

I want to place my confidence in an instrument that will tell me the truth!

I find the GPS track made good to be an excellent heading source as well.

Happy Skies,

Old Bob

PS Several of our friends commented on their desire to have a warning flag to tell whether the Turn Coordinator or the Turn indicator is working. I think that most of those instruments which have flag capability merely show that the instrument is receiving power. I don't know for sure, but I don't think the flag will show if the instrument has incurred a frozen bearing or other internal problem.

[ARTICLES/19991204_131726.msg11556.tex]

T&B Verses Turn Coordinator**Sat, 4 Dec 1999 20:54:26**

In a message dated 12/4/99 6:45:58 PM Central Standard Time, newmanb@erols.com writes:

I'll bet that had more to do with the new display on the TC than it did the TC's response to yaw.

Good Evening Bob,

I agree one hundred per cent!

The non-pilot can be told to level the wings by looking at the TC presentation which mimics the presentation of an artificial horizon.

The trouble with that is that it emphasizes roll control and not directional control. The pure turn needle shows nothing but yaw. A TC shows the same indication for both roll and yaw. You can't tell which is causing the indication without observing other instrumentation.

Since we regularly use the artificial horizon for both roll and pitch, the possibility exists that one will mistake the TC instrument for an attitude gyro. No one ever mistakes a T&B for anything other than what it is!

Wonder why T&Bs were never made with the TC style display?

Why would you want to? The Turn indicator shows yaw or turn, not roll.

The thing that one wants to do to avoid losing the airplane is to fly straight.

If the turn needle is maintained in the middle, by whatever means, the airplane will remain in a safe flight regime. A TC style of indication implies that the wing is lowered or raised as the case may be. That is a roll indication, not a turn indication.

It is my opinion that pilots are not as heading aware as they should be anyway. I suggest that anything that encourages the thought process to concentrate on heading is better than anything that encourages thought on wings level. While it is true that an airplane with the wings level will go straight if there is no adverse yaw force applied, there is nothing that is more important to maintaining control than knowing where the nose is going!

It is not difficult to maintain control of the aircraft with a good stable directional gyro, a GPS track made good or even a magnetic compass flown on a heading of south in the northern hemisphere.

The Turn needle is a fine and stable indication of whether or not the aircraft is going straight and it can also be used to make stable turns at precise rates. The TC does that also but only if the airplane is in unaccelerated coordinated flight. The T&B doesn't care whether the flight is accelerated, coordinated or whatever!

It is simpler and therefore more reliable than the TC.

Obviously, no one else agrees with my point of view!

Both the TC and the Turn indicator will show yaw. The type of an airplane in which the indicator is installed is not an important factor unless it is an airplane that is basically unstable. I don't know of any modern airplane that cannot be flown adequately with either a TC or a Turn needle. An extremely unstable airplane will not react well to a single axis autopilot nor will it be comfortable to fly using just aileron to correct for a heading displacement. The more unstable the aircraft, the more important it is to have an instrument that differentiates between yaw and roll. Both the Debbie and the Bonanza are extremely stable machines and can use all of the production wing levelers to good advantage. Both airplanes have such high directional stability that they tend to wiggle in some turbulence conditions. The Debbie has slightly more vertical tail surface to dampen that wiggle, but is no more or less directionally stable than the Bonanza.

Once again, I know that there are few, if any, who agree with me, but there it is anyway!

Happy Skies,

Old Bob

[ARTICLES/19991204_205426.msg11610.tex]

2.7 AVIONICS-STANDBY

Desirability of Redundant Electric and Air Instrumentation**Tue, 25 Jan 2000 15:18:37**

In a message dated 1/25/00 1:41:30 PM Central Standard Time, shaker@employees.org writes:

The real answer is to get rid of mechanical gyros in favor of light based or differential GPS based gyro equivalents.

Good Afternoon All,

The real question is whether or not you want to go all electric.

While I would very much like to have ring laser gyros or GPS based three axis data generators available on our GA airplanes, they would be electrically powered and we would have no pneumatic system at all.

My current airplane has only one instrument driven by air. That is the artificial horizon. The only reason I have not replaced it with an electric horizon is that there is no practical electrical replacement for my AH that will power my Century IIB roll unit. Century provided one originally, but it was so unreliable that they no longer offer it as an option.

I have considered replacing my roll unit with an S-Tec canted gyro based autopilot and that may yet be the answer.

When I make a decision as to how to handle the roll autopilot capability, I will remove the pneumatic system entirely.

In any case, that means that an electrical system would have to be provided which is capable of providing a redundancy at least equal to the redundancy provided by the current pneumatic devices.

Now, there is no requirement that such redundancy be provided for we part 91 operators, but it is something which with we have become familiar and most of us would like to retain that capability.

In days past there have been a large number of airplanes which went all electric.

The Convair 240 was one of the first airliners that did so. A Northeast Airlines Flight approaching LGA one evening had the experience which the engineers thought could not happen. The entire electrical system was shorted out.

It also happened to some of the early Aerostars and Turbo Commanders. The result was that pneumatic systems were installed as backups!

What I would like to see would be for all of us to redirect the resources currently being put forth trying to provide back up pneumatic sources into solving the nuances of providing a truly redundant electrical source!

My initial thought is to resurrect my old free standing battery powered T&B to set up

on the instrument panel as a backup in case both my alternators and my battery are lost.

Surely, all of the engineering talent on this forum ought to be able to come up with something more elegant!

Happy Skies,

Old Bob

[ARTICLES/20000125.151837.msg01699.tex]

Desirability of Redundant Electric and Air Instrumentation**Wed, 26 Jan 2000 13:58:54**

In a message dated 1/26/00 10:44:31 AM Central Standard Time, Mavitor@aol.com writes:

Listening to all the pros & cons of redundant systems it seems to me that vacuum (Verses pressure, why they do that?) is better than electric for basic attitude control. If you can maintain a source its pretty fail safe. Electrical systems on the other hand, can burn, corrode, Highly complex and prone to wiring errors which show up as failures & smoke.

Good Afternoon Mike,

It appears that you and I are about to agree to disagree!

I can't wait to get rid of my one and only pneumatic pump, let alone mess up my airplane with two more!

There are a plethora of choices available to provide flight control guidance and automatic flight capability via the electrical route. The ones powered by air seem to be on the antique side. Are there any current auto pilots or wing levelers being manufactured today that rely on air?

If the airplane is equipped with air powered instruments, it would likely have a maximum of three. The artificial horizon, directional gyro and maybe a T&B or turn coordinator. (I guess I should add the air gauge to be totally correct.)

Now, I have experienced a failure of each of those instruments individually at various times. I have had similar individual failures of electric powered versions as well.

The key is the reliability of the power source. I don't think the air system is any more or less reliable than the electrical system. I have had wet air pumps fail, dry air pumps fail and alternators fail.

I have never experienced a total electrical failure on any airplane. It can and does happen, but then, wings fall off too.

Good maintenance and following the manufacturers recommendations will reduce the incidence of air pump failures.

The same is true of the potential for complete electrical failures.

As soon as I make a decision on how to get rid of the horizon driving my autopilot, the air pump will be history and my airplane will be all electric!

Having two alternators on my current machine, along with good and careful maintenance, should provide pretty good, not perfect, but pretty good redundancy.

The little battery pack powered T&B and my handhelds will be there just in case, but I

think the all electric machine will have a lower statistical potential for failure than one relying on air. On top of that, my engine compartment will be a lot less cluttered and the weight will be less.

Happy Skies,

Old Bob

[ARTICLES/20000126_135854_msg01768.tex]

Desirability of Redundant Electric and Air Instrumentation**Sat, 29 Apr 2000 09:47:02**

Good Morning John,

I wrote the following answer to your question. After I finished, I wondered if it might be of interest to a few of the others on the Bonanza list. If you feel that it would, would you mind sending the question that you sent me and this answer to the list?

Thanks,

Old Bob

In a message dated 4/28/00 11:04:13 PM Central Daylight Time, jtsmall@onramp.net writes:

Do you carry that now ... or asked another way, what backup power system do you use? Actually I recall you have a standby alternator and that would be good providing you can still the power to the avionics bus after the main alternator or other component failed.

Good Morning John,

Very kind of you to archive those old thoughts. Some of them still sound good, even to me!

I haven't carried the battery pack since the Convair days. I did carry it with me in my Bonanza in those days, but somewhere I just quit. Don't know why.

I suppose that I have become complacent. I have had pneumatic pumps fail, both pressure and vacuum, though that has usually been in airplanes which I did not personally maintain. I have had several alternators fail as well. Along the way I have had a few cases of instrument failure.

The most difficult to handle were the horizon failures. Even after the failure is determined, it is very difficult to tell your brain to disregard that information. As soon as your mind starts to think of something else, your subconscious habits take over and input a correction to that horizon that has become lazy. I now carry a rubber stick-on cover to use in the event of a horizon failure. Once it is covered up, I have no problem maintaining proper attitude via the remaining instrumentation.

I never incurred a failure affecting my instrumentation in as critical a time as did Itzakh. Who knows what any of us might have done.

I have always noted my pneumatic system and electrical failures long before they became a problem. That was true before the current warning devices became available. I now have a nice big red light that will let me know the alternator has failed, but my only indication of pneumatic failure is the action of the horizon or the indication on the pressure gauge. I think a Gizmo or similar device would be a good idea.

My intention is to go all electric. Eliminate the pressure pump entirely. The big hold up is my horizon. It provides the information for my primary roll autopilot. The manufacturer originally had an electric one available, but the failure rate was so high, they quit making it.

Once I solve that problem, I will eliminate the air!

My standby alternator works great. It is a very simple installation. It is hooked up to the basic electrical system and is running all of the time. No clutches, relays or anything else mechanical to fail. Anytime the electrical system voltage falls below 26 volts, the standby alternator starts to put out power. It will do that if the only problem is that the primary alternator is overloaded and can't keep up. A yellow light comes on to warn me that the standby alternator is in use, but no action is required on my part other than to monitor the load when I have time. The standby alternator is capable of putting out 30 or 35 amps for a short period of time. If it had a cooling blast tube run to it, that power could probably be carried for quite a while. However that isn't necessary. It is a simple job to reduce the loads to keep them within the output rating of the alternator without the additional cooling and I don't want to waste all of that nice cooling air during normal operations.

I installed a load meter and appropriate switching capability so that I can directly monitor the electrical system, but Bill Bainbridge has since gotten a device approved which will flash the yellow light anytime the alternator is putting out more than twenty amps. The operator can then reduce load until the light stops flashing.

I find that my normal night time running load with everything going, including the pitot heat, is just at, or a little over, 20 amps. If I turn off either the rotating beacon or the strobes, the load goes below twenty amps.

If one has the twelve volt system, as do you, load management would be a little more important, but you still have plenty of time to take care of it before the little alternator would be in trouble. I can't imagine how it could be made simpler or more reliable. It is a vast improvement over the complicated load reduction device that Beech used and I absolutely don't want something that has to have a clutch or that takes any action on my part to become operative.

I don't think any standby device that takes a pilot action to be put in operation is worth having. Redundancy is another matter. If I were really enamored with a pneumatic system as a source of instrument power, I would install dual pumps and set it up just like a light twin. Both pumps would be operative at all times with a shuttle valve for isolation. The only trouble is that those shuttle valves have been known to fail when an engine was shut down.

I think air driven instruments are from the dark ages! I like open cockpits, but I don't want one on my Bonanza.

I don't know how I will handle things if George gets his ignition system approved. Provided it is priced within my capability, I would like to have it. I don't know if my standby alternator system will satisfy the FAA as providing adequate redundancy or

not. Obviously, if you lose all electrical while flying with the full electronic ignition, the engine quits!

Reliability and redundancy of the electrical system becomes a very important factor in the equation, but we do fly with one engine don't we?

Decisions, decisions, all the time decisions!

Happy Skies,

Old Bob Siegfried Ancient Aviator

[ARTICLES/20000429_094702_msg07293.tex]

Desirability of Redundant Electric and Air Instrumentation**Tue, 27 Jun 2000 15:49:16**

Good Afternoon All,

Since there has been a resurgence in interest in standby instrumentation and power sources, I would like to reiterate what I have done in the past and am now doing to provide redundancy to my satisfaction.

We each have a different level of risk evaluation. What works for me may well be anathema to you, but here goes anyway!

On my first three Bonanzas, I carried two T&B instruments. One was powered by the vacuum system and the other was electric. I quit doing that about the time I started to run out of panel space!

Now that I am about to eliminate the pneumatic system entirely, I am considering going back to the dual T&Bs, but with the primary one supplied by the aircraft electrical system and a second one powered by a dedicated battery.

As many of you may recall, I installed a B&C standby alternator in my airplane about a year ago. I have now flown with that unit for some 250 hours. So far so good! I have not had an alternator failure so I guess I didn't need the standby! Seriously, I hope I never have need for the thing, but I am real glad it is there.

I obtained a local approval, but the company now has an STC to install the little twenty ampere alternator on all Bonanza, Debonair and model 36 airplanes from the J35 through the B36TC. It is completely automatic and is usable with either an alternator or a generator system. Anytime the system voltage drops below normal, the standby unit automatically picks up the load. If the load is above twenty amps, a little light flashes warning the operator to initiate a load reduction program.

With one T&B supplied by a dual electrical source and one powered by a separate and dedicated battery, I feel quite comfortable!

Happy Skies,

Old Bob

[ARTICLES/20000627_154916.msg10246.tex]

Desirability of Warning Flags**Wed, 26 Jan 2000 19:02:56**

In a message dated 1/26/00 5:07:53 PM Central Standard Time, newmanb@rocketmail.com writes:

I agree only if such a setup includes warning instrumentation to aid in determine nation of which instrument has failed should they disagree. For instance, the vacuum AI should have a built in gyro air flag, or an external gyro air warning system. The electric AI should have a power fail flag.

Best Regards,

Bob

Good Evening Bob,

The difficulty of relying on power indicators to tell you which instrument has failed is that not all failures result in the flag showing! I have seen horizons and other instruments fail several times when the flag was still out of sight.

I am sure folks are getting tired of hearing about it, but that is one of the nicest things about the turn needle. It is so easy to determine whether or not it is working!

Just kick the rudder, if it wiggles, it's working, period!

Happy Skies,

Old Bob

[ARTICLES/20000126_190256_msg01798.tex]

Rapco Standby Vacuum System Desirability**Mon, 24 Jan 2000 19:31:43**

In a message dated 1/24/00 6:03:19 PM Central Standard Time, newmanb@rocketmail.com writes:

The problem with the Rapco system is there have been cases of the clutch failing at the most inconvenient time...when the pump is called on to engage upon failure of the primary pump. I would not select this system because it adds the complication of a clutch with uncertain reliability.

Good Evening Bob And All,

I still think the best, cheapest, lightest and most reliable standby system is a pilot well trained and checked in rate instrument flying. While I think the turn needle is the easiest and best to fly, even the turn coordinator can be used, given enough practice.

The biggest problem I have had following a gyro failure has been my tendency to make corrections on the failed instrument. I carry stick on instrument covers to cover the failed instrument. With it out of sight, the rest is easy. In my early Bonanzas, I always had two turn needle instruments, one vacuum and one electric. Who could ask for more!!

Happy Skies,

Old Bob

[ARTICLES/20000124_193143.msg01610.tex]

Self Contained, Standby AI or T&B**Wed, 26 Jan 2000 08:36:37**

In a message dated 1/26/00 1:05:33 AM Central Standard Time, jtsmall@onramp.net writes:

On Tue, 25 Jan 2000 23:25:43 -0600, George Braly gwbraly@gami.com wrote:

Still mo' better if you have two alternators.

Could you make an arugment for a backup battery (on a trick charge) feeding a minimal bus (including an electronic AI)? I realize this will be superfluous when your system becomes available ... but might it suffice until we can save our pennies for better? I have been mulling this one over a lot since the Jacoby tragedy.

The big problem with dual electrical power sources is to provide a system that is relatively easy to operate and yet has almost fool proof isolation.

Very early twin installations sometimes had totally separate systems. The left engine had it's own generator, battery and all. Same for the right engine. The loads were split between the two. Some of the electrical items had the capability of being switched between the two, but things were otherwise completely isolated. Great reliability, but it took some pilot action to properly utilize.

The majority of the failures on multiengine or multi generator systems have been of the unanticipated failure type.

The Northeast Airline incident was caused by a wrench that had been left in the main electrical panel area which fell across the emergency buss and took out the entire electrical system.

We had a trainer out on a night IFR training flight many years ago which had a complete electrical failure when one of the primary generator cables failed, fell of it's mounting stud and contacted the airframe blowing the battery and all.

My little standby alternator works great, but it is still connected to the primary aircraft system and is therefore subject to one of those "completely impossible" failures. Highly unlikely maybe, but never completely impossible!

That is why I like the idea of a self contained completely separate unit. To protect against a Jacoby type accident, it would have to be placed on the glare shield in any actual instrument condition. I don't know if I would be disciplined enough to do that or not!

If it fastens to the airframe, it has to be approved.

Happy Skies,

Old Bob

P S Nothing is easy is it!

[ARTICLES/20000126_083637_msg01747.tex]

Self Contained, Standby AI or T&B**Fri, 28 Apr 2000 23:39:56**

In a message dated 4/28/00 10:28:40 PM Central Daylight Time, jtsmall@onramp.net writes:

Would you consider providing emergency power to one or both? If so, how?

Good Evening John,

My thought has always been to have a completely separate T&B. One that is not mounted in the panel and is powered by batteries. When I was a new Convair Captain in the late fifties, the Convair had some electrical failure problems (It was an all electric airplane, no pneumatic system at all.) I carried a T&B with some batteries taped around it in my flight bag and always figured I could get it down safely using that package. A standby power system could be designed that would power just the standby attitude indicator and the T&B, but I don't think I would do it. Not that it wouldn't be a good idea, I just don't feel it is that necessary. My completely portable system would require no approval of any sort. The built in one would have to be approved.

Whatever works!

Happy Skies,

Old Bob

[ARTICLES/20000428.233956.msg07279.tex]

Self Contained, Standby AI or T&B

Fri, 30 Jun 2000 22:14:37

In a message dated 6/30/00 2:48:50 PM Central Daylight Time, newmanb@rocketmail.com writes:

Do you think you will have any trouble having the separate battery approved on a 337?

Good Evening Bob,

I don't think so, but I have been wrong before!

I would approach it from the view point that it was not a required piece of equipment and that it would be installed in a manner so that it could not interfere with the normal operation of the aircraft and it's required equipment.

I might even placard it to state that it should not be used as a device to aid in flight control.

What you do in an emergency is your business!

Happy Skies,

Old Bob

[ARTICLES/20000630_221437.msg10410.tex]

Standby AI**Tue, 25 Jan 2000 23:51:56**

In a message dated 1/25/00 9:53:02 PM Central Standard Time, jdeakin@avweb.com writes:

Years ago, I'm pretty sure the airlines had a neat, small artificial horizon that went in the central panel, with its own battery, good for many hours. If the entire aircraft went dead, that AH would keep on a'turnin', perhaps with a tiny light, I don't recall.

Good Evening John,

This may be just faulty memory, but as near as I can recall, the little standby horizons were added to the turbine fleet in the late sixties. It is also my recollection that several of the early installations were powered by a designated standby NiCad battery. I believe the battery in the 727 was mounted just forward of the engineers panel.

I remember that I was surprised when the newer airplanes no longer had the designated battery and the standby horizons were powered from ships power. I am sure that was the way it was on our rope start 747s and the 767. It seemed like a step backwards at the time. Personally if I had to make a choice between a standby horizon and a turn needle, I'd take the turn needle, but it would be nice to have both.

Incidentally, as I read the regs, a horizon, turn coordinator or turn needle instrument mounted in a box with a few "C" cells to provide power and placed on the glare shield requires no certification of any kind to be used as an emergency method of keeping the aircraft under control.

It obviously could not serve as any required redundant system, but most of us GA types don't have a legal requirement for such a standby system.

I carried a similar unit made up of a T&B with three nine volt "B" batteries and a switch taped to it when I was a junior Convair captain and Northeast had their problem.

Never had to use it for real, but it worked just fine when I practiced with it!

If it is stuck in the panel or in any way hooked to the aircraft, then it has to be approved! Such is life!!

Enough old man rambling,

Happy Skies,

Old Bob

[ARTICLES/20000125_235156.msg01737.tex]

Standby Alternators - B&C Unit**Sun, 2 Jul 2000 21:45:46**

In a message dated 7/2/00 6:56:24 PM Central Daylight Time, avi1@ix.netcom.com writes:

is their an STC for early bonanza, or from like say 84 model .

Good Evening Avi,

If you are asking whether or not the B&C is approved on a 1984 airplane, the answer is yes.

The B&C standby alternator has STC approval on all Bonanza, Debonair and Model 36 products from the 1958 J35 through the latest production model 36s. It has been used as standard equipment on the Mooneys equipped for flight in known icing for several years and is available on the latest Beech products as a factory installed option.

There is an excellent service history with no known failures.

Happy Skies,

Old Bob

[ARTICLES/20000702.214546.msg10463.tex]

Standby Instrumentation**Thu, 27 Jan 2000 10:35:24**

In a message dated 1/27/00 8:33:56 AM Central Standard Time, MikeM86949@aol.com writes:

I think what we have is OK, but all planes should have the additional electric horizon.

Mike McNamara

Good Morning Mike,

I can accept your reasoning on all of the points you make except the one copied above. I may not agree with your conclusions, but that is merely a difference of opinion.

I am totally opposed to trying to require everyone to do anything.

We should each evaluate our own requirements and equip our machines as we see fit!

The safety records do not show a problem with minimally equipped aircraft. One pilot, one engine, one generator, one radio flight has an excellent safety record. All of the redundancy that we tend to add is nice because we all, me included, feel that we are doing something to add to the safety of our flight by those additions.

Unfortunately, most of the aircraft that are involved in serious incidents do have multiple power sources and lots of redundancy.

It doesn't seem to be a matter of what equipment is available, but how that equipment is used.

You prefer an additional horizon. I prefer a backup T&B. That is a function of our differing background, training and the way we use our equipment.

Nevertheless, those who fly with no backups have at least as good a safety record as we who load our aircraft up with extra gadgets!

Yours for individual decision.

Happy Skies,

Old Bob

[ARTICLES/20000127_103524_msg01835.tex]

Standby Instrumentation**Sun, 27 Feb 2000 07:23:42**

Good Morning All,

Those of you who are considering utilizing an electric standby horizon as a back up instrument might want to look at the instrument described at: <http://www.smithsind-aerospace.com/isis/intro1.html>

It is designed to be used for standby instrumentation in aircarrier and corporate aircraft. The dimensions are three inches by three inches by nine inches. It weighs only 3.75 pounds. The thing is entirely solid state, no mechanical gyro at all. The expected service life is 17,000 hours. I could not locate a specification as to power required other than it consumes 14 watts at maximum brightness. I would imagine that is at 24 volts.

The rumored price?

Well, let's see if anyone is interested and I will let you know what I heard!

Happy Skies,

Old Bob

[ARTICLES/20000227_072342.msg03710.tex]

Standby Instrumentation**Sun, 27 Feb 2000 08:22:02**

In a message dated 2/27/00 7:06:53 AM Central Standard Time, BobsV35B@aol.com writes:

I could not locate a specification as to power required other than it consumes 14 watts at maximum brightness. I would imagine that is at 24 volts.

More Information:

It is a 28 volt unit. While the manufacturer lists it as 3 by 3 by 9 in the first page of the specifications, that is a little optimistic. It is a standard ARINC instrument size which would require a 3.26 inch square of panel space. It is also rather deep. Nine inches is correct for the case, but the devices on the back of the case eat up another inch and a half plus the required connectors. I would imagine it would take at least eleven inches, maybe even a foot, behind the panel. At one-half amp power consumption, batteries should be able to power it for quite a while. That 14 watts evidently includes the internal lighting. Amazing!

It includes the capability of displaying CDI information along with attitude, direction, airspeed, altitude and skid/slip.

Who will be the first kid on the block to get one?

Happy Skies,

Old Bob

[ARTICLES/20000227_082202.msg03713.tex]

Standby Instrumentation

Sun, 27 Feb 2000 08:57:06

In a message dated 2/27/00 7:48:02 AM Central Standard Time, epoule@scoot.netis.com writes:

Uhhhh gulp ... I'll bite....

Are you sitting down?

18,000 UK pounds, and that is wholesale! Any idea what the exchange rate is?

Remember that redundant statement?

Happy Skies,

Old Bob

[ARTICLES/20000227.085706.msg03714.tex]

Standby Instrumentation**Sun, 27 Feb 2000 18:56:42**

In a message dated 2/27/00 5:25:01 PM Central Standard Time, doug@cayne.com writes:

Great box! But they're not the only ones, and possibly not the cheapest. See also the BFGoodrich GH-3000 <http://bfgavionics.com/docs/gh3000.html> and <http://www.meggittavi.com/magic/index.htm> . With these sorts of instruments trickling down from big iron, and things like Sierra Flight Systems percolating up from the experimental world, combined with relatively affordable traffic and terrain avoidance systems, we're witnessing a revolution in GA avionics. The Garmin 430 and Sandel EFIS were just the beginning...

Good Evening Douglas,

It is an exciting time!

The last price I saw for the Goodrich box was \$45,000. Do you know if that is still a current figure? Any idea what the Meggitt MAGIC is going for?

If the spin down in price for these units is anywhere near the degree of reduction that we have witnessed for the GPS boxes, something competitive should be available in a couple of years or less.

The only cloud on the horizon (no pun intended) is that those units are only used in aviation. The reason GPS prices have dropped so rapidly is due to the adoption of the technology by the general public.

Still it is a hopeful sign!

Happy Skies,

Old Bob

[ARTICLES/20000227.185642.msg03737.tex]

Standby Instrumentation**Sun, 27 Feb 2000 21:22:33**

In a message dated 2/27/00 8:03:24 PM Central Standard Time, doug@cayne.com writes:

The other key cost factor will be installation, which I would expect to run at least 50% of hardware cost on complex systems like these.

Good Evening Douglas,

I think all of your points are well taken. The Smith and Goodrich boxes are definitely oriented toward the airline emergency standby roll.

I wonder, though, about installation costs for the Smith unit. It could be very little!

All it requires is a twenty-four/twenty-eight volt power source, pitot/static connections and the left/right, up/down indications for the CDI function. That is pretty minimal! The type instrument that requires a lot of installation cost is something like the Sandel that uses numerous outside sensors and then just presents the information.

In any case, they are all out of my price class now, but who knows what the future may bring?

Happy Skies,

Old Bob

[ARTICLES/20000227_212233.msg03745.tex]

Standby Instrumentation**Mon, 28 Feb 2000 09:02:51**

Good Morning All,

This is from another list in reference to the Smith Standby unit, but may be of interest to a few.

n a message dated 2/28/00 6:50:14 AM Central Standard Time, Peter.J.Beaty@USA.dupont.com writes:

Looks like the Sandel unit, which costs approx \$8,000.

Good Morning Peter,

Yes, it LOOKs like the Sandel, but it is a lot different!

The Sandel has no artificial horizon function and that is the primary requirement for a standby unit as required by Part 121.

In addition, the Sandel requires a number of sensors to supply information which it displays. It provides no basic information, it just displays information from other sources.

The Smith box is totally self contained except for whatever information is chosen to be displayed on the two CDI bars.

It has self contained totally solid state devices to supply roll, yaw and pitch information. From the brochure, I can't tell whether it has any method of self alignment with a North reference. It might require setting as does an old AN gyro, but I didn't note a means to do so.

The Sandel is an exciting development and is very handy when presentation space on the panel is at a premium, but the Smith, or other similar device, is exciting in that it is all self contained and requires nothing but a twenty-eight volt power source to provide adequate roll, pitch and yaw information. Hook up a pitot and static source and it will provide airspeed and altitude. Add the input from any left/right or up/down steering source and it presents that information as would any CDI instrument.

The price is steep, but the potential for a self contained emergency device is enormous.

Since it requires only 14 watts, about one half ampere, of electrical power, it could be powered by a small standby battery for a long time. With no other inputs than the electrical power, it could be used to safely keep the airplane under control.

I would love to see a derivative which would not even have the airspeed, altitude, heading and CDI functions if the price were to be reduced commensurately.

Unlike the full glass cockpit aircraft, we GA types rarely lose our airspeed, altitude or primary heading source. If we had a complete electrical failure, we wouldn't have anything to feed the CDI either!

Something like a simple version of the Smith powered by a small battery along with handheld GPS and Comm would provide everything we need to get the machine safely on the ground.

Happy Skies,

Old Bob

[ARTICLES/20000228_090251_msg03760.tex]

Wind Verses Engine Driven Standby Alternators**Sun, 2 Jul 2000 15:51:16**

In a message dated 7/2/00 2:14:14 PM Central Daylight Time, ajlspero@home.com writes:

In the midst of this thread about all electric airplanes and standby equipment, would anyone care to comment about the wind-driven alternator as a standby power source?

Good Afternoon Alan,

I prefer the engine driven unit! It has been my experience that standby devices that aren't regularly exercised tend to not work correctly when deployed in an emergency.

I have had dump valves hang up and wind driven emergency equipment fail to work on airliners.

I don't think I want to mess with them on a light airplane.

The B&C 20 Ampere unit that I have has worked just as I hoped for a year and over two hundred and fifty hours.

I imagine that the one which George Braly is developing will be as reliable and will have the added advantage of being capable of selfexcitation.

Since the standby engine driven alternators are so readily available and use very conservative standard components, I see little reason to cut up the airplane to install something that would take action by the pilot to put in service.

The B&C is turning any time the engine is running. It will pick up the load anytime the primary alternator is not providing the proper voltage. It is completely automatic and will even help if the primary unit is just a little overloaded. There is no action needed by the pilot.

I would imagine that George's unit will have a similar capability.

Both the old Beech standby eight amp generator and the wind driven alternator take pilot action to place in service.

Happy Skies,

Old Bob

[ARTICLES/20000702.155116.msg10454.tex]

2.8 AVIONICS-WXAVOID

RADAR**Sun, 11 Jun 2000 09:51:38**

In a message dated 6/11/00 8:17:00 AM Central Daylight Time, Ron@Koyich.com writes:

There is one thing that I don't recall being discussed here on this topic. The airline weather radars utilize large antennas. The radar antennas on our airplanes are of a smaller diameter, especially those on singles.

Good Morning Ron,

I know my messages get awfully long and boring, but I do believe I have mentioned that fact several times in this discussion. I know John Whitehead has brought it up at least once!

I agree completely with your discussion.

In addition, I still like the C-band better than X-band for exactly the same reason. It doesn't show as sharper a definition and takes a little more learning time to get proper interpretations, but it does penetrate even the strongest cells to show what is behind them. The trouble is that it can't be made to work at all with the small antennas. The physics don't change even with better technology. A wave length is a wave length and antenna size is still dependent on the wave length. There is just no way to carry those large antennas in a small plane. Even the Convair 340 was barely large enough. That was one of the reasons most airlines opted for the X-band in lieu of the C-band. It was a lot cheaper and easier to mount the smaller antenna that could be used by X-band.

Happy Skies,

Old Bob

[ARTICLES/20000611.095138.msg09505.tex]

RADAR**Mon, 19 Jun 2000 07:35:59**

In a message dated 6/19/00 4:08:38 AM Central Daylight Time, epoule@scoot.netis.com writes:

but I believe that the big red blob on the screen depicts an area that is more likely than not to have severe or extreme turbulence associated,

Good Morning Eric,

The big red blob tells you where the rain is. Whether that rain is associated with turbulence or not is dependent on the shape of the blob and the gradients of the rain around the center. It was easier to discern the difference on the old non color C band radars than it is on the modern X band stuff. Heavy rain WILL almost always be accompanied by a strong down draft and if performance is a problem, it might be pertinent to avoid it for that reason. In addition, there may be a fair amount of turbulence as the area is approached and departed. The air that is coming down in the rain storm hits the ground and spreads out into horizontal components. That can cause some pretty bumpy rides around the outside of the storm area. It can be worse in areas where that horizontal component is influenced by topographical features. We then may encounter orographic turbulence from those horizontal wind components.

There is no magic bullet other than to park the airplane and don't fly at all.

Beyond that, one should learn what tools are available and use them all for their best individual characteristics. The sferic is a VERY useful tool.

Happy Skies,

Old Bob

[ARTICLES/20000619_073559_msg09850.tex]

RADAR Verses Sferics (Stormscope, Strikefinder, etc.)**Wed, 7 Jun 2000 11:02:01**

In a message dated 6/7/00 8:33:31 AM Central Daylight Time, jtsmall@onramp.net writes:

Reports that sferics amount of only a 'feel good' or 'warm fuzzy' device at best and provide a false sense of security at worse. I initially dismissed these reports as so many pilots have written anecdotal stories similiar to Ed's. On the surface these stories appear convincing in themselves. However the negative reports I have read all share a common thread: they are from ATP level pilots who fly a lot, fly a lot of IMC and have continuously cross checked sferic data with on board radar and ATC calls. Now before blasting this as unscientific (it is of course) and pointing out that radar and sferics display different phenomena be aware these pilots are fully aware of these issues. They are interesting in missing thunderstorms and to a person say radar properly interepreted does this and sferics do not.

Good Morning John,

Well, here is a person who will not agree with those you referred to. The radar and the sferic boxes show different things. Neither of them show the "whole " picture all by themselves. Either device needs to be used as one part of the information on which to make an operational decision. The look out the windshield and the reports from others along with a knowledge of the weather system to be dealt with are all important.

Both radar and sferics are very helpful. My experience with radar in Bonanzas and Barons has been that the radar available to small aircraft is nowhere near as helpful as the radar we were able to carry in the large aircraft.

In fact, I don't think the X band radar now used in most new airplanes is anywhere near as helpful as the old C band radar available years ago. However, the C band radar required a much bigger antenna and took a LOT longer to learn to use. It required a considerable amount of tuning for individual conditions to gain that superior picture. Like so many things, in making something easier to use and to teach, we have lost a lot of useful capability, but back to the sferics.

It is my experience that the sferic box is equally as useful as the radar we have available in small aircraft to aid in missing a storm. What the sferic will not give is an accurate distance from the storm. Bearings are good but distance isn't. However, the sferics will tell of a storm behind the one you can see. With X band radar, the closer storm often hides another storm which is lurking behind the one ahead.

Radar shows water. Water does not necessarily mean turbulence. If there is a shallow gradient from the heavy rain, to light rain, to no rain. It could be a completely smooth ride, yet it would show a solid red core on a color radar. Turbulence is almost always associated with lightning and sferics show lightning, but not all turbulence! Nothing is all things to all folks.

For the dollars spent, the weight, power and space required, I chose the sferic. I find it very useful. I was an active user of radar from the days of experimental sets on a test basis to the present time. I think I should qualify as a knowledgeable user.

It would be nice to have both, but certainly not required.

Happy Skies,

Old Bob

[ARTICLES/20000607.110201.msg09236.tex]

RADAR Verses Sferics (Stormscope, Strikefinder, etc.)**Thu, 8 Jun 2000 11:42:49**

In a message dated 6/8/00 9:45:11 AM Central Daylight Time, jtsmall@onramp.net writes:

Old Bob, I in no way doubt your conclusions (however, the distance and radial spread issues have concerned me). Let me ask some specifics to see if we are talking about the same useage pattern.

Hi John,

First, the distance on the radar is very accurate, but can be of limited usefulness due to signal attenuation. The distance with sferic is relative to the strength of the stroke adjusted by an algorithm to give an approximate distance. It can be substantially in error, but I find the accuracy of range information to be very good up to 30 or 40 miles. For very strong weather systems, a storm four hundred miles away will occasionally show up as being one hundred and fifty to two hundred miles away. I don't find that a problem since I generally know about that storm already!

The azimuth information on both the radar and the sferic is excellent.

Here are my answers to your specific questions.

1. Would you trust your sferic to detect and miss embedded thunderstorms assuming you are flying IMC? Do you do in fact fly IMC with embedded thunderstorms?

Yes, and yes. (Both with reservations explained later)

2. How about widespread mass thunderstorms like we see in the summer from unstable conditions? Do you trust your sferic to guide you through these when you are in and out of IMC?

Yes and yes. (Same cop out)

It is these two issues that really have me concerned about the utility of a sferic. If I can see the weather on Nexrad and Intellicast before launching, follow it with FSS and ATC plus stay visual ... well, sure an sferic would add to the comfort level but it actually would add no operational advantage. This is the way most say they use their sferic.

The sferic is just one device, a useful one, but still just one source of data. I use it along with all other data to provide the guidance required. The thing that scares me the most is hail. I want to have a pretty good idea of the condition and characteristics of the general airmass through which I am flying before I stick my nose in it, with or without my Strikefinder or radar.

To restate the case, what I'm looking for is a way to stay out of trouble

when I am in the clag (not on the ground) and wondering what might have popped up since I launched. Say crossing a trough at night IMC. Or with layers up to the flight levels and widely scattered thunderstorms. I once thought the sferic was the answer to these situations, but some say it definately is not.

As I said before, there is no device that gives the complete answer. It is a matter of using what you have to do the job at hand. When we get down to just evaluating the use of radar against the use of a Strikefinder or Stormscope, it is a little easier. The radar shows water. It may or may not show hail, depending on the temperature. The sferics show only electrical activity. Nothing else.

Heavy rain is not necessarily turbulent. It can be very smooth though it is always associated with strong downdrafts. The turbulence comes when one is transitioning from one intensity to another. If the gradient is gradual, the ride is acceptable. If the gradient is sharp, you can get the bejeezers beat out of you. That is also where the lightning is generally found.

As I said before, you can have a picture on a color radar that shows a big red dot in the middle of a big yellow and then green doughnut with very slow gradual transitions on all sides. That condition is flyable and will generally be quite smooth but with a substantial loss in performance due to the downdraft. It will show nothing on a sferics detector. That is one case were the sferics do a better job than the radar. You would undoubtedly fly around that blob if you saw it on the radar. The aircarrier for whom I flew required that we do so. The FAA controller will steer you away from such a system, yet flight through the area is not likely to be any problem at all. Does that mean that you should disregard what is shown on a radar or advice given by the controller? Of course not. What it means is that there is more to storm avoidance than purchasing a device to mount in the airplane!

I would like to see these issues addressed in a controlled scientific analysis. If these devices do work then I doubly wonder studies or analyses like this don't exist. Of course they may and I simply haven't found them yet. That's why I'm asking.

There is voluminous data available on radar. Unfortunately I can't tell you where to locate it! UAL had an airplane designated for radar research which went out and purposely flew through mid western thunderstorms to find out how things worked. That was during the early fifties. After that research was completed, we started to equip our airplanes with radar. I believe that was in about 1954.

I know that Ryan did a lot of flight testing for the Storm Scope and I imagine Insight did some more for the Strikefinder. Why don't you contact them and ask?

Thanks.

-jts Arlington, TX

Your welcome!

Happy Skies,

Old Bob

[ARTICLES/20000608.114249.msg09338.tex]

RADAR Verses Sferics (Stormscope, Strikefinder, etc.)**Sat, 10 Jun 2000 08:57:04**

Good Morning John,

I guess the easy answer is: Why would you pay any attention to what a Mooney pilot says?

In all truth though, I think what you are seeing is people trying to compare apples and oranges combined with fifty years of simplification of training.

When we first started using radar, we were taught about things like gradient, smooth flight in certain types of heavy rain, potential for hail, association of "hook" signals and a whole lot more.

It soon became apparent that the education required to learn all of the fine points of radar use was very time consuming. At the same time, the aircraft in use were getting faster and gaining longer legs.

It was expedient to train the aviators of the day to just stay away from anything that showed a lot of water on the scope. The traffic situation and the capabilities of the aircraft were such that relatively little efficiency was lost by detouring everything that was at all suspicious.

We now have a couple of generations of aviators that are petrified of ever flying through a rain storm, regardless of whether there is turbulence there or not.

If you are looking at a color radar showing a big red blob that you have been told will tear your airplane into little pieces and spit it out the top, it is very hard to trust a relatively low cost little box of dots that tells you flight through that big red blob is OK. There is no doubt that the Strikefinder (or Storm Scope) will disagree with the radar often, but other times, they will agree closely.

Neither device will assure a smooth ride.

I guess I am repeating myself for the umpteenth time, but radar and sferic equipment are merely two of the tools that should be used to analyze the situation. You can get by adequately with neither. IFR aviators did it before either was invented.

Those who understood the weather got by fine.

Those who didn't respect the problem, bent some airplanes.

I remember flying with what I felt was a grizzled old Captain (He was probably all of thirty-five or forty years old!) who stated that he had never seen a thunderstorm that was worth detouring and always just stayed on course and drove right on through. A couple of years later, he ran into a doozey! From then on, he was a believer.

That was just about the same time that radar was starting to be installed. The first couple of years, it was used to gain experience by comparing it's story with what the

pilots had learned from the school of hard knocks. That experience was jelled into something that could easily be taught and that is what the industry uses today. Certainly not perfect, but eminently usable.

I fear that your Mooney friends just don't have the complete picture either.

Happy Skies,

Old Bob

[ARTICLES/20000610.085704.msg09438.tex]

RADAR Verses Sferics (Stormscope, Strikefinder, etc.)**Sat, 10 Jun 2000 23:49:43**

In a message dated 6/10/00 1:12:49 PM Central Daylight Time, jtsmall@onramp.net writes:

Ironically what we do have going here for the sferic hypothesis are a LOT of positive experiences. But so did the flat earth theory.

I tend to believe in the sferic, but not quite enough yet to purchase one and place my life on the line when IMC in an unstable atmosphere. That may change.

Good Evening John,

I feel I should answer your message, but I am not sure what the question is!

Does a lightning detection system have value in avoiding turbulence? Absolutely. Are there other ways of avoiding turbulence? Absolutely!

It has been shown many times that an area heavy with lightning will be turbulent, but so will flight near a rotor cloud. A rotor cloud won't show up on a lightning detector or a radar. You do avoid rotor clouds, don't you?

Can there be smooth flight in heavy rain? Absolutely

Will it always be smooth in heavy rain? Not at all, but if there is no lightning it probably will be smooth.

If you accidentally fly your airplane into heavy turbulence, is it likely to come unglued? Extremely unlikely.

I know of no airplanes that have been destroyed by turbulence if the pilot was able to keep the airplane under control, except for a few cases where the structure was found to be deficient and not in conformity to the type design.

National Airlines had a DC-6B that shed it's wings during a flight across the Gulf Of Mexico some years back. The NTSB laid the blame on the Captain stating that he had flown into conditions beyond the capability of the airframe to withstand the stress. Some folks didn't agree with that finding and continued to try to find the wreckage. After an extensive search, the aircraft was found. It was discovered that there was a manufacturing defect in the wing structure which had been there since the airplane was new. It reduced the ultimate failure point to somewhere between 2 and 2.5 Gs. The entire DC-6 and DC-6B fleet was checked. It was found that there were a number of aircraft flying that had the same defect in the structure. That means that all of those airplanes had been flying in regular air carrier service with a wing that was about half as strong as the wing on your Bonanza. No other one had come apart and that was before radar. Most inflight breakups are for the same reason as JFKs airplane broke up. The pilot lost control of the aircraft and let it get outside the design envelope.

Considering the thousands upon thousands of flights that have been conducted in some very violent weather, it is a testament to the basic strength of the fleet that so few have been lost. It means that our pilots are rather competent as well!

I don't mean to encourage a cavalier attitude toward IFR flight, but there really isn't very much weather out there that is violent enough to tear the airplane apart or even to make a competent pilot lose control.

Stay away from tornados, avoid fast moving cold fronts. Be aware of the possibility of hail and use what you have available. Even a small amount of caution should provide a safe, if not a comfortable, ride.

I think you will by now have noted that most folks who have experience with big airplane radar, small plane radar and lightning detection equipment, have decided that the sferics do add to the capability and usefulness of the aircraft. It is a relatively common occurrence to have the sferic verify that heavy rain shown on the center or flight watch scope is not dangerous or turbulent. If that heavy rain is accompanied by lightning, it should be avoided.

If you figure out how to avoid a rotor cloud, that will also add to the number of smooth flights you have! Everything is relative!!

There is no one answer as to what it takes to ensure safe, let alone smooth, flight.

You state: "but not quite enough yet to purchase one and place my life on the line when IMC in an unstable atmosphere." I don't think anyone is recommending that you place your life on the line.

I also don't think flying in bumpy air constitutes placing your life on the line.

It has to be pretty bad weather to break up an airplane. It is almost unthinkable that even the most inattentive pilot could stumble into that sort of condition without some degree of warning.

Relax and enjoy, stay attentive and you will be fine, sferics or no sferics, but a Strikefinder or a Stormscope will add to your capability. So would a radar, but that costs a lot more in money, weight and space. I think that for we GA types, the sferics give a lot more capability than the types of radar that would be usable on a Bonanza. The best of radars can't tell you for sure that it will be smooth in heavy rain. A very knowledgeable user might be able to come up with a very good guess. But, the sferic is much easier to use and interpret. Plus it is a lot cheaper.

I know I am rambling, but I'm still not sure of the question!!

Happy Skies,

Old Bob

[ARTICLES/20000610.234943.msg09485.tex]

RADAR Verses Sferics (Stormscope, Strikefinder, etc.)**Sun, 11 Jun 2000 00:10:53**

In a message dated 6/10/00 10:04:29 PM Central Daylight Time, wabpilot@yahoo.com writes:

The airlines are required to have radar, so they buy it. They are not required to have stormscope, so they do not buy it.

Good Evening Alan,

I'm afraid I must disagree with that statement. The airlines are in the business of making money, just as are most of us. I imagine that is at least part of your reason for engaging in the practice of law.

The airlines tend to buy equipment that will allow them to do their job well at the lowest cost. Radar was not developed by the federal government. It was developed by the electronics industry with heavy support from the airlines. UAL supplied an airplane and crew to fly in the weather and develop operating procedures. I know that American and Northwest were heavily involved as well.

Radar soon showed that it could help provide the kind of smooth flight that our passengers desired while reducing the degree of excursion from course that sometimes resulted from that search for smooth air. UAL put it first on their Convairs because the Convairs had the least capability of detouring the weather by other means.

I think it is possible that the sferics could reduce delays and provide greater efficiency for major carriers, but it would take complete retraining of a couple of generations of pilots, regulators and aircraft educators.

So far, no one has made the effort.

I don't like all of the decisions made by management, but the airlines are doing a good job of providing a low cost and safe transportation system. It is not a mere compliance program.

Happy Skies,

Old Bob

[ARTICLES/20000611_001053_msg09486.tex]

Stormscope WX7A Verses Strikefinder**Tue, 28 Apr 1998 18:08:49**

Good Evening Ray Lockhart,

In a message dated 98-04-28 14:40:41 EDT, you write:

My V36B has a WX-7A which was in the plane when I bought it. It seems to work OK.

My V35B also had a WX7A in it when I bought it nine years ago. It worked very well. Presentation, range and bearing was about on par with my Strikefinder. The azimuth is always pretty good, but the range is rather iffy. Both units seem quite accurate when you are within 30 or 40 miles of the storm but accuracy falls off with distance. Since they are both passive receivers and the range is determined by how much noise the storm is making, that makes sense.

I replaced the WX7A with the Strikefinder primarily because the Strikefinder weighs 2.2 pounds and the WX7A weighs 19.2 pounds. Both figures include the antenna. The Strikefinder is contained in one panel unit and the antenna where the WX7A has the panel indicator, a panel mounted control box and a remote amplifier in addition to the antenna.

There was also an announcement at about that time from 3M (who owned Stormscope then) that they would no longer support the WX7A. It seems that the manufacturer of one of the primary power tubes or something was no longer going to build the required part and no suitable replacements were available.

The Strikefinder was not only lighter and cheaper than anything Stormscope offered, but it took up less space in the airplane and the presentation turns with the fluxgate. Not horribly important but kind of fun to have.

I have flown with the Strikefinder about 1200 hours and find it a very useful tool.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980428_180849_msg02160.tex]

Strikefinder Display**Sun, 1 Nov 1998 18:30:08**

Good Evening Mark and Eric,

In a message dated 11/1/98 5:02:02 PM Central Standard Time, markjenn@halcyon.com writes:

The ads show nice bright red dots, but in daylight then are washed out and in direct sunlight they nearly disappear.

Interesting that you both have problems with the display washing out on the Strikefinder.

I have never had a problem reading mine in seven years and some 1400 hours operation of the unit.

I wonder if the difference is in the location? Mine is mounted on the lower subpanel beneath the floating panel just above and to the left of the trim wheel. It is a rather protected location and that might be making the difference.

I had a Stormscope before the Strikefinder and replaced it with the Strikefinder mainly to eliminate some 15 pounds and gain more panel space. I am sure the newer Stormscopes are lighter than the one I had and I don't think they have the extra control panel any longer either.

In any case I have been very pleased with the Strikefinder and it's presentation. I particularly like the fact that it does rotate with the flux gate compass. That probably doesn't make any real difference in usability, but it looks neat!

My unit is serial number 31.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981101.183008.msg06569.tex]

Strikefinder and Static Wicks

Wed, 29 Apr 1998 09:32:06

Good Morning All,

I have never noted the static problem on my Strikefinder and my airplane has no static wicks installed. They were never standard equipment though Beech would install them as a customer option.

I do find that there are places around the country where I occasionally see spurious signals on the unit. North of St. Louis where McDonnell Douglas was doing electronic warfare tests and near the Fermi laboratories west of Chicago are a couple of places that have disturbed my set.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980429_093206_msg02173.tex]

WX Avoidance Strategies**Sun, 18 Jun 2000 23:39:49**

In a message dated 6/18/00 10:04:53 PM Central Daylight Time, epoole@scoot.netis.com writes:

George, with all due respect and meaning no offense ... You've got rocks in your head!

Good Evening Eric,

I do believe you are missing the point. The level of water in the storm is not an indication of turbulence. It is the gradient between the shafts of water that make the turbulence. When we first got radar, we flew through that stuff all of the time. The trouble was that it took too much training to teach the troops how to tell the difference between the storms that would have heavy rain with light or no turbulence and those storms that are very rough. We now have a couple of generations of pilots who have been taught, as have you, that just because it shows red on the radar, it is bad and dangerous.

It is unfortunate because many trips are canceled unnecessarily and many long diversions are made that would not have to be made. The sferic, either a Stormscope or a Strikefinder, adds a dimension to the evaluation that does tell whether that hunk of water is going to be turbulent or not.

Until we all get to the point of properly evaluating the weather instead of making a knee jerk reaction to a red blob on the radar screen. No improvement is likely.

The radar is one tool. The sferic is another. The Weather Channel is important and so are reports from other aircraft. Whatever can be gained from approach control or the center is icing on the cake. A broad smooth radar picture with gradual changes from one color to the next combined with a sferic picture showing no electrical activity is a safe and complete indication of the potential for a smooth ride!

You can always park the airplane and not fly at all. That is a valid thing to do, but don't insult the intelligence of one who has taken the time and the effort to learn how to find the smooth spots IF they exist!

There IS more than one way to skin a cat!!

Happy Skies,

Old Bob

[ARTICLES/20000618_233949_msg09842.tex]

WX Avoidance Strategies**Mon, 19 Jun 2000 12:05:37**

In a message dated 6/19/00 7:12:17 AM Central Daylight Time, epoule@scoot.netis.com writes:

If I misread, then I apologize.

Otherwise, it didn't seem to me like there was much opportunity for George to interpret the shapes of the blobs and the gradients around.

Good Morning Eric,

No, I think you read it correctly. However, radar is just one of many things that a prudent pilot evaluates when making such a decision. The fact that his lightning indicating device was showing strikes where he knew them to be was an excellent confirmation that all of the other indications were correct and the chances of a smooth, or at least, an acceptable ride existed.

As I have said so often before: There is no one device that can all by itself guarantee a smooth ride. It takes knowledge of the weather system and experience in using the tools that are available. I wish we had had a sferic device available to help us develop the avoidance guidance for the radar. I am sure that the suggested deviation procedures would be vastly different from those that were developed.

You, and others, discount the positive experience that many of us have found using the sferics as purely anecdotal. I guess that is proper in that all experience is basically anecdotal. Just because someone has a smooth ride through an area that some feel should be rough is not by itself proof. However, enough anecdotal experience will eventually be accepted as an indication of reasonable probability by even the most skeptical scientist.

I have found that my Strikefinder coordinates well with, and confirms my evaluation of, the conditions prevalent in almost all of the weather conditions I have observed since I first installed the Strikefinder in the fall of 1991.

I am fortunate to have had a few years of experience trying to work my way around the country safely and comfortably before we had radar. I was actively using radar during the time in which we were developing the procedures that are now used as the Holy Grail of weather avoidance.

My Strikefinder does not give me the capability of flying through all of the weather observed, but it is a great help in the decisions that I do make. I would still fly without it, but I would probably make greater diversions from course than are now required.

In some 54 years and 36,000 hours of flying, I have found that there are times to park it and wait the weather out. There are other times when a small deviation can make a flight practical and others where major deviations are best.

The first order of business for me is to have an understanding of the airmass with which

I am working. From there on, it is to use the tools available in the most efficient manner.

That, to me, appears to be what George was doing.

Happy Skies,

Old Bob

[ARTICLES/20000619.120537.msg09876.tex]

Chapter 3

DESIGN

35F vs. 35H

Mon, 31 Jan 2000 19:53:31

In a message dated 1/31/00 6:24:14 PM Central Standard Time, barryb@pon.net writes:

I have a friend who is shopping for an earlier Bonanza. He's not the computer type but has a question I can't seem to find an answer to. Was there much structural difference between the F & H? The F he is looking at has been upgraded to the IO 470N. The H has the 240hp 470. Comments please. Thanks, Barry

Good Evening Barry,

The F35 was the next to the last of the "light" Bonanzas, the last being the G35. The H35 was the first with the late style spar. Everything on the airplane is just a little heavier. While the airplane gained weight with each model from the straight 35 all the way to the last V35B built, the H35 was one of the major steps toward the structure used on the last ones.

I have never personally gone through the process of getting a 470 or later engine installed in an airplane that was originally equipped with an E-series engine, but have been told it is a big job and expensive. If I were interested in buying one that had been converted, I would want to check out who did the job and what the approval basis was. Check to see whether or not the engine is approved for full power or whether it is restricted to the power originally approved for the airframe. It would also be interesting to know whether the approval covered installing a 520 or 550 as well as the 470. Some do and others do not.

The early light airplanes are delightful to fly and rather jump off the ground compared to the later ones. Just imagine how that F35 would go with a 550 on board!

There is an anomaly associated with the later, supposedly heavier and stronger, spar. It requires an inspection each 500 hours that is not applicable to the spar in the last fifteen straight 35s and all of the A35 through G35s.

The F35 has a gross of only 2750, the H35 is good for 2900. With comparable equipment and the same engine installed, that would likely mean the H35 could carry at least 125 more pounds of useful load than the F35. Enough for a nice sized lady friend or two hours more fuel!

Nothing is easy, is it!

Happy Skies,

Old Bob

[ARTICLES/20000131_195331_msg02185.tex]

5th or 6th Seat

Fri, 13 Nov 1998 10:10:27

Good Morning Skip Weld,

In a message dated 11/13/98 8:33:09 AM Central Standard Time, Sweld11111@aol.com writes:

I am thinking about selling my K-35 and buying something with 5 or 6 seats.

While the room is adequate and comfort reasonable for the 5th and 6th seat passengers in the Bonanzas so equipped, it is a rare airplane that can handle anything other than two adults and four little children due to center of gravity restraints. Beech referred to that configuration as "Family Seating" and even dropped the availability of the sixth seat in 1977 or 78.

If any airplane would be practical for that loading it might well be the "TC." It has an awful lot of extra weight up forward with the turbo and such.

Be sure and check the CG with the fuel loads you will have for landing.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981113_101027.msg06900.tex]

A36 vs. F33

Thu, 16 Nov 2000 11:40:24

In a message dated 11/16/00 9:31:41 AM Central Standard Time, MikeM86949@aol.com writes:

The F33 has those big doors aft of the wing with a whole bunch of space there. My C33 just has a little door with a little space. If they are both the same length, where did the additional space come from on the F33? Did they just enlarge the baggage compartment back into the tail?

Mike McNamara

Good Morning Mike,

Yes and no! I think you are confusing the F33 with the model 36. The model 36 is the one which has the large doors in the aft fuselage. The F33 generally has the same optional large baggage door that is found on most later V35, V35A and V35B aircraft. However, the length from the trailing edge of the wing to the aft end of the fuselage structure is the same on the 33, 35 and 36, therefore, that big double door is stuck into the same space that was available on even the very earliest model 35s.

Obviously, Beech has moved the rear cabin bulkhead aft on the 33 and 35 series over the years. I haven't checked precisely, but I am reasonably confident (how's that for hedging!) that the rear bulkhead (the one just aft of that big rear door) in the model 36 is the same distance from the tail as is the rear cabin bulkhead in the last 35s and 33s. They did add a small baggage compartment even further back into the rear fuselage on some of the Barons. That might have happened on some of the 36 models. I am sure that we have many 36 operators on this list who can let us know.

Incidentally, the 36 fuselage was not lengthened by adding a plug as was done on the stretched Piper Cherokees. It was more of a "Z" shaped cut that started up, from just in front of the wing, went vertical to the height of the spars, aft to the back of the second side windows and then up to the top. That was not done literally, but that was the effect.

The pilot and front seat passenger are still the same distance from the engine and propeller as in the 33 and 35 models. The two aft seats in the 36 are the same (almost, there are some differences in different iterations, but in the order of an inch or so) distance from the aft end of the fuselage structure as they are in the 33 and 35.

Thus, the cabin has a ten inch stretch and the pilot has a MUCH better downward view in front of the wing.

Just in case anyone cares, I personally think the 36 is a very nice airplane and if my mission required the payload capability that it provides, that is what I would have. As it is, my normal trip is with just my bride and me onboard. I prefer the way it flies and the extra eight to ten knots I get out of the Bonanza makes it the choice for me.

Before someone jumps on me about the difference in my cruise speed and that 3 knot difference previously reported, I normally fly at relatively low indicated airspeeds. I like the efficiency available at the lower speeds and I enjoy flying. I only use maximum cruise powers when I have the need for speed and that is not often a factor for an old guy like me. My long time perception is that my V35B is about eight knots faster than the model 36s that I previously owned. That is, of course a very small sample, and as George has mentioned, the rigging differences between otherwise identical airplanes is often responsible for 5 knots and can occasionally make a ten knot difference.

Happy Skies,

Old Bob

[ARTICLES/20001116_114024_msg16330.tex]

A36 vs. V-Tail Bonanza

Tue, 29 Feb 2000 10:00:13

In a message dated 2/29/00 12:31:27 AM Central Standard Time, johnmills@sprynet.com writes:

Would it be easier to put a V tail on a 36?

Good Morning John,

No doubt that it would! Unfortunately, most of the model 36s seem to be very heavy airplanes.

Beech claimed that the stretch only added 31 pounds to the empty weight. However, most of the Model 36 series weight and balance forms I have looked at seem to be 2500 pounds or more. There is no question that those airplanes all had a lot of equipment. Who knows!

The stretch airplanes that we had, always seemed to be rather heavy and stodgy which is why I went back to the V-Tail for my retirement airplane.

Even my current Bonanza flies like a Mac truck compared to my sons J model and that is heavy and ponderous when compared to a C model or earlier.

I guess my dream airplane would still be a 1952 C model with a 550 engine and the fuselage stretched in the manner of the 36. I would not put in the big cargo door. I like it a lot. It is (in my opinion) one of the best features of the Model 36, but it has to add considerable weight.

The thing that I like most about the model 36 is the visibility in front of the wing. The broader CG range is a close second. The V-tail would not be likely to enjoy the expanded CG range and I would probably have to carry ballast to keep the CG within limits when flown with one or two people up front. Since I hate to carry anything that does not have a purpose, I would probably install a fuselage fuel cell in the back to handle CG adjustments. That adds to the workload as it would require following a burnout schedule to keep things in balance.

I guess there is a reason Beech never did it.

But it would be a fun project!

Happy Skies,

Old Bob

[ARTICLES/20000229_100013.msg03899.tex]

Baron E-55 TE-1152 (oddball serial number)

Thu, 22 Oct 1998 10:35:18

Good Morning Ron Koyich,

In a message dated 10/22/98 9:11:14 AM Central Daylight Time, rkhintak@mnl.sequel.net writes:

For instance, take engine operating range on the tach. Serial TE-1084 through TE-1170 (except TE-1152) green arc is from 2000 to 2700. Serials TE-1152, TE-1171 and after green arc is from 2000 to 2650 (or 2550 with two blade prop). Red line in both is 2700. This has something to do, I think, with different McCauley props - there's an exception for 1152 in that area, too.

The notation that you have spotted generally refers to an airplane that was pulled off the line to originate a model, part supplier or series change in the airplane by Beech Aircraft Corporation. As an example, the later V35B is often referenced as D-10097, D-10120 and after. The preceding series is often listed as D-9947 thru D- 10119 except D-10097.

I believe this notation refers to changing from the 12 volt system to the 24 volt one among other things. It is my understanding that the "exception" can be as small as a change in the supplier of a rotating beacon to a major model change.

You probably knew all this already but just want to know the specific change for that airplane. If you are really curious you might be able to figure it out by careful perusal and cross referencing of several sections of the parts manual.

Happy Hunting,

Bob Siegfried Ancient Aviator

[ARTICLES/19981022_103518.msg06192.tex]

Bonanza History

Sun, 7 Sep 1997 14:32:38

To John — The future Bonanza owner.

Glad to have you planning to join the ranks of the most satisfied airplane owners in the world!

Having said that there are some things that one should be aware of when first becoming associated with the Bonanza.

First of all, it is an ancient design. The basic layout can be traced to airplanes designed by Mooney in the thirties. (The Dart, Culver, etc.) The first sketches of the design during WW II were for a three place conventional gear (tail wheel) airplane. It looked almost like a Culver Cadet with the tapered square tipped wing substituted for Mooneys elliptical tipped wing.

Airplanes of that era were regularly designed with the CG where the pilots sat on the theory that they could then easily handle pilots of many different weights. In the middle forties when the Beech designers were working to come up with the small cheap and efficient everymans airplane, their maximum efforts were put to making the airframe and all of its accessories as light and as efficient as possible consistent with economical construction technique. They weren't pushing the aerodynamic design envelope as hard as they were the production and weight of components envelope.

As we all know, they came up with a winner. The light weight and efficient aerodynamics combined with superior handling characteristics made a delightful and efficient machine. Unfortunately the CG envelope was a little narrow.

As the years went by and the back of the airplane was made more and more available to we aviators to stuff things into it became easier and easier to get the CG too far aft. The airplane has some very bad flight characteristic with a far aft CG and in the later versions it is very easy to get it loaded in that manner. This was made even worse when the large (and very desirable) 80 gallon tankage became available. With the tanks full the airplane might feel pretty good on takeoff but after burning 450 pounds of fuel from in front of the CG the airplane could get pretty squirrely. It is worse at low airspeeds and of course low speed is desirable for landing!

The ones with that funny looking inverted "T" tail are a little better, especially those stretch models with the wing moved back 10 inches in relation to the engine. The model 36 can handle things pretty well with careful loading.

Things are made a little worse by the fact that it is usually easier to mount amplifier boxes, autopilot mixers and servos in the rear so that is commonly where they go.

The Ms and Ns are pretty good about CG if they haven't had too many things added in the wrong places.

Modern airplanes using the airfoils with maximum thickness further aft allow the spar

to go under the rear seat and since the designers now realize that they always have a pilot they can put the pilot ahead of the CG and things work out real nice.

CG ranges on modern airplanes are much easier to work with. The Bonanzas are fabulous machines but they are all sensitive to loading and the full fuel and empty fuel wts must be considered.

Find yourself a good airframe and you can fix everything else. A crummy airframe is a crummy airframe regardless of what you do to it. Any airplane that has had a lot of different components added or taken off needs to be looked over very carefully.

The paper work on any airplane that old is likely to be very inaccurate. The only way to tell for sure what the current weight and CG situation is is to weigh the airplane and calculate the new CG. It must be done properly by someone with good equipment and no axe to grind.

I hope you find what you are looking for and look forward to meeting you at some of the flyins.

Yours,

Bob

[ARTICLES/19970907.143238.msg01683.tex]

Bonanza Weight

Mon, 7 Aug 2000 15:00:57

In a message dated 8/7/00 11:55:59 AM Central Daylight Time, Ernie.Ganas@email.msn.com writes:

I think some of the weight is better soundproofing and plusher interior on the newer Bo's, but where in the heck did the rest of weight come from?? All the plush up couldn't be more than 100 pounds I wonder where did the other 250 pounds come from???

Good Afternoon Ernie,

Don't know about all of it, but 78 pounds was for air-conditioning. The owner said he wanted it without air conditioning, but was told they wouldn't make them that way. I haven't had a chance to ask a Raytheon person about that, but Lynn Jenkins was there and he said he thought they could still be purchased without air-conditioning.

With the AC installed, they also have to have the 100 amp alternator. Don't know how much that weighs but it has to be six or eight pounds.

The airplane also had the crummy little 8 amp backup generator and the associated relays and wiring along with the big heavy electrical powered standby pressure pump.

There is at least one hundred pounds of aluminum and steel that has been added via the "commonality of parts" program.

In order to reduce the parts inventory, Beech started using as many components from the Baron as they possibly could on the 33s, 35, and 36s. Everything from landing gear components to some of the little gussets and brackets. It is nice that we can still get brand new parts for our airplanes, but it is disgusting that they are strong enough to be used on a six thousand pound airframe!

The best model 35 that I ever owned had forty pounds of radios and a full AN gyro panel yet it only weighed 1590 pounds empty. Every year that old commonality of parts bugaboo has snuck the weight higher and higher.

They are a lot stronger than they were in those days, but there are a lot of parts that are much heavier and stronger than they need to be to attain the current overall structural strength.

Such is life! If I were in the market for a model 36, I would buy the earliest one I could find that met my condition specifications. They are a loadhauler, but they need to be kept light to gain the maximum performance.

Happy Skies,

Old Bob

[ARTICLES/20000807_150057.msg11851.tex]

Bonanza vs. C-210

Wed, 17 Nov 1999 09:43:19

In a message dated 11/16/99 7:40:29 PM Central Standard Time, RSmith8594@aol.com writes:

Fred,

I went through the same ordeal about 1 year ago, the Bonanzas are an excellent choice. Initial cost and maintenance will be higher than the plane I purchased. I bought a 1961 Cessna 210 with 2200 TT and 80 SMOH on eng and prop. In the last 15 months I have taken my private pilots in this plane and put aprox 200 hours on it. Orriginal cost was \$45,500.00 and I have since added some upgrades (newer radio, apholstery and better brakes) It is a very stable plane to fly, gives me 165 K @ 10,000' on 11 + - gallons per/hr.

As a student pilot and now a low time pilot I paid \$2,100.00 per year for insurance. We use our plane much the same as you say you will. We live in the Seattle area and have gone to Pheonix, San francisco and Calgary, Alberta with our kids.

Good luck!

Rob Smith

Good Morning Rob,

I am glad that you found an airplane that fit's you and your family. I have very little flight time in the C210 but have noted that there are many fine attributes. You can park a car under each wing in the hangar, you can stand comfortably under the wing during a summer rain shower (maybe even a winter one!) and it excels at providing a view of the ground for the passengers.

The 210 has a roomy cabin, an excellent payload capability and a CG range that is the envy of many Bonanza drivers.

Cessna has done a fine job of adapting the Cessna 170 into a very extensive line of hard working airplanes. They are to be congratulated!

But, I wonder about the accuracy of the numbers you have given for your attainable cruise configuration?

I know that my Bonanza is one of the slowest ones in captivity and I am sure there are others of the same era and power that are at least ten knots faster, still, I have never had a 210 of any type pass me up! I would imagine a turbo charged one could do so at altitude, but it has never happened to me.

My airplane requires close to 13 GPH to attain 165 knots at ten thousand feet. If I am heavy, and due to my overeating, I generally am very heavy, I can only count on around

156 to 160 at ten thousand burning a full gallon per hour more than do you!

If you are ever in the midwest, I would sincerely appreciate the opportunity to make a few comparison flights (read flat out race!) including an actual comparison of fuel burned by making a representative flight and then, filling the fuel cells.

Who knows, maybe the 210 is an even better machine than I thought!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19991117_094319.msg10683.tex]

Buying a Classic

Sun, 22 Aug 1999 14:26:36

In a message dated 8/22/99 9:15:11 AM Central Daylight Time, safety@zeus.chapel1.com writes:

A partner and I are trying to decide between two 47-48 models. One has the elec. prop and a 185 hp. The other has the 225 and the Hartzell with the ad in compliance. If both planes are close in equipment and hours, how much performance difference is there between the 185 & 225? How much performance and maintenance difference is there between the hydraulic prop and the electric? Any information is deeply appreciated because our experience has been with Cessnas. You can post or reply to me directly at lp1coll@acs.eku.edu Thanks in advance for your help!

Good Afternoon Larry,

There should be very little difference in performance between a straight 35 equipped with the E185 and one that has an E225.

The straight 35 airframe is restricted to a maximum of 185 HP for takeoff and 165 continuous regardless of what engine is installed.

I know there are lot's of folks who are pulling higher horsepower than is allowed. Some have told me that they had a 337 or other paperwork showing the installation to be legal for higher power.

I have yet to see even one single airplane that had such paperwork. I doubt if any exists.

There were a lot of structural improvements made in the A35s over the straight 35s.

I consider it unwise to utilize a higher power than is approved on those early airframes. In the same vein, I would not operate one above the current AD imposed speed limits. They are wonderful light weight airplanes and perform admirably at the weights and power settings that are approved. Why take a chance?

With the E225, there is a manifold pressure restriction as well as reduced RPM limits so as to preclude the engine exceeding 185 horsepower.

I always felt that the Beech electric prop with the 88 inch blades performed a little better than any shorter bladed prop, but that was a subjective evaluation and not scientifically measured.

The E225 should give slightly better T/O performance at altitudes above three thousand feet or so, as three thousand is about where full throttle could be used for takeoff and the engine would still be developing the full allowed 185 HP. The climb and cruise performance at various higher altitudes should be slightly better with the 225 for the same reason, more HP available at any given manifold pressure.

There is a definite advantage in takeoff and climb for the 88 inch prop with either engine.

An interesting anomaly appears in the Aircraft Specifications concerning approval for higher horsepower engines in the A35 and B35 airplanes which does not apply to the straight 35 series.

If an E185-11 is installed in an A35 or B35, it is restricted to the same horsepower as the engine originally installed in the airframe, just as is the straight 35. The full 205 horsepower is NOT allowed.

Should you happen to put an E225-8 in an A35 or B35, the full 225 horsepower is available on both the A and the B. Doesn't make sense I know, but that is the way they were approved.

Hope that helps!!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990822_142636_msg07144.tex]

C and D Models

Fri, 3 Sep 1999 11:24:31

In a message dated 9/3/99 9:32:41 AM Central Daylight Time, beech_35@yahoo.com writes:

Although no one does it, the only way to ensure there will be no surprises is to perform an annual inspection on the subject airplane. A cursory inspection and examination of the logbooks may turn up some show-stopper, but nothing substitutes for an annual.

Good Morning John and Richard,

I would second everything John has said and add that I think the D is one of the best models ever built. There were a ton of small changes made on the 51 C and especially on the 52 C model. The D is almost the same as the late 1952 C model airplanes with just a few minor improvements.

I can't delineate them all, but it was a time when Beech realized that these were not going to be throwaway airplanes and that they would likely be around for several years. (I doubt they thought they would be around this long though!) Between 1950 and 1953 many changes were made to the structure which improved serviceability and simplified maintenance.

Yet the airplane is still relatively light and performs very well!

The one caveat I would add to John's post is a caution as to who does that pre-purchase annual. There are still those out there who will do a lick and a look and sign off an annual inspection. For one thing, NO airplane has to be in perfect or even in good shape to pass an annual, it just has to meet the minimum airworthiness standards.

Make sure that whoever does it is a knowledgeable Bonanza mechanic and has your interest at heart and not the sellers!

ENJOY!!

Happy Skies,

Old Bob

[ARTICLES/19990903_112431_msg07832.tex]

Cabin Size

Sun, 10 Jan 1999 20:07:24

In a message dated 1/10/99 6:16:29 PM Central Standard Time, raylockhart@tconl.com writes:

According to Larry Ball's Book, The (1970) F33A is merely a 285 HP model of the (1970) F33. However, beginning with the first deliveries in 1971 the F33A acquired the cabin length of the V35B. So, I would assume that the cabin length of the F33 is 19 inches shorter than some F33A's

Good Evening Ray,

As you undoubtedly already know, length of the cabin makes very little difference in the basic structure of the airplane. The longer cabin is merely extended further aft in the fuselage.

The 1947 Bonanza and the last of the model 33s all have the same exterior dimensions with the exception of spinner and tailcone lengths.

There are of course many little beefups and such to handle the higher weights, but the basic structure is not changed. The only ones that actually have a bigger fuselage are the models 36 and 58.

From the pilots point of view, or should I say place of sitting, the roomiest of the series is the 1947 model 35 and the smallest and most crowded is the pressurized model 58 Baron. There is a definite advantage to the adjustable seats in accommodating the longer legged aviators, but that entails a substantial loss of headroom over that available in the early airplanes equipped with the fixed bench seats. (Not to mention that the lower seating arrangement makes it a LOT easier to crank the gear down!)

The difference Larry mentions is strictly a matter of how far back in the fuselage the cabin extends. A marketing decision, not an engineering one.

Happy Skies.

Bob Siegfried Ancient Aviator

[ARTICLES/19990110_200724_msg00425.tex]

Carpet

Mon, 5 Jun 2000 16:52:56

In a message dated 6/5/00 2:28:30 PM Central Daylight Time, raven@tminet.com writes:

I'll bet I can get a lighter weight carpet, too- this one weighs about 5lb!

Good Afternoon Bill,

On the original model 35s, there was no carpet as such. They had carpet like cloth fastened to the fir plywood pieces. They did a fantastic job on weight control!

Happy Skies,

Old Bob

[ARTICLES/20000605_165256_msg09140.tex]

Control Locks

Wed, 24 May 2000 22:50:22

Good Evening All,

Just want to put in my two bits!

I like control locks. I particularly like control locks which can be applied and removed from the cockpit!

Cessna and many other manufacturers have provided locks which went through a fitting on the control panel. Most were equipped with some sort of a flag. Piper had a lock on the Super Cubs which fit over the top of the control stick. The DC-4 and the DC-6/7 had one which was a lever which came up from the floor and locked the controls somewhere in the bowels of the aircraft. So does the North American AT-6.

The Douglas DC-3, and many other airplanes of the era, had control locks which fit externally on the control surfaces themselves.

Note that none of the manufacturers of those aircraft made any attempt to block the airplane from being started and or taxied with the control locks in place. Almost all had various flag and warning devices attached to the locks which could be seen if one made any effort to look at all.

Then along came Beechcraft. They designed a very simple and light weight locking device that was accompanied by a blocking device that would make it difficult, if not impossible, to start the engine with the lock in place.

To my recollection, Beech was the only manufacturer who made any attempt at all to make it difficult to start the engine with a control lock in place. Now I hear everyone berating Beech for providing a product which can be broken by the user and end up not stopping the operator from starting the engine. It appears that they would be subject to less abuse if they had merely installed a flag or streamer on the pin as does every other manufacturer.

The Douglas DC-4 and DC-6 had a lock which was held in the locked position by an overcenter device. A gentleman named Lucky Jordan attempted a takeoff in a DC-4 on Runway 22 at LGA with the control lock in place and the airplane crashed off the end of the runway. The fix was to eliminate the overcenter up lock and provide a tape which came down from the overhead, over a pin on the console and back to the lock lever to hold it in the locked position. I know of no case since that time where the control lock on that aircraft was not properly released before takeoff.

As far as I am concerned, the pin all by itself without a flag or streamer is more than adequate. I am sure that I am as likely as anyone to make a mistake, but I find it hard to believe that anyone would get up to a speed above a safe abort speed without attempting to move either the elevator or the aileron on a Bonanza or a Baron. Certainly a checklist will include wiggling the controls before takeoff, and I suppose if there is absolutely no

crosswind, we all may fail to lay in some aileron, but the feel of a locked elevator ought to be apparent to even the most ham fisted aviator. I know that when I forget to trim the airplane properly for takeoff, the control column position tells me about it by the time the throttle is open.

I want no more requirements from anyone that try to tell me how to lock my controls. I like flags and streamers for myself, but I don't want to presume to tell anyone else how to best warn themselves that control locks are installed.

Simple use of the controls to aid in directional control when taxiing will alert anyone to the existence of a locked or jammed control surface. Not only that, it is good technique and helps save the brakes and steering mechanisms.

Why don't we congratulate Beech for at least trying to make something that would warn the most complacent of us that a lock was in place instead of threatening them with lawsuits for not making a device which could not be damaged by improper use?

If we feel that the blocking device is necessary to keep us from starting the engine with the control lock in place, then I guess it is up to us as individuals to see that the locking and blocking device is in the condition that it was when delivered with the airplane.

Happy Skies,

Old Bob

[ARTICLES/20000524.225022.msg08611.tex]

Diesel and Gas Turbine Engines

Sun, 23 Apr 2000 20:48:26

Good Evening All,

When I sat down to see what had happened on this forum in the last few days, I was struck by the interest shown in the diesel engine controversy.

Just some comments on how I perceive the situation. I would be interested in what others have concluded.

1. Gas turbine fuel has a greater availability world wide than does AVGAS.
2. There is more "power" available per pound of gas turbine fuel than there is per pound of AVGAS.
3. There are more pounds of power in a gallon of gas turbine fuel than there is in AVGAS.
4. The current crop of gas turbines do not provide the specific fuel consumption numbers that most of us want for operation of our low altitude, relatively long range, style of aircraft.
5. Today's gas turbine engines provide the greatest amount of horsepower per pound of engine weight.
6. Internal combustion piston engines utilizing Diesel ignition have historically provided the best specific fuel consumption figures.
7. Recent advances in ignition timing control and fuel delivery control have allowed better specific fuel consumption in lighter weight engines whether the fuel is ignited by Diesel or spark ignition.

The first three points indicate to me that we should be directing some effort toward finding a powerplant for our aircraft which will utilize current or future gas turbine fuel.

The last four items direct my thoughts to development of the internal combustion piston engine as our best current hope for the combination of power and economy that we desire.

I wish I could remember more of what George Braly was showing with his magic ignition system down at Sun 'n Fun, but it seems there is a potential that his engine could be run on current turbine fuel, though possibly at a lower peak power output than we are getting using AVGAS.

It seems to me that the next practical baby step for us to take is along the line of what George is doing. Learn to control the power pulse so that the engines can be lighter per pound of horsepower developed.

The next step would seem to be to better control the timing and rate of flow of the fuel as is being done with current Diesel research.

I guess my conclusion is that it is not an argument between Diesel ignition and spark ignition, but rather a quest to better understand the combustion process and the mechanics of harnessing that combustion to provide usable power in a power plant that can use the widely available and more environmentally acceptable gas turbine fuel.

If George can provide his ignition source at a price that I can justify expending on my aircraft, it will find a home. That has to be the first step. The next is to develop whatever it is going to take to allow us to use that turbine fuel.

This conclusion is from my non-engineering, strictly operational background. No guarantees on any of the above!

What say all of you?

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/20000423_204826_msg06919.tex]

Diesel and Gas Turbine Engines

Tue, 25 Apr 2000 07:53:12

In a message dated 4/24/00 2:54:24 PM Central Daylight Time, newmanb@rocketmail.com writes:

2. I would prefer a turbine engine to a piston engine even if the specific fuel consumption was not as good as the piston engine. However, I am not holding my breath since no attempt in the last 40 years at a simplified turbine engine that would even approach our price point has succeeded. Williams is closing the gap, but the gap is still there.

Good Morning Bob,

How much worse SFC would be acceptable to you?

The fact that almost all commercial operators have switched to turbine power is evidence that the economics of high fuel consumption can be practical if the benefits are sufficient.

It seems to be a matter of the stage length the flight is to be flown measured in hours rather than miles.

For short duration flights, the high power more than makes up for the additional burn required. Let's assume a three hundred horsepower turbine engine that weighs 150 pounds and a three hundred horsepower piston engine of 450 pounds. Let's also assume that the piston engine has an SFC of .4 and the turbine 1.0, that would allow the airframe carrying the turbine to accommodate 300 more pounds of fuel at the same gross weight. (This, of course, discounts consideration of weight savings to be gained by designing the structure to take advantage of the change in weight distribution.)

Cruising at 225 horsepower, the piston would be burning 90 pounds per hour and the turbine would consume 225 pph. On any flight shorter than three hours and twenty minutes, the turbine wins! But, if one needs an alternate, things get complicated. The slower the airplane, the more time is needed to get to an alternate. At turbo jet speeds, one hour provides a lot more alternates than it does at 160 knots.

Throw in a desire to fly longer stage lengths or to ferry fuel and the piston engine starts to shine. That is why some folks are considering the use of the Orenda on the old King Air airframes. It doesn't have the macho feeling of the turbine, but for long range it is very efficient. Plus the fuel costs are a LOT lower.

If the fuel costs are the same per pound of fuel, the cost of the fuel will be two and a half times more for the turbine. When turbines were first introduced to the air carrier world, gasoline was three and a half times the cost of turbine fuel. That made the costs competitive provided tankering was not required and if you didn't need an alternate.

Such price differentials do exist in some parts of the world, but in our markets there is little price advantage to turbine fuel, certainly not enough to make the turbine fuel costs lower than the piston.

The reliability of the turbine has exceeded the reliability we have with pistons and that is an important factor. I would probably accept a slightly greater cost to gain that reliability, but I don't know just how much!

Most of my cross country flights are four to five hours in length with an occasional seven to eight hour leg thrown in. I suppose if the costs, both acquisition and operational, were identical, I would opt for the turbine and more fuel stops!

But, if my fuel costs for the turbine were two and a half times higher than for the piston, I would probably stick with the piston.

Too bad we don't have a competitively priced turbine available.

Happy Skies,

Old Bob

[ARTICLES/20000425_075312.msg07020.tex]

Differences Between S35's and V35's

Thu, 12 Mar 1998 10:46:09

Hi again Skip,

In a message dated 98-03-12 10:05:34 EST, you write:

I am trying to find the differences between the bonanza models built between the 1964 S model through the 1968 v35 a. Any info or thoughts would be greatly appreciated !!!!!

The biggie was the increased gross on the V model and later from 3300 to 3400. An interesting point is that if you put BDS tip tanks on the S model through the V35B the gross goes up to 3550 thus an S model gains 250 pounds and the others only 150.

The earlier the airplane, the lighter the airframe. Most all of the additional weight in later airplanes is from the use of Baron parts for production commonality purposes with no real effective increase in structural integrity. The best load haulers are the early S models with tip tanks. Great machines.

The fastest Bonanza I have ever owned was a 1964 S model, N8664Q. If I had known what an exceptional airplane it was, I never would have let it go. I have never had another one that performed as well as that airplane. I also had a glider tow hitch approved on that airplane and it was the most fantastic glider tug you ever saw.

Oh well, we live and learn!!

Happy Skies,

Bob

[ARTICLES/19980312.104609.msg01219.tex]

E-Series Engine

Thu, 15 Mar 2001 10:19:49

In a message dated 3/15/01 8:58:29 AM Central Standard Time, dcoyote@ix.netcom.com writes:

Hate to burst your bubble, but the E series were running in the Navions before the Bo, so I sorta doubt they were designed specifically for the Bonanza.

Rich

Good Morning Rich,

No, the engine was designed specifically for the Bonanza.

Unfortunately, The Bonanza was slow in gestation.

North American requested an engine in the same power range and Continental developed the E-185-3 wet sump version of the E-165/E-185 for them. Since North American got their airplane to market sooner than Beech, The -3 version was the first one available, but the E-165-1 was the start of the program and was rapidly developed into the E-185-1 when Beech decided that 165 horsepower was just not enough for the Bonanza.

Incidentally, did you know that the Bonanza which was first one to fly on December 22, 1945, was powered by the four banger geared Lycoming and not the Continental engine? It also had the "round" wing, not the 23000 series used in the production aircraft.

Happy Skies,

Old Bob

[ARTICLES/20010315_101949_msg05925.tex]

Early Bonanza's

Fri, 3 Nov 2000 00:03:22

In a message dated 11/2/00 6:34:59 PM Central Standard Time, usnapilot@hotmail.com writes:

I am looking at a 1947 BE35 (SN 619). It has a lot of upgrades and seems to be well maintained. I am curious what you guys know about this year of Bo's and what advice you can give me. Also, I am curious about this speed restriction—if someone can give me the low down on that, I would appreciate it. As always, thanks for the advice.

Good Evening Andy,

I am sure you will get many opinions that differ from mine, but here it is.

The Straight 35s are wonderful flying airplanes. They are light and very responsive to the controls. A real pleasure to fly.

The speed restriction may or may not be something that is important, but if it were mine, I would honor the speed restriction until the procedures required by the appropriate service bulletin had been complied with.

Regardless of what engine is installed in the airframe, it is not legal to use more than 185 horsepower for takeoff and 165 horsepower for cruise.

The maximum RPM allowed for takeoff is 2300 RPM and the maximum allowed for all other operations is 2050.

Considering the age of the airframe and the very light construction of the airplane, I would suggest that the legal limitations be observed. The same goes for the gross weight limits.

The airplane is approved for a maximum gross TO weight of 2550 pounds. The very earliest ones had empty weights as low as 1500 to 1600 pounds, however most of them gained weight in the past fifty some years. It is not at all unusual to find 35s with an empty weight of 1800 to 1900 pounds. That doesn't leave much room for people and fuel.

If you are a very knowledgeable Bonanza aficionado and just want operate a vintage Bonanza in the same way one might own and operate a vintage automobile, go for it. They are a lot of fun and great machines, but don't expect to be able to add equipment such as big engines and extra fuel tanks to make the airplane do the job of the newer, stronger and heavier airframes. You can make it look like a late model, but it will still be the same original aircraft structurally.

If you do decide to buy one, be sure you know what you are getting into!

Happy Skies,

Old Bob

[ARTICLES/20001103.000322.msg15640.tex]

Early Bonanza's

Fri, 13 Apr 2001 22:50:13

In a message dated 4/12/01 7:40:48 AM Central Daylight Time, thomas.jankowski@provision.com writes:

Hello all,

I have flown 8 h on my "new" 1948 35 Bonanza and some questions came up.

Does any body has manual for the electric beech prop (maybe mechanical drawing?). I have following problem :

On my last flight, during approach training, my prop stacked in full forward position. Since no body in Germany is flying electro prop, i have no chance to compare its function. The electro motor was loose. After fixing I let my friend look at the blades and i ran the pitch motor to and fro. My friend was saying the blades are not moving. After inspecting it again I have found out that the pitch control is not linear, first it moves slow then fast. Is this intentional, or is the grease old. Any comment on this before i start taking every thing apart.

The second question: My engine is 225-8 S/N 40092-D 577h after last overhaul the EGTs are some where near 1400 F but the CHT is 370 to 430 F. Is this normal ? What will be the normal operation for the CHT/EGT with this engine?

Good Evening Thomas,

It seems that you have had some very good answers to your questions and I have little to add other than a caution.

You mention that you have a "new" 1948 35 Bonanza.

Beechcraft built two different models of the 35 in 1948, the "straight" 35 and the A35. The A35 was called the new 1949 model, but quite a few of them were built in late 1948.

Serial numbers up to D-1500 were the straight 35 and the A35 started with D-1501.

The engine and propellor combination that you have has been fitted to many model 35 and A35 airframes. The limitations on the operation of the engine are considerably different depending on which model aircraft that you have.

There were some A35s built during late 1948. Yours may be one of those airplanes, though the factory did not refer to those as 1948 models. They definitely listed them as the "New 1949" model Beechcrafts.

The A35 can use the full power settings of the E225, but the straight 35 cannot.

Regardless of which engine and propellor combination is installed in the straight 35 airframe, it must not be allowed to exceed 185 horsepower. Even that power is only allowed for one minute during and after takeoff. The rest of the time it is restricted to 165 horsepower. Those are the powers that can be developed by the original E-185-1 engine which was standard in the 1947 and 1948 model 35 Bonanza.

When the E225 is installed in any airplane with a serial number before D-1501 (except the 35R), the maximum allowable RPM for takeoff is 2300. That is allowed for one minute during and after takeoff. All other operations must utilize no more than 2050 RPM.

While the engine is being operated at 2300 RPM, the maximum allowable manifold pressure is 26.5 inches of mercury. When 2050 is used, 27.5 MP is OK.

The first 1500 Bonanzas are wonderful, fast and efficient airplanes. They can provide many hours of comfort and enjoyment with great safety and efficiency, but they should be operated in accordance with the speeds and engine power settings for which they are certificated. The mere installation of a more modern engine and propellor does not constitute an approval to use higher power settings than have been approved for use in that early airframe.

If your airplane is serial number D-1501 or higher, the full 225 horsepower can be used, provided that all of the requirements listed in the type specifications are met, but the loading and speed restrictions applicable to the A35 must still be observed.

Have fun and enjoy, but keep it legal and safe.

Happy Skies,

Old Bob

[ARTICLES/20010413.225013.msg07689.tex]

Early History

Tue, 23 Mar 1999 22:10:40

Good Evening Lee,

In a message dated 3/23/99 8:35:17 PM Central Standard Time, you wrote:

Think what you want. The real Bonanza started flying in 47..That makes 52 years and still going strong.

Three tails were an after thought.

Deboniers and 36's are good planes, but they are not Bonanzas.

My opinion and I am sticking to it !!!!

I think you already know that I am on your side!

The first test version of the Bonanza flew on December 22, 1945, just 42 years and 5 days following Orville and Wilbur's triumph.

I believe it was in 1948 that Beech first flew a derivative aircraft, the Mentor. As the years went by many derivative aircraft were designed and produced, among them in addition to the Mentor were the Twin Bonanza, Travel Air, Baron, Debonair and Model 36. Note that the Beechcraft marketing department was able to come up with some descriptive name for all of the listed variants (and many more) except for the Model 36. Somehow they had a full blown Brain Block about that time and, in desperation, tried to steal the name of one of their early offsprings, the granddaddy of the rest, and apply it retroactively to the Debonair and the Model 36. Now the Debonair and the stretch Debonair are wonderful airplanes. They generally command a premium price and have characteristics that may well be improvements over a Bonanza, BUT there is still only one version of Beechcraft aircraft that deserves the name Bonanza and that is the Model 35.

Like Lee says:

"My opinion and I am sticking to it !!!!"

Happy Skies,

Old Bob

[ARTICLES/19990323.221040.msg03248.tex]

Early Model Wing Design

Fri, 19 Nov 1999 19:47:17

In a message dated 11/19/99 9:04:41 AM Central Standard Time, newmanb@erols.com writes:

The 35's wing design with thin skins and no shear web on the spar is clearly less robust than the revised wing introduced on the A35, which was the first model licensed in the utility category at gross.

Good Evening Bob,

I do not feel too offended by your desire to avoid the straight 35, but I would like to add some defense of the structure.

Without checking any particular source except my memory, I do believe the full web was not added to the spar until the H model. The skin thickness makes some difference in overall strength, but the major reason to thicken them up was to make them easier to work with and to reduce the cosmetic damage from light hail. You could drop a gum drop on those early skins and cause a dent!

The absolutely lightest weight version was tested to 5.5 Gs before there was any permanent set or deformation. It still hung together!

Beech kept making the wing stronger and stronger, whether it needed that strength or not, because they were under the false impression that the wings were bending and breaking due to excessive flight loads encountered during flight with the tail intact.

It was the failure of the tail assembly and the resultant tumble that made the wings come off and that will happen even with the eight G wing.

The only wing that I know of that separated in flight with the tail intact was the one that had the center section spar lower member completely broken through. That airplane had been signed off as inspected per the AD and yet the adjacent materials which needed to be removed to make the inspection were still in their factory produced condition. The airplane showed evidence of having been broken for a considerable length of time prior to the failure. It was overloaded with four large men on board and was buzzing on a hot summer turbulent day. The pilot executed a sharp pull up at the end of a low pass and the poor thing finally gave up and separated! But it didn't fail in the wing structure, it was the center section! Other 35s with that center section were found to have the same faulty welds with the lower spar completely cracked through. They were found during the AD required inspection and no others caused an accident. The thing held together whether it was supposed to or not! How many other designs have had such a robust structural backup?

It is nice to have airplanes that are stronger than the FAA requires and the A35 and later Bonanzas are stronger than the FAA requires.

BUT, so are the straight 35s!

They aren't just a little stronger than required, they are a lot stronger. I wonder if the Cessna 190 or 170 could sustain five and a half Gs without coming apart? The weakest of the Bonanzas ever built stood up to that test.

I do have reservations about the early airplanes, but it is not due to any doubt that the basic design is in need of a stronger wing! Any machine that is over fifty years old has had experiences that might have been detrimental to longevity. There is something happening to the tail and I hope the problem is solved soon, but I will guarantee that beefing up the wing won't help.

If you have one that is in the condition that it was when it came from the factory, I have complete confidence that it will meet the design requirements that were required at the time, provided it is flown within the limits that were and are specified for that category of aircraft.

Had Beech recognized the problem that the tail would have when the wing was suddenly unloaded, we would likely have much lighter built wings on our current aircraft with a corresponding increase in the useful load allowed!

There I go with another harangue, but I do want to make sure that the early airplanes are not criticized for a defect which they don't have! Too Many Old Wives Tales out there already!

Happy Skies,

Old Bob

[ARTICLES/19991119_194717.msg10820.tex]

Flush Rivets

Thu, 19 Feb 1998 12:40:16

Good Afternoon Reinhard,

In a message dated 98-02-19 11:49:22 EST, you write:

Beech must have recognized that later when they flushed a lot of those. Do I have that right?

Yes and no! I think you are correct when you say flush is better. The earliest Bonanzas had the highest percentage of flush riveting. As the years went by more and more universal head rivets were used for manufacturing expediency etc.

It does seem that the very newest airplanes are reverting to the earlier practice of more flush rivets.

And so it goes!

Happy Skies,

Bob

[ARTICLES/19980219.124016.msg01017.tex]

Gear Retraction Switch Location

Thu, 25 May 2000 15:25:45

In a message dated 5/25/00 12:45:21 PM Central Daylight Time, jtsmall@onramp.net writes:

Yes, but if Bob had been moving very likely the squat switch would not have saved him! I clean up on the move after landing but I'm close to stopping this practice.

Good Afternoon John and All,

Considering the number of incidents which appear to have been caused by the pilot operating the gear retraction mechanism at an inappropriate time, do you suppose there might be a better place to put the switch?

On the Douglas DC-4, the Landing gear lever and the flap lever were placed along side each other on the rear of, and in the middle of, the center console. The levers were of identical construction and action. The left one worked the wheels and the right one moved the flaps. Predictably, there were a number of instances where a crew member grabbed the wrong lever and added to the list of undesirable reports.

The DC-6, which was a DC-4 with bigger engines and pressurization, moved the flap lever over to the right side of the console and rotated it ninety degrees. The number of inadvertent gear retractions dropped significantly.

When the passenger jets came upon the scene, almost all of them moved the gear retraction lever up on to the instrument panel to the right of the center panel and just to the left of the copilot's position.

On most aircraft, there are no other levers or switches anywhere near the gear lever that ever need to be operated.

Inadvertent gear retractions have been reduced to an insignificant number.

The DC-4 was in production when the first Bonanza was test hopped. The first DC-6 was delivered at about the same time as the first Bonanza.

There has been a lot of human factors engineering improvement since 1947 and yet we still have our landing gear switch in a relatively unhandy location and in an area of the aircraft where many other switch and lever devices are located.

On the DC-6, and on lot's of other aircraft which utilize a hydraulic mechanism to fold away the rollers, it is not easy to relocate the actuating device.

With an electrical system, such as we enjoy, it is relatively simple to relocate a switch.

That is precisely what Beech did at the request of Lufthansa when they built all of the Debbies which were used as pilot trainers at Goodyear Arizona.

The switch is located at the upper right hand corner of the otherwise stock late Bonanza style center panel.

They did it primarily so that the gear switch is in a position similar to all of the airplanes which the students were soon to be operating, but I have been told that they have had very few inadvertent gear retractions.

When I first saw the installation, I asked Beech if they had gone through any FAA approval. I was told that since they were a manufacturer of the aircraft, no additional approval was required.

I don't know anything at all about manufacturers certification requirements or privileges, but I do know that my next panel modification will include a relocation of the landing gear actuation switch from it's present subpanel location to a position of prominence in the upper right hand corner of my center instrument panel!

I think that it should be OK to do so under the auspices of a minor alteration, but I will probably put it through on a 337 just to see what happens.

Anyone else think the idea has merit?

Happy Skies,

Old Bob

[ARTICLES/20000525_152545.msg08651.tex]

Magnesium Ruddervators

Wed, 20 May 1998 13:43:53

Good Afternoon Eric Poole,

In a message dated 98-05-20 12:03:36 EDT, you write:

For example, does anyone know what the ruddervator control surface assemblies weigh now, and how much more they would weigh if aluminum? With that I can at least do a balance and CG check and see how much of an effect the extra weight would have.

Interesting that you should bring this up. I have been considering a little evaluation of the weight of the ruddervators with magnesium skins but for a slightly different reason.

I would like to see if a set could not be built using the current leading edge and hinge assembly along with aluminum ribs and drag braces covered by one of the new light weight fabrics.

If a significant weight advantage could be obtained, I would think it might help the current early airplane situation. I have been told that some of the early preproduction airplanes had such surfaces but have never verified that with an authoritative source. My first Bonanza, serial number D10, had fabric covered ailerons and I was told that it had come from the factory with fabric covered flaps. Can't verify that.

I really don't think I would want to do anything that would add more total weight to the ruddervator. It appears that extra weight as well as unbalanced surfaces has been affecting the flutter problem.

That wouldn't help Eric's CG problem though!

I know a lot of Bonanza people wouldn't like fabric on their airplanes but I can tell you from experience that fabric will stand up to hail that would damage the skin on the Bonanzas and it has been used on some very high speed aircraft. The Douglas DC-7 had a fabric covered rudder and some of the early jet fighters had fabric covered surfaces.

Who knows, it might work!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980520_134353.msg02712.tex]

Models with Canted Engine

Fri, 22 Jan 1999 15:09:26

In a message dated 1/22/99 12:49:00 PM Central Standard Time, jtsmall@onramp.net writes:

Bob, which models and/or engines are canted and why is this?

Good Afternoon John,

On the V-tails, I believe the first one with a crooked engine was the 1964 S model. Don't know about those ones with that funny looking inverted T tail, but I imagine it was about the same time.

It was done to aid in holding the thing straight on take off, it reduces the amount of rudder pressure needed markedly with a relatively small deterioration in top speed.

It's easy to tell the airplanes that either had the crooked engine to start with or have been converted later. They are the ones that came from the factory with no afterbody on the nose bugeyes behind the spinner. They would have had to make a new one to fit the canted machine so they just eliminated the afterbody. Cheaper and easier.

If you will look at the early ones with factory canted engines, you will note what looks like a patch on the top of the bugeye on each side (on the inside that is). That is where they spliced in the new section on the bugeyes that were already in stock when the change was made.

At the time, Beech claimed that the crooked thrust line changed the applied thrust so little that the difference in speed was negligible. Could be!

I have spoken to speed mod builders who claim that the statement is true as far as it goes. The changed angle of thrust doesn't make much difference, but who were of the opinion that the canted engine creates an airflow around the fuselage that requires a retrimming of the tail surfaces to maintain straight flight. Supposedly this creates drag that makes the airplane five to seven mph slower than it would have been had the 520 been put in straight.

With the engine in straight, left crosswinds are a little hard to handle with the higher powered airplanes. I had a straight 35 back in the late fifties equipped with an engine that was developing around 235 to 240 HP. I found that at light weights, it was necessary to back off on the power or switch around to a right crosswind to keep from running out of rudder and I was using adverse aileron steering to maximum effect.

I don't believe anyone has an approval to put the 520 or the 550 in an earlier airframe without a power restriction for takeoff down to the power the airplane was originally approved with or canting the engine.

Most folks opt for the crooked engine mounts and full available power.

If I were a doctor instead of a retired airline pilot, I would love to take a P model and

have a 550 installed straight ahead just to see what it would do!

I suppose financially it would not be a wise decision, but even if it would be only three of four mph faster, I could live with a partial power takeoff restriction! If it really picked up seven mph I would be in heaven.

I guess I will never find out unless somebody tries it and lets me know.

Happy Skies

Old Unemployed Bob

[ARTICLES/19990122.150926.msg00998.tex]

Mooney vs. Bonanza

Wed, 4 Oct 2000 10:12:51

In a message dated 10/4/00 12:05:20 AM Central Daylight Time, Ernie_Ganas@email.msn.com writes:

He picked the Mooney Ovation II, while his wife favors the A-36

Good Morning Ernie,

Interesting information!

While I agree that the burn numbers seem quite high for the model 36, it really isn't kosher to compare based on percentage powers.

The Mooney uses a derated version of the 550. I am not aware whether the Viking does or not.

In any case, if the rated power of the Mooney is 280 and the 36 is 300, seventy-five percent of each would be 210 and 225 respectively.

As George has so ably pointed out, percentage power figures really don't mean much. They are so dependent on leaning and timing factors that we should probably never use them in any comparison unless we know all of the details of operation used to arrive at the so called 'percentage of power.'

The only test that I am comfortable with when comparing performance figures between two airplanes is how much fuel each aircraft burns when flown for an extended period side by side. Optimally, they should be flown in formation close enough that all airmass factors affecting one will also affect the other.

The operators should be manipulating the engine controls in a manner agreed to before the test. That planned method would vary depending on whether there was a contest or whether the participants were merely trying to establish an equivalent database for both aircraft.

For simple runs between you and me, I would suggest that we would each run somewhere around 20 to 40 degrees F lean of peak EGT at a RPM and manifold pressure that would be comfortable for the individual airplane. Obviously, there are still a large number of variables left unaccounted for, but converting the GPH to horsepower via some reasonable method using an estimated Specific Fuel Consumption figure (the one used by George is reasonable, but there are others) would supply a fairly accurate horsepower figure for the subject comparison flight.

If I were a new aviator and wanted to buy a brand new single engine airplane to carry my wife and I around the country, I would probably opt for the Mooney myself. The Mooney is still smaller than the 36 and doesn't have a very good useful load, but for two folks and baggage, it is adequate

Given my irrational love affair with the Bonanza, I would have a hard time passing up

the new 36, but comparing the new model 36 with your model 36, I don't think I could bring myself to buy a new one!

Beech, and then Raytheon, have messed up that airplane by adding so much weight that I now find the 36 to be almost repugnant.

I suppose if I wasn't aware of how great a loadhauler one like yours is, I wouldn't be so disappointed in the new ones! If I were that hypothetical new aviator, I might opt for the 36 based on the larger interior and more sophisticated structure it has compared to the Mooney.

I probably should have read the article you quote before I make such an extensive comment, I will try to do better next time.

Happy Skies,

Old Bob

[ARTICLES/20001004_101251_msg14419.tex]

Nose Bowl

Thu, 15 Mar 2001 10:08:23

In a message dated 3/15/01 8:32:10 AM Central Standard Time, sderrick@tnstaafl.net writes:

Walter Beech designed an amazing plane, but he sure dropped the ball on that DAMN nose bowl. That is the stupidest hairbrained arrangement for engine removal/installation!

Good Morning Scott,

I don't think I can agree with your assessment of the Bonanza engine mount and cowling structure.

As I am sure you are aware, Beech was not an engineer and he designed nothing. What he did is direct his engineers to come up with a light weight design that could be built in large numbers economically.

Unfortunately, the large numbers never developed so the design was never able to be built economically, but they did a fantastic job of making it light!

The integrated cowling, engine mount, nose gear support and fuselage structure on The Bonanza is still lighter than any comparable unit on any other aircraft.

I hate working on it and cuss the lack of accessibility regularly, but it is things like that which make the Bonanza perform as well as it does on relatively low power.

Had you used a Lear Romec fuel pump on your engine, it could have been installed with the pump installed. I think it is the Thompson that sometimes causes a problem.

We users have changed a lot of things on the Bonanza since Walter's boys designed the aircraft.

Happy Skies,

Old Bob

[ARTICLES/20010315_100823_msg05924.tex]

O-470/IO-470 Powered Bonanza's

Sun, 16 Nov 1997 17:04:08

In a message dated 97-11-16 16:28:07 EST, you write:

When did the IO-470s start and what were the differences between the L's,
C's, N's etc.?

The J35 (1958) was the first one with a fuel injected IO470. The 1957 model, the H35, had an O470 with a PS5C injection carburetor and an AMC (automatic mixture control) unit. The IO470 was used through the P model and then the 1964 S35 started the IO520s. There was no "L35", the C35 was built in 1951 and 52. It had the "E" series engine rated at 205 HP for take off in 1952. Nice airplane, especially the 1952 one. The N35 was very similar to the "P" I guess you best check out Larry Balls book, it has all that in it. As someone else has said, you absolutely must join the ABS and obtain the CD with all of the past newsletters on it. "Everything you ever wanted to know but were afraid to ask" is contained therein!

The earlier the airplane the lighter they are and the nicer they fly. The newer the airplane the heavier they are. Lower maintenance and higher payloads might be anticipated on the later models. I would at least call Lee Larsen and find out what he would charge to find you an airplane. You would learn a heap and it would undoubtedly be money well spent.

Yours,

Bob

[ARTICLES/19971116_170408.msg02400.tex]

Older Bonanza's and Bendix PS5C Carb

Tue, 20 May 1997 17:37:50

Hey, as long as we're talking older Bonanzas, lets cover the whole bunch. I've owned three straight 35s and they were without any doubt the best flying ones I've ever owned. They are much lighter and really do well on the small engine. (The engine isn't really small, it just isn't wound very tight) the only rub is that they take a lot of tender loving care. That extra beef that Ralph talks about in later airplanes is mainly in areas that have commonality with the Baron or parts that are made heavier for easier maintenance. There really isn't much substantial increase in the strength required for the Bonanza mission. Incidentally, the H was the first airplane that has the spar which requires the spar inspection each 500 hours. The A model through the G have NO problems with the spar at all. Only the straight 35's and the later ones need repetitive spar inspections! Personally, I think the 1952 C model has the best combination of gross weight, horsepower, servcibility and such of the early units. (There were several maintainability improvements on the 1952 C over the 1951 C) The G has all those good characteristics and yet has very little of the Baron commonality weight increase.

As to the PS5C carb on the H, When the AMC unit works it is great. Unfortunately most people never bothered to learn much about it. Also the parts for it are getting very expensive. I always felt the engines had much better fuel /air distribution with the PS5C on the "E" engine than we have with the fuel injection (pre-GAMIjectors.) on the "O" series. I always ran my "E" engines on the lean side of best power and it worked great.

Don't be afraid of the early airplanes but remember that you will probably have difficulty finding a really clean one and if you do ,it will be WORTH a LOT of money.

I think I have rambled on long enough.

Bye

[Added Wed, 21 May 1997 09:24:40]

I forgot to comment on the D model. It is almost identical to the C and I agree that it is every bit as good as the C. The C just came first and is usually cheaper to purchase. The main point I wanted to make is that the 52 C is the first airplane with all the goodies as far as easy maintenance is concerned. The 51 C flies and handles just as well but there were some small maintenance oriented items improved on the 52.

[ARTICLES/19970520.173750.msg00908.tex]

Primary Instruction in a Bonanza

Thu, 1 Oct 1998 13:14:19

Good Morning Richard Taylor,

In a message dated 10/1/98 11:58:30 AM Central Daylight Time, richard@taylorbruce.com writes:

I'm looking for advice about whether or not it is a crazy goal for me to purchase, checkout in and fly a 1950's bonanza with my level of experience.

It is a very reasonable thing to do. I have taught several students from scratch in the Bonanza, no problems at all.

The basic flying is easier than the 172, it's just a little more procedurally challenging!

Insurance may be something of a problem, perhaps Tom Turner will comment.

Gotta run now, talk more later.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981001_131419_msg05729.tex]

Questions Regarding M35 to P35

Sat, 30 Sep 2000 11:09:26

In a message dated 9/30/00 9:02:18 AM Central Daylight Time, Jeff_Kinder@oes.ca.gov writes:

Getting more excited every day about the prospect of actually owning and flying a Bonanza, I would like to ask for the assistance of the list members in a couple of questions to help me evaluate what I am looking at..

Good Morning Jeff,

There are many on this list who are much more qualified than I to answer your questions, but I will throw in my two bits as a starter.

1. What amount of time on a Bonanza airframe is too much?

Your comment concerning the maintenance an individual airplane has received is very astute. There are a lot of things that start needing serious attention somewhere around two thousand hours. If the small things have been regularly picked up and attended to, the Beechcraft recommended times of inspection and overhaul complied with and the aircraft regularly flown and licensed, a high time airframe can be an excellent choice. But the odds of finding a good one get tougher as the time goes up. Low time is better, especially one under two thousand hours. Even if the maintenance has not been stellar, not too many things go wrong in less than two thousand hours. Unfortunately, any airplane of the age group you are looking at that has less than two thousand hours is likely to have sat a lot and possibly been neglected along the way. Corrosion becomes a major consideration. Bathtub fittings can be bad, filiform (sp?) corrosion could be present, etc. If you can find that proverbial airplane that has been owned by a little old lady in the Arizona high country, has been kept in a heated air-conditioned hangar and flown only to church on Sunday, that would be the perfect one to have.

2. Issues specific to the M35-P35 series that should be given more attention when looking the airplane over (prior to a pre-purchase inspection)?

I know of nothing specific to those models.

3. Reasons to prefer one of the models over one of the others (outside of the 3rd window and the horsepower issues)?

The N or later which have the optional forty gallons on a side would be a major consideration for me. The third window (any style of third window!) can be added to any Bonanza if you want them bad enough. As to horsepower, a later 470, 520 or 550 can be mounted in any of those airframes

and it will likely be lighter than the engine it replaces. There are, to my knowledge, NO STCs to install larger fuel tanks in the wing leading edges of any of the Bonanzas.

4. Would anyone like to make any recommendations of a good shop for a pre-purchase inspection in the Delaware/Virginia area?

I don't have any personal knowledge and I don't know the gentleman at all, but Dan Towery of Cheswald, Delaware specializes in Bonanzas and has been recommended by many others over the years. Cheswald is a suburb of Dover. The airport there is Delaware Airpark, 33N.

I know this is a lot to ask of you, but your help will be most appreciated.

Not a 'lot to ask' at all, we want to welcome you to Bonanza ownership and hope that your experience will be a positive one.

Remember, engine, paint, glass, radios and instrument panels can be changed relatively easily. But, if you buy a corroded and worn out airframe, the expense and practicality of repair can be atrocious.

Buy the absolutely best airframe you can afford and forget the little things like engine, interior, radios and paint!

You will be happier in the long run.

Happy Skies,

Old Bob AKA Bob Siegfried Ancient Aviator

[ARTICLES/20000930_110926_msg14252.tex]

Rear Seat Structural Member

Wed, 19 Aug 1998 14:06:03

Good Afternoon Ralph,

In a message dated 98-08-19 13:49:21 EDT, you write:

I have heard that the rear seat is a structural member and can not be removed.

It depends on the model. On the straight 35s (approximately the first fifteen hundred airplanes) there is a tube that runs from wall to wall forming part of the rear seat. When the rear seat was removed for cargo or to facilitate carrying a stretcher patient, there was an STC for installing the tube without the seat. The tube is there to provide stiffness and hold the sides of the airplane from collapsing in. When removing the rear seat for maintenance, it is accepted procedure to fit a suitably padded jack between the side walls and force them out slightly to facilitate the removal. Very definitely a structural member. If your rear seat does not bolt directly to the side wall, it is not a structural member and the seats can be safely and legally removed. Just be sure to make an appropriate entry in the ships record.

Happy Skies,

Bob

[ARTICLES/19980819_140603_msg04545.tex]

Redesign the Entire Cockpit?

Thu, 25 May 2000 20:37:12

In a message dated 5/25/00 5:32:26 PM Central Daylight Time, jtsmall@onramp.net writes:

Which brings up another point. I would like ideally to have the trim wheel located between the seats and while we're at it why not put the flap switch there too. Problem solved this way as well. The trim wheel is awkward to reach were it is and would be a snap between the seats.

Well John,

If we are going to redesign the entire cockpit, I would have a few druthers myself!

I like a stick better than a control wheel and that would free up the entire panel for radios and instruments that could be placed just anywhere!

I think the trim wheel is in a very nice spot right now, but the center location would be acceptable. The cabling and such should be lighter and simpler where it is now. As to the flaps, for an airplane the size of the Bonanza, I would prefer manual flaps. I always thought Cessnas nice big flap lever on the 180 and 185 was just about perfect. I never did understand why they went to electric flaps on their later machines. As long as we are stuck with the electric flaps, having the switch close to the cowl flap actuator fits nicely for my after landing clean up list.

Now what are we going to replace that old Continental with?

Happy Skies,

Old Bob

[ARTICLES/20000525_203712_msg08674.tex]

Ruddervator Bob Weights

Sat, 26 Feb 2000 01:13:32

In a message dated 2/25/00 11:59:02 PM Central Standard Time, esoteric@sprynet.com writes:

bob-weights were added starting with the D35 to "harmonize" stick forces, although some claim that it took away the "sinfully light" handling of the earlier models.

Good Evening Paul,

Beech was still in their denial mode back then. The fact that the wings were being shed was blamed on ham handed aviators and PIO. Vance Breese wrote about the tail coming off and causing the tumbling which the tore off the wings, but his was a lone voice in the wilderness. It took almost twenty years for the rest of the industry to come around to his way of thinking. Meanwhile they made the airplane less and less delightful to fly by adding those devices to take the control away from the aviator!

Such is life!

Happy Skies,

Old Bob

[ARTICLES/20000226.011332_msg03658.tex]

Single vs. Twin**Mon, 24 Apr 2000 09:50:26**

Good Morning All,

The twin question continues to arise and the answer seems to be "it depends."

If the extra engine makes you feel good, go for it!

Is it safer? That very definitely depends on how the twin is operated. The mere existence of the extra engine does not provide the capability of continued safe flight following an engine failure any more than the failure of the one and only engine on a single engine airplane precludes continued safe flight.

The airlines gain reasonable safety of flight with twin engine aircraft by observing rules considering control capability and engine out performance following the failure of a critical engine.

That is not just the balanced field length concept, but it includes the evaluation of continued flight over the terrain enroute or the consideration of a drift down alternate in the event that the twin engine machine is being flown over terrain that is above the aircraft's single engine ceiling.

When the DC-3 was King, there had to be an alternate with suitable weather in every valley along the mountainous routes into which the aircraft could descend in the event of an engine failure. Many of those alternate airports are no longer available now that the gas turbine airplanes are used which have much higher single engine ceilings.

If you are flying an airplane with a single engine ceiling of five thousand feet at your present weight, don't go west of Denver if you want multiengine safety.

As to flying a single engine airplane, if you want the capability of safe continued flight after an engine failure don't ever takeoff or fly over any terrain that would not be suitable for a glide down to a safe landing.

Many years ago, I checked what it would take to fly a Beechcraft Bonanza from Chicago to St. Louis using air carrier style "drift down" techniques to provide the capability of landing on a lighted hard surface runway in the event of an engine failure.

The glide ratio that I used was for an early airplane with the electric prop which has a much better glide ratio than the current hydraulic prop.

I found that one could takeoff from ORD, fly a basically circular pattern over the airport so as to attain enough altitude to either land back at ORD

or go to the next lighted airport and so on all the way to Lambert Field by flying at a cruise altitude of seven thousand feet. It would be necessary to work out an approach procedure that would allow the aircraft to execute an approach where the airplane would always be within gliding distance of the airport during the descent.

Using such a technique, the Bonanza had the same level of engine out capability as the DC-3 had flying west of Denver.

Like I said. It all depends.

Happy Skies,

Old Bob

[ARTICLES/20000424.095026_msg06967.tex]

Single vs. Twin - Cessna Skymaster

Mon, 24 Apr 2000 12:45:26

In a message dated 4/24/00 10:55:25 AM Central Daylight Time, whprim@pdq.net writes:

He tells me that the thing can really bite you if you lose the front engine (I believe it is the front but I could have this backwards) on departure.

Good Morning Howard,

Most push-pull devotees recommend opening the rear throttle first, at least far enough to assure that it is running. Not a few pilots have had the rear engine quit after they had performed all of the engine checks. Sometimes just as they were cleared for takeoff. The takeoff was then made with just the front engine. This happened to one of my pilots when we were operating the FBO. He had picked up the airplane at Palwaukee airport to bring it to our place for some radio work. Sometime after he had completed the runup and before he took off, the rear engine stopped. He thought the takeoff was a little sluggish, but since it was the first time he had ever flown a Skymaster, he wasn't too concerned. He didn't discover that it was not running until he leveled off at cruise and began to adjust the power. The owner had stuck around to watch the takeoff of his little jewel and later called our shop to say how happy he was that our pilot had elected to try a takeoff without the rear engine as he had been wanting to try that himself but had never built up the guts!

Just an aside on the efficiency of the push pull arrangement.

The NACA (Predecessor to NASA) in the thirties ran some tests on the efficiency of that arrangement. They tested engines that were mounted on the same axis as each other, whereas the Cessna engines are mounted with the rear one slightly higher than the front. Comparisons may not directly correlate.

NACA used the latest cowlings which they had developed for both tractor and pusher installations on the appropriate engine. Their conclusion was that the interference between the airflow from the front engine and the rear was such that the best one could get from the combination was about ninety percent of the thrust that you could get if the engines were mounted side by side or on the wings.

That brings up an interesting anomaly. If you lose one of the engines, the other one becomes more efficient. You only lose forty percent of the possible thrust rather than the fifty percent that might have been thought.

On the Cessna, the rear engine performs better with the front one feathered

than the other way around. I have been told that this is due to very high drag around the rear of the fuselage with the rear engine feathered. It seems that when the rear engine is the one running, the propellor helps pull the airflow into a more laminar flow around the rather abruptly changing structure and thereby reduces the drag. This effect combined with the commonly observed phenomenon of pusher propellers being slightly more efficient than tractors makes the Cessna perform quite a bit better on the rear than on the front.

Happy Skies,

Old Bob

[ARTICLES/20000424_124526_msg06984.tex]

Straight Tail vs. V-Tail

Mon, 15 Nov 1999 15:16:00

In a message dated 11/15/99 1:24:04 PM Central Standard Time, mark-jenn@halcyon.com writes:

When I was shopping for my 33/35, I looked at both and would have bought either. I was willing to pay a small premium to get the straight-tail though because I believed it to be a better tail. My thinking would be exactly the same if I returned to the market today.

- Mark (F33A)

Good Afternoon Mark,

All of what you state is true as I see it, BUT, just as beauty is in the eye of the beholder, better is as to what the beholder wants!

If the V tail is three or four MPH faster than the straight tail, it would be my choice.

Is it faster? I am sure we can get all sorts of anecdotal references that will show it to be faster and an equal number that show it the same or slower.

When Beech first decided to use the V-tail, they tested it on a modified AT-10. From that information they estimated that the increase in speed for a 165 horsepower Bonanza would be seven mph. That is likely loaded with a little bit of sales hyperbole.

When the Debbie was first introduced, I was involved with a Beech dealership and we tried to make what unscientific comparisons we could. Since there weren't any airplanes that had exactly the same engine, direct comparisons were not possible. We did try to set up at equivalent horsepower's and felt that there was somewhere around 5 mph in favor of the V-tail. We did note, however, that some of the V-tails were slower than some of the Debbies. We started doing a fair amount of comparisons with the whole bunch and came to the conclusion that some of the airplanes were just plain fast and others were just plain slow!

I believe there is as much as ten knots difference between two apparently identical airplanes, but most are within three or four knots of each other. I don't know why this is so, but I do know that some just look like they are little more carefully assembled and those tend to be the fast ones, straight tail or V-tail.

Over the years I have owned fast ones and slow ones, model 33s, 36s and 35s.

It is my totally subjective and biased opinion that the V tail is five mph faster than a comparable 33 and about seven mph faster than a comparable 36!

There is another factor that comes into play when you are comparing V-tail accident statistics with other aircraft, be they Beech or others.

The aggressive pusher type person will buy the Bonanza because it is, or should be, or is believed to be, the fastest. The conservative buyer might well buy a Navion because it is slower and perceived to be safer.

When the Debbie first came out, we had a lot of customers buy them who stated that they had always admired the Bonanza, but they were afraid of the V-tail. Those conservative types just didn't fly their airplanes as aggressively as did the type A folks!

I think the very nature of the customer had a lot to do with the difference in the accident statistics.

Any flying machine is a compromise between maximum performance and maximum strength. FAA standards for certification set minimum standards to assure that all flying machines meet the acceptable level of risk that we have said we would be happy with. The entire Bonanza line exceeds those requirements, some exceed them by more than others!

I am not convinced that the latest straight tails are any stronger than the latest V-tails with the cuffs, but I am convinced that the more conservative pilot will tend to buy the straight tail and the more aggressive will opt for the V-tail.

Many of the early V-tails that have had extensive modification are evidencing problems that are not completely understood at this time. Suffice it to say that while I consider them "safe" to fly, I am an aggressive aviator and like the performance of the early light weight airplanes. I would not, however, fly them any faster than they are currently certificated to fly, nor at weights or horsepower's above those certificated to be used.

Happy Skies,

Old Bob

[ARTICLES/19991115_151600_msg10604.tex]

Structural Strength

Sat, 24 Jun 2000 13:26:37

In a message dated 6/24/00 11:20:10 AM Central Daylight Time, jts-mall@onramp.net writes:

This reminds me ... in another thread you and later Alan made the statement that the Bonanza is structurally more sturdy in turbulence than a commercial airliner. You also said one is better off in wind shear with the piston Bonanza than a jet. I can see that ... but the structural integrity? Tell me more about that so I can brag accordingly. g

Good Morning John,

I don't think I made that statement in exactly that context, especially as to a Bonanza being better in windshear than a jet. If I did, I must apologize as I am not qualified to make such a statement and don't believe it myself. I don't think the Bonanza is better than a 747 in a windshear. On another point, I try very carefully to describe an airplane by its aerodynamic capabilities, not by the type of engine it uses. Wing loading is much more important in this area of discussion.

Hopefully one of the many qualified engineers on the forum will supply a more correct answer than I am able to give. But, here is my perception.

The FARs do not require as much strength, as measured by G load, for the airliners as they do for the GA aircraft.

Most of the Bonanzas are built to the even stronger requirements of the utility category and not just the required normal category. That makes them stronger than the airliners as far as how many Gs they are required to withstand. However, the Bonanzas and the modern airliners will generally stand a lot more force than is required by the regulations.

We know that a 747SP will handle 5 Gs because that is what the Chinese pulled while recovering from an upset over the Pacific. I believe it was Northwest that pulled 4Gs in 727 while recovering from an upset that incurred when the crew forgot to turn on the pitot heat.

I would prefer to be in a 747 while encountering heavy weather than to be in my Bonanza. The higher wing loading means that any individual gust will not displace it as far and it will therefore not be subjected to as high a G load.

However, I would sooner do a loop in the Bonanza than in the 747. When it comes to raw Gs, the Bonanza is probably stronger! At least, it has to meet tougher G force requirements to be certified.

When penetrating turbulence, there is no beating a high wing loading!!

Happy Skies,

Old Bob

[ARTICLES/20000624_132637_msg10057.tex]

The Floor

Mon, 5 Jun 2000 14:23:45

In a message dated 6/5/00 10:31:27 AM Central Daylight Time, avil@ix.netcom.com writes:

The floor is made from cheap unpainted 1/4" plywood, and badly rotted out.

Good Afternoon Bill,

Don't be so hard on Beechcraft! The floor is made from a very light weight fir plywood, but it wasn't necessarily cheap! One of reasons the Bonanza turned out as good as it did, was due to the extreme pressure put on the designers to make everything as light as possible.

That is the reason there is the one piece combination fuel selector, fuel pump and fuel sump/drain unit.

That type engineering was pressed on all of the departments at Beechcraft. The lightweight fir plywood was used to save weight. It isn't very strong and it doesn't feel nice when you work with it, but it is light and it has done the job! There are a lot of fifty year old airplanes that still have those flimsy floor boards installed. I have replaced them with nice high grade aircraft plywood on occasion, but I always feel guilty for adding that weight. A few ounces here and a few ounces there don't seem all that important, but every ounce we carry that is not absolutely required is not only an ounce wasted, but likely several ounces as it takes more structure and power to carry that extra ounce!

Happy Skies,

Old Bob

[ARTICLES/20000605_142345_msg09130.tex]

The Secret - Weight

Fri, 4 Aug 2000 10:34:24

In a message dated 8/4/00 4:15:05 AM Central Daylight Time, epoole@scoot.netis.com writes:

That's certainly one thing among many that the Bonanzas have all over the Commanders and most other makes ... all the cool STC'd things we can spend money on to customize our rides ;-).

Good Morning Eric,

The "real" secret to Bonanza performance was the effort put out by the original designers to keep the weight down.

Unfortunately, once Walter died, that effort was lost and the airplanes have gained weight unmercifully. Even so, the Bonanza still ends up being the lightest airplane and the best performer in most comparisons of equivalent aircraft.

Just like you can't beat cubic inches in a quest for horsepower, you can't beat light weight for performance.

Happy Skies,

Old Bob

[ARTICLES/20000804.103424_msg11729.tex]

V-tail AD's**Tue, 16 Nov 1999 08:38:55**

In a message dated 11/16/99 6:44:18 AM Central Standard Time, phaedra@aerobot.com writes:

I thought the airspeed AD was only if you hadn't done the tail mod. Is there some airspeed AD even if you *have* done the mod? (We are talking about 35A model, right?)

Good Morning Ms Hise,

Beech Aircraft Corporation built the original V-tail in the 1940s, they were given the name Bonanza. The model number of the first 1500 was the Beechcraft model 35, later referred to as the 'plain' 35 by the factory and the 'straight' 35 by most of the rest of the industry. The next iterations (sometimes yearly, but not always) were the model A35, then B35 and so on through the model V35. When they reached that magic number, it was decided by the powers that be that the rest of the Bonanzas built would retain the V35 designation, but further changes would be designated by adding a following letter. We thus have the V35A and the V35B.

There were a few straight 35s which had an upgrade to a configuration close to the A35. Those were designated the 35R.

The first speed restricting AD applied to the series concerned the later airplanes, which had a longer leading edge surface. It extended further forward of the spar and added surface area to the stabilizer. This area was not supported and it was found that when flown outside of the design envelope, failure could occur. As others have mentioned, it appears that the extension should have had a forward spar or other reinforcement from the beginning, but it is amazing how good we all are with hindsight.

Once the "cuff" was added to those aircraft the speed restriction was lifted.

The airplanes that are currently operating under an AD imposed speed restriction are the 35, A35, B35 and 35R aircraft. There have been difficulties with flutter and vibration that are not yet completely understood. Hopefully a cause will be determined and a fix devised.

It must be noted in the defense of our senior designers, that the Bonanza was in the design stage some forty years after the Wright brothers first flight. The first prototype flew just forty-two years and five days after Orville's first solo!

I would hope that there has been some increase in aeronautical engineering knowledge in the ensuing fifty-four years.

Incidentally, there was an engineer named Vance Breese who started talking

about a structural problem with the V-tail as used on the Bonanza in the early 1950s. As I remember, he liked the basic design, but felt that the testing used did not fully explore the loads that could be applied under unusual conditions. It appears that he was on the right track.

Does that answer your question!

Happy Skies,

Old Bob

[ARTICLES/19991116.083855_msg10648.tex]

V-tail Safety

Thu, 18 Nov 1999 00:07:43

In a message dated 11/17/99 7:00:46 PM Central Standard Time, diamondlil@diamondlil.seanet.com writes:

The 1986 DOT report vol. 2 Has the individual analysis of the in flight breakups. In most of the cases the cause was structural failure wing. I believe Norm Colvin remarked in the ABS magazine about the wings failing first. Cheers Carmine Pecoraro

Good Evening Carmine,

It is my recollection that Beech really felt the wing was failing first for many years.

I believe that it was an H model that shed it's wings during a race somewhere in the southwest. The pilot had been asking friends questions as to how far above the redline he could safely go in the down hill portion of the race! There were high winds and lot's of turbulence in the area where the wings came off. Beech analysis mentioned that there was evidence of the wings bending up and down several times before separation occurred. I believe Beech said that the structure was good for somewhere around eight "G"s. The theory was that the pilot had far exceeded the redline in turbulent air during the descent. Flight through updrafts and downdrafts made things worse and even those eight G wings finally gave up.

Somewhere around 1952 or 53, Vance Breese came up with the thought that it was the tail that was failing first and that the airplane then would tumble end over end as did the Aircobra of WW II. That made for very heavy alternating forces applied in what would appear to be an up and down motion before the wings failed.

He further postulated that most of the airplanes that shed wings did so after the pilot had loaded up the wing quite highly. The pilot would suddenly realize what was happening and either shove forward or suddenly release the control column to reduce the wing loading. That action produced a sudden load on the stabilizers which exceeded the design limit. They then failed, causing the tumbling which led to wing separation.

An aft CG made things worse!

I think it was after this H model shed it's wings that more and more folks started to agree with Vance and I believe the 'tail first' theory is the one accepted by most today.

I remember reading lots of "official" reports in those days which spoke of

wing failure following flight into turbulent conditions. They all mentioned that the failure showed evidence of several reverses of force before failure occurred. I don't think Beech was trying to hide anything. Even with those violent conditions, had the forces been loaded and/or unloaded smoothly, the design limits of the tail would not have been exceeded. Vance felt that it was the panic style of effort to unload that was causing the failure.

I think we all wish that Beech had made them a little stronger to start with, but it is a lot easier to see that now than it was forty years ago! I am glad my airplane has the cuffs. It was a good idea, but the airplane was safe without them, provided it was flown within the design parameters. It is even better with them!

It was a good example of the fact that we must first determine what the problem is before we can devise a fix. Beech kept making the wings stronger and stronger because they thought that was the problem. Once everyone accepted the theory of the tail failing first, the problem seems to have been solved.

It is my hope that we will be able to determine soon what is causing the trouble with flutter that has surfaced recently. It is the same deal. Once a problem is recognized, it ceases to be a problem. But, if we keep trying to apply a fix to a problem that doesn't exist, we get nowhere and don't accomplish anything!

The important thing is to find out what is really happening.

Happy Skies,

Old Bob

[ARTICLES/19991118.000743_msg10717.tex]

V35A-TC

Tue, 5 May 1998 15:13:31

Good Afternoon Timothy W. Freeze,

In a message dated 98-05-05 12:25:41 EDT, you write:

Thanks for the input. I'm going fopr the test flight Wednesday and looking forward to it.

Have fun!

You will find it a delightful airplane but a totally different breed of cat from your F35.

It is a lot heavier and a lot more expensive to maintain. There are some areas of reduced maintenance due to the heavier and more rugged airframe but the addition of the turbo and the more expensive fuel control system add considerable to the maintenance costs.

It isn't just the turbo system and heavier engine that add to the weight, the airframe is substantially heavier. The newer the Bonanza, the more Baron parts it has in it and consequently, the heavier it is. Not all bad, but they just don't have the deliciously light control forces and responsiveness of the early airplanes.

For high altitudes the turbo is great, with tip tanks the range can still be substantial. If you need the performance available, the costs are not excessive. If you don't need the altitude capability or the higher speeds available, your F will operate a lot cheaper!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980505_151331_msg02264.tex]

Which Bonanza?

Mon, 7 Feb 2000 11:02:17

In a message dated 2/7/00 8:34:35 AM Central Standard Time, jtsmall@onramp.net writes:

The unstated assumption here is that one is comparing a later model Bonanza (and that cost) against what it would cost to upgrade an earlier model to the same level of fit and finish (plus the lower initial purchase price), correct?

Good Morning John,

I believe your above statement is correct when only the potential for financial recovery or possible appreciation in value is considered. Most changes to a stock factory airplane affect the airplane like a swimming pool in the midwest affects a house. It may make it easier to sell or it may make it harder to sell, but it affects the value very little, if at all.

If you can find the airplane that fits your mission, buy it!

The Bonanza line is unusual in that the same basic design is available in airframes of many very different strengths and weights.

Continental has maximum continuous horsepower from 165 to 300 available in engines that are all almost the same size and shape. Any of them will fit in any of the Bonanzas or it's derivatives. The 470, 520 and 550 all weigh about the same. The E series engines are lighter, but still the same size.

The option is there to build almost anything your heart desires, but custom building anything is more expensive than choosing a high production item.

If you want an airplane that will carry six adults and baggage on a thousand mile trip, no Bonanza will do it, but the model 36 will. If you have a vacation home with a nice 800 foot strip in the backyard, An A35 with an E225 and an eighty-eight inch Beech electric might be a better choice than the stretch Debbie!

(Before somebody complains, I love the Debonair and the Stretch Debonair, but all Bonanzas have V-tails, regardless of what the Beech sales department decreed!)

Throwing more horsepower at an airplane is a terribly inefficient way to get speed.

The heavier airplanes will attain maximum efficiency at a higher indicated airspeed, but they will still burn more fuel doing it. Nothing is free.

I like the big engines for the rate of climb they provide. I also like an

airplane that can safely get out of any airport it can safely land at. The big engine helps!

Enough philosophical discussion. I gotta run!

Happy Skies,

Old Bob

[ARTICLES/20000207.110217_msg02509.tex]

Chapter 4

EQUIP

4.1 EQUIP-DEICE

Prop Deice**Sun, 16 Jan 2000 17:17:28**

In a message dated 1/16/00 3:52:57 PM Central Standard Time, epoole@scoot.netis.com writes:

Geez, wouldn't that be the greatest thing going ... a spray-on anti-icer? Who cares if it's not approved by the Federale battle 'droids ... it'd still be great for helping you get out of a bad situation in which you didn't want to find yourself.

Good Afternoon Eric,

It would be nice!

I have tried several different compounds over the years starting fifty years ago with B. F. Goodrich's ICEX. I find that most of them will make the ice easier to remove once I am on the ground, but none of them had any appreciable influence on the rate or amount of accretion on the airframe. I have used various anti-ice sprays around the gear doors and such when I am departing in slushy conditions near freezing. I think it helps, but who knows for sure.

There was an ablative material on the market a few years ago called XIM. It took more trouble to apply and remove than did Gliddens silicone wax based Glidair Ice Repellent. It worked a little better, but I haven't seen it anywhere for at least the last twenty years. ICEX is still available, but it is designed primarily as a dressing for rubber deicing boots. Both XIM and Glidair worked better than ICEX for metal when I tried them all.

I now use ICG as sold by Sportys in the yellow can. It appears to me to be the same product as was previously sold by Gliddens. I would imagine it was spun off to a small manufacturer with insufficient assets to be worth suing!

That works for me on the prop and I am interested in anybody's ideas for the rest of the aircraft!

Happy Skies,

Old Bob

P S Somebody also mentioned the possibility of placing loudspeakers in the wings to provide a sonic method of ice removal such as has been done to discourage barnacles on ships!

[ARTICLES/20000116.171728_msg00898.tex]

4.2 EQUIP-ELECTRICAL

28 Volt Bonanza's**Fri, 8 Jan 1999 18:39:56**

In a message dated 1/8/99 3:29:56 PM Central Standard Time, jtsmall@onramp.net writes:

Which Bonanza's use 24v?

The 28 volt system is used on F33A CE-748, CE-772 and after, V35B D-10097, D-10120 and after, A36TC EA-1 thru EA-241, EA-243 thru EA-272, F33C CJ-149 and after, A36 E-1111, E1241 thru E-1945, E1947 thru E-2103, E-2105 thru E-2110, B36TC EA-242, EA-273 thru EA-319, EA-321 thru EA-388.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990108_183956_msg00348.tex]

Alcor/InterAv Alternator

Mon, 7 Feb 2000 17:52:05

In a message dated 2/7/00 4:44:16 PM Central Standard Time, rvand@rica.net writes:

My partner and I recently purchased a J35 that has the alcor alternator mod installed. The log entry(8/15/75) references STC SA334SW but there is not STC or 337 in the paperwork.

Good Afternoon Bob,

That STC number is the one currently sold by Interav. They must have acquired the approval.

Interav has always been very receptive and helpful. Give them a call!

Happy Skies,

Old Bob

[ARTICLES/20000207_175205_msg02528.tex]

Alternator Failure**Tue, 1 Feb 2000 19:02:06**

In a message dated 2/1/00 5:07:22 PM Central Standard Time, swo49@hotmail.com writes:

Bob:

I have never had an alternator failure. How do you know that you have one? When you recognize that you have had one, besides turning off all nonessential equipment, what else should you do (besides getting down)? Alt switch off?

Steve

Good Evening Steve,

On my airplane there is a red warning light on the floating panel that lights up when the primary alternator fails as well as a yellow warning light on an Electronics International Loadmeter which lights any time the battery is supplying current to the aircraft system. Now that I have the B&C unit, there is also a yellow warning light that illuminates any time the standby alternator is putting out current whether the primary has failed or not.

For aircraft without any warning devices, it can be rather insidious. By the time you notice things aren't working right, the battery is likely to be pretty well depleted. If your airplane is not equipped with some sort of an alternator failure warning device, I think I would look into getting one. The Gizmo looked like a good choice and I have been happy with the EI unit. I am not sure whether the Gizmo is available now or not. I'm sure there are other good ones considering all of the monitoring stuff that is on the market today.

Once you have determined the alternator has failed, the first step is to reduce the electrical load to as low an amount as practical. I was once IFR in cloud when I had an alternator failure. I turned off the autopilot and all other nonessential equipment. Used just one Nav/Comm, my IFR GPS and transponder plus communicated as little as possible. The approach was an ILS to about a five hundred foot ceiling so I left the gear alone till I was sure I had the field made. I figured I could crank it down while circling beneath the overcast if required. The battery took it out in the usual four seconds and the flaps operated normally as well. The total flight time from the time of failure until I was on the ground was about forty-five minutes. The battery was still showing over 23 volts when I shut things down.

I tried cranking the engine just to see how it was and it spun merrily away.

The key thing is to make sure you pick up the failure and immediately go

into a load reduction exercise.

A good battery is usable for a long time.

I haven't had an alternator failure since I installed the standby unit. I imagine now that I have the backup, my primary alternator will last forever! Isn't that the way things work?

Happy Skies,

Old Bob

[ARTICLES/20000201_190206_msg02275.tex]

InterAv Alternator Pully Alignment**Mon, 6 Mar 2000 11:41:07**

In a message dated 3/6/00 6:34:51 AM Central Standard Time, flyin-glo@msn.com writes:

If it is, have it welded. Do not bother with the rubber insulated Continental mount. If it's not, either shim or carefully Dremel off enough of the aluminum block to make them align. Otherwise, you're going to be ruining alternator belts.

Good Morning Jerry,

First off, I am sure you did work hard and well to attain a proper alignment for your belt and it will likely work well for years without throwing any or causing premature wear, but I would like to suggest that there may be another way to accomplish the desired result.

As you mention, it is a Continental mount, not a Beech part as I have been calling it! I guess I was in the wrong mind set since it came from the factory with that mount and the suggestion to change to the Anti-Vibration mount was in a Beech Service Bulletin.

When we put the InterAv on my son's J we ordered the parts to install the new mount from Continental and not Beech/Raytheon.

I am not against welding a part if new is not available. There are times when I might use welding if I feel that the part as manufactured was not made strong enough to start with and I might reengineer it a bit to avoid a future problem.

However, I would normally replace a broken part with a new one if it is readily available at a reasonable price.

Secondly, if Beech felt there was a problem that was causing mounts to break that could possibly be solved by a new mount from Continental, I would definitely give it a try! That is what we did on my son's airplane. Whether it will make any difference or not, I don't know. The longer I don't know, the better I will like it!

I would strongly caution against trying to attain alignment by grinding on the aluminum adapter bar. If the misalignment is caused by the stock factory mount, I would repair or replace that component. If the misalignment is caused by the steel "L" brackets that Interav supplied, I would replace or adjust those brackets. The only misalignment that should be corrected by the use of shims or washers should be a misalignment of the pulleys fore and aft, not to make their planes of operation parallel. If the line on which the unit rotates to tighten is not parallel to the center line of the engine,

every adjustment to tighten or loosen the belt will throw the alignment of the pulleys out of parallel. You have to start from a proper base. The first step is to get those factory components in correct alignment. That done, the rest is a no brainer!

Happy Skies,

Old Bob

[ARTICLES/20000306.114107_msg04321.tex]

Interav Alternator**Sun, 5 Mar 2000 18:57:51**

In a message dated 3/5/00 12:04:31 PM Central Standard Time, raven@tminet.com writes:

I have the Interav alternator conversion, but none of the installation data survived the previous owners.

Changing the oil yesterday, I noticed that the alternator shaft is not aligned with the engine output shaft, but is canted towards the shaft about 5 degrees. It looks like it was re-assembled at some point with a spacer missing, or one of the support brackets is on the wrong side of the mounting flange.

Anyone have a copy of the installation drawings for the mod?

Good Evening Bill,

I see John Mills has already made arrangements to get the installation instructions to you.

I put one of the units in my number two son's J model last year and I just bought one to put in our Piper Pacer. I like the device, but the instructions are rather generic. The instructions and the kit for the Pacer and the Bonanza are identical! It just tells you to adjust the stuff as required to make it fit and get things lined up by judicious use of washers.

The people I spoke to at Interav were very helpful and it really isn't difficult to install, but you won't get a lot of help from the directions! They do suggest that you install a Beech anti-vibration kit along with the alternator.

I would suggest that once you do get the instructions from John, you wait until you have a few days where you won't need the airplane and then pull the unit off and look for broken, loose or misaligned components. Once you get a look at the thing disassembled, the adjustments are quite obvious. I wouldn't be surprised if you find that it is the Beech portion of the mount which has failed. If you do take up John's offer to fly the book over to Tehachapi, Try to get a good look at his installation.

It is a nice unit and we have been very happy with the unit and the service rendered.

Happy Skies,

Old Bob

[ARTICLES/20000305_185751_msg04274.tex]

Power Management**Fri, 6 Aug 1999 13:30:54**

In a message dated 7/22/99 10:27:22 PM Central Daylight Time, jts-mall@onramp.net writes:

I assumed the 50 amp alt is not enough but it seems a consensus that it is, if it's working, and that I need to look further.

Good Afternoon John,

I am just mulling through the several hundred messages that were received while I was away for OSH and this may have been well covered in something that I have not yet read.

The key is to whether or not you desire to have adequate electrical output to power everything on your airplane all at the same time or whether you are content with the FAA suggested loading which says that you should have sufficient capacity such that the normal steady loads are no more than eighty percent of the power source's maximum capability.

Landing lights are considered to be intermittent and are not required to be considered in the computation. The early airliners were not equipped with enough generator capacity to run everything all at the same time and most light airplanes are not built that way either. The early Bonanza landing lights, which were mounted in the wings, were meant to be used primarily while airborne and for a limited amount of time. If they were used continuously on the ground, the heat would warp the lenses!

Nowadays when landing lights are often used for conspicuity purposes, there is good reason to consider a higher capacity electrical source but it might be cheaper and more practical to install a set of lower power conspicuity lights in the wing tips than use landing lights for that purpose.

My first Bonanza had a twenty-five amp generator. By judicious management of that power, night IFR was practical. I soon upgraded to a thirty-five amp unit and that was more than enough provided I used the landing lights sparingly. The normal running loads for those early airplanes was about the same as the aircraft of today. We have added more conspicuity lighting such as rotating beacons and strobes, but the electronics require vastly less power in their non transmitting state.

I think the power requirements then and now are about a draw.

An advantage of the alternator is that it will supply a lot more power at low RPM than does an equivalently rated generator.

I would think that any small airplane with fifty amp alternator should be relatively easy to manage properly in today's environment.

My airplane running at night with the pitot heat on, all autopilot functions in use and lit up like a christmas tree draws only about twenty-four or five amps at twenty-four volts. It wouldn't take much to reduce the load below twenty amps which would put the load at a power equivalent of eighty percent of the capacity of your fifty amp twelve volt system. Certainly seventy amps would be better, but some of those units get awfully large and are difficult to service.

A little effort at power management can go a long way.

Happy Skies,

Old Bob

[ARTICLES/19990806_133054_msg06713.tex]

Standby Alternator**Wed, 21 Apr 1999 22:32:41**

In a message dated 4/21/99 8:54:35 PM Central Daylight Time, russg@vnet.net writes:

When you said "When I get Bill Bainbridge's standby alternator approved on my airplane", it piqued my interest. I'm looking for a sources of 24 VDC standby alternators. Can you give me a lead?

Good Evening Russ,

Bill has the approval for his very nice little 20 amp, twenty-four volt standby alternators on 1984 and later model 36s. The unit bolts to the right hand accessory pad and has an automatic regulator that allows it to pick up the load when the primary voltage falls to somewhere in the 26 volt range. It has been used for the past few years on the Mooneys that are approved for known ice.

He has applied for an STC for the other Bonanzas, both twelve and twenty-four volt.

I have submitted an application for a field approval on my V35B which has a twenty-four volt system. So far, the FEDs have had no comment.

Check with Bill Bainbridge at B & C. Specialty Products Inc., 316 283-8000.

Happy Skies,

Old Bob

[ARTICLES/19990421.223241_msg03959.tex]

Standby Alternator**Thu, 10 Jun 1999 19:04:13**

Good Evening All,

I have been taking a vacation from the Bonanza E-mail list for the last few weeks in order to get some projects finished that had been dragging along a little too slowly.

One of those projects was the installation of a Standby Alternator System designed and manufactured by Bill Bainbridge of B&C Specialty Products.

The unit has been used on the Mooneys for a couple of years now with excellent results. Raytheon has cooperated with the approval of the alternator on A36s E-2104, E-2111 and after, along with B36TCs EA-320, EA-440 and after. The approval for those aircraft was issued on December 18, 1998.

Since there are a considerable number of differences in the electrical system of my old V-tail and those late model Stretched Debbies, the approval was not applicable to my old machine.

I purchased the components and prepared a tentative 337 for a local one time only approval. The package was submitted on March 11, 1999, and the approval was issued on June 8, 1999. I completed the conformity inspection and returned the aircraft to service on June 9, 1999.

The major stumbling block appeared to be the requirement for some changes in the Approved Airplane Flight Manual Supplement. The local FSDO does not have the authority to approve those changes and they had to be submitted to the Chicago Aircraft Certification Office for review.

Fortunately, they seemed to have a relatively light workload at the time we requested the review and it was done quite expeditiously.

Instructions for Continued Airworthiness were required, but the FAA has a nice little handout that was quite easy to follow. The ones I wrote were accepted without change.

The changes I made in the Flight Manual Supplement were also accepted without change.

The inspector from the local FSDO came out on June 9th to look it over and was happy with the installation so I now have a very nice little 20 amp Standby Alternator available should my primary one ever fail again.

Over all it was a very pleasant experience. The local FSDO was cooperative and pleasant to work with. The Chicago ACO was likewise very cooperative and handled things in what I would consider a very short period of time.

It is a neat little unit. If anyone would like more information, let me know or you might like to contact Bill Bainbridge directly at 316 283-8000. I recommend him and his product highly.

Happy Skies,

Old Bob

[ARTICLES/19990610.190413_msg05248.tex]

Standby Alternator**Fri, 11 Jun 1999 00:24:50**

In a message dated 6/10/99 10:41:04 PM Central Daylight Time, jwhitehead@earthlink.net writes:

Is your system set up in any way such that you can regularly test the actual function of this stdby alternator? That is, does it kick in by you simply turning off the alternator - is it passive - or do you have to be proactive and force it on?

Good Evening John,

Yes, if the primary alternator is turned off, the standby one will pick up the load.

As long as the standby master switch is turned on, the unit is available for use. If the primary system voltage drops below 26 volts, the standby alternator will become active and an annunciator will light to advise you that it is doing it's thing. No other action required except to monitor the output of the standby alternator to maintain it below 20 amps. I am told that the alternator is capable of outputting at least twenty-six to twenty-eight amps, but it is conservatively rated at twenty.

My normal night time IFR (pitot heat on) amperage requirements is around twenty-one or twenty-two amps. I don't think I would have to shut much down to stay within the specification of the unit.

It does require at least 1800 RPM or so to provide usable output but I don't anticipate that to be a problem.

Hopefully there will never be a need for the thing, but it is comforting to have it aboard. The total weight of the installation is around six pounds.

It consists of the alternator itself, the regulator, an annunciator, two circuit breakers, a master switch, a current limiter and a capacitor.

I happened to have an Electronics International Volt/Ammeter already installed and I use it to monitor the output. Bill has designed a circuit that will flash the annunciator light if the load goes over twenty amps but I have not installed that function. It will probably be added later.

Happy Skies,

Old Bob

[ARTICLES/19990611_002450_msg05253.tex]

Standby Alternator**Wed, 8 Dec 1999 22:53:57**

In a message dated 12/8/99 8:43:33 PM Central Standard Time, jack-taylor@kingwoodcable.com writes:

Does anyone have any experience with this unit.

Good Evening Jack,

I installed one of those units on my Bonanza in June of 1999. So far I am very happy with the installation. I do check it every now and then by shutting down the primary alternator. It always works!

I like the lack of clutches and relays. Nothing to switch or select. The standby alternator picks up the load automatically whenever the system voltage falls to 26 volts. It will even come on line if the primary alternator is overloaded for some reason.

If the unit is producing more current than it is built to deliver, the load can be reduced by the pilot as he/she sees fit, but there is no hurry as it will handle a forty to fifty percent overload for some time without difficulty.

I hope I never have the opportunity to see it operate when it is truly needed, but it is nice to know that it is there!

The installation was relatively simple and it takes little space.

I guess you can see that I am happy with the unit!

Happy Skies,

Old Bob

[ARTICLES/19991208.225357_msg11809.tex]

Standby Alternator and AC Fuel Senders**Fri, 11 Jun 1999 13:49:38**

In a message dated 6/11/99 11:24:09 AM Central Daylight Time, hale@lucy.fc.hp.com writes:

Are you one of the few 28V V tails, or is this a 14V setup?

You would probably make some dough if you went ahead and got an STC for this.

Bill H.

Good Afternoon Bill,

Mine is an early twenty-eight volt system, S/N D-10173. I think Bill Bainbridge is working hard trying to get it approved for the early airplanes. I wish him well. The twenty amps is plenty for my airplane, but I suppose that with the fourteen volt systems it would take some judicious planning to handle a night/IFR trip. It's still a lot better than the abomination Beech was offering! I keep thinking back to the days when I was flying serial D-10. It had a twenty-five amp generator and I flew it IFR and at night all of the time. Wasn't all that bad as long as you watched the power consumption. That was in the days of the Narco VTR-1, VTA-1, Motorola LF and such which used a lot more juice than the stuff we now have available.

Happy Skies,

Old Bob

[ARTICLES/19990611_134938_msg05259.tex]

Standby Alternators**Tue, 4 Jul 2000 00:20:21**

In a message dated 7/3/00 9:37:19 PM Central Daylight Time, jack-taylor@bigfoot.com writes:

Would you take-off with only the standby alternator operating? Jack Taylor

Good Evening Jack,

That IS a major problem, especially with the 520 and 550 which have the alternator driven off the crankshaft. My feeling is that a landing should be made as soon as practical following an alternator failure.

If it was a mechanical failure which was in the process of distributing metal around the one and only powerplant, as soon as practical could be pretty soon!

There was a rash of mechanical failures with that nose mounted position early on, but the incidence of such failure has decreased dramatically if the alternators are inspected as now recommended.

I have had three alternator failures in the last 1500 hours, all of which were various electrical problems.

I also experienced a slipping clutch which, if I had not picked up on it, could have led to a failure which would spread metal. Not too likely, but possible.

As to whether or not one could, or should, continue the flight after a determination was made that the alternator was mechanically sound, but just not generating electricity, that brings up some problems.

It would not be legal to depart with just the standby operating unless you obtain a ferry permit and have it signed by an A&P or other authorizing entity.

I believe George Braly is applying for authority to continue in VFR conditions with has standby alternator if it can be determined that the primary alternator is mechanically sound, just electrically inoperative.

I would imagine it would be necessary to include a procedure in the FAA Approved Airplane Flight Manual Supplement to spell out the method of making the determination.

Would I make a takeoff with just the standby alternator operating if I was sure the primary unit was safe to operate?

If it was legal, absolutely!

Now, would I do it illegally?

I guess I would have to say that depends!

There are many things that I think are safe to do with the airplane that I don't do because the penalty of certificate action or loss of insurance coverage is too great to make the risk worthwhile.

But I am sure there are conditions when I might decide that the risk is worthwhile!

Happy Skies,

Old Bob

[ARTICLES/20000704.002021_msg10488.tex]

Starter Hang Up Warning Light**Sat, 12 Jun 1999 10:44:46**

In a message dated 6/12/99 6:51:47 AM Central Daylight Time, home-
insp@gateway.net writes:

MY QUESTION: since the starter is just a DC motor, if the Bendix locks-up, wouldn't the starter motor act as a "generator" and then light up the warning light too? Any comments would be appreciated.

Good Morning Cliff,

MY ANSWER - Duh, might, but sounds too simple to me!

That being said, I do believe the previous correspondents were referring to the tendency of the starter relay to remain engaged, for whatever reason, and continue to operate the starter after the starter switch has been released.

That has occurred on several Cessna 210s, possibly many other types as well. On the 210s it is known to have started in-flight fires. I haven't heard of any fires occurring on the Bonanza, but I don't read the discrepancy reports all that often. Beech added a starter powered warning light some years ago to alert the operator that power was being applied to the starter motor. That is accomplished by running a wire from the output side of the starter relay to a warning light on the floating panel and then to ground. Another wire is taken from the panel light test switch to the power side of the light to provide test capability (of the light). In order to preclude the power from the test circuit trying to power the starter, a diode is inserted in the circuit between the starter power side of the starter relay and the warning light. On the twenty-eight volt system (the only one on which Beech used the light) the diode was initially a 1N4005 which was later superseded by a 1N4007.

I installed the warning system on my airplane several years ago and considered it a minor alteration, thus requiring only a log book entry. Some IAs or FEDs may disagree.

If you wanted to eliminate the test function, the diode could be eliminated. Operation could then be checked by monitoring the light while cranking the engine and observing that it extinguishes when the starter switch is released.

In the case of the starter relay hanging up, it is obviously still powered and the generation of a current flow would not be likely. I wonder what type of voltages might be generated under the conditions you describe?

Happy Skies,

Old Bob

[ARTICLES/19990612.104446_msg05267.tex]

Strobes - Wing Tip**Thu, 12 Mar 1998 03:34:20**

Good Morning Joe Garner,

In a message dated 98-03-11 23:50:28 EST, you write:

Im thinking of installing wing tip strobes on my N35 and wonder how much trouble it would be to run the wires through the wings? Can anyone comment on the job or offer suggestions... And any ideas pro/con on power supplies in each tip or one in the middle?

I suppose there are lots of possible solutions but the one I used a few years ago on my V35B was to run the wires along the same bundle as the existing nav light wires. It wasn't all that hard, surprisingly. The Bonanza doesn't have as many inspection plates as a Cessna but with a little thought, and maybe some assistance from people with longer and/or skinner arms, you should be able to get the job done.

Another possibly easier route would be the method Allen Peterson uses for the wiring on the BDS tip tank installations. Put the wires in a piece of protective plastic tubing and lay it in the bottom of one of the "J" stringers along the bottom of the wing. He then uses hot glue judiciously placed to keep the tubing in place. If you elect to do the latter, be sure and clear it with your friendly AI. I have heard some say that they don't like the method. It is easy though, and that is the way my tip tank wiring was put in by Allen in 1979. It looks a little crummy but I have had no problems with the tip tank wiring at all!

I wanted all three of my strobes to fire at the same time and when I installed the Whelen system to do that a few years ago it was necessary to use three separate units tied together with a "trigger wire" to comply with the whelen STC. I felt that I would sooner have the high voltage wires as short as possible so I mounted one unit in each tip and one in the tail. Probably not necessary but it seems to work OK and I haven't had any audio interference from the strobes. (Lots of people mount the power supplies aft of the baggage compartment and that seems OK also). Be sure and use the shielded wire grounded as called for by the Whelen STC. Since the tiptanks were in the way of mounting the power supplies on the outside of the tip ribs, I removed the rivets holding the forward section of the outboard ribs and replaced them with 4-40 screws and nut plates making that section of the tip rib removable. The power supplies were then placed on the forward side of the spar web just inboard of the tip rib. I don't remember whether the N model has a solid spar web in that area or just top and bottom stringers like the early airplanes, but I would suppose a web section could be added if none is installed in that bay.

Once again it is important that your AI be happy with the installation before you attempt the mod. If there is any doubt, draw up your proposed installation and submit it to the FEDs for local approval on a 337 before you start.

My AI thought it looked fine and was just a minor alteration but we did submit a standard 337 form with no request for "local approval" and it went though fine so I went ahead with the installation.

My method was rather labor intensive but it makes a very nice installation and has worked well. I don't know if I would recommend it at shop rates!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980312.033420_msg01212.tex]

4.3 EQUIP-ENGINE

Air/Oil Separator**Thu, 25 May 2000 11:35:51**

In a message dated 5/25/00 8:18:57 AM Central Daylight Time, jdeakin@avweb.com writes:

I do NOT want to dump that **** back into my engine.

I DO want to see what's coming out of the breather, even if I have to clean it off the belly, and then fix whatever is wrong that put it there in the first place.

Good Morning All,

As usual, I agree with John on this one.

Every time I have an occasion to clean an oil separator and observe the gunk and junk that it has collected, I wonder why anyone would want one of those on his/her airplane.

The big boys tell me that the temperatures of the engine will boil all of the bad stuff off and it will leave the airplane as a vapor. I suppose that is true, but why not just let it go along with a little teeny bit of oil the first time around?

I doubt that the amount of oil lost between oil changes via a standard breather vent on any engine that is running properly would amount to enough to be measurable on a dip stick. If there is enough going over the side to be measurable, something needs to be fixed.

At least, that its the way I see it!

Happy Skies,

Old Bob

[ARTICLES/20000525_113551_msg08630.tex]

Baffling**Mon, 28 Dec 1998 23:58:28**

In a message dated 12/28/98 5:03:24 PM Central Standard Time, billfinlen@ozemail.com.au writes:

..and where can I get information on the new style baffle that may be suitable if I stay with the IO-520? Thanks Bill Finlen
Australia

Good Evening Bill Finlen,

I don't have anything to offer other than anecdotal evidence but just in case you are interested, here goes!

I feel the following would apply to the IO-520 or the IO-550.

I put an IO-550B in my 1978 V35B, S/N D-10173 a couple of years ago. A Beech baffle system, as currently installed on the model 36, was used minus the extra gills on the side. It worked and was a definite improvement over the original baffles, but I had a set of Beryl D'Shannon baffles installed last month along with the 100 pound gross weight increase approval.

The factory stuff worked OK and there were absolutely no problems with overheating except for the number two cylinder. Other than that, the engine ran a little on the cool side.

I have about 75 hours with the new BDS baffles and couldn't be more pleased. They have a plenum chamber behind number two cylinder which manages to do the cooling job nicely. As before, if there is any problem at all, it is keeping the engine warm!

The one thing I would stay away from is any suggestion that additional louvers or scoops be installed anywhere on the cowling. They don't seem to be needed at all.

I know that George Braly is working on a new cooling system for the series and I am sure that whatever he comes up with will be just as great an improvement over the stock stuff as are the GAMInjectors.

If you have the luxury of waiting for George's stuff to be approved, that is what I would do. If not, then I would seriously consider the BDS engine STC, gross weight increase and their new baffle system.

Happy Skies,

Bob Siegfried Ancient aviator

[ARTICLES/19981228.235828_msg07923.tex]

Baffling**Wed, 21 Jul 1999 12:51:42**

In a message dated 7/20/99 5:12:43 PM Central Daylight Time, hgp@madaket.netwizards.net writes:

Does anyone in the forum know about the new cowling scoop from = D'Shannon. Suppose to do a good job of keeping the rear cylinders on the = 520 &550 cool. I wonder if George Braley could share some information = with me.

John Ornellas

The scoop in question is applied to the inside (nothing external and no new holes) of the starboard cowl door and directs air over to the port side in the vicinity of the # 2 cylinder. Since BDS opened up the area aft of the # 2 cylinder on their recent baffling kits, the extra air does not seem to be needed. I don't believe an approval for the scoop has been issued, in fact I am not sure if they are even working on it anymore.

As I mentioned somewhere before, I am waiting (though anxiously) to see what George Braly comes up with.

The Beech factory baffling has been known to be atrocious for many years by many folks including the people at Beech. The changes they have made over the years, including the side gills, have merely been Band-Aids to get something done at the lowest possible cost. The cowl flaps need improvement along with many spot redirection's around the cylinders and potential redesign of the inlet. Big job.

I think Allen Peterson's current baffle is the best available, but there is still a long way to go.

Happy Skies,

Old Bob

[ARTICLES/19990721_125142_msg06291.tex]

Baffling**Fri, 14 Jul 2000 16:07:50**

In a message dated 7/14/00 10:33:44 AM Central Daylight Time, jdeakin@avweb.com writes:

Engine is about 50 SFOH. Baffles are new and I think they seal well.

Good Afternoon ?,

I am sorry, but I have lost the name of the person who started this thread!

In addition to the excellent advice to assure that the fuel flows are at the redline or slightly over, consider adding the modification to the baffling that BDS has used for the last couple of years. They have opened up the area behind number two cylinder to allow air to circulate to the bottom portion of the cylinder head.

The factory has been using a small box or channel to accomplish the same thing for the last four or five years, but I don't think the factory modification does as well as the BDS one.

With the BDS late style box between the number two cylinder and the oil cooler, there is no need to cut up the exterior to add those ugly extra cooling louvers. The cylinders run nice and cool, including number two! If you have older BDS baffling or the horrible original factory baffling, you might see if you could get at least the space behind number two modified to the new BDS configuration. I suppose one should try to get a local approval to be perfectly legal, but I doubt if there are very many FAA folks around who would know the difference if a BDS baffle for that area were to be copied and installed.

Better yet, just go ahead and pop for the full BDS baffles, Allen Peterson deserves to make a few bucks for the wonderful job he has done to cool that number two cylinder!

Happy Skies,

Old Bob

[ARTICLES/20000714_160750_msg10930.tex]

Baffling**Sat, 26 Aug 2000 10:33:20**

In a message dated 8/26/00 8:18:01 AM Central Daylight Time, raylockhart@tconl.com writes:

I wonder if you can modify your baffling with parts of the BDS. I would rather suspect that you would have to buy the BDS mod on an all or nothing basis.

Good Morning Ray,

You are probably correct, but I would at least consider copying the way BDS has the baffling on their latest iteration. I would be willing to do it as a minor alteration, but the FAA may well disagree. A minor alteration takes only a log book entry by the authorized person doing the work. The IA doing an annual may or may not agree that it is a minor alteration. Why don't you see if your IA is familiar with the latest BDS baffling and ask what he/she thinks about doing it as a minor alteration?

Happy Skies,

Old Bob

PS I think that when I am at the SAT convention, I will ask Allen about selling a modification that would just add the new open box behind number two to the baffling.

[ARTICLES/20000826_103320_msg12609.tex]

Baffling**Tue, 19 Sep 2000 00:01:48**

In a message dated 9/18/00 9:00:09 PM Central Daylight Time, N54CE@aol.com writes:

My question is: will I see #2 CHT get better as I get more time on the engine, or is there something that is not right?

Good Evening Jim,

Do you have the stock baffling or one of the after market setups?

The stock Beech baffling for the number two cylinder of the IO520 is atrocious.

BDS has a modification that brings the temperature down substantially though George tells us (and I believe him) that the cooling is not as even around the cylinder as it should be.

The factory started using a scoop on the back of number two around 1994 or so, at least on the 550 installations. I don't know if it was on the last F33As or not. The factory scoop definitely helps. George feels that it does a better job than the BDS setup but reports from users seem to indicate that the temperature measured at the CHT probe well will be lower with the BDS method of opening up the rear of the area behind number two. Once again, George agrees that the temperatures are low that way, but that the cooling is not even around the cylinder.

in any case, I think you should take some action to modify the baffling behind number two cylinder to increase the effectiveness of the baffling.

Happy Skies,

Old Bob

[ARTICLES/20000919.000148_msg13702.tex]

Baffling**Sat, 10 Feb 2001 08:40:52**

In a message dated 2/10/01 12:17:28 AM Central Standard Time, KenV35A@cs.com writes:

You may already be aware of this, but to the best of my knowledge, and I'm sure others will correct me if I'm wrong, there is no retrofit or revised baffling kit by BDS, GAMI, Raytheon, etc. available for the IO-520.

Good Morning Ken,

As you are aware, the exterior dimensions of the engine are identical.

I haven't directly asked the question about an STC for the BDS or GAMI baffling on the IO-520, but I did ask Mike Trudeau of BDS whether there was any difference between their baffle kits for the IO-520 and their kit for the IO-550.

I was told that the only differences were as related to differences in the airframe into which the engine was installed.

For instance, if your S35 is one of the ones where the main cabin air is taken from the aft starboard side of the rear baffle, there will be a large, three inch, hole in that baffle for the hose to the muffler. The little two inch muffler air inlet will come from the induction air box. If the kit is for my airplane, the main cabin vent air, three inch, will come from the induction air box on the nose bowl and the other little two inch hose to the muffler will be taken from the right rear baffle, but way out to the right and not directly behind number one cylinder.

I asked if there would be any problem on the approval if I used the V35B style on my son's S35.

His answer. Who would ever notice?

I then asked how to order to make sure the stuff I got would be consistent with what I wanted to do and he said to just make sure I spelled out clearly on the order exactly where I wanted all of the holes to be and they would make it the way I wanted.

Now, I didn't specifically ask if his baffle was approved on the 520, but it sure sounded to me like it is!

Happy Skies,

Old Bob

[ARTICLES/20010210_084052_msg03358.tex]

Baffling

Sun, 11 Feb 2001 08:51:15

Good Morning Ken,

You have obviously spent more thought answering this question than I have, but I will be happy to expand on what my perception of the situation is.

In a message dated 2/11/01 1:58:56 AM Central Standard Time, KenV35A@cs.com writes:

The later TCM rebuilt engine comes with the seventh bolt case and cylinder hold pads. Some of the bottom cylinder barrel baffling must be modified to fit around these pads.

The new 520s come from the factory with the seventh stud. I have been told that some of the overhaulers are installing the seventh stud on the 520s during overhaul. Must not be a big deal.

Also the baffling behind the alternator requires major surgery for it to fit.

This one has me confused. I can't recall any difference at all, but I will take another look at our son's 520 sometime today to see if I can spot any difference. His engine is an old one!

So, does BDS have two baffle kits, one for the earlier case and one for the latest case?

I don't think so, but if there are any modifications required, I am sure they are making them or advising the installer how to handle it, if not in the kit, via follow up communication. Their installation instructions leave a lot up to the installer.

Once again, every time I have asked Continental about any differences in the case, the answer has been the same. They are the same. I have been told by some reps that there is absolutely no difference, but by others that there are a couple of minor machining differences internally. Don't know which is correct! I have never spotted anything externally except for the seventh stud. Since that is now on both, I have no idea how to tell one case from the other.

Also, does BDS provide a baffle design change to # 2 cylinder on the 520?

It Depends! (I was waiting for a chance to use that)

The very early BDS baffles still had the flat plate behind number two. About three or four years ago they started using a large plenum in the area

with the floor lower than the factory baffles, far enough so that it allows the air into the fins below the finless area of the cylinder head. It does nothing to force the air through the upper fins, but seems to work very well. I have it on good authority that the cooling is definitely better than the original factory baffling, but still rather uneven around the cylinder. I would imagine the weak spot would be around the that upper aft portion. My number two is now one of the coolest running cylinders. My hottest is number six followed by four and one.

I looked at a ULTimate engine overhaul done at their facility on a S35 and it had the latest baffle design, but no change to # 2 cylinder. As a result # 2 CHT ran hot in climb, 415-420F. I modified it some (the owner didn't want the full tweak) and it brought the CHT down closer to 400F. The engine had an earlier case, so no retrofit of the cyl. barrel baffling was required.

Now ULTimate does a most thorough and concise job of writing up their engine overhaul, but there was nothing (zero, stc, 337) entry regarding the baffling redesigned modification. I suspect it was a Raytheon up-grade, thus a minor alteration. But, I really don't know.

For this I am at a loss! The only major change that I am aware of from Raytheon is the little iteration they have been messing with since 93 or 94 which provides a scoop and a box to direct the air from the upper portion of the number two head around the back and down to the lower fin area. That has changed often since 93. I asked whether they were going to offer that as a kit and was told it is not in the cards. I did obtain all of the part numbers and was planning on using it on my airplane, but when BDS came out with their plenum chamber behind number two, I decided to go that route instead.

I'll get on the phone Monday and satisfy my curiosity.

Be sure to let us know what you find out.

Thank you for your informed comments Bob,

My pleasure, but I don't know about the informed part!

I was hoping GAMI would respond. KenV35A

Me too! I think George knows more about the current status of cooling for our engines than anyone else in the world!

Happy Skies,

Old Bob

PS My personal opinion is that the biggest fault in the Bonanza series engine installation is the lack of good airflow control across the engine. Part of that is from the lack of effective cowl flaps. I think they don't suck enough air through when open and don't block the outflow sufficiently when closed.

I think that if we could get better cowl flaps worked out, we could eliminate all of those abominable louvers and slots in the lower cowling. That, combined with some afterbody control in the nose bowl area, should not only help with the cooling, but pick up a few knots.

[ARTICLES/20010211.085115_msg03474.tex]

Baffling**Tue, 13 Feb 2001 07:10:37**

In a message dated 2/12/01 11:22:48 PM Central Standard Time, KenV35A@cs.com writes:

One more question: Do you have the cylinder hold down pads on your 550? If not, that may explain our difference in retrofitting baffles.

Good Morning Ken,

Hmmm. Now I am not sure. Do you mean the pads under the seventh stud or something else?

The only difference I have noted between my old 1978 520 BA and the 1996 factory reman 550B I now have, has been the seventh stud and the pad which that stud uses to better secure the cylinder base.

Is there something more?

Once again, I will try to get over to my son's house to check his 1965 S35.

You have definitely piqued my curiosity!

I had the Colemill Starfire conversion put on my airplane in 1966. They used the later style factory model 36 baffling with their conversion, but without the 1993 style conduit to direct air around the backside of number two.

That, and the lack of approval for the full 300 horsepower, is what led me to buying the BDS baffling and installation approval in 1998.

My son and I are probably going to jury up some sort of arrangement to better seal that right side area, but we don't intend to get too fancy.

When the current engine gives out, it will be replaced with a 550 and new baffling installed.

I have been very pleased with the BDS baffling, but my son and I will obviously check out the GAMI baffling when that time comes.

Happy Skies,

Old Bob

[ARTICLES/20010213.071037_msg03711.tex]

Baffling - Raytheon Air Scoop**Sat, 26 Aug 2000 14:56:10**

In a message dated 8/26/00 1:33:30 PM Central Daylight Time, gwbraly@gami.com writes:

Bob,

The data I have collected show that the scoop arrangement, when properly done, works better than simply leaving the backside of the #2 cylinder open. Significantly better, with more uniform temperatures.

Good Afternoon George,

I have no doubt that you have data to back up your statement and my experience is strictly anecdotal. I had planned to add the Raytheon scoop, but everyone who added the opened up BDS box raved so enthusiastically about it, I decided to give it a shot. Since I installed the BDS baffling, my number two cylinder has consistently been the coolest, but I have no way of knowing how even that cooling is!

I have an acquaintance who has a 36 with the Raytheon scoop and his number two is within reason, but not the coolest. That was my reason for feeling that the BDS does it better. I can see where careful redirection of the air could provide more even temperature around the cylinder. I didn't like the lack of anything to hold the air against the fins on the bottom rear of number two so I added a plate to redirect the air closer in and keep it tight around the cylinder more toward the bottom. But I don't have any way of checking whether it helped or hindered!

I am eager to try your baffling when you get it approved!

Happy Skies,

Old Bob

[ARTICLES/20000826.145610_msg12622.tex]

Brackett Filter and Alternate Air**Wed, 27 Jan 1999 01:42:25**

Good Morning Scott,

In a message dated 1/26/99 11:26:12 PM Central Standard Time, sderrick@yahoo-eng.com writes:

I have heard that with the bracket air filter that enough suction can be created at full throttle to open the alt air door.

Thats interesting there was an article in Light Plane Maintenance this month about how Brackett is being investigated by the FAA because their filter doesn't supply enough back pressure to open the alternate air door if it gets wet or old.

Scott

I received a slightly different perception when reading the article in LPM.

I don't think it is a matter of whether the paper filter or the Brackett filter will cause the most back pressure, but rather that the moisture will go on through the foam/oil filter (whether it is new or old) and freeze on portions of the intake system downstream of the filter whereas with the paper filter, the moisture is more likely to be stopped at the filter and freeze there which will provide enough differential pressure to open the spring loaded alternate air door.

I discussed the pressure loss across the Brackett filter compared to the standard Bonanza paper filter with one of the engineers at Brackett a couple of years ago. He advised that their tests show about one-third to one-half an inch greater loss of manifold pressure with the Brackett than with the standard filter. He stated that the primary advantage of their filter was that it maintained it's filtering capability for a longer time and provided better filtering due to the oil impregnation. He also said that it was important that the excess oil be squeezed from the filter before installation. They ship them heavily saturated so that there will be enough oil to do the job regardless of how long the element is in storage before installation.

One of the detractors of the Brackett filter told me that he had measured as much as a two inch MP loss with a Brackett filter. I don't know if that was with the excess oil squeezed out or not.

Jim Freeman rigged a micro switch on his alternate air door so that he could tell any time it opened and said it opened every time he opened the throttle when he was using the Brackett filter.

I use a Brackett in my Pacer and a Beech unit in the Bonanza and don't have a strong preference for either, though the article in LPM does bring

up the point that if you are operating one of the Bonanzas that does not have the capability of manually opening the alternate air door, there is an increased possibility of encountering some intake icing problems that you may not be able to get rid of.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990127.014225_msg01243.tex]

Canted Mount**Tue, 30 May 2000 23:29:57**

In a message dated 5/30/00 10:08:22 PM Central Daylight Time, flyin-glo@msn.com writes:

Bob, isn't this HP limitation on whether its mounted canted or straight a legality; when in actuality, assuming you could keep it flying straight down the runway, a person could get the maximum HP and climb from either mounting? If its mounted straight, you'd have to give it more right rudder.

Good Evening Jerry,

You are precisely correct!

I have, in a far distant past and in a land far, far away had occasion to operate a Bonanza equipped with an engine that was developing a little more horsepower than it was certificated for. I have never had any problem with directional control with a wind on the nose or with a right crosswind. With a very strong left crosswind and I mean a STRONG crosswind, there is a tendency to run out of right rudder. Therefore, anytime there is a choice, I would suggest placing the strong wind on the right even if it meant that the takeoff was slightly downwind.

There is a whole 'nother factor here which I hesitate to bring up, but proper use of the aileron to take advantage of the drag produced by differential action of the aileron will aid tremendously in holding almost any aileron equipped airplane straight. Too bad it is no longer emphasized in training and rarely used by Bonanza pilots.

I think we can safely say that there should be no problem safely handling the airplane with a straight mounted 550 'Wide Open Throttle' even if full rudder is occasionally required.

Happy Skies,

Old Bob

[ARTICLES/20000530_232957_msg08910.tex]

Case Cracking**Sun, 1 Nov 1998 14:57:06**

Good Afternoon John,

In a message dated 11/1/98 10:17:04 AM Central Standard Time, jts-mall@onramp.net writes:

The case ... it's the same as a block on an automotive engine?

Similar. The block, as referred to by automotive folks, usually includes the crankcase and cylinders in one single cast unit

Is it known What is causing the cracks?

I don't think specific information has been passed to we folks in the field, at least I have not seen it. Continental has worked on the problem by increasing the amount of metal in the cases. I suppose there have been metallurgical and casting revisions as well.

There are two basic types of case currently used by Continental. The Permold and the Sandcast. That is about as much as I know about them, but it was the early Permold case that had the most problems. The 520 and 550 we use both have Permold cases.

You will hear reference to the "light case" and the "heavy case." Very few of the early "light case" units are still in the field but even some of the early "heavy case" engines had case cracking problems. They are getting pretty rare on the current production engines.

Any estimate on how many cases crack and under what circumstances? Is it dangerous to your health or only wallet?

It seems that most of the cracks have shown up early in the life of an individual case, though I have heard rumor of some coming to light on second run or later cases. Not common though.

It was never a problem that affected the safety of the immediate flight. In fact, the engine could remain in service with some of the cracks found. I think I mentioned earlier about the potential for stop drilling and sealing the cracks with epoxy.

Happy Skies,

Bob

[ARTICLES/19981101.145706_msg06564.tex]

Engine Cooling**Fri, 30 Jan 1998 21:46:18**

Good Evening Bob Briggs,

In a message dated 98-01-30 17:38:29 EST, you write:

Hate to break your record but I heard of one who regrets putting an IO-550 in his Bonanza – can't keep the engine cool. Sorry I don't know details, but I heard this from Steve Culbertson who runs an aircraft repair shop at Lampson Field north of San Francisco.

I had been told of temperature control problems by 550 detractors before I purchased the 550. After the Colemill conversion was installed, I took it home, went over all of the baffling myself and sealed every little nook and cranny.

No lower side gills or anything. Just late style Beech side baffles and close attention to proper fitting baffles.

I also set up the fuel controller myself to a richer setting than they had used.

My engine runs very cool, in fact I am thinking of better ways to reduce the cooling airflow to get the temperatures up somewhat. When George Braly finishes his cooling research, we should know a lot more about what goes on in our cowlings.

I think tighter fitting cowl flaps with side fences and eliminating the side cowl gills would be a big help.

The aircraft you heard about must have received a poor installation. I have not met an unhappy owner either, (other than the cylinder problem common to the entire series) but I did hear a lot of 550 problem stories from people who neither owned nor operated them before I bought one!

Happy Skies,

Bob Siegfried

[ARTICLES/19980130_214618.msg00673.tex]

Engine Upgrade and Gross Weight Increase**Tue, 29 Dec 1998 12:29:57**

In a message dated 12/29/98 8:48:19 AM Central Standard Time, milton@pcc.net writes:

Is there a gross weight increase for installing new baffles??!!! Or do they have a different STC for a gross weight increase...I thought that the tip tanks or the VG's were the only ways to get a gross weight increase?

Good Morning Tony,

BDS now has a one hundred pound gross weight approval available when you install their STC'd IO-550 conversion package. I don't remember for sure, but I think it added about a thousand bucks to the cost of the installation. I did a lot of other things at the same time and didn't break out all of the costs. If you have tip tanks there really isn't much advantage. What they do is take the airplane out of utility and put it in normal whenever it is flown over (in my case) 3400 pounds. With the tips empty, my gross is now 3500. I can go to 3550 if I put a little over four gallons in each tip tank.

It obviously doesn't change the performance a bit, just makes things a little more legal!

Happy Skies,

Old Bob

[ARTICLES/19981229_122957.msg07929.tex]

GAMI Injectors and Balancing Fuel Flows**Sat, 13 Mar 1999 08:57:34**

In a message dated 3/13/99 7:18:25 AM Central Standard Time, wwebb@usa.net writes:

Yes, that was my understanding as I asked the same question and he advised they will have new injectors matched for each cylinder and the cost would be about 1/3rd of the currently available STC'd variety.

Good Morning William Webb,

As we all know, the cost of the injectors is not the reason for the pricing of the product. As Mickey stated, a product is priced to make some money based on the cost of manufacture, cost of development and the amount of profit the producer feels can be derived while still developing a market.

Any of us who have had any experience with FAA approvals of even the simplest of devices attached to our flying machines knows the difficulty of getting an FAA approval!

I am convinced that George has a superior product.

His nozzles have exhibited a much closer adherence to specified flow rates than do the factory nozzles.

The service, customer followup and education on usage are unequaled in our industry.

Previously manufactured factory nozzles have been so inaccurate and far from their designed flow rates that some persons were able to use those factory nozzles in a balanced manner by switching them around till they found ones that would then be balanced.

You lawyers can argue about this forever, but it is my opinion that once you have determined that the nozzle is not flowing the proper rate that is called for in Continentals Injector Service Manual, it should be withdrawn from service as it is no longer an airworthy part.

To use such a nozzle to balance the fuel flow was just as illegal as was the use of those factory nozzles which were bored by certain unnamed mechanics in the field. Now I would never say that I had ever done such a thing, but it was done by a lot of people. I will tell you that my airplane is now equipped with a very nice set of LEGAL GAMIjectors and it runs as well as it ever has. Beyond that, I will say that it runs better than any fuel injected engine I have flown without such well balanced injectors or with any that had home blown balanced injectors.

I am glad that Continental has been forced to join the rest of the world.

We all owe a major debt of gratitude to George for bringing out into the open a situation that has been primarily discussed quietly and surreptitiously by those who attempted to do unscientifically what George and Tim accomplished legally and with DATA.

I am confident that George and Company will survive and prosper.

I hope that Continental's new nozzles have better quality control than their engines have exhibited over the last few years and I hope they work better than the post 1992 cylinders.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990313.085734.msg02834.tex]

GAMI Injectors and Balancing Fuel Flows**Thu, 2 Sep 1999 21:12:07**

In a message dated 9/2/99 5:37:26 PM Central Daylight Time, epoole@scoot.netis.com writes:

Below 65% you can run the mixture wherever you want to, according to TCM, as long as you keep the temperatures under control (not too hard to do at 11K, normally, with mine at least). Mine runs fine WOT at peak or just a little LOP at that altitude, but I definitely see the power fall off a little. Not what I want. Power is little enough at that altitude under the best of conditions.

Good Evening Eric,

I understand that you want the most power you can get out of your engine when operating at altitudes where full throttle is the appropriate setting.

It is also reasonable to expect that the greatest amount of power can be extracted from the engine when it is burning all of the fuel and all of the air. I am sure there are some nuances there that I don't understand, but I think that should equate to best power or so. Best power is obtained richer than peak EGT. That is the place where the engine will run the hottest, but it is approved for such operation if the power setting is 65% or less.

If there is an excess of air, power will fall off. If there is an excess of fuel, power will fall off, not as fast as it does on the lean side, but it still falls off.

If you are running your engine with an equal distribution in all cylinders, you have a chance at operating them all at the optimum setting for your purposes. If any cylinder is running leaner or richer than peak power mixture, you are losing some potential power.

That is where the GAMIs come in. They allow you to balance your fuel flow to obtain the results that you desire.

As someone else has already noted, they may save you a gallon of fuel or so per hour. Even if that is not important to you, it will allow you to have a cleaner running engine.

If the fuel cost is a consideration, the GAMIs will pay for themselves in four or five hundred hours of operation regardless of how you operate your engine.

If you don't care about the cost of operation, the GAMIs will give you the possibility of squeezing out a little more horsepower at those times when your altitude will only allow you to get 65% or less power.

If you don't care about the cost of operation or the power your engine will produce, who needs GAMIs?

Happy Skies,

Old Bob

[ARTICLES/19990902.211207.msg07807.tex]

IO-470K to IO-470N, IO-520 or IO-550 Conversion**Sun, 6 Feb 2000 09:49:42**

In a message dated 2/5/00 10:58:33 PM Central Standard Time, farrarwd@myriad.net writes:

I am considering converting my 66 C33 w/ IO470K to
the IO470N
the IO520 or IO550.

Please provide me with any helpful advice/comments on your experiences with such a conversion. Thanks for your time and help.

Will Farrar College Station, Texas N7929M

Good Morning Will,

Cal Young, who has been active on this list, put a 520 in a Debbie. I am not sure about the year, but I think it was a '62.

Our oldest son flew the airplane quite a bit both before and after the engine change.

He said it made a different airplane out of it! The thing not only went faster, but since the rate of climb was so much better, higher altitudes became more practical and the fuel burn per average trip actually was less with the 520 than it had been with the 470.

I think if I were doing it, I would definitely go with either a 520 or a 550. The weights are almost the same for all three engines.

The major draw back for a 550 is the cost of the engine and the possibility that you might have to buy a new prop.

CMC 520s and two blade props that will work are available around the country fairly reasonably priced due to the large number of folks who opt for a 550. That is not so for the 550. Continental is selling new and remanufactured 550s so briskly that they have been able to maintain a substantially higher price for the 550 even though it is nothing but a 520 with a stroker shaft.

As to the desirability of the 550 over the 520. I have been very happy that I made the change, but it is nowhere near as dramatic improvement as the 520 is over the 470. I find my cruise is up about ten knots. Since the climb is a little better and I now have the capability of getting those speeds at a little higher altitude, my burn per mile is the same or slightly lower than with the 520.

I would definitely get rid of the 470 and go to either the 520 or the 550. Financially, the 520 is likely to be a more fiscally responsible decision, but the 550 is real goer!

Hopefully Cal will come in with more information. If he does not and you would like to get hold of him, let me know and I will contact my son to obtain Cal's address.

Happy Skies,

Old Bob

[ARTICLES/20000206_094942.msg02450.tex]

IO-470K to IO-470N, IO-520 or IO-550 Conversion**Mon, 7 Feb 2000 00:20:29**

In a message dated 2/6/00 6:44:15 PM Central Standard Time, sw049@hotmail.com writes:

For me, the 470-N and the 520 was almost the same money, so why do the 470-N. The 550 had two strikes out for me, the cost was more and more important, there was a need to cant the engine (too much work to the plane) or limit takeoff HP which was too much extra work on takeoffs for me.

Good Evening Steve,

Are you sure about the need for a power reduction? I believe John Small has a P model.

Last time I asked the folks at BDS, I was advised that they have an approval for the full 300 HP for the 550 in a P model with the engine straight, but not for the earlier airplanes. I have never inquired about the approvals for the various Debbies.

On top of that, BDS is not the only supplier of engine upgrade STCs. If someone is serious about stepping up, it would be pertinent to do some serious research.

Financially, it is almost always better to buy the newest, latest, finest and fastest that you can afford. But, if you are looking for that ultimate performance, remember that all of the Bonanzas will perform the same at the same weight and with the same horsepower. The lighter the airframe, the better it performs!

Putting the 550 in the earlier airframe is kinda like dropping a big block Chevy engine in a '68 Camaro convertible. It's a lot of fun, but may not be practical.

One thing for sure, regardless of the power available, the gross weight and speed restrictions should be observed, including the current speed restrictions on the 35s, A35s and B35s.

The primary advantage of the big engine is takeoff performance, rate of climb and better altitude capability. The additional speed that you can get by pulling high power is just not worth it. You burn too much fuel and the airplane gets too close to the yellow line. If all of ones flying is at low altitude and out of big airports, the 470 is plenty of power.

Now if you have a neat little strip out in the boonies with about a thousand feet of good surface, that 550 might look pretty good!

As always, it depends.

If it was mine, it would get a 550.

Happy Skies,

Old Bob

[ARTICLES/20000207_002029_msg02488.tex]

IO-470K to IO-470N, IO-520 or IO-550 Conversion**Mon, 7 Feb 2000 02:40:02**

In a message dated 2/6/00 11:33:35 PM Central Standard Time, swo49@hotmail.com writes:

Bob: ALL V-Tails with 550's installed straight have a takeoff HP limit to 285 - to do this you must watch for not-to-exceed settings for MP and RPM. Without doing this, you run out of rudder authority. Yes I am sure about this. Steve

Good Morning Steve,

How long ago did you get this information and from what converter? It was just about a month ago when I called BDS. I was inquiring about hanging a 550 in an N model. I was told, over the phone, that BDS did not have the approval to use the full 300 HP in the N, but if I could find a P model that I wanted to stick the engine in straight, the P model was approved.

Now I will agree that there doesn't seem to be any reason why the P model should be OK and the N model not, but that was the information I was given! I haven't yet seen it in writing though, and I wouldn't spend any money before seeing the documentation.

Far be it from me to ever encourage anyone to do anything that is not approved. Not only do the FEDs take a dim view of such things, but the insurance companies do as well!

However, forty some years ago, I had the opportunity to fly a straight thirty five which had substantially more power available than it was designed for. It would run out of rudder in a strong left crosswind. It wasn't as big a problem as it might have seemed. I just tried to avoid strong left crosswinds! A slightly downwind right crosswind was preferred to a strong left one.

Have you ever spoken to anyone who has a non-canted 550 installation?

It would be interesting to hear their comments.

Happy Skies,

Old Bob

[ARTICLES/20000207_024002_msg02495.tex]

IO-470K to IO-470N, IO-520 or IO-550 Conversion**Mon, 7 Feb 2000 20:49:40**

In a message dated 2/7/00 6:46:00 PM Central Standard Time, swo49@hotmail.com writes:

Soooo - I called BDS and spoke to Scott (just now) and the 550 can go into the N or P (as well as many other models). AND when installed straight, it is derated to 285HP by the STC paperwork (nothing is done to the engine). The only way to get this derating is MP and RPM settings for takeoff. Steve

Good Evening Steve,

That does make more sense!

I couldn't see any reason that it should be approved on the P and not on the N. I had planned to call them today, but didn't get around to it. Thanks for checking it out.

Happy Skies,

Old Bob

PS When I had the Colemill conversion done, it was derated from 300 to 285 by just reducing the manifold pressure. I would imagine the same could be done with the N or P. As Cy Galley mentioned, there are a lot of airplanes that have a MP restriction for takeoff. Not too difficult to manage. If an old man like me could handle it on the Colemill conversion, I would imagine you young whippersnappers would have no problem at all!

Not only that, by the time you get to a couple of thousand feet, full throttle would be within the accepted limits anyway!

I still think I would go for a 550 mounted straight!

[ARTICLES/20000207_204940_msg02554.tex]

IO-470 Conversion**Tue, 13 Mar 2001 19:20:59**

In a message dated 3/13/01 4:53:41 PM Central Standard Time, spindel@mindspring.com writes:

I never claimed that the owner would get his money back, just that there should be some value in the equation.

Good Evening Stuart,

This has been rather heavily beat around, but I will add some comment anyhow!

The biggest disadvantage that I see to putting the IO-470 in an airframe instead of the E-225-8 is the additional weight involved.

The difference between the two engines is around eighty-five pounds. I have no direct knowledge as to what the weight of any required beef up of the airframe might be, but let's allow five pounds. We have now added ninety pounds or the weight of fifteen gallons of fuel to the older airframe.

That is a rather large decrease in the allowable payload capacity of those early airframes.

Is it worth doing?

Well, evidently, Scott thinks not.

There has to be a considerable increase in the potential rate of climb when the airplane is flown at gross, but the payload at that gross figure will be less than could be carried with the lighter weight engine.

It is possible that there could be sufficient fuel savings on a long trip to offset the additional weight of the larger engine, but it would take some pretty extreme conditions to attain it. While some of the E series engines have excellent fuel distribution with the stock PS5C, not all do.

One hundred and twenty horsepower is a decent cruise horsepower for the early airframes. A finely tuned, well leaned GAMI equipped IO-470-N flown at it's optimum altitude might turn out that 120 HP on as little as eight GPH. The 225 with less than perfect distribution could burn as much as ten GPH. On a seven and a half hour cruise leg, the 470 would come out even. Any longer and the 470 is ahead!

BUT! There are other advantages to going modern. Once you have bitten the bullet and decided to live with the loss of ninety pounds of potential payload, you are in a position to raise the horsepower considerably with no further additional weight (after you win the lottery)!

The 520 and the 550 will slip right in the same spot at the same or less weight. Lots more money, but no more weight or loss of payload.

The E series engines are all excellent and extremely light weight engines. I, personally, never thought there was 20 horsepower difference between the E-205 and the E-225, but who knows for sure! I always felt that the 205 with an 88 inch prop did as well as the 225 with 84. Never flew a 225 with the 88, that may well do better

With the IO-470-N, I think you could conservatively count on an additional thirty horsepower more than you have with the 225. Maybe more. Thirty HP won't do much for speed, but that is 990,000 foot pounds per minute climb that is available at any chosen climb speed. If your airplane is at a gross weight of 2750 pounds, that should give you an additional 360 FPM. Nothing to be sneezed at!

If it were my airplane, being used as I use my airplane, I would go for the more modern, easily maintained engine, higher rate of climb, greater selection of propellers and potential for further gains provided by the IO-470-N.

To Each His Own.

Happy Skies,

Old Bob

[ARTICLES/20010313_192059_msg05856.tex]

IO-470 vs. IO-520**Sun, 30 Aug 1998 21:34:31**

Good Evening Eric Poole,

From what I understand, the IO-550 STC requires a three blade prop (someone please correct me if I'm wrong on this), so the chances are I'll go with the 520.

There are no two blade propellers approved on the IO550B which is the engine normally used when 550s are put in Bonanzas. Some of the two blade props weigh as much as the lighter three blades. There is a four blade approved but it has limited usefulness and is very heavy.

Many of the three blade props approved on the 520s are not approved on the 550s. Be sure and check out all of the possibilities. There may well be governor problems also.

Happy Skies,

Bob

[ARTICLES/19980830_213431.msg05022.tex]

IO-470 vs. IO-520 vs. IO-550**Sat, 30 Oct 1999 17:59:40**

In a message dated 10/30/99 4:45:49 PM Central Daylight Time, epoule@scoot.netis.com writes:

Everything else being equal, WOT and 2350, 11,000 ft, how much can I expect the true airspeed to increase with the 520? The 550?

Good Afternoon Eric,

Strictly a WAG, but I would expect 163 knots with the 520 and 173 with the 550.

The big improvement would be in the rate of climb. It makes it ever more practical to go high, even on the short trips.

If I could find the right airframe, something between the H and a P, I would buy it and do just that! One of the nicer aspects of the pre model S35 airplanes is that the engine can be mounted straight instead of crooked. That should make it faster, but who could know without giving it a try! Some pundits claim that would allow as much as five more knots.

Happy Skies,

Old Bob

[ARTICLES/19991030_175940.msg09906.tex]

IO-470 vs. IO-520 vs. IO-550**Wed, 3 Nov 1999 00:29:22**

In a message dated 11/2/99 10:18:06 PM Central Standard Time, jgarner@netwiz.net writes:

The way I remember its only the motor mounts that offset the motor, I dont think nosebowl mods are required- could be wrong about that on some models though...

Good Evening Joe,

The S model was the first Bonanza with the canted engine. All previous models had the engines installed more or less straight. With the offset, the prop shaft is no longer in the center and consequently, the small afterbody that had been behind the propellor spinner on all of the earlier airplanes was eliminated. If the engine is to be installed in a P model or earlier in the canted position, the open inlet is required. Either the existing nose bowl must be modified or a new one installed. There are also numerous changes required of the baffling. Not a big deal if you are replacing all of the baffling anyway, but if you plan on using some or all of the old baffling, it can add quite a bit of cost and or labor to the conversion.

Happy Skies,

Old Bob

[ARTICLES/19991103_002922.msg10066.tex]

IO-470 vs. IO-520 vs. IO-550**Sun, 28 May 2000 09:57:54**

In a message dated 5/28/00 7:22:18 AM Central Daylight Time, epoule@scoot.netis.com writes:

I don't WANT to upgrade to a bigger engine and then have to put up with all sorts of cooling problems from then on out. The 470 is absolutely powerful enough for me, and runs nice and cool, if I could only get it to perform decently in the altitudes in the mid-teens.

Good Morning Eric,

I guess we could argue forever on how much power is enough power, but I have a hard time convincing myself that I should carry around a 470 cubic inch engine when a 550 cubic inch engine that weighs the same can be put in the same space. The only problem is the price that Continental is getting for the engine!

I suppose that I am once again in the nostalgic mode, but I remember how disappointed I was when the H model came out with the first 470. It was such a dog compared to the G model that I don't know if I would have become such a Bonanza lover had I not flown the older light weight Bonanzas before I flew the H.

I kept a straight 1947 model 35 as my personal airplane during the H through the P model era.

Once the S came out, it was a different story. While the airplane was still a lot heavier and not as lively as the E series powered aircraft, the takeoff and climb performance was back up to the standards of the earlier airplanes. Not as good for real short fields due to the higher stall speeds, but the climb was equivalent to or better.

The 550 makes the good airplane even better, there just is no substitute for cubic inches. When you can get those cubic inches with little or no gain in weight, I can't see any reason not to do so.

You have mentioned that your friend's V has cooling problems. I would suggest that he has baffling or fuel flow troubles. The factory baffling is atrocious, but even it will keep the 520 adequately cooled if maintained and operated properly. The 550 is a different story. All of that horsepower in the same space cooled by baffling that was originally designed for 185 horsepower does need better cooling.

I have no doubt that George's new baffling will cool the engine more than adequately. I had the newer Beech model 36 baffling installed with my 550. It was OK, but I had the latest style BDS baffling installed a year and a half ago and cooling is no problem at all. George's solution will be even better.

My oldest son was in a flying club that had a very nice 1962 Debbie with the 470. They had a 520 put in it about twelve or fifteen years ago. It made it into a totally different airplane! The rate of climb was so much better that he was actually burning less total

fuel on his normal trips. He felt that was due to the ability to get to cruise altitude so much faster and the greater efficiency available at reasonable cruise speeds at those altitudes. I find the same thing true with my change to the 550. My climb rate and performance at altitude is so much better that I am getting places faster on the same or less fuel.

The only reason I can see to NOT put a 550 in any Bonanza is money.

It is not a good financial move when you look at the selling prices of airplanes so equipped. The market does not reflect the costs involved. I guess that means one should search for an early airplane that IS so equipped!

Them's my thoughts!!

Happy Skies,

Old Bob

[ARTICLES/20000528_095754_msg08824.tex]

IO-470 vs. IO-520 vs. IO-550 vs. Turbo**Sat, 26 Feb 2000 16:50:30**

In a message dated 2/26/00 2:42:37 PM Central Standard Time, epoule@scoot.netis.com writes:

That's one big reason I'd go with the 520. Are you saying that the canted installation is needed for the 520 as well?

Good Afternoon Eric,

I don't know for sure. As I said, I asked that question of the previous owner of TurboFlite and he told me that they only had approval for the canted installation. When I pressed for further information, he told me that their parts wouldn't fit on an engine that was mounted straight.

Having said that, I don't think he knew very much about the whole project. Before they had the approval for the 550, I had asked him if their unit was going to be approved on that engine as well as the 520. He told me that they were working on it, but that it would take a lot of work and changes as the dimensions of the 550 were different. He stated that the engine was a lot bigger and took up more room in the engine compartment. Since I knew that he was completely wrong about that, I quit having any confidence in anything he told me!

On my dream plane, I would try for straight ahead and a manual waste gate. If the RAY JAY was available and approved for that configuration, it is likely that is what I would use.

The last time I checked, the BDS approval of a 550 in any of the early airplanes is derated to 285 if mounted straight. I doubt if there is any RAY JAY approval for that combination. It has been a long time since they were getting theirs approved and I doubt if that was considered.

I asked George if he was considering a manual waste gate. He told me that by the time they got it approved, it would likely have to cost more than what they already have approved. I don't like the idea of the higher upper deck pressure used on the TurboFlite conversion, but I am admittedly no expert on supercharging. Still, it does seem that a manual wastegate would be more efficient.

I rather imagine that my son's thought of a 550 in the J without the TN would be a more practical solution. That would allow better climb and more horsepower for cruise in the 10 to 12 thousand foot altitude range. He would have to restrict his use of the throttle to avoid exceeding 285 HP for takeoff. I don't have the data handy right now, but I think around twenty-seven and a half inches of manifold pressure at 2700 RPM on the 550 will give 285 horsepower. As soon as he was a couple thousand feet above sea level, it would no longer be a problem. His takeoff at sea level would be no better than Steve Oxman's, but from 2000 feet on up, the takeoff, climb and cruise performance would all be better than with the 520.

Adding the TurboNormalizer and oxygen would eliminate one lightweight passenger!

Possibly you should consider doing the 550 first and deciding whether you really need the higher altitude performance once you are familiar with the larger engine and it's capabilities.

I notice better performance with my 550 over the 520 in spite of the three blade propellor. I THINK it would be even better if there was a two bladed prop approved.

Your airplane being substantially lighter than mine, should do a lot better.

I have no information concerning the difference in cost between mounting the 550 in an early airframe straight as against the cost of putting it in crooked, but I would like to try one straight. It may not be any better, but how do you know until you try it out? Maybe someone who has tried both will let us know.

Happy Skies,

Old Bob

[ARTICLES/20000226_165030.msg03687.tex]

IO-470 vs. IO-520 vs. IO-550 vs. Turbo**Sun, 27 Feb 2000 07:04:18**

In a message dated 2/26/00 3:52:38 PM Central Standard Time, BobsV35B@aol.com writes:

His takeoff at sea level would be no better than Steve Oxman's, but from 2000 feet on up, the takeoff, climb and cruise performance would all be better than with the 520.

Good Morning Eric,

Last night, when I wrote this comment, I did not mean to imply that Steve's airplane has anything other than fantastic performance! I am sure it does very well. It is just that the 520 and the 550 weigh the same (within a few pounds either way, depending on model and accessories) and take up the same amount of space. I am not an engineer or a racing mechanic, but the big boys say "you can't beat cubic inches."

The primary difference between the 520 and the 550 is the price Continental is able to get folks to pay!

You asked the question: "Are you saying that the canted installation is needed for the 520 as well?"

It is probably required by the approval currently available, but I don't think the term "needed" is the correct one to be applied if we are questioning whether the airplane could be flown easily and safely using the full three hundred horsepower for takeoff at sea level. That is the only time that much power would be available.

The easiest way to get a larger engine approved in an airframe is to derate it to the same power as an engine which is already approved. Depending on the method of data presentation and substantiation agreed to by the parties involved, there might not even be any requirement for flight tests.

The comment is often made that the 520 was canted in the S model because one would run out of rudder on takeoff with the engine mounted straight. Given enough of a left crosswind, one can run out of rudder on takeoff with almost any Bonanza. (Or other airplane for that matter!)

The fact that there are several approvals of the 520 in early airframes mounted straight ahead that are successfully being operated proves to me that it does not take superhuman skill and technique to handle that 285 horsepower!

I would also be rather surprised if there have not been a few cases where those folks who do have a 550 mounted in an early airframe in the straight position have accidentally used full throttle instead of 27.7 (or whatever the restriction is) inches of manifold pressure on takeoff.

It is my not so humble opinion that any model Bonanza would not be a difficult airplane

to fly using three hundred horsepower for takeoff with the engine mounted straight ahead.

It might require the use of some flight control technique that is not normally used by most Bonanza pilots, but that is another story!

If your pocket book can handle it, go with the 550.

Happy Skies,

Old Bob

[ARTICLES/20000227_070418.msg03709.tex]

IO-470 vs. IO-520 vs. IO-550 vs. Turbo**Tue, 30 May 2000 17:57:55**

In a message dated 5/30/00 10:30:03 AM Central Daylight Time, jtsmall@onramp.net writes:

Which brings me full circle to your argument for the 550, provided it could be installed in my P35 without paying a large premium over a new 470. Which as I understand it cannot be.

Good Afternoon John,

I still feel that putting the bigger engine in one of the old airframes is not a wise financial decision, but if it were me, I would do it! I think you might find that your P model with a 550 flown at legal gross weights would give you a rate of climb and the performance at altitude that would do almost all of what you say you want out of the airplane.

I haven't checked recently how much more it would cost than putting in a new 470, but the figure I was given a year or so came out between ten and twenty-thousand. The variables include what propellor and accessories you now have and what kind of shape your airframe is in.

If you want to do a 'gold plate' installation, the cost will be high whether you overhaul the 470 or drop in a 550. Be sure that you are comparing apples with apples.

Adding the turbo will make it an entirely different machine, but it may not be the best machine for what you want it to do.

The Turbo adds enough weight that your available useful will be reduced by an amount equivalent to eleven gallons of gasoline. That's an hour at medium to economy cruise settings.

Your available takeoff horsepower will be less at sea level with the turbo, regardless of which engine you choose. Remember, the turbo normalizer is only allowed to provide enough boost to bring the power back up to the rated power of the engine. The power that is needed to provide the higher upper deck pressure so that the controller may provide enough oomph to feed the engine the air required to get full rated power has to come off the full rated power of the engine.

I have been told that the break even point for take off power is around 2500 feet under standard conditions. Perhaps George will have some precise figure.

The 550 will provide more horsepower than the 470 for takeoff at any altitude. If you currently have a 260 HP engine, at sea level you gain forty horsepower with a 550 installed crooked and twenty-five with the engine mounted straight. With the engine straight or crooked, you would still get 260 horsepower for takeoff up to around four thousand feet.

All of that with little or no weight penalty depending on the propeller and accessories

chosen.

As I said before, it may not make good financial sense. I believe that financially you are best off to buy the absolutely newest Bonanza you can possibly afford, but an early light weight airplane with that big bunch of cubic inches up front has to be a ball! It may well be worth an extra ten or twenty Gs to you, I know it would be to me!

Happy Skies,

Old Bob

[ARTICLES/20000530_175755_msg08894.tex]

IO-470 vs. IO-550 - fuel flow**Tue, 6 Feb 2001 10:59:08**

In a message dated 2/6/01 9:31:09 AM Central Standard Time, flyinglo@email.msn.com writes:

Ok, guys, speaking of #'s, I've got a ?. If a person has an IO-470-C & gets about 12 gal/hr, what will he get if he goes to an IO-550-B, 17 gal/hr? (I know it depends g) {Nomax flame suit on} g

Good Morning Jerry,

Same speed, fuel and payload on board, it will burn the same or less fuel.

If you want to go faster at the same altitude it may be able to do just a teenie bit faster on the same fuel due to slightly higher efficiency. You didn't mention whether or not you have balanced fuel injector nozzles.

With the balanced fuel nozzles on the 550 and none on the 470 you would probably get the same speed at the same altitude on about a gallon per hour less fuel.

You would undoubtedly be able to get a higher cruise on twelve gallons per hour with the 550 if you go up three or four thousand feet higher.

Take it up to the highest altitude that you can get where the engine will burn twelve GPH at full throttle, 2500 RPM and leaned to peak EGT. It will be a whole lot faster!

As you say, it all depends!

Happy Skies,

Old Bob

[ARTICLES/20010206_105908.msg02928.tex]

IO-520 vs. IO-550 - Prop**Fri, 2 Jun 2000 16:16:55**

In a message dated 6/2/00 2:32:01 PM Central Daylight Time, epoole@scoot.netis.com writes:

Don't most conversions need a three blade prop anyway?

Good Afternoon Eric,

There are currently no two blade props approved on the 550, but there are several approved on the 520. If you stick with a 520, you could probably find a used two blade that would work. If you are going to buy a new prop, you might as well get a three blade. There are several that are approved on the 550 as well as the 520. The difference in cost between a new two blade and a new three blade is inconsequential. A three blade Black Mac can be had for as little as \$6000 if you find a hungry enough dealer. \$7000 almost anywhere!

Buy the conversion paperwork, baffling and propellor from the same source and everything will likely be cheaper.

The Black Mac 406 three blade is approved on both the 520 and the 550 while there is a version of the same prop that is especially matched to the vibration characteristics of the 550 and listed as the 409.

The only reason that there are no two blade props approved on the IO-550-B is that not enough people have asked for them. Most folks like the Macho look of the three blade. There is absolutely no structural, vibration or power absorption problem with a two blade at the RPM and propellor diameter that would be used. Properly designed, the two blade should give better takeoff and climb while a three blade might be faster. As we all know, there is a lot of anecdotal data that proves that the theory is not always correct. There is just as much difference between various two and three blade props as there are differences between high wing and low wing airplanes. Saying that one or the other is better is like saying a high wing airplane is better than a low wing. It depends on dozens of other factors than just where the wing is placed. The same thing goes for propellers.

If the engine is to be mounted straight, the approval, baffling and installation added up to around \$10,000 a couple of years ago. Add seven thousand for the prop and whatever extra the engine costs above a 470 and that should be the price. I think the whole deal could be done for about twenty grand over a similar 470 installation cost. The forty-thousand quoted by George is likely to be close to the cost including the new or reman engine and exchanging your old engine and prop.

There are a lot of variables depending on which engine, prop and accessories you now have and their condition.

Happy Skies,

Old Bob

[ARTICLES/20000602.161655.msg09046.tex]

IO-550 - Automatic Mixture Compensation**Tue, 15 Feb 2000 10:52:46**

In a message dated 2/14/00 9:05:52 PM Central Standard Time, jack-taylor@kingwoodcable.com writes:

I bought an IO550 last year and then found out that I could have ordered it without the automatic mixture leaning however I didn't know that and got the auto job. I have heard that the new Bonanzas can be had without the auto lean feature which I think would have been better. Jack Taylor

Good Morning Jack,

Had the IO550 been available without an AMC unit when I bought mine, I would have ordered it that way. However, since I have had the unit, I find that I do like it!

It has to be setup properly, which takes some time. It is rare that one adjustment session will get it right. It is more likely that further adjustment will be required as things seat, but that is true of the non-compensating fuel controls as well.

The fuel flow still needs to be monitored. The AMC isn't perfect, but it in my opinion, it does help.

Happy Skies,

Old Bob

[ARTICLES/20000215.105246.msg03006.tex]

IO-550 - Automatic Mixture Compensation**Wed, 9 Aug 2000 22:49:54**

In a message dated 8/9/00 9:09:07 AM Central Daylight Time, epoule@scoot.netis.com writes:

Really? That's interesting. How does that affect the ability to run LOP, run richer for cooling on hot days if needed, etc.?

Good Evening Eric,

I am not sure just what your question is, but if you are asking how the automatic mixture compensation affects normal operation I offer the following.

You still need to adjust the mixture for all of the normal reasons, but the AMC unit will allow a setting that you make to last for a few thousand feet up or down.

If you make a full throttle, full rich takeoff and just continue climbing without touching the mixture, the mixture will be automatically leaned to maintain a mixture that is relatively as rich as you had at takeoff. If you lean for climb, the AMC unit will attempt to hold that same ratio during the rest of the climb.

It isn't perfect, but it does a good enough job that the time spent adjusting the mixture is reduced.

The same goes for the descent process.

I don't find the unit bothersome and there are some labor saving advantages.

I don't consider it a detriment, but I wouldn't pay very much to have one added to my engine.

All of the normal functions about which you inquire are still available to the operator.

Happy Skies,

Old Bob

[ARTICLES/20000809_224954_msg11954.tex]

IO-550 Colemill Conversion**Wed, 3 Nov 1999 13:16:22**

In a message dated 11/3/99 11:09:04 AM Central Standard Time, newmanb@erols.com writes:

Comments and experiences with the Colemill Starfire? Is the quoted price realistic, or do extras and up charges eat you up?

Good Morning Bob,

For what it is worth, I had a Colemill conversion done on my V35B in 1996. I found them to be easy to deal with and pleasant to be around. I called looking for an engine, they had all of the components in stock and I flew it home six days after I made the first phone call inquiry. The price was exactly as had been quoted.

The reason for the four blade prop is to reduce the noise. It does that and then some. For anyone outside the airplane the noise reduction is astounding. For the passengers, I really didn't notice any difference, but then, I didn't measure it scientifically.

The prop gives a lot better ground clearance.

It looks cool, if you like such things!

It was the best conversation piece I ever owned.

It weighs some 38 pounds more than the three blade so if you need ballast forward, it is provided by the four blade unit.

If you ever have occasion to land with the nose gear retracted while the mains are down and locked, the propellor will take most of the damage and reduce damage to the nose bowl and keel section.

Things I didn't like.

The first thing is strictly my own fault. I didn't ask the right question. I asked if the engine was rated at three hundred horsepower. They said it was and it is. But not in my airframe with the Colemill conversion! After my old engine was out of the airplane, I was looking at the paperwork for the new installation and noted that there was a manifold pressure restriction for the use of the engine in my V35B.

When I asked about that, I was told that the FAA had told Colemill they would have to run a complete aircraft certification program to gain approval to use full throttle with the 550 so they elected to restrict the horsepower to 285 and avoid that certification expense. They do a similar thing with their 550 installation in the B55 Barons. The engines are derated to the power that was originally installed.

The Colemill conversion in the model 36 is approved for full power, but not the one in the V35B. I am not sure about the model 33 approvals, but I think they are the same as the V35B. If you want the full power for takeoff at low altitude airports, be sure to

check it out.

The baffling they use is the standard late model Beech model 36 baffling. It is better than the regular V35B baffling, but not as good as the latest BDS stuff.

I found that the four blade just didn't give me the takeoff and climb performance that I expected. It is a very subjective evaluation, but I don't think the initial takeoff acceleration was as good with the four blade as it had been with the 520 and the two blade.

It bothered me that if I elected to use full throttle on takeoff at low altitudes, I was violating an FAR. I do enough things wrong when I am trying to be legit without consciously disobeying the rules!

I investigated the cost of getting a BDS installation approval along with a 406 or 409 McCauley prop. It seemed the cost of baffling, approval and a prop would be a little over ten thousand bucks so I chalked it up to experience and decided to go with the BDS approval and a McCauley 409. It was worth the money to me to have the full three hundred horsepower legally available.

That was a year ago and just about the time I was going to bite that bullet, my nose gear decided to get jammed in the up position which necessitated a landing with the nose gear retracted.

I made the installation of the BDS approval as had been previously planned with the exception of the propeller. A 406 was available immediately and I would have had to wait a couple of months to get a 409.

I find the performance now to be much closer to what I had expected from the 550 exchange. I find my climb is substantially better than with the 520 and I normally cruise about ten knots faster.

If anyone ever gets a two blade approved for the Bonanza with a 550B, I will give it a try.

I believe it was Einstein who said: One experiment is worth a thousand theories!

More than you really wanted to know, wasn't it?

Happy Skies,

Old Bob

[ARTICLES/19991103.131622.msg10090.tex]

IO-550 Conversion**Tue, 20 Jul 1999 10:48:04**

Good Morning John,

In a message dated 7/20/99 7:58:11 AM Central Daylight Time, john_galt@cyberdude.com writes:

Hello all, I am considering an upgrade to the IO-550 for my V35, and would like to hear from anyone who has performed this conversion who could answer the following:

Before I start answering the questions, I should mention that I had the installation done by Colemill. They call it the Starfire conversion. This conversion includes the four blade Hartzell prop. I later switched to a three blade McCauley.

+ How long did it take?

Five days

+ What unexpected problems were encountered during the installation?

None

+ How much did it cost?

\$36,500 in 1996

+ What performance increases have been noted?

This is a tough one. The initial acceleration suffered with the four blade prop as did the climb performance. Cruise was slightly better. The nicest part is that I can get the desired cruise power at a slightly higher altitude. I find that I am cruising about ten knots faster than I did before, but I do burn a little more fuel to do it.

Since I switched to the three blade prop, the initial TO and the climb performance has increased and I do believe it is now better than it was with the 520 and the two blade. I just wish there was a two blade prop approved for the 550. It may not be any better than the three blade, but I would like to try it!

+ Have there been any problems with your IO-550?

Just the common one of all late Continentals, excessive cylinder wear. I don't think that has anything to do with whether it is a 550 or a 520.

+ Would you do it again?

Absolutely!

Happy Skies,

Old Bob

[ARTICLES/19990720_104804.msg06258.tex]

IO-550 Conversion**Tue, 20 Jul 1999 20:52:33**

In a message dated 7/20/99 7:17:29 PM Central Daylight Time, Pete.Bedell@aopa.org writes:

Why did you trade the four-blade for the three blade? Was there a performance decrease? Anybody else have any input to Colemill conversions?

Good Evening Pete,

The four blade did what it was supposed to do. It reduced the noise outside the airplane dramatically. My understanding is that the airplane will meet the European noise requirements with that prop and the silencers on the exhaust. There was a small reduction inside too, but the major advantage was how quiet it was for my neighbors. I felt (no scientific measurements) that I lost considerable performance both on the initial takeoff run and in climb.

The airplane did not get out or climb as well with the four blade as it did with the 520 and the two blade prop. As we have discussed here many times, I don't think the number of blades is as important as the blade profile, twist, disc area, diameter and a lot of luck on the designers part. The performance did improve when I installed the Black Mac 406.

As to the Colemill operation in general, I found them easy to deal with. Nice folks and the job was done when they said it would be and with no surprises or unplanned expense.

They use the late style factory model 36 baffling and that seemed to work OK. I installed BDS baffling last fall and it seems to cool the number two cylinder better than the factory stuff did. The engine has run cool with both sets of baffling. Colemill sealed it up nice and tight and I sealed every hole they missed. It does make a difference!

If I had to put one together today, I would use the Black Mac 409 prop and the BDS baffling. When George Braly gets his new baffles finalized I bet they will be better! If there was a two blade approved on the 550, I would try it, but who knows what the result would be.

One thing for sure! I definitely would not stick any more holes or louvers on the cowl than are there to start with! They just aren't needed if the late style factory or BDS baffling is used and properly installed.

Does that help?

Happy Skies,

Old Bob

[ARTICLES/19990720_205233_msg06278.tex]

IO-550 Conversion

Wed, 3 Nov 1999 12:05:19

In a message dated 11/3/99 10:56:47 AM Central Standard Time, marccook@earthlink.net writes:

In the end, it appeared that, for me, the opportunity to upgrade to a 520 or 550 was driven by emotion and not rational economics. If I want the extra power bad enough, I'll sell the P and get something else.

Good Morning Mark,

I agree wholeheartedly with all points you make!

BUT!!!

Speaking of emotion, a light weight early 35 equipped with an IO-550 would be a sky-rocket alongside a stodgy newer F33A or V35B!

If I could find the right early airframe to do it to, it would be done, regardless of the economics.

What's money for anyway?

Happy Skies,

Old Bob

[ARTICLES/19991103_120519_msg10087.tex]

IO-550 Conversion**Tue, 14 Nov 2000 23:46:31**

In a message dated 11/14/00 9:45:32 PM Central Standard Time, DGlienke@aol.com writes:

I have a 1979 V35B and thinking about upgrading to an IO-550. Does anybody have numbers on changes to the 1) Weight/CG (I don't think it changes), 2) increase in useful load (I heard for an extra \$1000 in paperwork you can get a 100lbs increase, 3) Climb performance, 4) Cruise Performance, and 5) Fuel consumption. Thanks

David Glienke

Good Evening David,

I have S/N D-10173, a 1978 V35B which I converted to the IO-550 in 1996. I now have a little over one thousand hours with that engine. The numbers should be similar to what you might expect.

For Number 1, the empty weight should decrease. There are some conditions though. The engine is a couple of pounds lighter. There are lighter weight starters, alternators and magnetos available now than were standard in 1979, but you may have those now due to earlier replacement. If you are still using the threaded shank, two blade, McCauley and switch to a Black Mac there is possibility of another ten to fifteen pound weight savings.

I checked this out a couple of months ago, and off the top of my head, I think the total weight savings could be close to forty pounds if all light weight accessories are chosen instead of the older heavier units, but most of that saving comes from the new accessories and propellor. You may already have some, or all, of those on your current IO-520.

For number 2, Beryl D'Shannon does have an STC to raise the max TO gross to 3500 pounds if you use their approval. The one hundred pound increase is not cumulative though. If you already have tip tanks, the extra one hundred pounds is not added to the tip tank increase. The allowable gross will still be the max allowed with the tips. I do have the approval on my airplane. As you said, it is merely paper work.

For numbers 3, 4 and 5, I can only supply my impressions as I did not make accurate comparisons. However, the acceleration has improved slightly, the climb is better and the cruise is faster. How Much? I really can't say about the takeoff distance or the rate of climb except to say I seem to get to ten or twelve thousand now in about the same time I formerly got to 8 to 10 thousand and the cruise is definitely at least ten knots higher on about the same fuel. I feel that part of that increase in cruise is due to the fact that I can now get my desired cruise power a couple of thousand feet higher than I could before. I find that on any specific trip, my burnouts are the same or a smidgen lower, but I am getting there quicker.

I like it and would do it again!

Happy Skies,

Old Bob

[ARTICLES/20001114_234631_msg16231.tex]

IO-550 Conversion**Tue, 28 Nov 2000 16:48:05**

In a message dated 11/28/00 3:00:21 PM Central Standard Time, Weldsports@cs.com writes:

Does anybody have an STC for the straight installation of the IO-550 or a TN-IO-550 in the J_K_M_N_P_S models of the Bonanza line? Skip Weld

Good Afternoon Skip,

Beryl D'Shannon has the approval to install the IO-550 engine in everything from an A35 on.

I believe they offer it in both the straight and crooked mounts for all of those except the S. The S is approved only with the crooked mount. That was what they had from the factory. I know it is available either way for the J through the P. If it is put in straight, full throttle may not be used until the aircraft is at an altitude where full throttle will only yield 285 HP. If it is mounted crooked, full throttle may be used all of the way down to sea level.

Now, don't ask me how I know, but I can assure you that the aircraft is easily controllable at full throttle even at sea level. To my knowledge, TAT has no approvals for their Turbo Normalizer on any straight mounted engine.

The RAJAY is approved on several straight engines, but I doubt if has been approved on the 550. The TN that was sold a few years ago up in the Northwest may have been, but the name escapes me, they are out of business and I doubt if it was approved on the straight installations anyway.

Happy Skies,

Old Bob

[ARTICLES/20001128.164805.msg16861.tex]

IO-550 Platinum Engine**Tue, 28 Nov 2000 12:40:53**

In a message dated 11/28/00 10:32:58 AM Central Standard Time, jtsmall@onramp.net writes:

On Tue, 21 Nov 2000 18:14:38 EST, BobsV35B@aol.com wrote:

Since your basic airplane came from the factory some four-hundred pounds lighter than my V35B, it should run the pants off my old clunker!

Bob, is this the fundamental reason you have stated you'd like to find a P and put a 550 in it?

Thanks.

-jts

Hi John,

That is a true statement!

Incidentally, I went to Mobile last week to fly home with a friend who had just had the Platinum Continental engine installed in his V35B. His airplane has always been faster than mine. When we both had IO-520s, he was about ten mph faster. Now that he has the Platinum IO-550, he appears to be about 15 MPH faster than I am with a stock IO-550.

We haven't had a neck and neck flat out horserace yet. That will wait until his engine is fully broken in, but I am really looking forward to it. In any case, his is a real screamer.

We were indicating 202 MPH at 4500 feet.

The lighter weight of the P model wouldn't make a lot of difference in the true airspeed to be developed down low and at maximum powers, but the light weight really pays off with the higher climb rate and the ability to get fairly high cruise powers at the higher altitudes.

The more I see of the IO-550, the more I like it. I just hope that Continental can get their manufacturing problems straightened out. The problems such as George Bown has had should not be occurring in this day and age.

When the time comes, stick a 550 in the nose of that P!

If it were mine, it would be stuck in straight, not crooked, but I have no data to show whether that is a good idea or not!

Happy Skies,

Old Bob

[ARTICLES/20001128_124053_msg16844.tex]

IO-550 or IO-520 for T-34?**Sat, 30 Oct 1999 15:43:38**

In a message dated 10/30/99 11:42:58 AM Central Daylight Time, sbuerkle@adelphia.net writes:

Hello all: I'm in a partnership on a T-34 which we're rebuilding and we're debating the 300 hp. IO550 vs. 285 hp. IO520 question right now. Does anyone have any experience with both of these engines in a T-34? For the extra 15 hp, do you gain a great deal of performance?

Good Afternoon Steve,

I have absolutely no experience operating a T-34 and it has been at least thirty to thirty-five years since I even flew one. I will make a comment on the IO-550 compared to an IO-520 though.

I don't think a case can be made that installing the 550 over the 520 is financially viable. Continental knows they have a good thing going and price it for all the market will bear!

Having said that, I am glad I popped for the 550 and would do it again!

I find that my average cruise speeds are about ten knots higher than they were with the 520 and my overall stage length burns are about the same or maybe even a little bit less.

I don't really know why this is so.

Fifteen horsepower doesn't seem like it should make that much difference.

I remember when the IO-520 was installed in the first S35s, I was amazed at how much better it performed than had the IO-470 powered P model. 25 additional horsepower didn't seem like it should make that much difference either, but it sure did!

The IO-470, IO-520 and IO-550 are all the same size and basically the same weight. Many versions of the 470 are heavier than many versions of the 550.

The performance difference between an early lightweight airframe powered by an IO-470 and one powered by an IO-550 are nothing less than spectacular.

The 'big' boys have always said: "It's the cubic inches that count!"

More cubes and the same or less weight! That's hard to beat.

More power in the same space means more attention is required to cool it, but the standard Beech baffling is so bad, that it is not harder to do better. I have the latest style BDS baffling with a few changes that I think are minor improvements and cooling has been no problem at all. When the 550 was first installed, it had the factory late style model 36 baffles. That was better than the original V35B baffles, but not as good as the present ones. I imagine whatever George Braly comes up with will be even better.

He is a T-34 nut so they should be available for that airframe as well.

Happy Skies,

Old Bob

[ARTICLES/19991030_154338_msg09895.tex]

IO-550 or IO-520 for T-34?**Sat, 30 Oct 1999 16:37:26**

In a message dated 10/30/99 3:20:19 PM Central Daylight Time, sbuerkle@adelphia.net writes:

How's your fuel burn with the 550 vs. the 520? One concern that we have is that without taking the baggage space and turning it into an extra fuel location, we'll be much more limited in range.

Good Afternoon Steve,

If you fly at the same speeds flown with the smaller engine, I am confident you will burn less fuel.

If I pull back to long range cruise, I get better than 140 knots at less than ten gallons per hour. That is at least a half gallon per hour better than I did with the 520.

I have had some friends claim they burn as much as two gallons per hour less at the same speeds previously flown.

I haven't made any scientific evaluation, but I know my burn is at least a half gallon per hour lower at the lower speeds and I think it is about one GPH lower in the 150 to 155 knot range.

You will burn substantially more fuel at full power though, horsepower doesn't come free! I have mine set up to flow about 28 to 29 GPH at full power and sea level.

Happy Skies,

Old Bob

[ARTICLES/19991030.163726.msg09898.tex]

Leaning**Thu, 29 Jan 1998 10:17:27**

Good Morning George Harrison,

In a message dated 98-01-29 09:39:04 EST, you write:

That aside, I guess a major part of the message here is to lean, at cruise, no further than roughness, and then richen it a bit as with almost every other engine.

With all due respect, I rather get the impression that you are missing the major point of George Braly's discussion.

The method you discuss is a serious compromise of the optimum possible operation of the engine. It is used to advantage when running at high power settings with an engine that has poor distribution so as to avoid operating with some cylinders at an excessively high temperature while running lean enough on the richest to avoid significant power loss.

I know from experience that George will explain it better. Read carefully and you will be using the same operating procedures used by Charles A. Lindbergh on his epoch flight across the North Atlantic and his subsequent "good will" flights in addition to his excellent training of WW II pilots in long range cruise techniques.

If you want an education in CYA written by the lawyers (other than George) obtain an early copy of the original 1947 POH for the model 35. Read the leaning recommendations therein and follow up by reading newer manuals every couple of years apart. The 1947 version is the most accurate.

Lindbergh and his contemporaries operated on the low power side but later airline operations were conducted to great advantage at much higher power settings and George is currently doing research at quite high powers settings for our chosen engine.

George Bralys information is the first authoritative and accurate presentation that I have read of this subject since I was studying for my Flight Engineer Certificate in the early fifties.

We have been inundated with false and inefficient information about how to operate our engines for the last fifty years and many of those poor operation techniques have found their way into what seems to be very authoritative publications.

Listen carefully to what George says!

He has historically correct information along with modern engineering knowledge to evaluate and present the results.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980129.101727.msg00629.tex]

Machen 350 Conversion**Wed, 17 Sep 1997 15:17:21**

Howard

That airplane currently belongs to Jim Huff. I sent a message to Bill Hale about it. Here is a copy—

Hi Bill,

I didn't want to make my comment on the bulletin board because I haven't flown the Machen conversion, however I certainly agree with everything you say about the installation. The ones that I looked at have been real lousy. Poor layout to begin with and crummy execution. I tend to agree with most of your observations on the turboed Bonanzas. Every one that I have flown has seemed to have some pretty serious deficiencies.

Each time I fly over those big hills west of you I get the urge to look into it again 'til I look at one of the installations and then I change my mind.

Have you seen the installation that Jim Huff from Denton Texas has on his airplane (I think it's a V35 but I'm not sure)? It is the same Lycoming that is in the Duke. I don't know how much different that engine is than the one Machen uses but Jims looks real nice. The cowling bumps are much less visible and the top cowl is a work of art. You really wouldn't spot it if you weren't looking very close. The thing that brought my attention to it was the belt driven generator up front. I walked over to look at that and then saw that it was a Lycoming. I hadn't even noticed the differences in the cowling till that time!

The original job was done by Darryl Greenameyer (sp?) and his Lockheed buddies and Jim has worked hard on the cosmetics. He claims 380 hp and tremendous performance. I've seen it fly and it really goes. It is, of course, experimental and he has no other plans for the airplane except to run around the country and enter races.

Incidentally he has a nice big Hartzell two blade prop on it. It is a sleeper. Three for show, two for go!

See Ya,

Bob

[ARTICLES/19970917_151721_msg01755.tex]

Manually Adjustable Spark Advance**Sat, 22 Jan 2000 00:53:55**

In a message dated 1/21/00 8:42:11 PM Central Standard Time, V35B@sp4sp.com writes:

Unfortunately, this kind of thing is extremely expensive to certify for an aircraft engine. Like many other things, this is held back by FAA rules which make it prohibitive to certify a technology that has been proven in non-aviation uses over hundreds of millions of hours of use.

Good Evening Michael,

Just a comment! I do not have direct knowledge on this, but have been told that some models of the OX-6 engine had manually adjustable spark. I asked one friend who flew several OX-5 powered airplanes and it was his comment that he did not recall any OX-5s equipped with such a device, but he too had heard of aircraft of the era which used it. As I understand, it was very similar to the method used in Model T Fords and other autos of the period. The R3350s we had in the Douglas DC-7s had a two position spark advance which was actuated electrically by a simple switch. I can't imagine that it could be too difficult to get a simple manual system approved. I rather imagine it is the automatic, complicated procedure of the electronic ignition system that is the cause of all of the approval difficulties. Too bad no one is interested in a simple solution!

Happy Skies,

Old Bob

[ARTICLES/20000122_005355_msg01261.tex]

Oil Consumption

Tue, 29 Dec 1998 21:10:45

In a message dated 12/29/98 5:50:06 PM Central Standard Time, jtsmall@onramp.net writes:

I thought this was a good thing ... but maybe not. Can you explain this?

Good Evening John,

It seemed in days past, when the Continentals burned a quart of oil every 6 to 10 hours of operation, the cylinders easily made it to TBO. Around 1990 or so when they changed something and all of a sudden the oil consumption dropped to a quart every 25 or 30 hours, the cylinders started to wear out in 300 to 600 hours of operation.

Personally. I would sooner add some oil than change the cylinders a couple of times before TBO

One guys opinion!

Happy Skies,

Bob

[ARTICLES/19981229_211045.msg07954.tex]

Ram Air Inlet**Mon, 18 Sep 2000 16:28:13**

In a message dated 8/31/00 10:49:53 AM Central Daylight Time, Mavitor@aol.com writes:

My neighbor has a Falcon, and by using a NAAC air inlet to his carb he was able to increase his MP by about 2" at 2,000 feet.

I was wondering, "Oh experts of Bonanza", if a similar arrangement could be developed for the E-225-8. I would route a hose to just behind the air filter into the air box and use a manual butterfly valve to open it at altitude. This would give me a 5 to 8% improvement in power at altitude. Another thought would be to mechanically remove the filter assembly.

Just trying to figure out a way to improve the anemic climb at 10,000.

Mike McGahan - F 35

Good Afternoon Mike,

Mooney had an arrangement some years ago whereby they had a bypass which could be operated from the cockpit. It supplied the engine with a straight unhindered ram air supply and was said to gain almost an inch of ram air effect plus whatever efficiency was gained by bypassing the filter.

It should have been capable of a couple of inches improvement. Does anyone have any experience with that unit?

I know that we had no filters on the air that fed the R2800s on the DC-6 or the 3350s on the DC-7, but I did lose an engine once on a DC-7 when a couple of Mallards ended up in the intake.

I suppose if a Mallard decided to run into a Bonanza cowl just at the air intake it might shut down a Bonanza engine, filter or no filter!

Sounds like a neat idea to me though.

Happy Skies,

Old Bob

[ARTICLES/20000918_162813.msg13680.tex]

Slick vs. Bendix Mags

Wed, 22 Jul 1998 15:35:31

Good Afternoon Chris,

In a message dated 98-07-22 14:53:07 EDT, you write:

The Bendix S-1200s are generally reputed to be one of the better unpresurized magnetors for high altitude flying, because of the large air gaps on the distributor block, which helps prevent arcing at altitude.

Interestingly, my local accessory guru is of the same opinion. He also recommends the Bendix over the Slick even though they do take more maintenance.

Different strokes for different folks!

Happy Skies,

Bob

[ARTICLES/19980722_153531_msg03841.tex]

Slick vs. Bendix Mags

Sun, 4 Oct 1998 13:59:46

Good Afternoon All,

In a message dated 10/3/98 9:26:30 PM Central Daylight Time, George Braly writes:

The Bendix 1200 mags are truly the best mags available if the aircraft is turbocharged. I have had a 1200 above 30,000', and it was not arcing. Rather remarkable.

Just a little additional recommendation for the 1200s.

I asked my local accessory guru about putting the Slick mags on my engine to avoid the required 500 hour inspection and it was his recommendation to stick with the 1200s. He says the larger size and greater space between components make for a lot less crossfire problems even on my low altitude aircraft.

Incidentally, the amount mentioned for performing the required 500 hour inspection was at least twice what I paid the last time it was performed and we are in a very high labor cost area.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981004.135946.msg05773.tex]

Slick vs. Bendix Mags

Sun, 4 Oct 1998 17:14:51

Good Afternoon John,

In a message dated 10/4/98 3:05:02 PM Central Daylight Time, bucherj@delphi.com writes:

However, for the E-series-powered subscribers among us, remember that the 1200 is not an approved mag for our engines. I recently bought a pair of Slicks for \$660 (net the rebate (which took about six weeks) from Unison) brand new from Mattituck. A pair of new Bendix mags is \$2800 from TCM.

Good point, well made!

We switched our Husky towplane over to Slicks a couple of years ago and I plan on using them for a 65 Continental that is on the slow path to recovery.

The Husky is doing just fine.

The price difference is extreme and I do like to support someone like Unison who is trying to offer some competition. Glad to hear they are working well on the "E" series engines.

It seems there might be an advantage to the 1200s on the 520s and 550s, especially at altitude.

Happy Skies,

Bob

[ARTICLES/19981004_171451_msg05775.tex]

Slick vs. Bendix Mags

Tue, 30 Jan 2001 19:46:24

In a message dated 1/30/01 6:29:44 PM Central Standard Time, gwbraly@gami.com writes:

Yes. In all three cases, they were slick mags.

Good Evening George,

My local accessory Guru, Terry Norris of Aircraft Systems, Rockford, IL, says the same thing. He feels that the Slicks are fine and very economical if you fly mainly down low, but if any high altitude flight is anticipated, he recommends sticking with the much larger Bendix mags, regardless of the additional maintenance they require.

Happy Skies,

Old Bob

[ARTICLES/20010130_194624.msg02253.tex]

Straight Mount Engine Faster?**Sat, 13 Jan 2001 19:29:04**

In a message dated 1/13/01 5:59:30 PM Central Standard Time, gwbraly@gami.com writes:

I can think of a theory as to why that [airplane with straight mount engine] "might" be true, but I'm not just in love with the idea.

Do you have any thoughts?

Regards, George

Good Evening George,

None at all! At least, not of my own.

Every bit of information I have has been hearsay. One source was Allen Peterson. He claimed that the straight mount would be faster because the tail feathers can be rigged so that they will both fair with the straight installation, but will always be different, one up, the other faired, when using the canted mount. He felt that the slip stream varied with the different mounts.

I would just love to have the wherewithal to make the change each way on the same airplane. I guess actual flight testing is really the only way to tell for sure.

If I were doing it on my own airplane, assuming I had a "P" or earlier, I would do it straight, just to lower the cost, unless I was convinced that it would be faster with the engine crooked!

I don't think the additional rudder pressure required would be significant at all.

I also think it would be kinda neat to have 300 horsepower in an airplane that had the standard nose bowl and bug-eye with the afterbody behind the prop. It would be even better if it could use a two blade prop. What a sleeper that would be. It would look just like the early lower powered Bonanzas! No one would ever suspect the kind of performance it was capable of.

Happy Skies,

Old Bob

[ARTICLES/20010113_192904_msg00875.tex]

4.4 EQUIP-ENGINEINSTRUMENTS

Oil Pressure Gauge**Mon, 17 Apr 2000 17:38:15**

In a message dated 4/17/00 3:14:09 PM Central Daylight Time, jtsmall@onramp.net writes:

Bob, a related question. I'm planning on installing JPI's Slimline oil pressure gauge with annunciator. It is not STC'd, etc. Assuming I do not remove the factory oil pressure gauge do I need more than a log entry for a minor alteration? Does the FAA need be involved?

Thanks.

Good Evening John,

Always a tough call. I would consider it a minor alteration that thus requires only a log book entry, but many IAs and FAA personnel disagree. Most FAA inspectors will state that even if it is a minor alteration, a 337 should be submitted so as to provide a document that will stay with the aircraft records. If it were me, I would file the 337. You should ask the advice of the IA who will be signing for the next annual.

Happy Skies,

Old Bob

[ARTICLES/20000417_173815.msg06561.tex]

4.5 EQUIP-ENGINEMONITOR

CHT Replacement**Fri, 10 Nov 2000 10:59:33**

In a message dated 11/10/00 9:13:57 AM Central Standard Time, flyinglo@email.msn.com writes:

What is absurd is the fact that the new JPI has to be 1000 times more accurate than the original CHT. If the feds really want to help, why don't they allow the replacement of an ancient piece of equipment like this? I would think a good person like Janet Reno would favor this.

Good Morning Jim,

It can be done, IF someone is willing to spend the money. Getting an approval is a long and lengthy process. The lawyers of our nation have seen to that.

You MAY be able to get a local approval, but even that is not cheap if you pay the person who files the paper work a reasonable wage to do it. Not every mechanic is willing to spend the time and effort that is required. On top of that, a local approval is done at the discretion of your local FAA inspector. Regardless of the validity of your data or the practicality of the installation, the inspector has no obligation to issue the approval. It is his prerogative to do so, but not his obligation. If any litigation ensues due to the approval, he/she will be held personally responsible, NOT the FAA.

I checked the JPI and Electronics International web sites and could not find any approved CHT gauges. Electronics International does have other instruments, including EGTs, that are approved, but they did not list for which airplanes they hold approval.

If you can find any appliance listed in the aircraft's Type Certificate Data Sheet, it may be installed and utilized via an entry by an authorized person, usually an A or P rated mechanic as appropriate, in the ship's papers.

If you can find the unit you want to use for which the manufacturer, or someone else, has obtained an STC which lists your aircraft as being approved for that unit, you can have it installed by an authorized person. That person will file a 337 listing the STC number and the work performed. The 337 will float right through your FSDO with little or no trouble. An A&P mechanic can perform the work and it must be checked for conformity to the STC by an authorized person, usually a mechanic who holds Inspection Authorization.

Should you happen to find an appliance which would do the job for you and which is approved on a similar aircraft, but not on yours, that would be an excellent candidate for a local approval.

Once again, that is done at the discretion of a local FAA inspector and it helps to have a mechanic who is familiar with the local inspectors and how they like to do things.

If the local folks don't want to tackle the approval, you can submit it to FAA engineering and, depending on your political skills and affiliations, you may get it approved in a year

or two.

As I said before, I would call around to the various instrument manufacturers and solicit their advice. I think you can find everything you need except the CHT at Electronics International. Who knows, they may even have an approval for that or be able to find a 337 that someone else has used for a local approval. Such data will often be accepted by a local inspector as the required substantiating data for a local approval.

The first step for a local approval is to locate an A&P/IA who has some experience with local approvals and be willing to pay for his/her time while working on the approval.

Good Luck!

Happy Skies,

Old Bob

[ARTICLES/20001110_105933_msg16017.tex]

4.6 EQUIP-ESERIES

Beech Electric Prop**Thu, 11 Jun 1998 21:08:52**

Good Evening George Vasick,

In a message dated 98-06-11 20:00:15 EDT, you write:

Can somebody explain how an electric prop works.

It Works Great!

I assume there is an electric motor somewhere that controls the pitch. If it is located in the hub, what sort of connection is used to power the motor?

The Beech Roby prop used on the Bonanza and other airplanes of the era is an inflight adjustable pitch propellor. The pitch is changed by rotating a ring gear on the aft side of the propellor which moves the associated mechanism for and aft via a slip ring or bearing thus changing the pitch of the blades.

Some of them used a hand crank connected to a shaft which extended into the cockpit to move the ring gear and others used a small electric motor mounted on or near the ring gear to make it move.

The early Bonanzas used the motor mounted on the engine case with a short shaft to the gear which rotated the ring gear. The later ones used a motor mounted on the ring gear mount. many of the early airplanes had the later style motor retrofitted.

I have never seen a Bonanza with the "window crank" in the cockpit to control the pitch but it could be done! That arrangement was common on the Cessnas, Fairchilds, Culver Vs and other aircraft which used the prop.

As used in the Bonanza, it was not uncommon for an aftermarket electronic constant speed unit to be installed and that unit was offered as a factory option shortly after it came on the market. It consists of a device to measure the RPM and a controller to adjust the electric motor to control the pitch and therefore the RPM.

The unit worked very well but would not activate until the RPM was 20 revolutions off of that set. There is a new solid state replacement that works very well. It is more reliable and faster acting.

The ability to turn the constant speed function off and use the prop in the fixed position was very helpful in the leaning and engine evaluation process in the days before we had the accurate engine indication systems we enjoy today.

There were no other adjustable pitch propellers available for engines of the Bonanza type and the Beech engineers designed the mechanism but had it manufactured by others. That was another one of the little design details that set the Bonanza so far ahead of the rest of the field.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980611_210852.msg03068.tex]

Engine**Wed, 28 Apr 1999 10:41:41**

In a message dated 4/28/99 5:50:24 AM Central Daylight Time, curry_b@POPMAIL.FIRN.EDU writes:

does anyone with an e-225 fly at an RPM greater than 2300? What is the basis for that restriction anyway...anyone know?????

bob

Good Morning Bob,

I certainly don't have an engineering knowledge that would form the basis for an expert opinion.

However, that never seems to stop me from making my opinion known and here goes!

The E225 is a development of the E165 which was originally designed for the original Bonanza. The design criteria was that it would have a maximum allowable RPM of 2050. When the 165 ponies just didn't seem enough for the Mighty Bonanza, they decided to wind it up to 2300 so as to get 185 for one minute but then quickly backed it down to 2050.

It then continued on through the various iterations of the E-series until it was finally wound up sufficiently to produce a whopping 225 HP.

That engine was so highly stressed and pushed to it's limit that Continental decided to make a beefier version of the same basic size, 471 cubic inches, and thus came the venerable O470. No more cubes and little or no more RPM depending on the dash number, but with a lot more aluminum and steel, some 60 to 80 pounds more.

There must be a reason Continental decided to add all of that weight other than to provide forward ballast for we old Bonanza drivers.

Happy Skies,

Old Bob

[ARTICLES/19990428_104141.msg04093.tex]

PS5C Pressure Carb**Fri, 21 Aug 1998 17:07:29**

Good afternoon Dwaine, Ron and Whoever,

In a message dated 98-08-21 11:40:17 EDT, Dwaine wrote:

However George doesn't have GAMIs for the injected E-225, already asked.

I am sure you are all aware that the PS5C is a pressure injection carburetor and not a float unit. It measures the various air pressures and injects the fuel into the intake manifold at the downstream end of the unit, the top of the PS5C. Those little copper tubes that diffuse the fuel into the air stream can be cleaned and checked for "proper" alignment. Sometimes it helps.

Back in the days when I was flying PS5C equipped airplanes, I found that some of them had tremendously equal fuel distribution and others were horrible! By messing around with the fuel tubes and the inlet pipes leading to the PS5C I was often, but not always, able to get the distribution good enough to run smooth substantially on the lean side of best power. We didn't have all of these fancy gauges then so it was very much a hit or miss, trial and error process.

I found that some of the engines had better distribution with wide open throttle (enrichment valve full open) and with others it was better if I would throttle back until I could just perceive a small drop in manifold pressure. That would be the point at which the enrichment valve was closed. On still others it helped to just crack the alternate air valve open. I guess what I am trying to say is that there is a very large difference between individual airplanes with the PS5C and I am not sure just going to GAMIs would solve all of the induction problems if one has a PS5C equipped airplane with poor distribution.

Let's face it, If a float type carburetor will do the job - Great! If the PS5C does the job - Super! There is no magic about putting fuel injection on the engine. It is just another, and rather expensive, method of sending fuel to the engine. If you don't need it, don't use it.

Ron mentioned that the older cylinders are manufactured with provision to install the fuel injection nozzles.

That is not quite the way I remember it!

Those holes were put there to accommodate the priming of the engine. A couple of intelligent souls thought about just pumping fuel through them continuously as an emergency source of power should something happen to block the normal flow of fuel.

If the airplane was equipped with the electric priming pump, it was a snap to supply a steady flow of fuel with the primer and the throttle was adjusted to provide smooth power. All of a sudden, the engine had a backup method of supplying fuel.

Continental and some of the others heard about it and decided there was a good possibility of adapting that emergency procedure as a relatively economical method of constant flow intake manifold fuel injection. And so we have the current Continental fuel injection system.

At least that is the way I remember it!!

Just felt like rambling a bit!

Happy Skies,

Old Bob

[ARTICLES/19980821_170729.msg04695.tex]

PS5C Pressure Carb - Fuel Flow Measurements**Sat, 6 Sep 1997 09:18:52**

The problem is with The PS5C pressure Carburetor. The fuel is distributed through a set of nozzles which are internal to the carb. They are in the top of the unit right where it attaches to the manifold. It would be necessary to figure out how to measure the flow between the time that it leaves the metering area and the place where it is delivered to the distribution nozzles. Maybe it has been done.

I have not checked with any of the manufacturers but I haven't found it in any of the literature that I have.

A way to accomplish the desired result would be to measure the fuel (install a transducer) in the line feeding the carb and then install another transducer in the fuel return line and electronically subtract that amount from the inflow. I don't think any one has done that but I could be wrong.

Any engine which has a fuel injection system which uses a distributor block separate from the fuel metering unit (and I think all of them do) is a piece of cake. Engines with a float type carburetor will work with the fuel flow unit but the instantaneous flows may be slightly inaccurate as the float adjusts the flow into the bowl. They do just fine on overall burn. My youngest son has an electronic digital fuel flow unit on his Beech 18 with float carburetors and it seems to work quite well.

Yours,

Bob

[ARTICLES/19970906_091852.msg01666.tex]

PS5C Pressure Carb Icing**Wed, 31 Jan 2001 00:44:34**

In a message dated 1/30/01 10:43:16 PM Central Standard Time, stutzman@stutzman.com writes:

Is it possible for a Bendix pressure carb to ice up?

Good Evening Frank,

Not in the same sense as a venturi carburetor will ice. The intake filter may ice over and that is why we have the alternate air source. I have never had an icing problem with the PS5C as installed in the Bonanza.

I have experienced throttle plate icing with a pressure carburetor which did not have any induction air filter. The intake air went directly to the carburetor, kinda like it would if you equipped your airplane with that ram air system to bypass the air filter.

Throttle plate icing is where the ice comes from the high moisture content and low temperature air that is entering the intake. It is kinda like freezing rain hitting the throttle plate and the plate gets frozen in position or, at least, is hard to move. With an engine that is prone to throttle plate icing, the drill is to change the throttle setting every few minutes to make sure the throttle is free. If it gets hard to move, you lay on the carb heat till it is freed up. The ice is considered to be impact ice, just like that which forms on the wings. It isn't caused by a pressure drop in the intake system, though that effect can be contributory to some small degree.

Happy Skies,

Old Bob

[ARTICLES/20010131.004434.msg02300.tex]

PS5C Pressure Carb - Leaning for Takeoff and Climb**Wed, 3 Sep 1997 08:46:06**

The unit installed on the H35 was an altitude compensating pressure carburetor generally referred to as the PS5C with AMC (Automatic Mixture Control). Previous to the "H" all Bonanzas had a standard PS5C pressure carb.

The unit seemed to either work great or not at all. A high percentage of them were replaced with fuel injection which became available a year later. I have even been told that some people either had the AMC unit removed or deactivated though I have no personal knowledge of how to go about that.

If you are very sensitive to engine operation you can ascertain how yours is working by observation of the sound and feel of combustion, the amount of soot on the stacks or the condition of the spark plugs.

If it's running too rich for high altitude takeoffs, it can be leaned. I personally wouldn't lean to best power but to somewhat rich of best power mixture. Just so long as the engine is running smooth. You still MAY need some extra fuel for cooling. The same thing goes for climb.

That is of course ancient technology. The modern and much easier procedure (though more expensive) is to install a good six cylinder EGT. I can't seem to find any data in my files which will tell me if any of the good digital fuel flow units will work with that carb (and it is too early in the morning to call) but if one is available that would be good too.

Some of those AMC equipped airplanes have been working just fine for forty years (if it ain't broke don't fix it?) but it would be nice to have the engine analysis capability of modern technology.

Yours,

Bob

[ARTICLES/19970903_084606_msg01633.tex]

Primer**Fri, 13 Nov 1998 07:42:39**

Good Morning Ron Davis,

That was an excellent description of the primer system as applied to the E series engines.

I agree with Lew Gage and you, that it really isn't needed.

If the hand wobble pump and the PS5C are in proper working order and the operation is understood by the pilot, the primer system is totally superfluous.

In a message dated 11/12/98 11:12:54 PM Central Standard Time, rondavis@access1.net writes:

Apparently Continental thought that this might be necessary to help start it in colder weather, but that has not turned out to be the case.

I think it was more a matter of Beech and Continental responding to the requests of individuals who just plain insisted that a primer capability be put on the engine!

One of the early indications that the pump or PS5C is in need of maintenance is the loss of full priming capability. Adding a primer just masks the problem.

The important thing is that the priming via the wobble pump and PS5C is best done while the engine is cranking, not before. The rate and amount of priming is a function of how the wobble pump is handled by the operator.

I never experienced any problems starting a properly maintained E series engine in the cold country in the fifteen or so years that I owned them, or on the occasions since then, when the opportunity has been available to fly one.

Great posting!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981113.074239_msg06888.tex]

Prop**Thu, 29 Apr 1999 06:34:16**

In a message dated 4/28/99 11:07:38 PM Central Daylight Time, rondavis@access1.net writes:

Don't forget, the E185-11 uses an 88" prop, and the E225-8 uses an 84" prop.

Good Morning Ron,

All of what you say about the E-225 seems proper to me, but I would like to add one thing that has surprised me.

The E-225s all came from Beech with an 84 inch prop installed and I went along for years thinking that was the only length blade approved. A few years ago I noted that the 88 inch blades are also approved for the Bonanza with an E-225.

I am sure it would be noisier, but do believe the initial acceleration, takeoff and climb performance will be better with the longer blades. It might lose a knot or two at top speed.

Happy Skies,

Old Bob

[ARTICLES/19990429.063416.msg04130.tex]

Prop - Which One?**Tue, 20 Oct 1998 09:40:33**

Good Morning Dwaine,

In a message dated 10/20/98 12:35:00 AM Central Daylight Time, classicbonanza@juno.com writes:

I have done some research on this subject and I have yet to find anyone who has flown with both props on their personnel (read that out of their own hip pocket) airplanes that will prefer the electric prop.

I guess I fit in the category of never having owned the late model Hartzell on an E engine but it came pretty close. My number two son had one on an A35 which I flew and maintained.

It worked very well and I particularly liked the ability to get rated power on the initial roll.

The negatives were the requirement for a governor on an already crowded rear case and such plus the extra care it takes to properly maintain the Hartzell as you mentioned in your message. I always felt the airplane performed better with the Beech unit but never had the opportunity to make any comparison checks.

The feature that I like best about the electric prop is the ability to operate it in manual mode. Only one of my Bonanzas with the electric prop even had the constant speed attachment (CSU) and I became very comfortable controlling the RPM with my thumb. The electric eye controlled unit could wander a bit, especially on takeoff. I understand that the new solid state devices control the RPM much better, but I have never flown one. I never used the CSU for takeoff.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981020_094033.msg06130.tex]

Prop - Which one?**Mon, 19 Oct 1998 20:39:14**

Good Evening Scott,

In a message dated 10/19/98 5:14:08 PM Central Daylight Time, sderrick@yahoo-eng.com writes:

Are there any other prop/hub combinations available for the E225-8 than the 2 bladed Hartzell with AD 97-18-02?

My feelings coincide with those of John. I like the Beech electric with the full 88 inch blades best of all for an E series engine. The only performance rub is the lack of maximum horsepower availability at static. If the propeller is properly set up, you won't get rated RPM until 60 mph or greater (depends on whether you have a constant speed prop control or just the straight manual setup). The other problem is one of cost. Parts are very high and hard to come by. As others have said, it is a very highly stressed part and deserving of careful consideration.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981019.203914.msg06114.tex]

Thompson Fuel Pump**Thu, 12 Aug 1999 12:47:03**

In a message dated 8/12/99 10:23:36 AM Central Daylight Time, kehlerb@cadvision.com writes:

Has anyone actually flown the Bonanza's on the hand pump?? can it be done and for how long?

Good Morning B Kehler,

Been there, done that!

I lost fuel pressure twice right after rotation, the first time was before I had retracted the gear and the second time I had just reached for the gear switch when the engine quit. In neither case was there sufficient runway left for a successful landing.

In both cases, I had the original vertical style of pump (it was in Straight 35s) and that is a little harder to actuate than the later ones.

I settled a bit during the time it took to change hands on the control column and get my left hand to pumping, but the engine came back to life and allowed me to clear the obstacles ahead with aplomb. It was much easier in the one where I had the gear up! I found that at takeoff power, I had to pump pretty hard, (which adrenaline had me doing) but once I was up to pattern altitude and reduced power, the fuel pressure was fairly easy to maintain with a slow steady action on the pump.

The first time it happened to me, I was pretty busy, the second time was a snap.

I had been told previously that at the normal 185 horsepower for takeoff, the early pump, such as I had on that airplane, would provide adequate fuel, BUT if one was operating an E225 or E205 at the full rated power of the engine, the early pump would not provide enough fuel. That is one of the reasons that the higher power of the E205 and E225 engines is not allowed on takeoff.

If one was operating at those higher (illegal) powers on a straight 35, the recommendation was to reduce the RPM to 2300 or 2050 and then start pumping.

With the later hinged handle pump, one is supposed to be able to supply adequate fuel for those more powerful engines, but I have never had to do it!

Overall, the pump does what it is designed to do and it isn't difficult. However, I would add one of the aftermarket electric back up pumps that are now available.

Happy Skies,

Old Bob

[ARTICLES/19990812.124703.msg06889.tex]

4.7 EQUIP-FUEL

Bladders**Sat, 17 Mar 2001 10:53:01**

In a message dated 3/17/01 9:18:45 AM Central Standard Time, flyinglo@email.msn.com writes:

Bob, if I'm reading my Shop Manual correctly for my J35 with 20-gallon tanks, on p. 2-240 it gives a PN of 35-921218-5 (LH) & 35-921218-6 (RH); but it doesn't say if they're baffled or not. I guess I could run a tank dry and reach in there and feel around, but even if it has baffled tanks now, but was not built with them, when I replace them, I wouldn't necessarily have to install baffled tanks, right? How can I find out if it was built without baffled tanks?

Good Morning Jerry,

To my knowledge, no one has been stupid enough to install the baffles in a twenty gallon tank. I suppose that some after market fuel tank supplier might have done it just to see if he could, but I don't know of any.

The factory didn't start putting the baffles in until they were well into the 40 gallon tank airplanes.

My son's S35 has the unbaffled tanks and I can assure you that if they are ever replaced, it will be with unbaffled tanks. If my 1978 V35B was legal with the unbaffled tanks, I would install them right now!

Your J35 might even have the old original natural rubber tanks. I think those are the best tanks Beech ever used! They will last forever, provided that they are kept full of fuel or properly treated if left to stand for a long period of time. The biggest problem that I have seen with airplanes of that vintage is corrosion around the inside of the tank cavity in the wing. There can be some troubles with the nipples getting hard and being damaged when attempting to remove the drain valve. If you do have to remove the tank for some reason, be sure to properly correct the corrosion problem.

I have never seen one that was so bad that it required anything more than a good cleaning and some Alumaprep followed by Alodine and paint, but many are marginal.

The early tanks are generally easily repaired as required.

Some of the later 40 gallon tanks were junk. They are made of lighter weight material and I am generally biased toward light weight, but there are limits!

I am reasonably confident that your tanks do not contain baffles!

Happy Skies,

Old Bob

[ARTICLES/20010317_105301.msg06055.tex]

Fuel Bladders**Mon, 8 Nov 1999 11:06:13**

In a message dated 11/7/99 11:51:51 PM Central Standard Time, markjenn@halcyon.com writes:

I disagree about preventative replacement; like vacuum pumps, some bladders seem to go many, many years while others fail early. I wouldn't fix one that isn't leaking yet, especially considering it will cost about the same whether you do them both together or one at a time.

Good Morning Mark and All,

While I certainly do not consider myself a fuel bladder expert, my experience has been more along the line that Mark has suggested.

The very early 20 gallon tanks installed from 1947 to who knows when were natural rubber and many of them are still doing fine!

There was a spate of fuel bladder failures among the early forty gallon units, but that seemed to be among those made by one company more than another. I don't have access to the records right now and can't remember whether it was U. S. Rubber or Goodyear that was the culprit, but think it was one or the other. I'm sure someone on the list can help us out with that information.

One friend has a J35 that still has the original tanks. There are a few wrinkles in the bottom of the tank that we have never been able to get out, but no leaks and no flaking.

Another friend has an H35 that developed leaks a few years ago. The thing that amazed me was the amount of corrosion we found beneath the tank! Fortunately, with a lot of work, it cleaned up OK.

I have never worked on a 25 gallon tank, therefore, no direct experience with those and I have never had a ten gallon aux out of the airplane!

My own V35B is 21 years old now, so far no leaks, though I am getting nervous!

Most experts feel that keeping the tanks full whenever possible will add to the life of the tank and I am sure that can't hurt.

Carl Hartwig of Aircraft Fuel Cell Repair, Eagle River Wisconsin, says that he finds many tanks that only leak when they are full and the leaks are in the top of the tank!

I have worried about that in the past as I do not make a practice of filling the airplane after each flight. I normally try to have a couple of hours of fuel on board in case the need arises for a short trip, but I normally just add fuel based on the length of the flight and the payload to be carried. If I ever planned to let the airplane sit for a couple of weeks or more, I think I would try to fill the tanks though.

My totally unscientific and incomplete evaluation is that if they are used regularly and

filled full every month or so, all except those poorly built early forties will last almost indefinitely!

Happy Skies,

Old Bob

[ARTICLES/19991108.110613.msg10308.tex]

Fuel Cell Service Advice

Wed, 19 Aug 1998 13:50:10

Good Afternoon William S. Helfand,

In a message dated 98-08-19 12:09:02 EDT, you write:

Anyone have a recommendation as a source for remanufactured fuel cells?
I need to replace one?

Very definetly!

I highly recommend the Hartwig family of Eagle River Wisconsin.

Try them at:

Aircraft Fuel Cell Repair 300 Airport Road Eagle River, WI 54521

Phone: 800 437-8732 715 479-8732 FAX: 715 479-6344

Very nice people with fast and courteous service combined with an excellent product
and fair pices

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980819.135010.msg04543.tex]

Fuel Flow Calibration**Mon, 6 Sep 1999 08:55:16**

In a message dated 9/6/99 2:36:10 AM Central Daylight Time, requa@ibm.net writes:

Bob,

I don't think that there is any equipment needed to calibrate the JPI fuel flow. I recently installed one in my M35 and all that is required is to record the fuel added and compare that with the fuel used in according to the JPI. With that data you can adjust the JPI K factor until you get the same fuel added as fuel used.

Fuel flow would then be correct.

Procedure is explained in the owners manual.

Cheers, Ralph

Good Morning Ralph,

Yes, that is the method I have always used, but there is a device mentioned in the maintenance manual which would allow calibration without the necessity of flight.

The Shadin unit that was installed by Colemill when I had the Starfire conversion installed in my Bonanza was about six percent off when received. Colemill set up the fuel control based on that indication, not the fuel pressure as they should have. On my first takeoff, the EGTs were much higher than expected and the head temps started to rise. By using the boost pump, I was able to get enough fuel into the thing to bring the temps down, but the first thing I did when I got home was to increase the fuel pressures to where they should have been set. Had the calibration been done before flight, the error would have been found. Of course, if the fuel pressure would have been set with the proper pressure gauges as Continental specifies, there wouldn't have been a problem either!

If the fuel flow gauge is set by recording the amount of fuel used in the manner suggested by JPI, the accuracy of the fuel dispensing device used to fuel the airplane and the consistency of the fueling method can become a factor. The fuel dispensing equipment at our little field is only four years old and we have it inspected by the state division of weights and measures as required. It is not unusual for it to be four or five percent in error when tested. I have noted that when I run a tank dry, then have it filled at various FBOs around the country, there are often substantial differences in the amount of fuel recorded as being put in the tank.

This problem first came to my attention when I had a D18 many years ago which was equipped with 25 gallon aux tanks. I ran those dry almost every trip. The amount of fuel that it took to fill those tanks varied from 23 to 27 gallons at different places around the country!

Since that time, I have been suspicious of any fueling quantities when fueling has done using equipment that has not been recently calibrated. I do think that modern equipment is more accurate and reliable than was true in those days of yore, but it still can be a problem!

Happy Skies,

Old Bob

[ARTICLES/19990906_085516_msg07949.tex]

Fuel Injector Nossles - Balancing**Sat, 22 Jan 2000 15:13:51**

In a message dated 1/22/00 1:24:30 PM Central Standard Time, cgalley@accessus.net writes:

"I'm still not certain, but the issue is murky enough that I'd rather have the STC and prevent some ignorant FAA Inspector from filing a violation.-
John Deakin"

Come on now... How would even a knowledgeable FAA Inspector know that you had messed with the injectors?

Good Afternoon Cy,

Well, let's just do a little hypothesizing! Suppose some individual decided to illegally take some nozzles out of the tolerance specified by TCM. (I don't know how it would work on the 470, but on the 520 and 550, the flow has to be well out of the factory tolerance to attain satisfactory fuel balance). Wouldn't most of us want to mark those nozzles in some manner to show that there were differences and to assure that if they were ever removed, they would be placed back in the cylinders in a manner that preserved the proper balance?

If there was an incident with the airplane, the engine would likely be sent to a competent authority for tear down inspection. Now let's suppose that you were the competent authority assisting the FEDs in that inspection. Don't you think you might notice any unusual markings on the nozzles?

If there had been an engine problem that could have been caused by very bad distribution, isn't there a possibility that you would flow check the nozzles? Now if the nozzles were checked and two of them showed much higher than specified flows, two were way below and two were right on, wouldn't you look rather closely?

The worse thing that could happen to an engine with injectors that provide a well balanced fuel flow is for some unsuspecting mechanic to have an occasion to clean those nozzles and not be aware of the different flow rates installed. If the high flow nozzle were to be placed in a cylinder that needed the low flow ones and vice versa, bad things are possible!

I think the money spent for an STCd version is worth it just for the peace of mind of legality.

The way I read the Continental fuel injection maintenance manual, all of the nozzles in any one engine must be of the same type and designation, if I find that a nozzle does not meet specs, I must reject it. Period!! If anyone has a mechanic who is willing to sign off on maintenance done otherwise. That is that mechanics business, but I won't do it!

Happy Skies,

Old Bob

[ARTICLES/20000122.151351.msg01321.tex]

Fuel Tank Baffle**Sun, 30 Apr 2000 14:44:49**

In a message dated 4/30/00 12:10:49 PM Central Daylight Time, ajlspero@home.com writes:

This suggests that the baffle is far inboard and therefore not visible by looking in the filler cap. Is this so?

Alan

Good Afternoon Alan,

While I certainly encourage all operators to comply with all government regulations, this is one of those ADs that, to my way of thinking, has very little affect on the way prudent pilots operate their airplane.

Aerobatic airplanes are often built with fuel cells which have numerous outlet ports to help prevent unporting. Unfortunately, multiple outlets alone often don't solve the problem. Some of the outlets placed in odd corners of the tank can be unported during normal maneuvers and allow air into the system. Header tanks, one way check valves, flop tubes and other devices have been tried with various degrees of success to avoid interrupting the fuel supply to the engine when the aircraft is in an unusual attitude.

The easiest way to avoid an undesired tank outlet unporting is to avoid unusual attitudes with low fuel.

The potential for unporting a wing tank is not peculiar to the Bonanza. It can happen in any airplane that is flown outside the designer's planned envelope. When the Bonanza was designed, it was not anticipated that anyone would want to fly the airplane in a prolonged slip or skid and certainly they did not plan on folks making high speed turning type takeoffs.

If there is a good operational reason for doing such things, it would seem that any reasonably competent aviator should be able to figure which tank would have more fuel piled up against the outlet and which will have less.

If one intends to initiate a prolonged slip, the feed should come from the tank that is away from the direction of slip.

If the aircraft is to be flown in a skid, or a turning style takeoff is anticipated, the fuel should come from the tank on the inside of the turn.

These facts are true for all aircraft.

The Bonanza has one of the best fuel systems available. They flew for years without those baffles and had very little trouble. No more than any other airplane equipped with wing tanks.

I personally prefer the unbaffled tanks. There have been service difficulties with some of

the early baffled types and they weigh more and cost more than the unbaffled ones. The baffled tanks also hold less fuel. One of the early efforts to hold some fuel around the outlet port during oddball maneuvering involved placing a sponge like material in the tank to keep the fuel from sloshing. The material crumbled and fouled the fuel system!

If you still have tanks which do not have the baffles and they are not leaking or otherwise giving you trouble, don't worry about it. Just fly the airplane in a normal coordinated manner and don't use a slip unless you are assured of landing. I don't slip my Bonanza any time other than when I am in the final stages of a crosswind landing. I prefer to hold the crab until I am about to flare at which time I drop the wing and establish a slip down to the landing. If the engine quits then (and I don't think it is likely to happen), who cares?

If I owned an airplane that was legal without the baffles, that is what I would install as a replacement.

The pertinent ADs are 70-03-05 and 72-11-02.

Neither of these requires the installation of baffled tanks in any airplane that was originally manufactured and approved without them. You may have to stick a few placards around the cockpit which tell you to do things that most aviators will do anyway. I liken it to the recent AD which requires that we have a placard to tell us that we should have the tank selector in the detent if we want it to feed properly.

Much ado about nothing!

Happy Skies,

Old Bob

[ARTICLES/20000430_144449.msg07344.tex]

Fuel Tank Selector Valve Location**Thu, 4 Feb 1999 01:02:37**

Good Evening Ron Davis,

If we are ruminating about why the fuel selector valve is located where it is, don't forget that it was combined with the fuel pump and strainer in order to save weight. Saving weight was the key ingredient that made the Bonanza what it is.

Placing it by the left side of the cockpit made it easy to stroke the fuel pump with the left hand while playing with the rest of the starting paraphernalia with the right. I agree with you that the rest of fuel valve components were easy to connect in that location as well.

I find it to be an excellent location, easy to select and operate, but it does require that you be able to do it by memory and feel, not by looking at the valve. With the original vertical pump and valve combination, it was actually a little easier to see the valve position, but there were many other less desirable features associated with that unit.

Enough wandering thought for now.

Happy Skies,

Old Bob

[ARTICLES/19990204_010237.msg01900.tex]

Fuel cells**Sun, 28 Dec 1997 17:04:29**

Good Afternoon Larry Robbins,

In a message dated 97-12-28 08:06:07 EST, you write:

What has the group found to be an average life (TBO if you will) of these bladder tanks, understanding this is directly dependent on prior care?

Just a couple of comments. I am not an expert on fuel cells and have never personally changed one though I have observed the operation a few times.

It seems that the early 20 gallon fuel cells last forever if they are not allowed to sit dry without coating with oil. While it would seem that they would last best if kept full of fuel, I have been told that they will do fine as long as there is some fuel in the tank though the best of all is for an unused tank to be drained and the inside coated with oil.

The newer tanks, especially the early 40 gallon cells appear to be junk. Ten to twelve year life with neglect and eighteen to twenty years with good care.

The newest ones appear to be a little better but not as good as the old (butyl rubber?) 20 gallon cells.

The forty gallon cells with baffles cost twice as much as the unbaffled ones and hold about one half gallon less fuel. I can't see why anyone with an airplane that came with the unbaffled cells would ever stick a baffled one in as a replacement but it is legal and a lot of people do so.

The only people that need the baffles are those who insist on slipping, skidding and making high speed turning style takeoffs while feeding on the outside tank!

Unfortunately, we who have airplanes that came from the factory with baffled tanks have to use them to be legal.

Of the tank rebuilders with whom I have spoken, I am most impressed with Aircraft Fuel Cell Repair of Eagle River Wisconsin, (800) 437-6344, and everyone that I know who has used them have been happy with the price, product and service.

Give them a call and pick their brains!

Hope that helps some.

Happy Skies,

Bob Siegfried

[ARTICLES/19971228.170429.msg02941.tex]

Hand Wobble Pump - Switching Tanks

Fri, 22 Sep 2000 00:32:28

In a message dated 9/21/00 11:20:39 PM Central Daylight Time, curry_b@POPMAIL.FIRN.EDU writes:

some of the older models do not have electric fuel pumps...so, is there a problem running them dry?????

Good Evening Bob,

The hand wobble pump works just fine. Most of the time it really isn't needed, but it gives the pilot something to do while he/she waits for the engine to restart. If a close watch is kept on the fuel pressure gauge, the tank can generally be switched before the engine misses a beat.

Happy Skies,

Old Bob

[ARTICLES/20000922_003228.msg13872.tex]

Leaking Quick Drain**Tue, 2 Nov 1999 11:13:19**

In a message dated 11/2/99 9:58:59 AM Central Standard Time, jtsmall@onramp.net writes:

a Curtis drain

Good Morning John,

Curtis is a manufacturer of drain valves. I believe all of the ones used by Beech on the Bonanza series of aircraft are manufactured by them, but I am not certain of that information.

The reference to a "Curtis Valve" in regard to various fuel drains on aircraft has become generic.

The "twist and push to drain" valves on the main wing tanks of our aircraft are a Curtis valve which is held to the fuel tank via a clamp on a rubber nipple and they cannot be serviced without removing them from the rubber nipple. Not an easy job and it often results in damage to the tank, especially on older fuel cells.

The one located under your fuel valve, lower left side of the fuselage, is a Curtis valve that screws into the receptacle and is easy to remove for service or replacement. The Hartwig/Eagle Fuel Cells device will provide a fitting that will eliminate the rubber nipple and allow a screw type drain valve to be installed. I think they are planning on using the smaller "almost flush" type such as are commonly used on the late BDS tip tanks.

Does that help?

Happy Skies,

Old Bob

[ARTICLES/19991102.111319.msg10028.tex]

Locking Fuel Tank Caps

Thu, 13 Jan 2000 19:04:29

In a message dated 1/13/00 4:41:50 PM Central Standard Time, Sebastian.Diaz@datco.cl writes:

Thanks for yor info but they don't have it. If you have any other contact please let me know

Regards,

Sebastian Diaz

Good Evening Sebastian,

You can obtain a nice set of locking fuel tank caps from Aviation Research Systems, Inc., Sandy River Airport, 42313 S.E. Oral Hull Road, Sandy Oregon 97055. Phone: (503) 668-4542, FAX: (503) 668-8359

Happy Skies,

Old Bob

[ARTICLES/20000113.190429.msg00770.tex]

Minimum Fuel Requirement AD**Fri, 5 Nov 1999 14:13:10**

In a message dated 11/5/99 10:45:12 AM Central Standard Time, marccook@earthlink.net writes:

Did I miss something, or does the minimum-fuel limitation only apply to non-baffled bladders?

Good Afternoon Marc,

Don't know if you missed anything or not! But AD 72-11-02 is applicable and lists the action to be taken on the various airplanes.

The following is a quick, and possibly inaccurate, overview of the AD.

If your airplane has the 40 gallon tanks, it should have a yellow mark up to the 3/8 gauge marking on each fuel gauge and a placard either on the fuel selector panel or elsewhere in the pilots view, cautioning that there must be at least 13 gallons in each main for takeoff. Should you have the 25 gallon tanks, the yellow mark should go to the 1/2 tank position. The placard is the same as for the 40 gallon tanks.

For those who have the 20 gallon tanks, the yellow marking is to extend to the center of the 1/2 mark. That is listed as the 7 gallon position, however a red mark is supposed to be placed to denote empty at the 3 gallon position.

This whole AD reeks of big brother protectionism! There is NO unusable fuel in any Bonanza, Debonair or Stretch Debbie if the airplane is flown in a coordinated manner.

The fuel outlet may be uncovered at very low fuel states by putting the flaps down and descending at the maximum flap extended speeds with the throttle closed or nearly so. I can't imagine why anybody would be descending like that unless they had just messed up an approach and were diving for the runway. I wouldn't think running the tank dry under those conditions would cause a problem unless one misjudged the approach and undershot the runway!! If the airplane is flown at normal approach speeds, the outlet will not unport, regardless of the flap setting and the quantity of fuel in the tank, till it is truly empty!

There was an earlier AD that applied to the non baffled tanks concerning eliminating prolonged slips and turning style takeoffs. That was AD 70-03-05.

Does that help?

Happy Skies,

Old Bob

[ARTICLES/19991105_141310.msg10201.tex]

Tank Baffles**Tue, 13 Mar 2001 09:46:50**

In a message dated 3/13/01 6:30:23 AM Central Standard Time, commwlthsls@msn.com writes:

Anyone bought a new 40 gallon fuel cell lately? If so, do you recall the cost of the tank and installation kit? Thanks

Good Morning Will,

I have noted that others have given you price and source information, but I would like to add a comment.

If your airplane first came from Beechcraft with the non baffled tank, you can still install that tank and be legal.

If it came with a baffled tank, a baffled one must be installed.

I STRONGLY recommend that a non baffled tank be used in any airplane for which it is legal.

The non baffled tank costs about sixty to seventy percent of the baffled tank. It is lighter and easier to install than the baffled one. On top of that, it holds more fuel!

The only folks who would have any need for a baffled tank would be those who have a need to fly in a steady state cross controlled slipping condition for long periods of time or for those who like to spin around in rapid tight turns on the ground before takeoff while burning fuel from a tank which is located on the outside of the turn. We can thank the lawyers and non thinking aviators among us for the heavy, troublesome, smaller capacity and more expensive baffled tank.

At least, that is the way I see it!

Happy Skies,

Old Bob

PS If I were buying, I would buy from Eagle Fuel Cells <http://www.eaglefuelcells.com>

[ARTICLES/20010313.094650_msg05829.tex]

Tip Tanks**Mon, 14 Sep 1998 22:07:49**

Good Evening Charlie,

Charlie Gibbs wrote:

Opinion Needed!

After returning from the ABS convention in STL yesterday (A great event !), I again wished for tip tanks. Even though I landed back here in JAX with over an hour of fuel left, the pucker factor was higher than I like after a 4.5 hour flight. Any opinions on Beryl D'Shannon vs. Osborne tanks? Is Osborne worth the extra money for 3 more gallons per side (17 vs. 20 gal) and aluminum vs. fiberglass?

Charlie Gibbs V-35A

I have owned several airplanes with the 20 gallon Brittain tanks (predecessor of the Osborne) and I liked them very much.

My current airplane had the BDS tanks on it when I purchased the airplane.

I have been pleasantly surprised by the ease of use and general reliability of Allen Peterson's tanks.

The Brittain/Osborne tanks for many years had a selector valve which provided the ability to feed from the individual tank direct to the engine. I liked that capability in the days before we had electronic fuel flow gauges available as it aided my long range fuel planning and analysis.

The Safe Flight Extenders had a similar valve before Allen bought the STC and re-designed them to transfer the fuel to the mains instead of feeding directly to the engine.

About eight or ten years ago the multiple position fuel valve Osborne had been using became prohibitive in price and Osborne adopted a fuel transfer system similar to that developed by Allen for his tanks.

There are some advantages in the transfer system, especially with the fuel injected engines. Most folks do not care to run tanks dry. When you are feeding from four different tanks and do not run them dry, there is likely to be a significant amount of fuel that is not practically available.

I rather like the idea of the aluminum tanks but I also find that I like the visual fuel gauges on the fiberglass tanks a lot better than the gauges in the cockpit. They are extremely accurate and easy to see (even at night with a flashlight). They never fail either!

My BDS tanks are now nineteen years old and show no sign of delamination. I understand the new ones have been changed to a material that should have an even longer

usable life.

I haven't checked the prices recently but if lower cost is a consideration I do believe the BDS units are still quite a bit cheaper.

What would I buy if I were buying today?

I would purchase the one that would give me the best gross weight increase on my airplane and for your V35A that is currently the Osborne. Beryl D'Shannon is trying to get the gross up and remove the restriction that all weight above 3400 be fuel in the tips but I do not believe it has been approved yet.

On a J35 I would buy the BDS tanks as they have the best approval for that machine.

Both are excellent products. The Osbornes are a little classier in the detail department and the extra fuel is handy. (I'd really like to have thirty gallons on each side!)

Long range is not the only advantage to tip tanks. The ability to ferry fuel to those neat out of the way airports is very helpful.

I can't imagine owning a Bonanza, Debbie or StretchDebbie without tip tanks.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980914.220749.msg05389.tex]

Transfer Pump**Fri, 22 Sep 2000 12:06:02**

In a message dated 9/21/00 10:13:34 PM Central Daylight Time, BobsV35B@aol.com writes:

I like the gravity feed if you are going to do a lot of extended overwater flight. Trips to Europe and such. For domestic flying, where finding a place to land in case of a transfer pump failure is not so critical, I would normally recommend the transfer pump system. While I do not mind running a tank dry while feeding the engine, there is no need to do it if you have the transfer pumps.

Good Morning All,

I was just mulling over this situation and had a thought. Pretty rare occurrence these days!

Jack's problem with the turbo adds another dimension that I was not aware of.

Maybe the best answer for those long overwater flights would be to have both the valve and the transfer pump. It would not be too comfortable to be several hundred miles offshore over the cold and dark North Atlantic and be messing around getting your one and only cooling fan back in operation should one of the tip tanks have difficulty starting it's flow. The transfer line could be hooked up in such a manner that it scavenged the air from the lines before you ever tried to feed directly from the tank to the engine. You could switch to a main when there was estimated to be a few gallons left in the other tank and then use the transfer system to strip the last bit of fuel from the auxiliary and/or wing tip tanks. If you really like to play around with complicated fuel management procedures, but don't like to run tanks dry, there might even be a reasonably simple way to use the transfer pump to take the last bit of fuel from the right tank over to the left one and then there would never be any necessity to run a tank dry while operating tank to engine!

Just a thought, and not at all developed!

Cy will probably have a stroke!

Happy Skies,

Old Bob

[ARTICLES/20000922_120602_msg13886.tex]

Two Speed Fuel Pump**Tue, 7 Mar 2000 07:23:16**

In a message dated 3/7/00 5:53:35 AM Central Standard Time, scottperdue@email.msn.com writes:

Your engine is the IO-470N and it has only a 1 speed electric fuel pump. The IO-520 has a two speed pump required as described (it is actually a 1 speed pump with a big resistor/ electrical doohickey to step down the voltage or something... you can tell I'm not EE smart).

Good Morning Scott,

Actually, I think you will find that a very high percentage of the IO-520 installations just have the one speed unit. Also, while a very high percentage of the airplanes utilize the same pump with a dropping resistor in line to accomplish the low speed function, there are some that do have two separate pumps!

Now, by my use of the term "very high percentage," you can tell that I don't have any idea of how many and what type pumps are used in the fleet!

Both the Colemill and the BDS IO-550 conversion STCs require the two speed option. When Colemill installed the 550 in my airplane, they neglected to add that feature. I installed the BDS dropping resistor kit to obtain the low pump pressure capability.

Happy Skies,

Old Bob

[ARTICLES/20000307.072316.msg04362.tex]

Usable Fuel**Tue, 4 May 1999 13:21:01**

In a message dated 5/4/99 11:20:42 AM Central Daylight Time, rcb@appsig.com writes:

Regarding placarded versus actual usable, I ran a 37 gal tank dry during cruise on my 1979 F33A a couple weeks ago and it took over 40 gal from the fuel truck.

Bob Briggs

Good Afternoon Bob,

If the tanks are snapped up and everything is in place, the 40 gallon tanks on your airplane will generally hold 40 and one half to 41 gallons. The early tanks without the extra fuel box or baffle system, would often hold as much as 41 and one half gallons.

When the forties were first installed, Beech listed them as forty gallons usable. It wasn't till after those slippers and sliders started screwing around with our beloved beasts that all of the ridiculous restrictions concerning unusable fuel and minimum fuel in each tank for takeoff was added.

There is NO unusable fuel in any of the 35, 33 or 36 series airplanes if the tanks are properly maintained and the aircraft is properly flown. My personal minimum fuel for takeoff in the early days of the S and V models was ten gallons in the tank being used.

The "thirty-seven usable" and "minimum thirteen gallon fuel in each tank" restrictions are things added by the lawyers.

Happy Skies,

Old Bob

[ARTICLES/19990504_132101_msg04308.tex]

4.8 EQUIP-LDGGEAR

Gear Extension Speed**Wed, 7 Feb 2001 23:19:11**

In a message dated 2/7/01 10:02:40 PM Central Standard Time, swo49@hotmail.com writes:

Wow! That is 152 knots! What damage can I expect - just the gear doors?
What about the gear themselves? Steve

Good Evening Steve,

If all of the components are in good shape and properly adjusted, nothing bent or worn out of normal limits, nothing will happen. If you do it regularly, the equipment will start to show signs of abnormal wear.

The gear itself will have no problems, but the door rods and such on the very early airplanes may fail. That is why you should only use that emergency number for the later airplanes or those that have had the beef up kit applied. Yours came from the factory equipped with the heavier rods.

I have been told by one factory test pilot that they threw the gear out at that speed or higher on every production test flight just to make sure everything was OK.

If you need it, use it!

Happy Skies,

Old Bob

PS The straight 35 nose gear door rods look like a piece of 1/8 inch welding rod. The later ones are a piece tubing about 1/4 inch OD. I think, but don't know for sure, that was the major weak point.

[ARTICLES/20010207_231911_msg03107.tex]

Gear Position Indicator**Tue, 15 Dec 1998 18:19:34**

In a message dated 12/15/98 12:09:17 PM Central Standard Time, foosej@oz.net writes:

Hi there, If you are getting a green "gear up" indication when the gear is only part way retracted, then it sounds like a limit switch must have come out of adjustment. It was shutting off power to the gear motor, and showing gear up at the same time.

Good Evening John and All,

I think we need to remember that this was on a "G" model. Like the rest of the early airplanes, on the G model when the light shows gear up or down, all that means is that the gear box shaft has turned full travel. It does not indicate the position of the gear unless all components are working properly.

The nose gear indicator is hooked directly to the nose gear and if it shows gear up, that means that it is not down and when it shows gear down, that will let you know that it is not up. The nose gear indicator will not tell you for sure the position of the landing gear anymore than the panel light will!

The indicating system on the early airplanes leaves a lot to be desired.

The nose gear can be hung up and not fully retracted even though the gear box shaft has turned full travel and shut off the motor.

The newer system will not show a gear safe condition (if properly adjusted) unless the individual landing gear legs are overcenter and in safe condition for landing.

Incidentally, I subscribe to the thought that cycling the Bonanza landing gear is almost always a bad idea.

Happy Skies,

Old Bob

[ARTICLES/19981215.181934.msg07551.tex]

Gear Position Indicator**Wed, 6 Jan 1999 13:27:47**

In a message dated 1/6/99 9:30:38 AM Central Standard Time, gregweiss@hotmail.com writes:

My gear lights have a mind of their own. I own a 1970 V35B. Am I assured that the gear is down and locked if the "DOWN" is visible in the window just above the floorboard? Thanks,

This is an important question. If your airplane is equipped with only the indicator on the cover below the throttle quadrant and the one light for up and one light for down type of system, it is the same as the early Bonanzas and is not a very good indication of landing gear position.

I rather remembered that all of the V35B's had the newer style indicating system with a separate light for each element of the gear. Obviously my memory is failing!

The indicator that I believe you are referring to is actuated by a cable from the nose gear. If it says down, all that means is that the nose gear is not in the up position. It does not mean that the nose gear is locked down and tells you nothing about the position of the main gear.

The two lights that are located on the panel and labeled gear up or gear down are related to whether or not the landing gear actuator shaft has turned far enough to actuate the switches that light the lights.

Either or both main gear elements could still be stowed in the wells and you would have no way to know that except by the feel of the airplane.

It is a terrible system. Fortunately, the gear itself is very reliable if properly maintained.

The later airplanes have switches on the gear legs which (if properly rigged) will tell you if the gear legs are overcenter and in the locked, safe to land, position.

Many early airplanes have been modified to the later type indicating devices. It is an excellent addition to the airplane.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990106_132747.msg00250.tex]

Gear Position Indicator**Wed, 6 Jan 1999 18:47:30**

Good Evening Greg Weiss,

In a message dated 1/6/99 2:22:26 PM Central Standard Time, gregweiss@hotmail.com writes:

O.K. so if the (3) indicator lights are green, that is golden. If the main gear lights are green and the nosewheel gear light is off, even if it is reading "DOWN" on the floor board, there is no guarantee that the nosewheel is locked, only that it is not retracted? I do have the mirror on the (L) wing but it is very difficult to see. I appreciate the feedback.

That is a true statement!

The movement that takes the mechanism overcenter is so small that a gross indication such as the UP or DOWN sign doesn't say much. If it says UP, that means that the nose gear is not down. If it says DOWN, that tells you that the nose gear is not up. Nothing more!

The mirrors are a big help, but if the gear is almost overcenter but not quite, you probably won't be able to tell the difference.

Treat any adverse gear light indication as the real thing. IMNSHO, the gear should never be cycled in an effort to get a better indication. There are a few cases where that might help, but in the vast majority of failure modes, cycling the gear will just make things worse.

It is almost always worth while to attempt a crank down to see if the sector gear has turned full travel but don't try to crank it up.

Happy Skies,

Old Bob

[ARTICLES/19990106_184730_msg00266.tex]

Gear Position Indicator**Thu, 7 Jan 1999 00:50:40**

Good Evening Bill,

Another viewpoint –

In a message dated 1/6/99 8:52:37 PM Central Standard Time, hale@lucy.fc.hp.com writes:

You do know something is amiss. If the (3) gears get outta synch, they will be a hell of a bang!!

Generally true but not always. I had a friend who had the left gear pushrod bend instead of shoving out the gear and he heard and felt nothing. I guess the argument could be made that there was sound and feel that should have given him a clue, but he noted nothing until the left side settled to the runway on landing. He was a fairly experienced aviator and was a current flight Instructor at the time.

And that's why I think they did a real disservice when they got rid of the mechanical indicator in favor of the 3 lites.

The nose gear mechanical indicator gave no unusual indication in my friends case as the nose gear was down and locked.

If you lose all electrical, cranking the gear till it hits the stop gives a pretty good indication that the gear is down provided that nothing mechanical fails. There is still no other way of checking that all three gear legs are in the proper overcenter position other then operative and properly rigged overcenter switches. If the gear is cranked down from the up position after an electrical failure, I always recommend that the turns be counted. (Should be around fifty-two turns, but should be cranked until it hits the stop anyhow.) That gives as much assurance as can be had and is a better indication that the gear is down as far as it can go, than does the mechanical flag type indicator. The DOWN indicator will show down before the nose gear leg is overcenter and tells you nothing about the other two gear legs.

I can cause all sorts of angst on the pilot's part in the newer airplanes by asking him to land with the power off.

No real gear position indication.

Agreed. There is no way, including looking at the nose gear mechanical indicator, to tell if the gear is properly extended and locked without electrical power.

Happy Skies,

Old Bob

[ARTICLES/19990107_005040.msg00286.tex]

Gear Position Indicator**Wed, 10 Nov 1999 23:10:55**

In a message dated 11/10/99 7:57:31 PM Central Standard Time, safety@zeus.chapel1.com writes:

Saturday I had the Nav lights on and the gear down light did not come on! After confirming gear down and landing, then gaining access to the bulb on the ground, the light started working. It's much brighter with the nav lights off but even with them on it's dim but visible. Thank goodness for the wing tip mirror and the mechanical gear down indicator on the floor. They reduced the pucker factor significantly! With only 12 hours in the Bo, I didn't want to wrinkle any sheet metal. Larry Collins N124RS Richmond, KY

Good Evening Larry,

Glad that your pucker factor was reduced by the indications shown, but there are a few things about the indication system that you should keep in mind.

The gear position indicator lights do not directly indicate the position of the gear or tell you whether or not the gear legs are in the locked position. They merely tell you that the shaft on the gear box has turned as far as it is supposed to turn. One, two or all of the gear could be up, partially up or just not locked and you would have no way of knowing that via the light indications. If the mechanical indicator is showing up, that means that the nose gear is not down, if it shows down, that means the nose gear is not up.

The Bonanza landing rear mechanism is a very reliable system and generally works very well if well maintained, but the indication system is from the dark ages! The later airplanes have a more modern style that does give reasonable assurance that the individual legs are down and locked, provided the switches are correctly rigged. On the early airplanes, neither the mechanical nor the electrical indications are a very positive indication of gear position.

Happy Skies,

Old Bob

[ARTICLES/19991110_231055.msg10469.tex]

Gear Position Indicator**Wed, 23 Feb 2000 13:19:52**

In a message dated 2/23/00 12:10:14 PM Central Standard Time, swo49@hotmail.com writes:

Now I thought I could rely on my little flag. Can I rely on the single landing light?

Good Afternoon Steve,

Unfortunately, not very much!

The single light just tells you that the shaft on the gear box has turned to it's proper limit. If all of the rods and such are properly adjusted the gear should be down, but if one of the rods has bent, that gear could still be in the well and the light would show green!

While the gear system on our airplanes is quite an engineering marvel, remember that it was designed less than forty-two years after Wilbur and Orvilles first successful powered flights.

The addition of gear down light switches on the actuator legs is a big improvement, but even that is not as good as the systems that actually have a switch which is activated when the gear leg knuckle is over-center.

Happy Skies,

Old Bob

[ARTICLES/20000223.131952.msg03429.tex]

Gear Position Indicator**Wed, 23 Feb 2000 19:02:53**

In a message dated 2/23/00 5:34:01 PM Central Standard Time, swo49@hotmail.com writes:

Bob: When did V-tails go to three lights? Where are those sensors (actuator legs)? Steve

Good Evening Steve,

I can't say for sure, but I believe the three light system was first used on the 1970 V35B.

The switches are mounted so that they are actuated by the position of the main and nose gear brace assemblies. The ones on the main gear braces are nice and solid, but the one for the nose gear has a rather flimsy lever and arm arrangement that is not as positive acting as the main gear set up. The amber 'in transit' light is actuated by the nose gear lever assembly. The gear down switches are adjusted so that they will not be actuated until the lift legs and the braces are in alignment and the knuckle faces are in complete contact with each other. The gear actuation spider turns a little beyond that point so as to provide a spring force to keep the knuckles in the over-center position.

There are some after market STC approvals to apply individual gear lights on the older models. I don't know if they use the same points of actuation or not.

Happy Skies,

Old Bob

[ARTICLES/20000223.190253.msg03445.tex]

Gear Position Indicator**Thu, 24 Feb 2000 10:10:22**

In a message dated 2/24/00 7:45:03 AM Central Standard Time, commwlthsls@msn.com writes:

BDS told me they will not sell the STC or kit EVER! They don't want the liability. The fellow that they bought the STC from(Harold Clark) has no papers and never filed any with theFAA. That road is a dead end.

Good Morning John and All,

Based on what I have heard here, I think if I were going to try to put a three light gear advisory system on the Bonanza and the STC remains so elusive, I would buy the components from Raytheon and apply for a local approval.

The FAA inspectors tend to be rather friendly whenever you are adding something that can be construed as an improvement in safety, especially if the later models of the same airplane have included it as standard.

The other side of coin is how much do you really need the three light system? I like it a lot and would prefer that it be on board, but I don't think I would go to much trouble to add it!

If there was an easy straight forward STC for a thousand bucks or so, parts included, I would do it, but much more than that, or if it was going to require a long exchange with the FEDs, I don't think I would bother.

While it is nice to know whether the gear is really down and locked or not, unlike hydraulic gears, there isn't much you can do about it on a Bonanza. If the gear box shaft has turned all of the way, the gear is down as far as it is going to go!

The thing to be concerned about is whether or not the single light switch which is on the early airplanes is properly rigged.

There are mirrors available which can be attached to the wing tips or the tip tanks to allow the landing gear to be inspected. I have never used those and don't know if you can tell whether the knuckles are over-center by viewing through those mirrors or not, but that might be one answer.

It might just be cheaper, easier and more practical to make it a habit every month or so to extend the landing gear by the normal electrical means, then unfold the gear handle, crank it to the down position and determine if the motion is still at the designated one-eighth to one-quarter turn. (five-eighths to three-quarters on the very latest actuators) Obviously for greatest safety, the circuit breaker should be pulled, that is just a risk I take.

For What It's Worth!

Happy Skies,

Old Bob

[ARTICLES/20000224.101022.msg03501.tex]

Gear Position Indicator**Fri, 25 Feb 2000 22:16:39**

In a message dated 2/25/00 9:00:50 PM Central Standard Time, swo49@hotmail.com writes:

Paul: If you would be willing to take pictures and have your A&P inspect and draw what he sees up, I would be glad to pay the bill - if that is not too much trouble for you. Steve

Good Evening Steve,

I don't know what was done on Paul's C35, but the setup on my V35B looks like it would be a no-brainer to duplicate and it should fit on any Bonanza. The brackets that hold both the up and the down switches for the main gear are just bent up sheet metal. The tab that actuates the switches is a straight piece attached to the gear brace. The nose gear is a little more complicated, but it is still simple flat stock bent to the right shape.

All of the components are very straight forward.

If it were me, I would first get the part numbers for all of the parts and see just how expensive they would be to purchase from Raytheon. You never know, that might be cheaper than having them made even though they are simple.

If you make the installation the same as the later airplanes and use all Beech/Raytheon parts, or reasonable facsimiles thereof, the local approval should slide right through at almost any FSDO. They like that kind of stuff!!

Don't make the job bigger than it is!

Happy Skies,

Old Bob

[ARTICLES/20000225_221639_msg03648.tex]

Gear Position Indicator**Tue, 15 Aug 2000 18:46:07**

In a message dated 8/15/00 5:06:54 PM Central Daylight Time, MikeM86949@aol.com writes:

Why all the interest in these 3 lights? I don't get it.

I have a 65 Deb with one green light that (I believe) indicates the position of the sector gear that is physically connected to all 3 gear. I also have a wheel that physically indicates the position of the nose wheel.

Why would I want to wire up a bunch of lights with new contactors? Just to emulate a new Bonanza?

Mike McNamara

Good Afternoon Mike,

Your analysis is basically correct.

If all of the components work as they are supposed to, when the shaft on the transmission has turned to its stop, all three landing gear legs should be fully extended with the gear legs overcenter.

Unfortunately, they do not always work as they should.

There have been many cases of the gear extension push rods (or other components) failing. The noise of the gear going down is about the same. You may or may not hear the tube when it fails and you have no way of knowing whether the gear is down and locked.

The situation is better now that most mechanics know a little more about proper servicing of the Beech landing gear. The most common cause of one gear hanging up was misrigging of the uplocks. Even with a misrigged uplock, the gear would usually come out OK if the rollers were properly lubricated.

In any case, there were enough failures of the system that Beech decided to go to a more conventional indicating system which indicates movement of the actual leg which extends the individual landing gear components. It still doesn't assure that the legs are overcenter, but it is much more positive than the old one light system.

As far as the nose gear indicator is concerned, the only thing it will tell you for sure is that the gear is not in the position opposite to that indicated. If the indicator says that the gear is down, you can be assured that it is not up, but it may or may not be in the locked, over center, position. If it indicates up, it is definitely not down, but it may not be fully retracted.

As long as your gear always works correctly, the one light system is fine, but if it always works perfectly, why do you need an indication at all?

I like the three light system better.

Happy Skies,

Old Bob

[ARTICLES/20000815_184607_msg12199.tex]

Gear Position Indicator**Thu, 15 Feb 2001 17:07:22**

In a message dated 2/15/01 10:43:46 AM Central Standard Time, HHammond@lgc.com writes:

I've always assumed that if I had a green light, the main gear was down and locked and if the mechanical indicator on the nose gear said down it was probably down and locked.

Good Afternoon Hal,

On the early airplanes, the light tells you that the shaft on the transmission has turned to the point where the gear should be down and locked. If there is any failure in the mechanism between the transmission and the overcenter mechanism on the landing gear, it will not stop the light from being lit.

I have seen failures of the extension rod where one main landing gear was completely retracted, but the nose and the other main gear were down and locked.

The light showed green and the mechanical indicator showed what it should show when the gear is down.

The mechanical gear indicator only concerns the nose gear, it has nothing to do with the mains.

If the indicator says the gear is down, you can be assured that the nose wheel is not up, but it may not be locked down. The indicator cannot be trusted to assure that it is.

Similarly, if the mechanical indicator says that the gear is up, you can be reasonably confident that the nose gear is not down, but it may not be fully up. It could be, and has been known to be, jammed on the nose gear doors and sticking several inches out in the breeze while still indicating up.

It has no relationship to the position of the mains at all.

Remember, the landing gear indication system for the Bonanza was designed approximately forty years after the Wright brothers first flight.

Retractable landing gear for a GA airplane was still a fairly new concept and Beech was obsessed with building an extremely light weight aircraft. Fortunately for us, they succeeded in that quest, but there were a few items that could have been made a little more secure.

The landing gear indicating system is one of those items.

Happy Skies,

Old Bob

[ARTICLES/20010215..170722.msg03942.tex]

Gear Switch Location**Mon, 16 Oct 2000 15:46:16**

In a message dated 10/16/00 12:50:01 PM Central Daylight Time, JH722700@MSXSEPC.SHELL.COM writes:

Bob Not a Lufthansa, but our F33C was a KLM training plane and while the gear switch is in the normal place for the plane, the four lights (3 green 1 red) are located about 6 inches up on the panel and so are visible past the dual yoke to both pilot and instructor.

Good Afternoon Jack,

I don't know how many were built in the configuration we saw. Our WBS convention was held in Phoenix a few years ago and one of the places we visited was the Lufthansa training center at Goodyear. They had the switch and the lights up on the center panel for all of the 33 and 36 models that we saw. I don't remember whether the Barons were that way or not.

I asked about the placement and was told that the switches were installed that way by Beechcraft at the request of Lufthansa.

I later contacted Beech and asked if they had any sort of a kit or other approval for placing the switches on the center panel. I was told that they didn't have a kit or other information. It seems that they considered it to be a minor alteration and just did it under their manufacturing authority.

The instructors at Goodyear were very pleased with the arrangement and felt that it was a major deterrent to inadvertent gear retraction.

I haven't decided if I will do it under the local approval concept or just figure that it is a minor alteration and let it go with a log book entry. If it's good enough for Beech, why not?

Happy Skies,

Old Bob

[ARTICLES/20001016_154616_msg14936.tex]

Jammed Nose Gear/Bug Replacement**Mon, 4 Dec 2000 13:40:51**

In a message dated 12/1/00 3:46:39 PM Central Standard Time, swo49@hotmail.com writes:

Old Bob - was yours changed after your nose wheel event?

Good Morning Steve,

No, there was only a very small surface scratch at the very low point of the "v" right where the leading edges of the nose gear doors meet the nose bowl.

We did replace the nose gear doors, but they are really not badly damaged and I feel they could be relatively easily repaired and reused.

One of the advantages of a planned nose gear retracted landing is that steps can be taken to minimize the damage.

I had a passenger with me and I had him go to a rear seat for the landing. I also used no flaps so as to be able to retain elevator authority to a lower speed. I purposely lowered the nose gently before the elevator lost power to reduce the down force on contact.

The four blade prop also held the nose up high enough to reduce the degree of damage sustained by the airframe. The primary damage to the airframe was caused by the nose gear extension rod which buckled and tore out the lightening holes in a couple of frames of the floor pan. The major airframe expense was the labor required to remove and reinstall all of the cables and components involved when repairing the relatively light damage to the frames.

Sorry I can't provide any guidance on replacing the nose bowl. So far, I haven't had to do it!

Happy Skies,

Old Bob

[ARTICLES/20001204.134051.msg17144.tex]

Jammed Nose Gear**Wed, 26 Jan 2000 23:01:06**

In a message dated 1/26/00 9:52:05 PM Central Standard Time, swo49@hotmail.com writes:

Bob:

I was under the (mistaken?) belief that the Bonanza Gear was all tied together with rods - so either all the gear is up or all the gear is down (unless a rod broke). Am I mistaken? Did one rod break?

Steve

Good Evening Steve,

I wrote about this a year ago, but you might have missed it!

When the nose gear became jammed, the rod which was supposed to push the gear out, bent and tore up a couple of bulkheads in the belly. The Bonanza gear is a neat design and generally very reliable, but when it fails there aren't many alternatives.

When I heard the two loud snaps as the rod bent and tore up the bulkheads, it was obvious a landing minus the nose gear was in order.

Happy Skies,

Old Bob

[ARTICLES/20000126_230106_msg01809.tex]

Jammed Nose Gear**Thu, 27 Jan 2000 11:28:03**

In a message dated 1/27/00 8:15:36 AM Central Standard Time, k5hmd@worldnet.att.net writes:

Bob, what caused the jam?

Thanks, Joe Christian P35 N61JC

And:

In a message dated 1/27/00 7:57:46 AM Central Standard Time, swo49@hotmail.com writes:

Bob: First: wow! (I was not on this list one year ago) Second: is there any maintenance that could be done that I should be thinking about doing to lessen the possibility of me having such an event (I love to learn from others experiences where possible). Steve

Good Morning Joe and Steve,

I suppose I would have to place the blame on faulty maintenance and improper preflight.

Now since I do all of the maintenance and am responsible for the preflight, I guess we know who to holler at!

The little devil that jammed the gear in the up position was the ball joint fitting on the end of the left nose gear retract rod. It had come off of the ball and the rod was of just the right length that the fitting was able to jam between the axle support of the nose gear strut and the rear of the nosewheel well. On my airplane (they are all a little different) that space is about one quarter inch. The fitting is three-eighths of an inch in diameter. As the mechanism pulls the gear up, it was able to supply a rather healthy pull and jammed it quite tightly. Even on the ground, we were unable to get the nose gear down until we released the air pressure in the strut.

Since the rod pushes the gear out, the rod bent and the force available to put it down was not as great as the force that pulled it up.

Now, why did the fitting come loose.

I don't know!

We disassembled the thing and it showed no signs of wear. The machining marks were still clearly visible on both the ball and the bearing surfaces. The spring was unbroken. The adjustment nut was at about the same place as all the others. There was no way to determine what the pressure on the spring had been, but it is something that I check whenever I work on the gear and it had only been about a hundred hours since the last annual, so who knows?

There was one big gouge on the ball and a slight enlargement of the key shaped slot. Our supposition is that a stone or something had lodged in the hole and a couple of rotations during retraction and extension had forced the fitting off the ball.

That is just a theory, nothing proven.

I questioned friends who have done a lot more maintenance than I as to whether they had ever seen such a thing. I found some who commented they had seen the fittings come loose before, but it had never caused a problem other than leaving the door dangling. It was the consensus that the fitting getting in just the right place to jam the gear was at least a thousand to one shot!

I would have caught it if I had checked the nose gear doors for attachment and security before takeoff. Unfortunately, that is not something that was a part of my normal preflight!

One of my neighbors had watched my first takeoff of the day, and had noted that the doors were fully closed as I passed over his head. He is certain that he would have noted a door hanging open. The gear problem was couple of gear cycles later. I was descending to land at an airport in northern Indiana where I was dropping some cylinders off for machine work.

Since my incident occurred, I have crawled under and examined at least a hundred different Bonanzas. Some are in atrociously bad condition and others look quite well cared for.

I haven't changed my maintenance procedure any, but I suppose I look at those fittings a little more carefully now!

I even try to wiggle those doors on some of my preflights!

Happy Skies,

Old Bob

[ARTICLES/20000127_112803_msg01842.tex]

Jammed Nose Gear**Sat, 11 Mar 2000 13:56:46**

In a message dated 3/11/00 11:37:54 AM Central Standard Time, epoole@scoot.netis.com writes:

In your case, though, weren't the mains down and only the nosewheel up? Seems that recovery should have been as easy as just raising up the nose and slipping some kind of wheeled dolly underneath, and then pushing/pulling it over to the maintenance shop.

Good Morning Eric,

True enough! Mine was a no brainer. We let the air out of the strut to release the jam and then put the nose gear down. After bracing it with a piece of two by four, it was towable.

Most full gear up landings are removed from the runway by lifting the airplane and putting the gear down. I have seen them lifted and put on flat beds though.

The sophisticated airports use airbags under the wing. The wild 'get it out of the way fast' guys use slings which do a lot of damage and the more knowledgeable small plane types will, on occasion, call out everyone that can be found to help, then just lift it up by placing people along the leading and trailing edges of the wings and tail, lifting it bodily. The guys along the leading edge need to do almost all of the lifting and the ones in back of the wing just stabilize it while the leading edge guys provide the muscle. I helped once and it went surprisingly well. We lifted it with the fuel that was on board and a person in the cockpit to operate the gear.

I have seen them lifted with one sling just ahead of the wing and one immediately behind with minimal damage. I also saw one where it had been lifted by placing one sling on each wing and that one had a lot of flap damage.

I saw another where an attempt was made to lift it by the engine lift fitting and that resulted in the fitting being pulled out of the crankcase. I don't think they had even thought about how the airplane would have hung from the fitting if it hadn't pulled out.

Beech recommends that the pilot's window be taken out, the door removed or opened, and the airplane lifted by attachments to the main spar. I have never seen that done.

Happy Skies,

Old Bob

[ARTICLES/20000311_135646_msg04583.tex]

Jammed Nose Gear**Fri, 16 Feb 2001 12:25:22**

In a message dated 2/15/01 10:44:28 PM Central Standard Time, raven@tminet.com writes:

Bob,

How do you think the shaft got bent? It looks like it would take a lot of force to do that!

Good Morning Bill,

The simple answer is: I don't know!

However, I have looked at a hundred or more airplanes since my incident and found many inconsistencies that give me concern.

First, the pin on the nose gear which goes into the fork and closes the doors provides a lot of force should the doors encounter some restriction to closing.

That pin is fixed on all but the latest airplanes and those older ones which have had the roller kit installed.

Next, my inspections have revealed that there is a considerable variance concerning the angular relationship between the position of the fork slot, the lift arms for the doors and the weldment that provides the stop.

If the pin should strike the fork on one of the tines instead of being reasonably aligned with the slot, a tremendous pressure could be put on the cross shaft. I think that is what is happening.

I found at least twenty-five or thirty percent of the airplanes I looked at seemed to have some bend in their cross shafts.

I have heard of at least one occasion, other than on my airplane, where the pin has ridden on the top of the upper tine instead of picking up the slot. I suspect that it happens a lot more often than any of us realize.

I believe the problem is associated with the difference in the angular relationship between the slot, the lift arms and the stop. I wish there were an adjustment, but there is none. The stop could be made adjustable quite easily, but the big problem is the angle between the lift arms and the slot.

The airloads on the doors tend to force the doors open except in a sideslip situation.

In order for the doors to resist sideslip motion, the lift legs are stopped by the fixed stop in a position where the door arms will be overcenter. The doors will then be protected from being closed by the side load.

If the amount of over center is excessive, and I think it is on many airplanes, mine

included, the fork gets lowered excessively by normal airloading. The outward force applied to the doors by normal coordinated flight pulls the fork slot down. In some cases, it comes down so far that the pin strikes on the upper tine. If it does that often enough and hard enough, it bends the shaft just a little. As the shaft is bent, the relationship between the slot and the pin gets worse. More strikes and more bending of the shaft results. If it gets bad enough, the pin will occasionally ride on the top of the fork and close the doors early!

Have you ever noted that the lifting pin on some airplanes is badly worn, maybe even has a slot half way through it or so, while other airplanes with a similar number of hours have a pin which shows no wear at all?

I THINK that is caused by a less desirable orientation between the pin on the nose gear and the slot in the fork.

That is why I recommend that everyone pull the cowl flap shaft and the nose gear cross shaft out of their airplane and check them for straightness. If yours has been around for a while and is not bent. All is well and there is nothing to worry about. Just make sure the spring has adequate tension and the assembly is kept well lubricated and there should be no problem.

If, however, there is any bending at all in either shaft. Something should be done.

What should be done is the problem!

I feel that there should be no more than about one-eighth of an inch over center when measured at the end of the nose gear door lift arm. Many airplanes have much more.

If the amount of over center is at a minimum (the way I like it) it is very important that the spring be strong and the bearing surfaces clean and lubricated to avoid the door being closed against the nose gear in a side slip.

I feel that the factory has changed the angle back and forth over the years to provide more or less overcenter, but no one that I have questioned at the factory has ever had, or at least admitted to, any knowledge of the situation at all!

When you check your gear retraction, be sure to check how well the pin aligns with the slot. It is important that this check be made with outward pressure being applied to the nose gear doors to simulate inflight loads.

It is also important to note how much force is required to open or close the cowl flaps. If it is appreciably more when the gear is up than when it is down, that is an indication that something is wrong with the nose gear door mechanism.

Any help?

Happy Skies,

Old Bob

[ARTICLES/20010216.122522.msg03988.tex]

Manually Retracting Gear**Sat, 9 Jan 1999 08:36:36**

Good Morning All,

I noted a couple of references to cranking the landing gear up.

The factory has always said NOT to do it.

When it is necessary (during maintenance on the jacks) to bring it up slowly, the recommended procedure is to do it by "bumping" it up utilizing the landing gear circuit breaker.

I don't know precisely which part of the mechanism they feel is not strong enough to stand the strain of cranking it up, but since all other components used while taking the gear up electrically are the same, it seems reasonable to assume that it has something to do with either the "screwdriver" drive end, the slot on the worm gear shaft or some thrust problem with reversed action on the worm gear.

Norm Colvin always said it was OK to crank it in the up direction some twenty turns or so until the inboard doors were open far enough for one to disconnect them as is required to properly check the landing gear rigging during maintenance.

Any greater movement in the up direction beyond that is applying more stress somewhere than the mechanism is designed to sustain.

On another point, the lower the speed you use while cranking the gear down, the easier it will be. As I said in an earlier post, I would get the speed down to no more than recommended approach speed (130 per cent of the stall speed at the weight you are operating). That should be somewhere below 80 knots the vast majority of the time. It makes it a lot easier if a climb is set up at that speed using the power you would need to maintain level flight with the landing gear extended.

Try it, you'll like it!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990109.083636.msg00376.tex]

Nose Gear Steering**Sun, 24 Jan 1999 21:49:13**

Good Evening All,

In a message dated 1/24/99 6:58:06 PM Central Standard Time, rondavis@access1.net writes:

The original Model 35 Bonanzas didn't have a steerable nosewheel. They used differential braking to turn the plane.

Not only that, the turning radius was tighter with the freeswiveling nose gear, there were a lot less components to maintain, fewer parts to go wrong and if one is using the nose gear steering for anything other than taxiing, it is likely that the flight controls are not being operated in the optimum manner. Two of my straight 35s had no nose gear steering and the other one had nose gear steering added when it was a couple of years old. I noted no difference in the ease of handling crosswinds with or without the nose gear steering.

The greatest advantage of the nose gear steering is in the event of a brake failure. It means that one can still carefully taxi in to a place where maintenance can be performed and it allows some limited braking on the landing roll without running off the side of the runway.

It is a nice to have thing, but if I were to buy an airplane that was not so equipped, I doubt that I would spend very much to have it added.

The proper use of the aerodynamic controls will do a much better job in a strong crosswind than will reliance on nose gear steering. Not only that, but the aerodynamic controls still work on slippery runways!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990124_214913.msg01093.tex]

Reusing Tire Tubes**Fri, 3 Nov 2000 09:26:18**

In a message dated 11/3/00 6:39:19 AM Central Standard Time, grady@mailzone.com writes:

I find no reason to scrimp on the cost of a new tube when there are clearly so many cases of tube failure when re-used.

Good Morning Wes,

That is an interesting observation!

Where do you get your data showing the incidence of tube failure? I know that anecdotal data is always suspect, but I can't remember ever having a tube failure on any airplane that I was flying over the past fifty-four years and 36,000 hours of flying.

I don't know what the policy of my airline was, (I have a hazy memory of them using tubeless tires the last twenty years or so, maybe Ralph Requa, Jim Northcott (sp?) or John Deakin can tell us what we used) but every FBO with which I was associated handled it the way Paul's operation does. They were changed on condition.

I tend to waffle a bit. I find that, as I have become more financially able, I tend to replace the tubes more often than I did in my younger years. Most of the time when I do, I feel a little guilty about doing so.

I have noted that the nose wheel seems to have more balance problems than do the mains.

If I have a combination of tire and tube on the nose wheel which balances very well with no weights added, I will often reuse the tube three or four times. I have the feeling that the tubes tend to be out of balance more often than do the tires, but there is no data to support that claim other than personal observation.

Happy Skies,

Old Bob

[ARTICLES/20001103_092618_msg15655.tex]

Reusing Tire Tubes**Fri, 3 Nov 2000 10:31:53**

In a message dated 11/3/00 8:52:36 AM Central Standard Time, aerome@ev1.net writes:

This is cheap insurance that, for most of us, only comes due about every five years or so.

Cheap insurance protecting you from what?

Where is the evidence that tube failures are causing any problem?

What makes you so certain that a new tube is any better than a used one that shows no sign of wear and which has a history of good performance?

Why do we set standards of repair and replacement for any parts on our engines and airframes?

Why are mechanics trained to evaluate the condition of parts and components if everything that is removed from the airplane is supposed to be replaced by a new component rather than be used to its acceptable service life?

Why don't we just buy a new airplane following each flight?

Happy Skies,

Old Bob

[ARTICLES/20001103_103153_msg15661.tex]

Tires - Michelin vs. Flight Customs**Wed, 6 Dec 2000 11:35:24**

In a message dated 12/6/00 8:21:30 AM Central Standard Time, jdeakin@avweb.com writes:

I don't like the Michelin "Air" tires. They take a set quicker than any other tire I've ever used, and thus always seem out of balance, terrible flat spots on the first takeoff after a few hours parked. Never again.

I have no data on wear rate, but I'll be glad to change 'em.

Good Morning John,

Interesting!

I have had just the opposite experience.

I had been using Flight Customs for many years and was always bothered by the thump, thump, thump after only a day or two of inactivity.

I switched to Michelins a few years ago and have been very pleased. I wonder if we are just seeing normal variances in production quality?

Happy Skies,

Old bob

[ARTICLES/20001206_113524_msg17248.tex]

Tires and Wheel Sizes**Mon, 7 Sep 1998 13:09:08**

Good Morning Al and Mike,

In a message dated 9/7/98 6:44:49 AM Central Daylight Time, aerome@onramp.net writes:

Mike; The bigger wheels/tires make it nicer for grass. Also, if this matters to you, the a/c will look to be sitting level, rather than nose high. With the smaller wheels you gain a bit in prop clearance. So far I haven't heard anyone complain of either setup. The bigger ones may cost about 300 to 400 more. Good luck, you'll love 'em. Al

It has been a long time since I have been involved with an airplane equipped with 6.50-8 or 7.00-8 wheels but I do believe both of those require no larger than the 6.50-8 tires be mounted.

The 6.00-6 wheels require a 7.00-6 tire.

The difference in the resulting overall diameter is likely to be less than one inch or one half inch in the height of the axle off the ground. I dare say that the amount of tread on the tire would make almost that much difference.

The inflation of the various struts and tires will make a substantially greater effect on the "sitting" attitude of the airplane.

As to operation on grass or other soft surfaces, I wonder whether there is any greater surface area applied to the ground by a 6.50 tire mounted on an eight inch wheel than there would be with a 7.00 tire on a six inch rim?

If I were evaluating the choice between the two optional wheel and brake assemblies, I think the consideration would be which would have the better braking capability, which would have the greater load carrying capacity and which weighed the least.

It seems that the larger wheel might allow a bigger, more powerful brake to be fitted. It would be interesting to find out.

Some of the very early airplanes were fitted with a Firestone brake and wheel that was of the eight inch diameter and it had the best brakes by far of any of the early airplanes. Unfortunately it was much more costly than the Goodyear and was dropped in favor of the simpler and cheaper unit.

I think you would be hard pressed to note any change in the way your airplane appears to be sitting and how well it operates on a soft surface.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980907_130908.msg05287.tex]

4.9 EQUIP-MISC

5th and 6th Seats

Thu, 12 Mar 1998 10:30:17

Good Morning Skip,

In a message dated 98-03-12 09:39:32 EST, you write:

Does anybody know if you can put 5th and 6th seats in a S model or a v-35-a if it didn't come from the factory with them? Thanks again!!!!!!
Skip Weld

Sure, you can put six in the early V35Bs as well, but the CG on most airplanes won't allow their use by anything but a small child. That is why Beech quit offering the sixth seat on the later airplanes. One of the few things I like about my four blade prop is that it does help with the CG, but even with that, the fifth seat has limited usefulness.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980312_103017.msg01217.tex]

Accessories Guru

Thu, 25 May 2000 22:26:25

In a message dated 5/25/00 9:05:27 PM Central Daylight Time, glenno@sgi.com writes:

Who is the Guru? When I change engines, I am thinking about going with the wet pump with no seperator. I think I am in your area and I would like to have him set it up for me.

Glenn

Good Evening Glenn,

Here is the information you requested.

Terry Norris, Aircraft Systems, 5187 Falcon Road, Rockford, Illinois 61109.

Telephone 815 399-0225

He is the most knowledgeable accessory person that I know. His prices are not low, but you get the quality that you are paying for. I recommend him and his shop highly.

Remember, regardless of where you are located, he is one day away by overnight delivery. In fact, Rockford is one of UPS's major distribution points.

Happy Skies,

Old Bob

[ARTICLES/20000525.222625.msg08679.tex]

Aileron Trim**Sun, 2 Jul 2000 00:51:21**

In a message dated 6/30/00 6:45:50 PM Central Daylight Time, falconaviation@home.com writes:

Hi Gang,, the newbie again grin,,,,, how involved would the installation of aileron trim be? can the parts be had from salvage? Recommended installation (my plane flies right wing low, and the trim tab has been used to often and is starting to show signs of fatigue..)

Good Evening Mike,

I tend to agree with those who say get it rigged correctly and you won't need the trim, but it is still handy to have even if the aircraft is properly trimmed.

It is my recollection that the aileron trim was not a factory item, but an aftermarket development that the factory then picked up and started using. I have never added one to an airplane, but a can't imagine the required machining being very difficult. All it does is apply a spring pressure against the aileron chain to hold a variable amount of tension against the undesirable aileron input. As I recall it was not a difficult aftermarket application to install.

Incidentally, the automatic control of the electric propellor didn't come from the factory boys either. It was another good idea developed by the aftermarket folks which was picked up and offered by Beech.

Happy Skies,

Old Bob

[ARTICLES/20000702.005121.msg10442.tex]

Air Skeg**Tue, 4 Jan 2000 09:53:49**

In a message dated 1/4/00 7:23:11 AM Central Standard Time, jfseis@pilot.infi.net writes:

planning stage - speed slope windshield, panel mod, all new glass, tip tanks (15 gal), air skeg, aileron gap seals, vortex generators, air scoop, etc - etc!

Good Morning Ed,

The B35 is one of the great ones! All of the things you are planning will do nice things to make it better EXCEPT the air skeg!

Forget IT!

Whether or not it does any good at all is debatable. I think it is worthless and if even a minimum effort is made with the rudders, anyone can dampen the aircraft sufficiently. The Skeg adds weight where we don't need it. To properly make the required tail bulkhead inspection, it must be removed. That inspection is required every one hundred hours of operation.

I always consider the tail skeg to be a detriment to the airplane and urge my friends to take them off and put the aluminum to a better use!

Happy Skies,

Old Bob

PS The jury is still out on the vortex generators. There are old wives tales that say the speed is negatively affected and that the airplane tends to ice up a little easier. My only experience with the VGs is on a pressurized Baron and they really made it into a different airplane. I like them there. Others have told me that the possible gain with a light wing load airplane just isn't worth the trouble!

[ARTICLES/20000104.095349.msg00157.tex]

Air Skegs**Thu, 25 Jan 2001 00:19:17**

In a message dated 1/24/01 11:07:24 PM Central Standard Time, Michael.Lott@ssc.nasa.gov writes:

Does any one else who has one feel that they are worth installing, or does anyone know of a better alternative to the air skeg? Thanks. Michael.

Good Evening Michael,

Well, I do have an opinion!

I feel I must warn you that we have beat this to death on this site in the past.

I think that all of the tail skegs should be taken off the airplanes and smashed to smithereens.

It gets in the way of a proper inspection of the tail mechanism, adds weight to the airplane in a place where it needs no weight, looks crummy and, in my opinion, doesn't help the wiggle a bit.

Just keeping you feet on the rudder pedals, where they belong anyhow, will do just as much good as the tail skeg. Active, proper, manipulation of the rudder will ameliorate the Bonanza wiggle as well as anything, but the technique is not intuitive, takes a while to learn and requires considerable concentration.

The electronic yaw dampers, which are available from at least a couple of manufacturers, are very expensive, but do almost as good a job as the best wiggler of rudders can do and they never get tired or distracted by ATC!

Happy Skies,

Old Bob

[ARTICLES/20010125_001917_msg01735.tex]

Alternate Static System**Tue, 6 Feb 2001 23:43:33**

In a message dated 2/6/01 8:11:58 PM Central Standard Time, esoteric5121@earthlink.net writes:

I wonder how leak-prone that would make the static system? keep plenty of those little Curtiss o-rings around, right? (I have a perpetually leaky Curtiss tip tank valve...) Your comments encouraged.

Good Evening Paul,

I think the Curtiss valve would not be particularly leak prone in that application. Unlike a fuel drain, nothing would be passing through it that might cause a leak.

On top of that, gasoline will drain through a hole which would not let enough air through to fail a static system check

I have never installed one myself, but if an airplane was presented to me for an annual which had the Curtiss valve installed via a log book entry, I would consider that acceptable. I don't doubt that there would be many FEDs and other IAs who would disagree!

As long as the static system passes the leak test, I figure we can put any kind of acceptable fittings in the line that we want. If you wanted to put a tee in the line to feed an auxiliary instrument, you wouldn't file a 337 would you?

I consider the Curtiss valve as just another "acceptable" fitting.

Would your IA buy that argument?

Depending on where the line runs in your airplane, it might even require a tee and some other fittings to get the line to where you want the Curtiss valve!

Getting to the drain fitting in the late Bonanzas with the Velcroed aft baggage bulkhead is relatively easy. I do agree with those who are trying to find the drain which some crummy reupholstery shop buried behind a panel. That's another reason why there should be an A&P monitoring upholstery installations. Too many things that don't seem pertinent to the upholstery folks are happening when no one is watching the store.

Checking and draining the static line is on the standard Beech inspection form and that should not require removing the side panels to accomplish.

Happy Skies,

Old Bob

[ARTICLES/20010206.234333.msg02997.tex]

Alternator - 50 Amp vs. 100 Amp**Sun, 16 Jan 2000 16:33:47**

In a message dated 1/16/00 2:21:46 PM Central Standard Time, inyomono@telis.org writes:

I am thinking about upgrading my 50 amp alternator to a 100 amp alternator. I have alternator Prestolite Part No. 9422/TCM Part No. 641668 (50 Amp) and am looking at TCM Part No. 642056A1 (100 Amp). Does anyone have any thoughts on the +/- of this change? What do you think that cost would be? Is there anything I should know before I do this?

Good Afternoon Peter,

I am wondering just what is your reason for desiring a larger amperage alternator on your A36?

A 1979 A36 should be equipped with a 24/28 volt system and I can't imagine any normal aviation use that would require more than 50 amps at 28 volts for anything except an electrically deiced prop. My 1978 V35B has a rather heavy load of electrical equipment and I find the 50 amp to be more than enough for all operations, day, night and IFR.

If you are considering the electric prop deicing, I would suggest that you at least consider NOT putting it on the airplane. It has been my experience that I have had just as good results of keeping the prop clean by applying a silicone wax style ice repellent to the propellor as I have had with electric or alcohol deiced propellers. Doesn't work for the wings, but works great on the prop! It is true that you must remember to put it on before flight in icing conditions, but it doesn't quit either!

The 100 amp alternator is not only expensive in of itself, but bigger and harder to take on and off the airplane, which leads to greater costs for servicing.

Now if you have some neat idea for making the airplane go faster that requires the use of a lot of electricity, maybe the big alternator is worth the trouble!

I have heard that some folks were experimenting with a series of electrically operated vibration devices that would shed ice from the wings! If that is what you have in mind, count me in!

If all you want the extra capacity for is an occasional time where a little more power would be handy, consider adding a B&C standby alternator. The way it is installed, it will automatically pick up the additional load if the primary alternator becomes overloaded! The rest of the time, it is there as a back up if needed.

Happy Skies,

Old Bob

[ARTICLES/20000116_163347_msg00892.tex]

Alternator - Dynamically Balancing

Thu, 4 Nov 1999 14:04:33

In a message dated 11/4/99 9:47:53 AM Central Standard Time, tturner@vol.com writes:

Does anyone know anything about dynamically balancing belt-driven alternators, specifically on IO-520-E engines, or in general? The left alternator of our Be55 sheared an alternator mounting bolt yesterday.

Good Afternoon Tom,

I know that Terry Norris of Aircraft Systems, Rockford, Illinois does it all of the time.

Happy Skies,

Old Bob

[ARTICLES/19991104_140433.msg10159.tex]

Baggage Net**Mon, 13 Apr 1998 23:58:53**

Good Evening Ray Lockhart,

In a message dated 98-04-13 21:08:13 EDT, you write:

Unlike, the arrow which I had before the V35B, the baggage compartment of the Bo does not have any straps or other way of securing baggage or the other miscellaneous stuff that accumulates back there. I am looking for some kind of a netting which I could secure to the floor and just hook and unhook when I put "stuff" back there.

The airplane came with a netting device and I imagine they would be available from Raytheon. There should be four metal clips on the aft end of the baggage compartment and four more on the forward end under the aft side of the rear seat. I am a little tight on time right now (gotta get ready for Sun 'n Fun) but if you haven't found them by the first of May, ask again and I will find the part numbers for you. I would think that there must be some after market netting suppliers that would be cheaper than Raytheon.

The factory restraining system works well.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980413.235853.msg01966.tex]

Baggage Net**Tue, 14 Apr 1998 10:38:44**

Good Morning Ray Lockhart,

This morning while loading our airplane for the trip to Lakeland, I took the time to look for part numbers on the cargo net assembly. While I found none, I did note that the net unit was made by Aeroquip. There is an number on the buckles, 31104.

Incidentally, the factory net has special clips to fasten to the cleats mounted in your airplane. In addition, it is FAA approved for the purpose.

I would suggest that you at least look at a factory unit before you try to replace it with something else. It is very well made and easy to use.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980414_103844.msg01975.tex]

Bonanza Seating**Sat, 1 Jul 2000 05:35:58**

In a message dated 6/30/00 10:36:46 PM Central Daylight Time, raven@tminet.com writes:

I have an Aeron chair in my office, which I find really comfortable (YMMV). The interesting thing about the chair is the upholstery, which is a nylon pellicle material- no padding of stuffing, just the stretched open cell pellicle.

Good Morning Bill,

Way back in the olden days before air-conditioning was common, every auto supply store sold a unit which consisted of a seat and back pad hinged together so that it could be placed on the seat and behind the driver. That pad was about one half inch thick and was constructed of a metal coil spring covered with an open reed type mesh. It allowed air to circulate between your butt, back and the chair or seat in the car, OR AIRPLANE!

The DC-3 and the DC-4 were especially hot and sweaty. Ventilation was very poor. We often flew with the side windows open.

But I digress! Many pilots carried those little car seat ventilation pads with them to use in the threes and fours. It really helped a lot. I haven't seen them in years.

We called them "cool stools"!

I would think that something such as you describe would be great!

Happy Skies,

Old Bob

[ARTICLES/20000701.053558.msg10421.tex]

Bonanza on Floats**Wed, 6 Jan 1999 14:58:16**

In a message dated 1/6/99 1:04:23 PM Central Standard Time, stutzman@mate.kjisl.com writes:

Does anybody know how well a Bonanza floats (on water that is)?

Hi Frank,

I don't have any idea myself, but I believe there was an article in the ABS mag a couple of months ago about a German gentleman who ditched in the Pacific. Have you checked out what it had to say?

My recollection is that the aircraft sank rather quickly.

I remember something from my youth about a trip Dick Merrill made over the Atlantic in a Consolidated cabin single and as recall the story, he filled the wings with Ping-Pong balls. Always seemed like a good idea to me!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990106.145816.msg00256.tex]

Chart and Approach Plate Storage**Sun, 25 Oct 1998 08:07:29**

Good Morning Tim Freeze,

In a message dated 10/25/98 3:03:24 AM Central Standard Time, freezetw@compuserve.com writes:

Ive been trying to figure out the best way to stow and retrieve my charts and approach plates in the Bonanza. Ive been keeping the bag in the back seat but that is really in the way of the back seat passengers. Im sure someone has already figured a better way and has some optimal flight bag that fits just right.

I think this is an excellent topic for discussion! My Jeppesen lower forty- eight coverage is currently contained in ten overstuffed manuals. Eight for the approach plates, one for the enroute charts and one for the Notams, Preferential routes, Area Charts and such. With the rapid increase in approaches associated with satellite navigation, that number is bound to grow dramatically. It takes three more binders now than it did four years ago.

The amount of space under or forward of the front seats ahead of the spar varies quite a bit on the various models of the Bonanza. It will help a lot if any storage suggestions will include the type and model of aircraft being flown.

Tim has mentioned the navigation data source he is using and that too is important information.

My aircraft is a 1978 V35B. I tend to select the four or five manuals I will need on any particular leg and place them on the front floor vertically oriented and book shelf style against the front side of the spar cover. To keep them somewhat organized I use a soft leather bag purchased from Bridgestone many years ago.

As an aside, the bag I have is no longer available from that source. I tried to order a couple more and even though the ad description was still the same, the product delivered was nowhere near the same. The new ones were too floppy to be used at all. The original bags I have are well bound around the top and are stiff enough to give some semblance of order.

If I end up with more than a couple of books out of the bag, things rather fall apart!

I have seen carriers made of aluminum utilized by various corporate pilot friends that were built to specific dimensions to fit in various spots around their corporate jets. They were generally open on the top and one side so as to allow easy removal of the contents and equipped with a leather strap for carrying purposes which would stow easily out of the way.

My wife and I both have rather short legs and we have the seats fairly far forward most of the time while flying. There seems to be adequate room under our legs for the type

of storage we use. What we need is a better container or containers for the equipment.

Something like that would be nice but I am too lazy to make such.

Another area that I have gazed at lustily in my airplane is the space forward of my right seat passenger and over the rudder pedal position. My airplane is set up as a strictly single pilot operation. No dual column and the rudder pedals are stowed down under the rugs. We tend to stuff as much heavy baggage up in that area as possible. I have wondered if some enterprising designer couldn't figure out a system for storing those heavy manuals in that space with some organized container system.

My wife's legs are too short to ever need that space and it would certainly help the CG situation in airplanes such as mine which have some difficulty staying in the envelope.

Can't wait to see what the group comes up with!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981025_080729_msg06258.tex]

Cold Weather Operation**Fri, 13 Nov 1998 09:43:52**

Good Morning Ken Burrows,

In a message dated 11/13/98 7:59:40 AM Central Standard Time, kburrows@pipeline.com writes:

It appears that I will be getting a tie-down spot that will permit me to plug in an engine heater this winter for the IO 520 BA in my F33A. I'd appreciate hearing about the group's experience with the various brands.

I think I would investigate the options available for heating the cylinders by a method other than the one Tanis normally uses. They put a probe in the spot designed for the cylinder head temperature probe. If you have or intend to install an engine monitoring system with provisions for a six cylinder CHT, special adapters are required and it gets to be expensive and somewhat of a mess.

There are bands which fit around the base of the barrel near the case which claim to supply much more even heat and I saw something a week or so ago concerning a heater which was encased in the valve rocker cover gasket. That either by itself or in consort with the barrel heater should be neat!

A heated engine is awfully nice to have but some of the overhaulers are claiming they are starting to see additional corrosion effects in engines where the heater is left on all of the time the aircraft is idle. The recommendation some of them make is that the heater only be turned on 12 to 24 hours before an intended operation of the engine. Tanis recommends it be used any time the engine is not in operation.

I have no personal knowledge either way. Just thought that you might like to make some further inquiries if you are going to go that route.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981113.094352.msg06897.tex]

Cold Weather Operation

Wed, 5 Jan 2000 22:24:41

In a message dated 1/5/00 7:33:01 PM Central Standard Time, jlfisher@chicagonet.net writes:

The question is, what is the best way to go, six spark plug gasket probes, or a mixture of JPI and Tanes?

Use the JPI probes in the cylinder wells and add either the Tanis valve cover gasket heaters or the other brand cylinder heater that wraps around the barrel. Don't mess around with sparkplug gasket heat sensors unless there are NO other options.

Happy Skies,

Old Coot Bob

[ARTICLES/20000105_222441_msg00294.tex]

Control Locks

Fri, 26 May 2000 13:54:23

In a message dated 5/26/00 10:14:42 AM Central Daylight Time, newmanb@rocketmail.com writes:

Anybody know of one? Further, this accident suggests that the control lock should definitely be an annual inspection item, and the aircraft should not pass if the control lock is defective. Is this a requirement?

Good Afternoon Bob,

Just my opinion, but I don't see the control lock as a required piece of equipment and I definitely do not inspect it as part of an annual inspection.

Furthermore, I would argue strongly against it being made a mandatory item. If the insertion of the control lock was such that it would cause damage to the airplane or it's controls, that would be a different story, but the absence of a control lock does not seem to me to be of any particular significance and the type of control lock the operator chooses to use should be up to that operator.

If he chooses to use the one supplied by Beech and feels that it should only be used if it is in the condition that it was when new, then I guess it would be the operators responsibility to see that the lock and it's blocking device are maintained in the new condition.

Any lock which is inserted near the control stick or wheel of the control system is only good for relatively light loads. If the aircraft is to be subjected to extremely high winds, the controls should be battened externally. That was the method used for the DC-3 and still recommended for any aircraft which must be left outside in extreme conditions.

I have seen aircraft where the internal components of the control system were damaged because the loads applied from the control surface toward the cockpit control device exceeded the design strength of those components. If the cockpit control device is pinned, all of those loads are applied to the cables, brackets, rods and bell cranks which make up the system. If the control surfaces are secured externally, no loads are applied to the control system components. My youngest son has a Beechcraft E-18S which is equipped with a cockpit control lock device. It was parked outside at San Carlos a few years ago when the area was hit by very strong winds. Some reports were that the wind was as high as 100 mph. It was blowing from the rear of his aircraft toward the front. The control column failed due to overload. There were no existing cracks or defects in the column. It was just plain subjected to loads beyond the design criteria. He now parks the aircraft without the elevator lock installed. If the wind is blowing from the rear, it will press down on the elevator and hold it against the stop. If the wind is blowing from the front, it will merely blow the surface up and cause no problem at all. If the surface is held against the stop and the surface fails or the stop fails, that should be easy to spot. If the control lock is inserted in the cockpit, as so many are today, it is not out of the realm of concern that internal damage to brackets and cable lead devices

could occur which would not be easy to spot.

The place to direct our attention is to proper preflight action to inspect the control system for freedom of movement and integrity. That should be followed by the use of a checklist, either written or memory, which includes a check of the controls.

Beyond that, we should all be encouraged to use the flight controls in all aircraft to provide whatever aid they can for taxiing the aircraft. If we develop proper habits of control usage, a malfunctioning control should become obvious long before it creates a problem.

We have a tendency to want to make our airplanes foolproof by applying rules and regulations. Trying to legislate the proper use of a control locking device seems about as practical as passing a law making it illegal to have an accident.

Education, not regulation, please!

Happy Skies,

Old Bob

[ARTICLES/20000526_135423.msg08723.tex]

Cowl Flaps**Mon, 11 Aug 1997 16:19:44**

To: Ron Davis,

It has been my understanding that cowl flaps come out into the breeze so as to create a suction and pull the air through.

Many years ago some friends and I were working on an STC for improved cooling in an L-5 glider tow plane. We experimented with lots of different shapes and angles of fixed cowl flaps and found that there was a fairly precise angle and extension into the airstream that gave us optimum cooling.

I guess we can hope that Beech did the same sort of experimentation on the Bonanza.

As far as operation at high speeds, I agree that the loads can be quite high. At various times when I have forgotten to close them, the loads seemed so heavy that I slowed down to adjust them. It probably wasn't necessary but it made me feel better!

Bob

[ARTICLES/19970811.161944.msg01538.tex]

Dual Yoke**Thu, 30 Apr 1998 11:06:59**

Good Morning Larry Grimm,

In a message dated 98-04-30 04:07:14 EDT, you write:

How involved is this (read, how much downtime and installation cost)?

The installation is a no brainer PROVIDED there are no electrical connections to the wheel. If there are no wires etc. to mess with the easiest way is to just pull one yoke from the column and stick on the other. A five minute job if you have a very slow mechanic.

If there are wires to the wheel, some people take the control wheel off the yoke and reinstall it on the one being installed. Takes a little extra time and requires some tightening and safetying.

If you own the yoke yourself and intend to switch back and forth often, I would suggest having control wheels attached to both yokes and installing a quick disconnect on the wiring which will take it back to a no brainer job.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980430_110659.msg02208.tex]

Dual Yoke**Thu, 28 Sep 2000 13:50:15**

In a message dated 9/28/00 12:01:14 PM Central Daylight Time, jaw@pciii.com writes:

All you folks who advocate single yokes might ask yourselves the following:

OK

If I owned a dual yoke, would I trade it in on a single?

Yes

If I needed one, and they cost the same, would I choose a single yoke over a dual?

Absolutely! My current Bonanza had a dual yoke when I bought it and it was traded for a single wheel yoke.

Instructors and examiners who fly with single yokes should be fired - after the psychiatric examination.

So, if I ever work for you, feel free to fire me!

Incidentally, isn't that a statement of opinion and not a question?

Aside from the extra room afforded a passenger, there isn't any justification for a single yoke.

Your opinion, but not mine! you have just as much right to your opinion as I have to mine.

My wife is a petite 108 pound lady and she enjoys all of the extra room and convenience of not having the control column in the way of her knitting and reading materials and the pleasure of being able to pile all sorts of paraphernalia on the floor sans the rudder pedals. I like the single pilot cockpit. Fortunately there is a dual column for you and the current regulations allow you to have one installed.

Fact is, if they're that big, they probably have no business being there.

I am a rather large person, but I am not sure why you feel big folks have no business flying Bonanzas. Lots of us do fly them and have gotten along quite nicely for many years. Are you a little person?

And if they can over power the plane from their side, you (the instructor) shouldn't be there.

This one I find hard to comment on. I have heard stories all of my life concerning problems that occurred when a student "froze" on the controls. Fortunately, it never

happened to me, but I have heard stories of students overpowering instructors regardless of what type of controls were installed.

Do you feel that all instructors should be stronger than their students?

That \$3,500.00 saved will likely be the last thing that goes through your mind. Single yokes were someones lame idea to save a few bucks.

John, I am afraid you have failed to consider the real reason that the Bonanza and many other airplanes designed when the Bonanza was designed had the throw over column in the first place.

I don't remember the exact dates that apply, but prior to WWII there was a regulation which stated that no primary flight controls could be available in the airplane that were accessible to anyone in the airplane unless one of the persons at those dual controls was a certificated and current flight instructor.

If you will look at a J-3 Cub, a Fairchild 24, Luscombe Silvaire or any other stick controlled airplane of the era, you will find that there was originally a pin or other easily removed device which held the passenger seat control stick in place. When the aircraft was flown by a single pilot carrying passengers for other than instruction by a licensed instructor, the stick had to be removed. For the Taylor Crafts and many other wheel controlled airplanes, the pin required that you get under the panel to remove the right side wheel. A little more difficult, but still doable. Beech, Spartan, Cessna and many of the other more sophisticated builders complied with the regulation by providing a throwover column along with an optional, easily removable, second control wheel.

That was the regulatory climate when the Bonanza was designed. I think the requirement to not have a control wheel available to a passenger was stupid, but a lot of rules have been promulgated that many of us feel are stupid. If enough feel that way, the regulations can generally be changed. Those regulations were.

It appears that you and I have totally different viewpoints as to what the privileges and responsibilities of a pilot should be. Fortunately for me, most of the FEDs and all of my employers seem to have understood my position.

Happy Skies,

Old Bob

[ARTICLES/20000928.135015.msg14201.tex]

Dual Yoke**Wed, 28 Feb 2001 22:38:33**

In a message dated 2/28/01 9:09:38 PM Central Standard Time, Jenco34@cs.com writes:

Somehow it is written that the yoke in the Bo is down and the Baron is up. Mine in the A35 is down. Up just ain't right.

Jim N.

Good Evening Jim and All,

It is my recollection that all of the early ones that were factory installed came with the V point up.

Some of the real leggy guys wanted them upside down and so a lot were installed that way to meet the owners wishes. This is getting a little foggy in my memory, but I believe the early center control shafts were machined with two holes on either side to allow two positions of the single column for either pilot.

That also allowed the dual column to be installed either way.

Since the seats were lower in all of those airplanes equipped with bench seats, the position of the yoke in the lower position was more comfortable for all but the tallest long legged aviators.

Things changed when they went to those adjustable seats and set everybody up higher.

That made the low wheel position uncomfortable for many. I, personally, have always preferred the lower control wheel position.

Happy Skies,

Old Bob

[ARTICLES/20010228_223833.msg04912.tex]

Dual Yoke - Instruction**Thu, 28 Sep 2000 09:59:15**

In a message dated 9/28/00 1:40:15 AM Central Daylight Time, raven@tminet.com writes:

So, why would a professional flight instructor / DE be reticent about taking on the task? My feeling is that this is a perception issue, not reasoned through. Also, is the demonstration of instrument skill considered to be a high risk? Why?

Good Morning Bill,

My feeling is that it is strictly a "fear of the FEDs" thing. Unfortunately, that feeling is probably very well justified.

The FAA has many very fine and knowledgeable aviators. Most have a sincere desire to be involved in aviation and try to do a good job. Unfortunately, there are a few who don't quite know how to handle the responsibility they have been given.

We end up with something like the Hoover case and the "brakes on the right side" fiasco that we just went through. The FAA is a little like the medical profession, they know they have some real losers on board, but have difficulty deciding how to get rid of them. They also are very protective of their own and unless the situation is as egregious as the Hoover and 'right side brakes' deal, the rest just kinda go along.

I started instructing in 1949. My heaviest spate of Bonanza instructing was from about 1953 to 1970 or so. I started several students from scratch and never found the need for a dual column. The vast majority of instructors did the same. Some of the FEDs wanted a dual column for the checkride, but not all. None of examiners I used in those days had any qualms about giving a check ride in a Bonanza with the single control wheel.

I doubt if there are many aviators with any real experience in the Bonanza who would hesitate to give instruction and check rides in a Bonanza from a strictly safety viewpoint, but many of the examiners rely on the examining authority either as a source of direct income or as a draw to bring customers to their flight training operation.

The designation as an examiner is a lot harder to come by now than it was years ago and is much more trouble to maintain.

When I became an examiner, (never for airplanes, just gliders) it was merely a matter of a FED contacting me and saying: "Hey Bob we need a glider examiner in the Chicago area, would you consider handling it?" I said yes, went for a ride in a glider with the FAA inspector and I was an examiner.

It is different now!

Most of the current crop don't figure it is worth arguing with the system.

The BPPP has gone through this battle continuously with mixed results. They have had letters which allowed them to instruct and then there have been letters which said maybe they could and maybe they couldn't. For a while some of the individual instructors had letters which said they could instruct with a single control wheel column. Ron Vickrey worked hard on the program while he was president with few concrete results.

I believe Jack Hirsch is now the head of that program. Maybe he will chime in and let us know what the current status is.

If I were doing a lot of instructing in my airplane, I would probably purchase a dual column, equip it with dual control wheels, put an appropriate plug on the wiring with a receptacle in the panel and not fight the program either.

If everything is set up so that nothing has to be switched or transferred between the two columns, they can be changed in five minutes. Just be careful to make sure the gear comes off with the column and doesn't want stay on the shaft! Even if it does, resetting it back on it's base isn't difficult, but will add a few minutes to the job. Make out a weight and balance showing it both ways. Put both in the equipment list with an "or" between the two and make a log book entry every time it is changed. That should keep it legal with even the most fastidious rule follower.

The new manufacture control column that is offered in the ABS magazine looks like the one I would most likely choose. The name escapes me, but I looked at it in SAT. I liked it.

Happy Skies,

Old Bob

[ARTICLES/20000928.095915.msg14178.tex]

Dual Yoke - Instruction**Thu, 28 Sep 2000 15:52:57**

In a message dated 9/28/00 1:51:37 PM Central Daylight Time, jaw@pciii.com writes:

The thrust of my comments were directed at instructors and examiners who would choose to instruct and or test in a plane that (IMO) they couldn't control, and at folks who would choose to take instruction and be tested in planes with single yokes. Sure, the instructor or examiner could GET control after a few seconds. And I expect that throwing that yoke over takes the same amount of time,

And I guess you have missed my point that many of us did instruct in Bonanzas with the single column for many years quite successfully. I never felt that I had any more or any less control in one that was equipped with a dual yoke than one that only had a single.

You state: "who would choose to instruct and or test in a plane that (IMO) they couldn't control,"

I certainly never instructed in an airplane I couldn't control. I doubt if any other examiner or instructor did either.

Whether the control wheel is in front of the student or in front of me, I always felt fully capable of flying the airplane. I can assure you that I never considered trying to move the wheel to my side of the airplane to attain that control.

If you have read all of the messages on this thread, you are aware that many of us feel quite comfortable with the single column. Others do not. I haven't heard anyone state that they are willing to give instruction in an airplane they can't control.

I guess it depends on what you feel is necessary to get the job done safely. I am happy with the single column, but if the law says I have to use a dual one, I will use a dual one and try to get the law changed. That is the way the system works.

How many hours of instructing do you have and in what type of aircraft?

All of us are products of our experience. Yours must be quite different from mine.

Happy Skies,

Old Bob

[ARTICLES/20000928_155257.msg14208.tex]

Dual Yokes**Mon, 22 Mar 1999 19:12:35**

Good Evening Tom,

In a message dated 3/22/99 5:33:12 PM Central Standard Time, you wrote:

As I understand it, Bonanza dual yokes (with aileron trim) are an inverted V, while Baron dual yokes are an upright V shape.

I am sure you have a lot more experience with dual yokes than do I, but I think we should mention that the early Bonanzas did not have an aileron trim and therefore the early dual columns were not equipped with one either!

The "aileron trim", which is merely a spring to help hold the wheel one way or the other was originally an after-market device, not a Beech product. I don't remember whether they developed their own or adopted the after-market device in the same manner as they offered factory installation of Brittain tip tanks.

In any case, there were a large number of Bonanzas built and flown without an aileron trim and a whole lot of factory dual Bonanza columns sold without the aileron trim function.

The legality of using a column without a trim spring on an airplane that was never produced without it is definitely open to question, but there are still a lot of them being flown quite successfully without that little spring!

It seems to me that the question gets back to that insidious "minor alteration" or "major alteration" decision.

The early column provided a high and a low setting for the single yoke. When that was changed to a single position, it affected the positioning of some of the dual yokes on airplanes that had been built with or without the high and low position.

Adapting the aircraft to use one type or the other once again brings us back to the question of an interpretation of whether or not a local approval is needed to install one style or the other yoke on the various airplanes.

I am confident that the actual mechanics of doing so are relatively simple. As you say, there could be some differences of opinion as to legality.

In my days of operating a Beech dealership and a 141 flight school, we often used the same dual yoke on all manner of Bonanzas, Twin Bonanzas, Barons and Travelairs. We might have had more than one in stock, but I am reasonably confident we used the same dual yokes on all models without a problem. I was not active in the shop at the time and really don't recall whether or not any modifications were necessary or performed.

Happy Skies,

Old Bob

[ARTICLES/19990322.191235.msg03157.tex]

Eclipse Personal Jet**Thu, 8 Jun 2000 18:35:59**

In a message dated 6/8/00 4:03:24 PM Central Daylight Time, barryb@pon.net writes:

The early Boeings I flew had a pneumatic pressurization controller which tended to be fairly sluggish.

Good Evening Barry,

All very true! And remember how the tar from the smokers would make the valves hang up and then go ape when they finally let go?

I would take crew members who were smokers down and show them what was causing the erratic pressurization bumps they complained about.

To make any pressurization system operate optimally for the individual flight can take a fair amount of attention. The one on the 58P did a pretty good job though, even if it was left alone to it's own devices. Not as good as when you and I were trying to keep the folks in back happy, but at least adequate.

Happy Skies,

Old Bob

[ARTICLES/20000608.183559.msg09360.tex]

Eclipse Personal Jet

Thu, 8 Jun 2000 20:14:28

In a message dated 6/8/00 6:33:52 PM Central Daylight Time, hgp@madaket.netwizards.net writes:

Back in the 80's when I was working for The Labs in NJ, someone from Boeing gave a talk regarding airliners and engineering.

He asked the audience (as I recall), "Can anyone guess why older airliners pressurize better than new ones but soon, we believe, will be moot?"

The answer: cigarette smoke.

Howard

Good Evening Howard,

The tars from the cigarette smoke were so bad, or should I say good, at sealing the little cracks and crevices, that when the DC-6s were a couple of years old, Douglas had to redesign the outflow valve and make it bigger. The tars had made the fuselage so tight that the door could not let enough air out even when wide open. The early airplanes were retrofitted with the bigger out flow valve doors and the new ones were delivered that way.

Happy Skies

Bob Siegfried Ancient Aviator

[ARTICLES/20000608_201428.msg09366.tex]

Electric Trim**Fri, 16 Feb 2001 17:47:22**

In a message dated 2/16/01 1:56:29 PM Central Standard Time, epoole@scoot.netis.com writes:

I'm considering getting electric trim installed. If any of you had this conversion done, do you think it was worth the expense?

Good Afternoon Eric,

It Depends!

I like being able to trim with my left thumb. Just like the old 747! Makes me feel as though I am back gainfully employed.

If you ever decide to buy an autopilot that has an automatic trim function, you will need to have an electric trim to utilize that feature.

It is nice to be able to click off the autopilot and have the airplane in trim.

On the other side, I have always felt that the trim wheel on the Bonanza was in just the right spot and my hand falls to it's use very comfortably.

The trim system weighs almost as much as a gallon and a half of fuel and most of that weight is way back in the tail of the airplane!

On top of all that, it costs a lot of money.

I am very happy with my electric trim and the autotrim function on my autopilot.

Would I do it again?

Probably not.

The cost is a factor, but the principal reason that I would not do it again has to do with the weight and the placement of that weight.

I find that I have gone overboard adding toys to my airplane and I now have a heavy, slow old clunker instead of a light and sprightly machine!

The big engine helps, but just like you can't beat cubic inches, you can't beat light weight!

Happy Skies,

Old Bob

[ARTICLES/20010216_174722_msg04017.tex]

Exhaust Resonators**Sun, 23 Jan 2000 13:20:37**

In a message dated 1/23/00 11:14:45 AM Central Standard Time, commwlthsls@msn.com writes:

No kidding. We should talk about these resonators. Are they obtrusive looking? Do they hinder the performance of the airplane or engine? Do they sience the exhaust at all? What do they look like?

Good Morning John,

I had a set of them on my V35B for about eight hundred hours. I perceived a small decrease in cabin noise, but that might have been because I wanted it to be so!

My neighbors reported that they thought it was a little quieter, but we did not do any measurements that would tell us for sure!

Four hundred of those hours I had the four blade on the airplane and with that combination, the airplane was a very quiet, good neighbor!

I think the effectiveness of the glass packs decreased fairly rapidly as they aged. They are rather bulky, though some folks told me they looked "cool".

I removed them at the same time I went to the BDS baffling and the three blade prop.

Since they are slightly larger and a little heavier, logic tells me that there must have been some deleterious effect on performance, but I didn't notice one way or the other.

I didn't care for the extra weight hanging on the tail pipe brackets and they are difficult to keep aligned in a manner such that they don't strike other portions of the airframe as the engine twists and turns during flight.

For What It's Worth!

Happy Skies,

Old Bob

[ARTICLES/20000123_132037_msg01446.tex]

Fixed Step - Removal**Thu, 7 Dec 2000 16:22:05**

In a message dated 12/7/00 2:33:21 PM Central Standard Time, jdeakin@avweb.com writes:

Can this be done legally [Remove the fixed step], easily, or would it be yet another ten-year FAA certification program?

Good Afternoon John,

As always, it depends.

If your A&P and your IA both agree that it can be done as a minor alteration, I would not hesitate to remove the step, make a logbook entry and adjust the weight and balance in the ships papers. There are some FEDs and a few IAs who will say: "If it came on the airplane when it came from the factory, it must be on the airplane or removed via a local approval or other method of FAA approval."

I removed mine several years ago and did just that. My A&P and IA (me) agrees that it is a minor alteration. I think it is a defensible position, but I have not been challenged!

The one thing that one must watch is that excessive loads are not applied toward the trailing edge of the flap that could lead to major overload and damage to the spot where the actuator attaches to the flap.

I caution folks to step as far forward on the flap as possible to reduce the load on the actuator attachment. I carry a step stool with me if there is likely to be a passenger that may have trouble making the BIG step to the front of the flap.

Mine has been in that configuration for at least five or six years and probably fifteen hundred hours.

As to any change in speed, I would WAG a decrease in drag that allows no more than a one knot increase in speed. The streamline tube aligned with the wind creates much less drag than it does when ninety degrees to the wind as is done with the retractable version.

Any help?

Happy Skies,

Old Bob

[ARTICLES/20001207_162205_msg17353.tex]

Fixed step**Sat, 4 Oct 1997 15:28:53**

Hi Bill Fleming,

No that is not the type step used on the early airplanes.

Yours is the one used on the early Debbies. The retractable ones are a long straight piece of streamline tubing that has the flat high drag side faced fore and aft with the narrow thin section oriented abeam the aircraft. Look at some older Bonanzas and you will see a lot of them.

Beech dropped it when they moved the baggage compartment back further into the fuselage and the step support tube which retracted into the fuselage would have been in the way.

The step you have was one of the things they did with the early Debs when they were trying to make it a low priced alternative to the Bonanza. It looks fairly draggy to me but I don't have any knowledge of what difference removing it would make. I would guess at a couple of knots.

As I said before I have the newer fixed streamline type and I notice no difference with it on or off but there must be some change. I have had some of the more speed concious people tell me they gain one or two knots when it is removed.

I suppose that if I wanted to make a comparison check I would try to find a nice stable air mass and fly the airplane tests a couple of hours after sundown.

Make a flight with the step on, record the numbers as accurately as possible. Land and take the step off and then make a second flight. Then put the step back on and make a third flight. If the numbers are the same on the first and third flight your numbers are probably fairly valid. If they are different you might as well throw the whole bunch out because the conditions must have changed in the air mass. That's what makes comparison flight testing so tough.

Have fun and let us all know how you make out!

Yours,

Bob

[ARTICLES/19971004_152853.msg01937.tex]

Flap Position Decal**Wed, 21 Jul 1999 14:07:24**

In a message dated 7/21/99 12:27:58 PM Central Daylight Time, jtsmall@onramp.net writes:

Where to locate this decal? I think I asked this before but didn't come away with a clear conclusion. My P-model does not have a flap angle indicator. I want something I can glance at to verify the flap angle. Current I count for 6 seconds to deploy approximately 20o of flap when turning base leg. Then full flaps on short final. I use a bolt/washer location on the flap now as my visual check, but heck, I have the decal and want to apply it.

Did Beech ever ship a Bonanza with these decals? If so, where did they locate them?

Good Afternoon John,

Yes, the stripes and notation on the left flap were standard for many years. I don't think they were decals though, I believe they were silk-screened.

The easiest way to position them is to roll in full right aileron (on the ground of course) and then extend the flaps until the left one is lined up with the aileron. That should be twenty degrees, if your ailerons are properly rigged. Sit in your normal in-flight position and have someone mark the spot where your line of sight lines up with the trailing edge of the wing structure ahead of the flap. Stick the twenty degree line there. For the ten degree line, make a mark when the flaps are up and just cut the distance between that mark and the twenty degree mark in half. For most of us, ten degrees will occur when the screw in the middle of the large washer on each side of the flap support is aligned with the trailing edge of the wing structure. If you want to get more scientific, you can use a Smart Level or a standard bubble level protractor to measure the ten and twenty degree positions from the full up position and then mark by eyesight from the cockpit. Just be sure you don't wiggle the airplane between the various measurements.

Happy Skies,

Old Bob

[ARTICLES/19990721_140724.msg06296.tex]

Gap Seals**Sun, 10 Jan 1999 12:00:43**

In a message dated 1/10/99 10:20:55 AM Central Standard Time, bfaught1@elp.rr.com writes:

Is air skeg modification still available; if so, where and how much?

I don't know if it is still available or not, but in any case, it is IMNSHO, worthless!

The directions that come with it say that in order to gain maximum effectiveness, the pilot should keep his/her feet on the rudder pedals. If that is done without the skeg, the results are the same.

The skeg has some weight and it is in a terrible CG position for most of our airplanes. In addition, in order to adequately inspect the tail bulkheads as required each one hundred hours, the skeg must be removed before the bottom inspection plate may be removed.

If you want some help for the wiggle and don't want to use your toes, buy either an Allied Signal or S-Tec yaw damper, definitely more expensive and the weight/CG situation is equally bad, but they both work great and they are working all of the time even when the pilot has more pressing things to care about than the dutch roll characteristic of all slab sided, taper winged aircraft.

Forget the skeg!!!

Happy Skies,

Old Bob

[ARTICLES/19990110_120043.msg00386.tex]

Gap Seals**Thu, 20 Apr 2000 13:29:40**

In a message dated 4/20/00 11:05:10 AM Central Daylight Time, flyinglo@msn.com writes:

...BUT don't you think most people buy them [gap seals] for their assumed speed increases...

Good Afternoon Jerry,

Always room for a difference of opinion, but I still have not formed an opinion on gap seals due to my lack of direct involvement with them, however the evidence you cite and that information offered by others would lead me toward forming an opinion that might look at them with favor. Not there yet though.

On a purely conjectural basis, it would seem that gap seals would be at their greatest effectiveness when the pressure differential between the top of the wing and the bottom is the greatest and that would be when the airplane is flying slow or at high angles of attack. I would suspect very little effect when the airplane is being shoved through the sky by raw power and the big wing is nothing but parasitic drag! I would suspect that the cruise speed at altitude when the aircraft is flying close to the best L/D speeds might be substantially increased if the gap seals do the job that is claimed for them.

That is an uninformed guess though.

Happy Skies,

Old Bob

[ARTICLES/20000420.132940.msg06768.tex]

Gust lock**Sat, 12 Feb 2000 20:25:44**

In a message dated 2/12/00 12:01:19 PM Central Standard Time, raven@tminet.com writes:

Gee, I parked the N35 down at Mojave this week. I used the old Cessna gust lock technique (pilot's seat belt around the yoke). This seems pretty low rent for a Bonanza, plus it cocks the ailerons funny. (Luckily, the winds didn't hit the 70 knot gusts, etc. that I'm used to seeing down there.)

Good Evening Bill,

The gust lock for my airplane measures .312, so I imagine the hole is nominally a 5/16th of an inch one. Any hunk of rod with about two inches of length to insert in the fitting should be adequate to secure the aileron and elevators. I believe the size has been standard ever since the straight 35, but I don't have one handy to measure.

On the early airplanes, the lock was inserted from the bottom up and it had a small metal plate which got in the way of putting in the key and clamped around the throttle to prevent it being opened fully.

On the later airplanes, the lock is installed from the top down and the shaft has a 180 degree bend to allow fastening to a plastic piece of junk which is supposed to block the operation of the engine controls.

I would fashion anything that seemed reasonable to you and use it!

I can't see how the FAA could get after anyone for using any sort of a gust lock which doesn't damage the airplane just as long as it is removed before flight is attempted!

Personally, I would discourage the use of an external control lock on the tail surfaces unless it was a full airfoil shaped device that completely immobilized the surface. The locks which we use on gliders when the surfaces are removed for storage and transportation are that type. I definitely would not attempt to add a control lock which fit on the balance tabs!

As to locking the rudder pedals, for many years I carried an eight inch length of 3/8 diameter steel rod which I inserted in the hollow of the rudder pedals just below the hinge line. I would shove it in one with the pedals displaced, then line them up and shove it into the other pedal till the lengths were about equal in each. The hole is just a little under 7/16, but 3/8 seemed to work OK.

I quit using that when I noted that no one else used such a lock and no one seemed to have any trouble!

My suggestion would be to get a six inch length of 5/16 inch steel rod and fasten a red flag to it. A ninety degree bend would make it easier to insert and remove. Just don't forget to remove it before flight!

I would forget the rudder pedal locks.

Happy Skies,

Old Bob

[ARTICLES/20000212_202544_msg02842.tex]

Gust locks**Fri, 15 Jan 1999 00:36:06**

Good Afternoon All,

Just a couple of comments on gust locks in general.

I think it is reasonable to consider that the closer the restraint is placed to the point at which the force is applied, the better the lock will work.

The Douglas DC-3 used a set of control locks that were applied to the trailing edge of the surface so as to lock the surface to the adjacent structure. That seemed to work quite well, but they were something of a bother to affix and remove and there were cases where a takeoff was attempted with the control locks still installed. Ruins your whole day!

The company for whom I flew DC-3s, rigged up a shock cord that we could put between the two control wheels to stabilize the ailerons in light wind conditions and for small periods of time such as an enroute stop. Handy device.

If a lock is applied to the control column shaft as is the Beech factory unit, the strain is felt by the shaft, it's components, the cables and fittings to the surface as well as the surface to be protected.

If a lock is placed on the control wheel of the Bonanza instead of the control column shaft, then the wheel, chain and the crossarm are added to the list of components exposed to the strain.

Does this make a difference?

I know of at least one case where an aircraft (not a Bonanza) with a control lock applied to the control wheel and the rudder pedals had the control column shaft fail completely. Had the control locks been of the type the factory supplied for the DC-3, there would have been no strain whatsoever on the wheel, column or any other component other than the control surface and adjacent structure.

If maximum restraint with a minimum stress on components of the control system is desired the best control lock would be one that consists of a fitted component shaped to conform to the airfoil of the primary surface and its movable portion.

There have been air carrier aircraft built that had cockpit operated control locks which placed a mechanical stop directly between the movable surface and it's surrounding structure. That provided the desired restraint without putting any strain on the connecting devices between the control wheel and the surface.

Unfortunately there were cases where these locks were accidentally engaged during flight. Not good either!

So what are we to do?

If your aircraft is to be exposed to extreme wind and weather conditions, fitted slip over restraints such as are common on gliders would seem to be the best.

For everyday use and simple application the pin through the control column as used by Cessna and Beech is probably OK, but it does expose all of the connecting hardware to strain which may or may not be able to stand the strain imposed.

I personally prefer the pin through the column over the one fastened to the wheel as it takes the crossarm, the chain and the control wheel itself out of the loop of restraint.

I have removed the plates that fit over the throttle and such and just use the column lock pin with a small red flag attached. It makes it a lot easier to install and remove but I suppose it would be possible to start the engine, taxi and attempt a takeoff with the pin installed. I haven't had the problem yet, but as senility sets in, it may happen!

Years ago, I used to place a 3/8 inch steel rod through the hollow of the rudder pedal axis (one to the other) to restrain the rudder motion of the ruddervators. I haven't done that for the last twenty or twenty-five years and have noted no ill effects.

I guess I am agreeing with e.p. – If it ain't broke, don't fix it!

For what it's worth.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990115_003606_msg00594.tex]

Nose Wheel Tow Pins

Sun, 7 Nov 1999 23:50:11

In a message dated 11/7/99 7:24:39 PM Central Standard Time, delta@emeraldnet.net writes:

My hanger is a little uphill, and I'm getting concerned about pushing the baron using the 1/4 inch pins on the nose gear....anybody have a reasonably accurate idea of the actual weight on the nose wheel. If those litle pins fail is seems that the sissors would part and the nose gear may extend to failure at takeoff.

Thinking of building a "lift and handle" attachment for the tug.

Good Evening Howard,

Those pins are supposedly designed to fail before damage is done to the mechanism. If you designed something to apply towing forces elsewhere on the nose gear, it is possible that structural damage may occur. Better that the pins should fail!!

Happy Skies,

Old Bob

[ARTICLES/19991107_235011_msg10295.tex]

Pitot Tube**Tue, 9 Dec 1997 14:30:07**

Good Morning Dave Cooke,

In a message dated 97-12-08 03:18:13 EST, you write:

Has anyone ever installed a heated pitot tube on a model 35? I ordered a heated pitot tube from Aircraft Spruce. The chrome plated one pound thing arrived a couple of days ago.

It has been many years since I have done one of those installations and I no longer remember the details nor do I have the required paperwork. I do remember that I used a Beech kit for the job.

The heated pitot tube is listed in the aircraft spec sheets as optional item number:

602. Heated pitot head installation, Beech Dwgs. 35-361100 1 lb. (+ 74)

I would suggest trying to find a copy of this drawing. If the parts you obtained from aircraft spruce are the same as listed on the Beech drawings, an A&P could install it as a minor alteration and no paper work other than a log book entry would be required.

You might start off by seeing what Raytheon would charge for the kit or the drawings. Surprisingly, that is occasionally the cheapest way to go!!

If that doesn't work out you will have to apply for a local approval through the 337 process. It shouldn't be bad, but I would definitely get pre-approval before I cut any metal.

Nothing is easy is it?

Safe Skies,

Bob Siegfried

[ARTICLES/19971209_143007.msg02669.tex]

Portable O2 System**Wed, 13 Aug 1997 09:37:53**

Hi Keith,

I don't know about the legality, that would require a little research but I have looked into the quality of refill oxygen and what I found out was that the standards for "Aviators Breathing Oxygen" are the lowest of the standards for the three most common uses.

My local supplier informed me that when they fire up the equipment to prepare for supplying oxygen they have to test for it's quality and that when it meets the minimum purity standard for "Aviators Breathing Oxygen" they can start filling the tanks for us and the airlines etc. After the equipment has run a little longer it is of a high enough quality for medical uses. (I understand there is very little difference between those two) Then after the equipment has operated quite some time longer, the purity is up to the standards required for welding. My supplier tells me that he makes a practice of waiting till the purity is up to welding quality before he taps any off so as to simplify his inventory control.

I have been told that moisture is sometimes added to medical oxygen but that it is usually done at the point of use, not in the cylinders as delivered.

I don't use breathing oxygen often, but when I do, I fill from my welding tanks. Proper sanitation procedures should be followed. You need to have a tank with high enough pressure for transfer, but that is about it.

I suppose some people have pumps to bring the pressure up for filling but every time that I have been associated with tank filling it was done by using a bank of oxygen tanks all manifolded together. The tank to be filled is hooked to the manifold, its valve opened and then the tank with the lowest pressure is turned on. Once the pressures have equalized and oxygen has stopped transferring, the valve on the 'low' tank is closed and the next lowest one is opened and the procedure repeated with higher and higher pressure tanks until the breathing tank is up to its required pressure. Usually around 1300 lbs. When the low tank is down to a couple of hundred lbs/sq in, it is relagated to welding use until emptied.

Incidentally, I had an emergency some years ago requiring medical use of oxygen and I used my welding equipment. When I checked with the attending physician he said that was just fine and no moisture was necessary for what we were doing.

I personally would have no hesitation to use the equipment you have for the altitudes you are talking about.

I would think that Nelson (I have found him very helpful) or any other aviation oxygen equipment supplier would be able to clue you in on the legalities.

Yours,

Bob

[ARTICLES/19970813.093753.msg01554.tex]

Pulsing Landing Lights**Mon, 28 Feb 2000 08:53:56**

In a message dated 2/28/00 7:38:46 AM Central Standard Time, flyinglo@msn.com writes:

 Around the patch, here at Prescott, especially on a pretty day like yesterday, with a lot of ordinary pilots out, as well as the usual bunch of Emory Riddle students out, most everyone keeps a light on all the time. It really helps.

Good Morning Jerry,

Along that line, I really like the pulsing landing lights. While I don't see them very often, it does seem that those aircraft which are so equipped draw my eye much faster. Those who have turned on their landing light are much easier to spot than those with none at all, but the pulsating light really stands out for me.

Has anyone else an opinion on the pulsating light?

Happy Skies,

Old Bob

[ARTICLES/20000228_085356_msg03759.tex]

Pulsing Landing Lights**Mon, 28 Feb 2000 14:52:56**

In a message dated 2/28/00 12:38:09 PM Central Standard Time, epoole@scoot.netis.com writes:

Doesn't a pulsed lighting system like that tend to cut down on bulb life?

Good Afternoon Eric,

The jury is still out on that one. The proponents of the pulsating landing light claim that the pulsing use of the light actually lengthens the life by keeping it at a better operating temperature. I sure don't know! I have not heard any complaints from those who do have the pulsing units.

Hopefully someone who has extensive experience with the pulsing light will comment!

I would use the pulsing unit even if it cut my bulb life in half, but then, my bulbs seem to last a long time anyhow!

Conspicuity lighting is a big help at night and I am beginning to believe that there is a lot of room for improvement of our daylight conspicuity via various forms of lighting.

I believe Capitol Airlines was the first to use any sort of rotating beacon, When it showed promise, United Air Lines and American Airlines equipped their airplanes with red rotating beacons. It was astonishing to realize how many airplanes were out there which we had not been seeing.

I would like to see someone get a set of small halogen lights approved for mounting in the leading edge of my tip tanks. I believe there are some of those approved now in various wing tips. I would think that those lights set up to flash alternately would be great aid to daytime conspicuity.

I feel I spot the pulsing landing lights quite a while before I see strobe lights. I wonder if anyone has done any scientific testing of that?

Happy Skies,

Old Bob

[ARTICLES/20000228.145256.msg03792.tex]

Rear Window - Opening In Flight**Tue, 6 Mar 2001 14:07:32**

In a message dated 3/6/01 12:36:39 PM Central Standard Time, glenno@sgi.com writes:

P.S. Now that she is getting older, I am concerned about her playing with the emergency window release on the rear windows in flight while she is strapped into her car seat. Any suggestions from the group as to how to keep her from being able to flip the window open in flight that will not present a safety hazard if we do have a need to open the window quickly?

Good Afternoon Glenn,

Let's look at it this way. The normal way of opening the middle windows for ventilation is via the handle which secures to the cabin side either by an overcenter action and a couple of small clips or, on the later airplanes, by a small latch which must be moved to allow the opening handle to be moved.

For emergency egress, you would have to pull the thin rod, (the one that provides the hinge function) out to release the window.

I would imagine your primary fear is the your daughter might inadvertently release the window to the ventilation position rather than that she might be able to remove the emergency egress pin.

While the window being opened in flight to that ventilation position can be very scary, it is unlikely to result in permanent damage or create any real safety hazard. I would suggest that you devise a method of safetying the ventilation handle in the down position. The emergency pin could still be pulled by an adult or older child, but it would be difficult for a young child to remove.

As to how best to deactivate the ventilation function, that depends on the age of the airplane. On the early ones, I think I would just fasten some safety wire to the area under the latch and wrap it around the portion which is lifted to provide ventilation. On the later airplanes there might be a way to safety the latch or possibly a small wedge could be made to stop the latch from being released, but I haven't checked that out yet.

The idea of eliminating the ventilation function may be anathema to some of the FEDs that are around, but I would have no hesitation to do it to my own airplane if I thought there was a possibility that a small child might accidentally open the window to the ventilation position.

If you think there is any possibility that the child could pull the safety egress pin, I would suggest that with a brass safety wire of sufficient strength that it would be difficult for a small child to break, but still doable by an adult. Such a use of safety wire is common on many aircraft to lessen the possibility of various safety devices being actuated.

That may border on the edge of what some folks think of as legality, but I think it would be defensible at a hearing!

Happy Skies,

Old Bob

[ARTICLES/20010306.140732.msg05376.tex]

Retractable Step**Sun, 5 Oct 1997 01:38:03**

To Frank Woods

In a message dated 97-10-05 00:01:31 EDT, you write:

One would reason that this would assist the retraction of the nose gear.

I suppose that is one way of putting it!!

The major worry is that if the step refuses to come out or extend (for whatever reason) the nose gear may not extend fully. That is why there is a small aluminum weak link installed to attach the cable to the nose gear strut.

If that link is missing or made of too strong a material and the step freezes in the up position it may well result (and has) in the nose gear not extending far enough to lock down and then collapsing on landing.

When the original strength shock cords are replaced with stronger or multiple cords or with a metal spring stronger than the one approved as an after market improvement, the weak link often breaks as it is designed to do.

If the weak link is removed and the cable fastened directly to the fitting on the nose gear strut or if the link is replaced with one made of a stronger material. It may continue to operate fine for years, BUT if the step hangs up it can be very expensive.

Make sure that the proper weak link is installed

Yours,

Bob.Siegfried

[ARTICLES/19971005_013803_msg01940.tex]

Retractable Step Speed Penalty**Thu, 5 Feb 1998 11:05:00**

Good Morning Buzz Rich,

In a message dated 98-02-05 02:07:58 EST, you write:

Some of the data might be hard to believe, but that is what the numbers showed. For what it is worth, the results/numbers follow:

I have no doubt that these are the numbers you accurately derived with your flight tests, but I wonder if you have ascertained that there was no subsidence or rising effect in the air mass between the tests. The really accurate way to check the difference in speed is to extend and retract the step several times on the same flight.

It has been some forty years since I performed such tests and my test airplane was a straight model 35 with an E185-11 engine. The highest indicated airspeed was around 160 mph and the speed differences noted were quite consistently in the range of five mph IAS at that speed and around four mph at around 130 mph IAS. I imagine that there could be a slightly higher speed advantage at somewhat higher speeds possible with the later airplane, but ten mph seems a little high.

Why don't you arrange to set up your airplane so that the step can be extended and retracted in flight and give it another series of checks? I would love to see the results of that.

I did it in a manner that would probably be illegal today (maybe even then). I left the rear shear web off (definitely illegal), took the little angle that attaches the retract mechanism to the step off by removing the bolt through the step and had my then five year old son climb into the baggage compartment and raise and lower the step on command. I don't think it would be too difficult to arrange some strong cord or light cable so that the same thing could be done with the shear web installed and the cables manipulated from the rear seat.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980205.110500.msg00771.tex]

Retractable Step Speed Penalty**Thu, 5 Feb 1998 12:43:22**

Good Morning Bob Curry,

In a message dated 98-02-05 11:47:57 EST, you write:

But Bob, that still doesn't give a completely accurate comparison with an aircraft having the step completely removed. Although small, there is still some drag with the step retracted because the bottom portion is still hanging out.

Regards, Bob...aka "Picky Pete"

Absolutely agreed!!

I do believe though, that Buzz was speaking of comparing a retracted step with an extended one. I can't be positive because I have already deleted the message.

Remember too that the retractable step uses a piece of "streamlined" tubing that has the flat side ninety degrees to the airstream when the step is extended. It is a very high drag item. When Beech went to the fixed steps, they used the tubing with its more normal thin side opposed to the airstream and the leg is much shorter.

I have removed my step and don't seem to notice any difference but I can not think of any good and accurate way to get a comparison for such a small change in drag. I suppose one could make a series of flights with the step on and off several times in one day and that may compensate for subsidence and such but extreme accuracy is very hard to come by.

Bob Siegfried Picky Ancient Aviator

[ARTICLES/19980205_124322.msg00775.tex]

Retractable Step Speed Penalty**Sat, 7 Feb 1998 01:37:37**

Good Morning Bob Newman,

In a message dated 98-02-06 23:23:11 EST, you write:

Good data, but applicable only to the older (I believe P35 and before) Bonanzas that used a step with a round tube. The newer ones have a streamlined tube, with reduced drag compared to the older design. I am surprised that you measured differences are as great as they are.

The newer style steps are higher drag than the older steps if the older ones are retracting properly.

The steps in question are the retractable steps. They are used on the airplanes without the extended baggage compartment. Once the baggage compartment was extended to the rear with the N35, there was no longer anyplace to retract the step.

The retractable step uses a "streamline" piece of aircraft tubing for the leg of the step, but it is oriented ninety degrees to the airstream to give maximum strength in the direction load is applied. Since it is retracted for flight there is no reason to worry about it's drag.

When the Debbie first came out, it used the step with a round fixed (non- retractable) tube as a cost saving effort consistent with the intent to produce a low cost Beech competitor to the Piper Comanche.

The Bonanzas with a fixed step have always used the streamline tubing oriented in the low drag orientation. (And they do break, I have never heard of the old retractable unit breaking!) When the Debbie was upgraded to Bonanza standards, it received the streamlined fixed step also.

Six thousand, five hundred and sixtyone Bonanzas were built with the retractable step. That is well over half of those built.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980207_013737_msg00819.tex]

Rigging**Thu, 7 Dec 2000 12:43:04**

In a message dated 12/7/00 10:50:48 AM Central Standard Time, swo49@hotmail.com writes:

..and got my retractable step working again

Good Morning Steve,

If your step was completely extended, not partially retracted as some are want to do, the retracted step should be good for at least four knots all by itself! Many years ago, I had a straight 35 on which I made some flight checks of the drag produced by extending and retracting the step manually while in flight.

With an E185-11 engine at about 60 percent cruise power, I would indicate five mph more with the step retracted than with the step extended. My then seven or eight year old son would sit in the baggage compartment and extend or retract the step when I asked.

That retractable step caused a LOT of drag when left extended.

Happy Skies,

Old Bob

[ARTICLES/20001207.124304.msg17342.tex]

Rosen Sun Visor's**Thu, 25 Jan 2001 11:47:09**

In a message dated 1/25/01 8:09:28 AM Central Standard Time, aerome@ev1.net writes:

I'm on the opposite side, Pete. I think the Rosens are about the best thing I've bought for the Bonanza. There was some list banter about the Ayers a few years ago and the thing that sticks in my mind was the high quality of workmanship. As I've said before, every time I try to save a hundred bucks on a cheaper item, I regret it. And, I never let careless pilots drive my flying machine! Al

Good Morning Al,

I'm with you! I don't know if I would say they are the best thing I've bought, but I would do it again.

I haven't tried any clear view sunshade other than the Rosen, but I am very happy with them. I can see traffic a lot better now, the adjustments help to place the sun protection where it is needed most and the service and support from the company has been excellent.

I have broken two of them, but it was strictly my fault. We all know that 1/8th inch thick hard plastic sheeting doesn't bend well!

Happy Skies,

Old Bob

[ARTICLES/20010125.114709.msg01764.tex]

Rosen Sun Visors

Thu, 25 Jan 2001 13:26:32

In a message dated 1/25/01 11:57:31 AM Central Standard Time, rhare@mich.com writes:

Bob, What did you do when a "lens" (as they call them) was broken? Factory wants \$60 for a replacement. Did you just say "after all, it IS an airplane part" or did you find some more cost-effective way to replace one? (Needless to say, I am in need).

Rich

Good Afternoon Rich,

The first time, I told them it was my fault and I expected to pay for the new one, but they sent me one free.

The second time, I ponied up the big bucks!

Happy Skies,

Old Bob

[ARTICLES/20010125.132632.msg01771.tex]

Rotating Beacon**Tue, 7 Jul 1998 12:58:51**

Good Morning George Vasick,

In a message dated 98-07-07 12:03:56 EDT, you write:

Is there a good alternative for a V-tail?

In the days of yore, when Mike Smith was doing his magic to the Bonanza airframe, it was his thought to go to an all strobe system. Strobe lights with each required running light. That does reduce the drag.

There are several options to accomplish that.

Both Grimes and Whelen provide combo units that are very easy to install and wing tips or tip tanks that provide a space for the lights inside of a plastic lens also provide an easy place to mount the strobe.

I personally like it best when the triple strobes are triggered so as to fire simultaneously but some prefer the alternating method. Either one meets the FAA requirements.

At the time I installed my strobes, it was necessary to provide a power supply for each strobe and wire them together with a trigger wire to obtain the simultaneous activation. There might be something newer available now that is less work to install. In any case I think you will find that the Whelen units are substantially cheaper if you are using new rather than used components. Whelen has a very nice catalog and installation manual that provides all of the information and STCs in one place.

As one who has come very close to taxiing over a small airplane that was sitting parked or taxiing slower than I, I have become very sensitive to the requirement that there be some light shining toward the rear to warn larger and faster moving aircraft that I am in their way! The single white tail light just doesn't do the job.

If you use strobes alone, you will find that some pilots will complain that they are being blinded by your strobes and you will be requested to cease the operation thereof while on the ground. For that reason I still like to have a rotating beacon on the top of the fuselage as a conspicuity device mainly for operations on the ground at large and busy airports. I have never had anyone complain of being blinded by the rotating beacon.

I have thought of providing a flush mounted light, such as a logo light, that pointed toward the rear to provide the ground warning but have never gone ahead with the idea. If you really don't like the drag of the rotating beacon, ground operations could be a problem.

Incidentally there was a serious accident at LAX a few years ago where a commuter airplane was holding in position and an airliner hit it on landing. Since the commuter was only equipped with strobes and had not yet been cleared for takeoff, the only light visible to the rear was the white aft navigation light. While that accident was eventually

blamed primarily on the controller, it sure would have been nice if a decent conspicuity light had been operating on the commuter airplane!

The round Grimes light is substantially smaller than the equivalent Whelen unit but the cost of Grimes is astronomical. Sad!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980707.125851.msg03513.tex]

Rotating Beacons**Sun, 3 Oct 1999 16:03:44**

In a message dated 10/3/99 2:38:52 PM Central Daylight Time, jtsmall@onramp.net writes:

The avg overhaul cost from AVLight is \$400 for the Grimes while the new Whelen strobe-beacon is \$350.

Good Afternoon John,

Yes, the prices charged by Grimes are outrageous! We are fortunate that Whelen has stepped up and does provide relatively economical replacement equipment. I use them whenever practical. I spoke to a Grimes representative several years ago and was told that Grimes had made the decision that they didn't want to mess with small GA aircraft. They have the high priced corporate, airline and military market pretty well tied up and they don't bitch about the inflated prices like we do!

I have thought about replacing the upper beacon with two flush red lights flashing alternately and pointing back toward where the large aircraft would be when overtaking a Bonanza. The only time I really worry about being overrun is when taxiing! So far I have not found quite the right light unit to use. When I do, I will apply for a local approval for the flush system.

I like having a red rotating beacon on the belly to help when some hot rod aircraft is overtaking me from the rear at a much higher rate of climb than I can maintain. Possibly that could be replaced by the directed flush lights as well. Incidentally, the belly beacon lights up the ground and helps warn those big iron pilots that something is in their way.

I use triple Whelen strobe lights timed to flash together and feel that they supply adequate conspicuity when airborne. It would be nice to get rid of the drag of the rotating beacon or beacons.

Happy Skies,

Old bob

[ARTICLES/19991003.160344.msg09051.tex]

Speed Brakes

Tue, 6 Feb 2001 09:54:02

In a message dated 2/6/01 8:50:56 AM Central Standard Time, sderrick@tnstaafl.net writes:

I would do speed brakes in a minute if the mod wasn't \$8,000+
Even if it were free, it would still add weight and, possibly, some drag.

Happy Skies,

Old Bob

[ARTICLES/20010206_095402_msg02918.tex]

Speed Brakes

Tue, 6 Feb 2001 10:48:02

In a message dated 2/6/01 9:10:49 AM Central Standard Time, tturner@vol.com writes:

About 24 pounds total, if I remember correctly. No added drag (they're flush-mounted in the wing). About \$10k installed sounds familiar, from my Pagosa Springs days.

Good Morning Tom,

I know about the flush mounting, but some of my aerodynamicist friends have told me that the speed brakes are very hard to get adequately sealed and they tend to cause varying amounts of drag due to leakage and surface disturbance. Way beyond my knowledge though.

They definitely are NOT on my wish list.

Happy Skies,

Old Bob

[ARTICLES/20010206_104802_msg02927.tex]

Speed Slope Windshield**Thu, 25 Sep 1997 11:35:21**

I have never replaced a windshield myself but I have done a lot of work behind the panel. I would go to a speed slope windshield just for the convenience of working behind the panel. All of the ones that I have worked on have gone to the new style panel with the speed slope.

There was a gentleman named Vance Breese who did some speed cleanups on an E35 back when it was new. One of the things he experimented with was a steeper sloped windshield much like the current Beech one. He said it was the biggest single improvement that he made.

Incidentally, Mr Breese was not a "fly by night" tinkerer. He was a retired aeronautical engineer who had worked for many of the major aircraft manufacturers before and during World War II. He was instrumental in the design of the "Fleet " and other aircraft of the day.

The project on the Bonanza was just an interesting personal challenge and not meant for any kits or anything other than his own enjoyment.

He also was writing in the fifties that the tail was the reason they were shedding wings and that the wing was strong enough already.

To bad they didn't listen to that "Old Retired Has Been".

Yours,

Bob

[ARTICLES/19970925_113521_msg01840.tex]

Static Wicks and Flap Position Decals**Fri, 22 Jan 1999 12:04:47**

Good Morning John,

In a message dated 1/22/99 9:25:12 AM Central Standard Time, jtsmall@onramp.net writes:

Any thoughts on the wicks protecting the radios from a direct lightning strike?

Strictly anecdotal, but every airplane in which I have experienced a static discharge has been equipped with static wicks. Sometimes some of the radios have been damaged, but in most cases they have not.

I don't want them on my airplane for several reasons but if you decide they will help, they will probably make Your House Safe From Tigers.

My reading on the subject during the time I was deciding convinced me that the only static wicks that do any good at all, are those which have the relatively stiff plastic exterior on which sharp needles a half inch long are applied ninety degrees to the axis of the wick. You will note that those are the type currently used on most aircarrier and more sophisticated corporate aircraft.

Those are so dangerous to personnel that they are generally made easily removable and are unscrewed and removed by the crew when the airplane is to be in a position where some person may come in close proximity to the static wicks. The people that sell those fancy wicks did an excellent job of convincing me that the old fashioned rope type static wicks are next to useless. Not completely useless, but enough so that I don't want them messing up my airplane.

As I have mentioned before, we do not steer away from flight in cloud and fly a fair amount in precipitation. I have no static wicks on my airplane and have never noted any difficulty with any static build up problems. My airplane is very well bonded and I do have the Nav blades on the tail. All of my antennas are located as far as I could get them from the windshield which I am told is a major generator of static interference on the Bonanza.

I have noted that many Bonanzas and other general aviation aircraft often have broken or about to break bonding straps on their control surfaces. Antennas are often not properly grounded and shielding is improperly placed or not grounded, I would think attention to those details might be in order and it will create no drag and tear no clothes!

You earlier mentioned where one might recommend the flap decal being placed. Since it was on the original airplane I guess it is a piece of required equipment and probably should be applied.

I would suggest that it be placed in the vicinity of the outboard flap track.

Personally, I know of no use for that indication.

This is what I recommend. If you are on the ground and wish to set the flaps at twenty degrees of deflection for takeoff, roll in full right aileron and extend the flaps until the flap is lined up with the left aileron. If you ailerons are properly rigged, that will be twenty degrees.

While the flaps are extending, note that there are two large washers, one on either side of the flap track that have a small screw right in the middle. If you want ten degrees of flap, stop the flap extension when that screw is lined up with the trailing edge. That works at least as well as lining up the little decal marks!

For inflight use, I don't think you have any intermediate setting that is allowed to be extended any higher than the flap extend limit speed. That being the case what do you care as to how much flap is deployed? It is unlikely that you will slow to a speed that is below the flaps up stall speed until landing is imminent. By then I would expect to have full flap anyway (controversial I know)!

I suggest extending the flaps in flight by feel. If you are extending them because you want a little drag, just put them out till it feels like you have the drag you want. If the amount feels like too much, bring them up a little!

You'll be amazed at how soon you are able to get just the amount desired without any indicator at all.

I find that I very rarely extend any flap at all until I am ready to set up my final approach descent and at that time I take full flaps.

I am not all that familiar with the speeds applicable to the various models but I do remember that on the straight 35s, the landing gear and flap limits were both 100 mph. Once the landing gear was extended and the inboard doors closed, you could take it on up to 130 mph. If drag is needed, the gear would seem to be the logical choice and there would be no issue of reduced gust protection.

Are there any Bonanzas on which there is a flap speed that allows extension at a higher speed than the gear? I don't remember any, but I am sure someone will let us know if there is!

Sometimes when I am flying at relatively low airspeeds, such as trying to stay below ninety knots for a category A maneuvering approach restriction, I find it helpful to extend some flap so as to get the nose lower for better visibility. Once again I do it by feel.

Works for me!

Happy Skies,

Old Bob

[ARTICLES/19990122_120447_msg00986.tex]

Strobe**Wed, 23 Aug 2000 12:30:03**

In a message dated 8/23/00 6:57:35 AM Central Daylight Time, HAROLD1339@aol.com writes:

I may change out both my bottom and top beacons. The bulbs have a short life and cost almost 24.00 each!. What is the best replacement for the bottom and rudder top beacon? Thanks.

Good Morning All,

This has been discussed on the forum before, but I would like to add a comment.

I like to see a rotating beacon or other flashing incandescent light on the top of the fuselage of a small aircraft so that it provides a good conspicuity warning to aircraft that might be taxiing behind that aircraft.

From experience, I know that small aircraft with nothing but running lights showing are hard to spot, especially from the rear. That little white tail light just doesn't attract the eye when mixed up with all of the other lights that are shining around a busy airport.

The view from anything from a DC-3 to a 747 is such that the line of sight is right over the top of a Bonanza or similar sized aircraft.

Now we all know that the flash intensity and duration of a strobe is such that no night blindness is caused by the flash even when the observer is very close by, yet, it is common for crews taxiing behind an aircraft equipped with strobes to ask that the strobes be turned off.

Some operators make it a practice to only turn the strobes on when cleared into position, others don't turn them on until they are cleared for takeoff.

No one seems to complain about being blinded by a rotating beacon and yet it does an excellent job of letting a big iron driver know that there is something on the taxiway ahead.

I want a rotating beacon, a set of alternating flashing red lights or something equally as eye-catching shining aft on my airplane!

The strobes will do the job, but you are liable to be bitched at by some aviators who are lacking in knowledge as to the effect of the strobe on their visual acuity.

Just my two cents worth!

Happy Skies,

Old Bob

[ARTICLES/20000823.123003.msg12471.tex]

Strobes**Wed, 13 Dec 2000 10:16:24**

In a message dated 12/13/00 8:35:44 AM Central Standard Time, epoole@scoot.netis.com writes:

I don't believe I have the "upper and lower sets of mounting holes" to which you refer. I could easily be wrong on that. But if that's the case, I'll probably be able to put it pretty much anywhere that looks reasonable, and will then have the joy of getting it approved sometime between now and the end of the next decade...

Good Morning Eric,

Since the strobes always were, and I think still are, an option, I don't believe there has ever been a mounting plate or hole installed unless a beacon or strobe was ordered as an option. The factory has mounted upper and lower strobes in various positions depending on the interior configuration. They generally affix a nice doubler that ties in with the associated structure. It is generally off center to the right side of the airframe for the upper beacon or strobe. That was done to avoid cutting the main stringer which runs along the top center of the fuselage.

There were several early field installations where the beacon was mounted on the center line and most of the installations did not meet the CAM 18 requirements. The FAA sent out guidance for DAMIs to be on the lookout for such discrepancies.

The lower beacon is generally factory mounted off center to the left in a position where it will not interfere with the cables in the belly.

In general, a doubler somehow integrated to the stringers is installed. It should either be in compliance with current FARs or shown to be adequate by another acceptable means. Check with your IA. It really isn't an unreasonable requirement.

Someday, if I ever find the time, I intend to clean off the top of my airplane, Mike Smith style.

I plan on installing a couple of flush logo style lights which will face aft and flash alternately. That is to warn large aircraft taxiing behind me that I am in their way!

'Nough of that.

Happy Skies,

Old Bob

[ARTICLES/20001213.101624.msg17705.tex]

V-Tail AD**Thu, 17 Dec 1998 18:05:27**

In a message dated 12/17/98 3:34:21 PM Central Standard Time,

George Vasick wrote:

Hi Ron, Hi Scott,

Thanks for your replies on the new V-tail AD. Of course, now I am more confused than I thought I was. One article I read definitely left me with the impression that Beech had gone to thicker rudervator skins, although still magnesium, and that most, if not all, of the tail vibration incidents were in aircraft with the thicker tail skins. I wanted to reread the article last night but naturally I couldn't find it. I think it was an email that I must have deleted.

Good Evening George,

I too have heard of the thicker skin theory. The story I got was that the skins are nominally .020 inch thick. The manufacturing tolerance is + or - .003, supposedly the ones on the early airplanes tended to run on the thin side of the limit where the newer ones are closer to full or maybe a little more in thickness.

I have discussed this with Ron Vickrey and he doesn't feel the differences are all that great, but if they were, that could easily add up to a fifteen or twenty percent difference in the weight of the skins even without the weight of the paint and aluminum parts now used.

The dynamics of flutter and vibration are rather complex and not easy to estimate or solve by eyeball engineering. It is going to take some testing or maybe the answer is to build a surface that has no more weight than the originals had.

In the "olden days", the materials were often changed just to provide some differences to test. Fabric covered surfaces often solved early flutter and vibration problems. If nothing else, it changed the coupling relationship of the materials.

I would love to try fabric covered surfaces on the affected airplanes but I know that the FEDs would never buy it and neither would most of the owners!

It would seem most likely that the answer will be in some method of returning the surfaces to something closer to the original weights, fits and structural strengths.

There have been onerous ADs in the past and a method of solving the problem has always been found. I'm confident this one will be no different.

Happy Skies,

Old Bob

[ARTICLES/19981217_180527.msg07642.tex]

4.10 EQUIP-PROP

Difference Between 406 and 409 Prop**Wed, 4 Oct 2000 23:32:47**

In a message dated 10/4/00 10:11:38 PM Central Daylight Time, hcanfly@pacbell.net writes:

The problem is the engine installation. As I understand it, the only difference with the 409 is an offset in the hub that is there to reduce vibration with the 550.

Hmmmm!

The folks at McCauley assured me that the only difference between the two was the position of the holes in the flange. The 406 is indexed at a slightly different angle to the TDC position. As you say, that is supposed to match it better to the vibration characteristics of the 550. Supposedly, all of the components are identical, even the flange before it is drilled.

If true, that could not possibly affect the fit on the engine.

I am eager to hear what George has to say!

Happy Skies,

Old Bob

[ARTICLES/20001004.233247.msg14467.tex]

Four Blade Prop**Fri, 13 Mar 1998 09:47:30**

Good Morning Frank Kelly,

In a message dated 98-03-13 09:01:09 EST, you write:

Bob, what is the advantage of the four blade prop?

It is MUCH quieter for the neighbors, a little quieter in the airplane and has better ground clearance. It is as quiet as a 170 on takeoff or a flyby. It just whooshes past.

The initial take off and climb performance with the 550 and the 4-blade are not as good as the 520 and the 2-blade provided. I can't tell any significant difference in the cruise performance. The airplane produces about the same true airspeeds as before using the same leaning procedures and fuel flows at the same altitudes. It does produce slightly more horsepower at any equivalent altitude and therefore I am able to realize slightly higher cruise speeds and my 10 to 12 thousand foot longrange cruise performance seems slightly improved. I have only 327 hours on the installation so far and don't really have a complete handle on the performance.

I removed a strong running 951 hour 520 engine when I put in the 550 so there wasn't as much increase in available power as there would have been with a run out engine and I also feel that the engine I have is probably at it's peak power output now. I do feel performance has improved slightly as the engine has broken in.

If there were a 2-blade approved on the 550, that is what I would try next. Unfortunately there is not much demand and no one wants to spend the money for an approval.

It appears that the old adage, "Two for go and three for show" should include the four blade and still applies where noise is not a problem.

I am sure this is more than you ever wanted to know!!!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980313.094730_msg01228.tex]

Four Blade Prop

Fri, 13 Mar 1998 12:19:59

Hi George,

In a message dated 98-03-13 11:57:23 EST, you write:

I had heard that the 4 blade Hartzell props were heavy, but I had no idea they were THAT heavy.

The blades are tiny but the hub looks like something they must have designed for a thousand horsepower turbo prop. It is big! The propeller is, over all, rather an abomination. Not one of my smarter moves.

Bob

PS It is, however, the best conversation starter that I have ever had!!

[ARTICLES/19980313_121959_msg01234.tex]

Four Blade Prop**Wed, 22 Jul 1998 11:53:52**

Good Morning Past Pres Charlie,

In a message dated 98-07-22 10:52:27 EDT, you write:

While we're on the subject, does anyone out there have any experience with the 4 bladed props that some Bonanza's are now being retrofitted with.

Yes. I had the Colemill conversion installed on my airplane in July 1996 and now have flown it a little over 450 hours.

Are they heavier than the 3 bladed prop?

Again, yes. The weight change from the two blade was just over forty pounds, the IO550B with the newer lighter weight accessories came in a little lighter than the 520 BA it replaced so the net gain was some 38.26 pounds, all in the prop.

Are they quieter?

Yes, amazingly so. The sound is a lot different, but the noise footprint is much closer to a 172 than a normal Bonanza. I don't notice a lot of change in the cockpit, but my neighbors all comment on how quiet my airplane is on departure.

How much cg change with this config?

Actual Empty Weight (not "Basic") before conversion was 2219.31, CG 80.4 After conversion, 2257.57 and CG at 79.06

Just curious. Charlie

Curiosity was the primary reason I went to the four blade. Would I do it again? No.

The pluses are:

It is without doubt the greatest conversation piece I have ever owned! Everybody stops and asks about it.

It is almost unbelievably quiet to the folks outside the airplane. Very nice for my neighbors.

The CG change is nice, but it is at the loss of available payload.

Propellor clearance is great, relatively little stone and nick damage.

The minuses:

There is a tremendous loss in takeoff and climb performance. Colemill had warned me that it wouldn't accelerate as well below 80 knots, but they said it would do as well as a three blade from 80 on (No mention made of comparison to a two blade.)

The performance loss was immediately noticeable. The airplane just does not accelerate well and I don't feel it climbs anywhere near as well as it did with the 520 and the 2 blade. These are personal subjective evaluations, not scientifically measured, but I have run some comparisons against a friend's V35B at equivalent weights both before and after the conversion. His airplane outperformed mine before I added the conversion and he beats me even more now! The only difference is in flat out high speed. Now, after running in level flight for twenty or thirty miles I can gain about a quarter mile on him whereas with the 520 he would have been a mile or so ahead. I don't know if that is due to the higher power of my 550B or the smaller diameter prop.

Four blades are even more in the way when working on the airplane than are three blades. If there was a two blade prop approved on the engine that is what I would try next.

I have inquired to both current propeller manufacturers about getting a two blade and both told me that I am the only person who has ever asked so they figure the market is just not there. The cost of a one time approval appears to be beyond what I can afford.

Such is life! I don't consider it one of my worst mistakes but it was one of the more costly in dollars!

Thanks for asking, as I said before; It is a great conversation piece!

Happy Skies.

Bob

[ARTICLES/19980722.115352.msg03833.tex]

Four Bladed Prop**Wed, 26 Jan 2000 11:16:39**

In a message dated 1/26/00 7:50:41 AM Central Standard Time, commwlthsls@msn.com writes:

If one has a four blade with Q-tips would it still be necessary to pull the prop back to 2500? Isn't the noise factor the reason we pull the prop back?

Good Morning John O,

The three blade is quieter than the two blade and the four blade is quieter than the three blade. But! The four blade is quieter at 2500 than it is at 2700. While I never did any scientific evaluations, it also seemed to me that I lost little if any performance by pulling back to 2500. it almost seemed as if the prop was losing efficiency at the higher RPM. It might have been just the change in sound, but it seemed nicer at 2500.

In any case, for my operation, the performance loss on takeoff and climb from the four blade was just too much to give up for a quieter operation.

The three blade at 2500 RPM seems to be a decent compromise between performance and noise.

Happy Skies,

Old Bob

[ARTICLES/20000126_111639.msg01758.tex]

IO-550 Conversion and 3 Bladed Prop**Sat, 27 Jan 2001 11:53:02**

In a message dated 1/27/01 10:21:36 AM Central Standard Time, 72227.2675@compuserve.com writes:

I am replacing my McCauley prop on a 67 V35 with an IO-550 and recall George mentioning what the most efficient prop for speed and climb is, unfortunately I don't recall the specifics. If any of you have the thread or if George can chime in it will be most appreciated.

Dave Burkart N3770Q

Good Morning Dave,

About a year ago, George recommended the Black Mac 409 by McCauley. I know that BDS is currently recommending one of the Hartzell Top Props.

George may have changed his mind or found something better, but I haven't heard about it if he has.

The 409 is lighter than the Hartzell.

The McCauley 409 and 406 are identical in all respects except that the 409 was developed to specifically match the vibration characteristics of the 550 and is only approved on that engine. The holes for the attaching bolts or studs are drilled with a slightly different orientation on the 550, supposedly to better coordinate with the 550 peak combustion pressure event. The 406 can be used on either the 520 or the 550.

The performance should be the same with either a 406 or 409. The 409 might be smoother.

Happy Skies,

Old Bob

[ARTICLES/20010127.115302.msg01962.tex]

IO-550 Conversion and Three Bladed Prop**Mon, 7 Aug 2000 16:54:03**

In a message dated 8/7/00 2:55:17 PM Central Daylight Time, Ernie.Ganas@email.msn.com writes:

I figure we probably will lose about 50# due to the 3 blade prop and IO-550 engine.

Hi Ernie,

I just checked the TCDS and there is a 2 blade approved for the model 36 which weighs 73 pounds. It is the 278-100-7 hub with 278-209-84 blades.

The 409 weighs 63 pounds. Several of the other two blades come in around 66 to 68 pounds. Unless you have an unusually light two blade, which I didn't notice on the list, you should have little or no weight change going to the IO550 with a 406 or 409 prop. There are some versions of the 550 which weigh a little more than some versions of the 520, but by choosing a light weight starter and alternator, you could end up with the big engine, three blade prop and save as much as twenty pounds!

It's amazing what you can do if you try!

Happy Skies,

Old Bob

[ARTICLES/20000807.165403.msg11857.tex]

IO-550 Conversion and Three Bladed Prop**Tue, 15 Aug 2000 17:01:07**

In a message dated 8/14/00 9:59:11 AM Central Daylight Time, swo49@hotmail.com writes:

Bob: I do not know what a 406 is. The only 3 blader certified for my K with the 520 conversion from BDS at the time that did not require a significant nose bowl modification was the top prop. All McCauley props required significant nose bowl mod. By the way, the 520 plus the top prop plus accessories together only weighed .5 pounds more then the 470-C/beechn 278/accessories that came out. For CG reasons, I would not wish to loose much weight up front. Steve

Good Afternoon Steve,

The 406 and the 409 are both McCauley Black Mac props.

I guess I did not realize just how long ago you converted to the 520! The spinners used on the 406 were a little too long to fit on your airplane without a small nose bowl modification, but BDS has had one designed that does fit and that has been available for some time now.

As I understand the situation, the 406 and the 409 are functionally identical. The only difference is the orientation of the holes that attach the prop to the crankshaft. McCauley engineers claim that they ran a vibration analysis that led them to believe that a slight reorientation of the prop on the 550 would have some beneficial result. Whether it did or not is open to discussion. It is possible that there might be some increase in smoothness with a 409 over a 406, but not all experts agree. Both are excellent propellers and the 406 has greater flexibility since it is approved on both the 550 and the 520. I don't know if it can be used on the 470 or not. I can't find it in the TCDS listings, but someone may have an STC for it.

I know reducing the weight up front will add to the CG problem, but it seems a shame to carry any weight you don't need! There must be something you could add that actually serves a need other than to just add weight!

Happy Skies,

Old Bob

[ARTICLES/20000815.170107.msg12184.tex]

IO-550 Conversion and Two Bladed Prop**Thu, 28 Oct 1999 13:45:21**

In a message dated 10/28/99 12:28:53 PM Central Daylight Time, foosej@oz.net writes:

I've been told you can't put a two blade on the 550 on a Bonanza. Is this 2 blade combination something new?? Thanks for any help, John

Good Afternoon John,

Good Point! I noticed that also. As of Oshkosh this year, both Hartzell and McCauley told me that no two blades were approved on the 550. The version used on the Mooney is a different one than we use, but perhaps there is hope!

The comment was made by both manufacturers that they are getting a lot of interest in the two blade prop now that a lot of the bush type airplanes are being equipped with 550s. The bush folks like two blades because they can be carried in most any small plane. The three and four blades are a pain to ship in any manner, let alone in a small aircraft!

You might note that Piper stuck with the two blade for the Malibu/Mirage until a couple of years ago. They finally had so many folks clamoring for a three blade that one was finally approved. I asked one of the Piper folks about it and he said it performed almost as well as the two blade and since so many folks liked the look of the three blade, they finally went to the trouble to get it approved. I would imagine the same thing would be true of the Mooney. The two blade likely gives the best overall performance, but I imagine the macho types will insist on multiple bladed propellers!

I would like to try a two blade on my 550B. If you make contact with anyone at McCauley or Hartzell, let us all know what they say!

Happy Skies,

Old Bob

[ARTICLES/19991028.134521.msg09776.tex]

IO-550 Conversion and Two Bladed Prop**Tue, 29 Feb 2000 10:13:11**

In a message dated 2/29/00 12:41:36 AM Central Standard Time, Ernie.Ganas@email.msn.com writes:

Why would the cost of certifying be so high, the IO-550 is certified for the airframe isn't it? They are covered in the same certificate as the be-35 etc

Good Morning Ernie,

I don't have an answer to your question, but when I asked the folks at Hartzell what it would cost to get a two blade prop approved on my 550, I was told that it would be an absolute minimum of \$100,000. I was told that they felt that the vibration characteristics of the engine are almost identical to the 520 and that there probably would be no difficulties with the approval. If that turned out to be the case and the entire approval program went forth with absolutely no adjustment or changes being necessary, the 100 grand would do the job, but if any, even very minor, changes needed to be made, the cost would escalate rapidly.

I am not knocking the FEDs, they are just following the procedures established. The problem is with the system. We insist that we be protected at every turn and that we be assured that everything we buy will be the safest it is humanly possible to make, yet we gripe about the cost of doing the approval process.

We have met the enemy and it is us!

Nothing is easy!

Happy Skies,

Old Bob

[ARTICLES/20000229.101311.msg03902.tex]

IO-550 and Two Bladed Prop**Fri, 2 Jun 2000 23:55:01**

In a message dated 6/2/00 8:42:05 PM Central Daylight Time, newmanb@rocketmail.com writes:

Mooney has a 2 blade on the revised Ovation which uses the IO-550 derated to 280 HP. Gained several knots over the prior 3 blade. Academic since the prop is unlikely to be STC'ed for the Bonanza, but you never know. Point is, there was a speed gain. - Bob

Good Evening Bob,

That engine is a 550-G which is quite a bit different from the IO-550-B which fits in the Bonanza. It has an overhead intake and a different valve arrangement on the cylinders. However, both Hartzell and McCauley have told me that they don't think it would be difficult to get a two blade approved on the 550-B. All it would take is someone to finance the tests. They estimated that it would cost about one hundred thousand to make the approval tests, provided everything checked out OK. If any changes had to be made, it would cost another hundred grand for the further tests. And so forth until it was accepted. So far, the only group that is pressing for the two blade approval is the bush pilot community. It is a bear to transport a three bladed prop by small aircraft. Duck soup for a two blade. I sure would like to give one a try!

Happy Skies,

Old Bob

[ARTICLES/20000602.235501_msg09077.tex]

McCauley 409 and 409 Three Bladed Prop**Wed, 3 Nov 1999 17:24:06**

In a message dated 11/3/99 3:21:35 PM Central Standard Time, rcb@appsig.com writes:

What's the difference between a [McCauley] 406 and a 409?? Bob Briggs

Good Afternoon Bob,

They are both Black Mac three blade props. All of the components of both are identical and interchangeable with the exception of the hub itself. Even that is of an identical construction except for the bolt hole indexing in relation to the blades. It mounts at a slightly different angle in relation to the power pulses.

McCauley spent the time and effort to match the 409 more closely to the vibration characteristics of the 550. It is possible that the 409 might be a little smoother than the 406 when installed. The 409 is only approved on the 550 whereas the 406 is approved on either engine.

There should be absolutely no difference in performance.

Hope that helps.

Happy Skies,

Old Bob

[ARTICLES/19991103.172406.msg10101.tex]

Prop De-ice/Anti-ice**Thu, 18 Dec 1997 11:46:10**

Good Morning All,

Just a comment on the propellor deice problem.

I think all of us would prefer that our airplanes be able to be flown in all conditions of weather and ice is one of those conditions. Unfortunately most of us have to evaluate the cost-benefit relationship of any funds we spend on our machines. Ice costs a lot of money to operate in, and we don't all need to fly that bad.

Having the propellers stay clear of ice is helpful and that can be done at a very reasonable cost.

There are various propellor coatings available which are quite effective in preventing ice build up on propellers when used properly.

In the days of propellor driven airliners, if a prop de-icer or anti-ice system was inoperative, we could operate in icing conditions by coating the rubber boot on the prop with Icex (Goodrich brand name). My recollection is that one application was approved for twentyfour hours of operation including up to eight hours in precipitation.

The mechanics generally coated the entire blade even though it was not required. It worked very well and I used Icex on my Bonanza until Glidden came out with Glidair ice repellent designed for use on aluminum propellers.

That product went off the market fifteen or twenty years ago, but Sportys sells something which appears to be about the same stuff under the name of ICG.

ICG does not spell out specific lengths of time for it's effectiveness as did Glidair but it seems to be at least as effective.

You can buy an awful lot of ICG for the price of propellor deicers. If you remember to put it on the prop, It won't fail like an electric system can or run out of fluid as slinger systems may. The weight is negligible. I carry one can with me and can tell when it is getting low by shaking. I put it on the prop every time there is any possibility I will be in cloud in the winter time and use about one can per year. It seems to do every bit as well as electric or fluid anti-ice/de-ice propellor systems.

I do think it helps if the leading edges are kept smooth and nicks properly filed out, but that should be done anyway.

I certainly don't want to encourage anyone to fly into any weather with deiced props that they wouldn't fly into otherwise, but if you goof, it is nice to have clean props!

Happy Skies,

Bob Siegfried

P.S. I use it on my snow blower too and it helps keep the vanes and chute from clogging!!

[ARTICLES/19971218..114610.msg02804.tex]

Prop Deice

Thu, 22 Jul 1999 09:37:01

In a message dated 7/22/99 7:19:34 AM Central Daylight Time, tturner@vol.com writes:

Last time I checked (for a customer while I was with FliteCraft Turbo), the kit for the electrothermal propeller deicing system cost about \$10,000 through Raytheon.

Good Morning Steve and Tom,

A can of ice repellent spray works just as well. In addition it weighs and costs a lot less. There is also no chance of failure provided you remember to put it on!

Happy Skies,

Old Bob

[ARTICLES/19990722_093701_msg06316.tex]

Three Blade Prop**Tue, 28 Oct 1997 08:59:44**

Good Morning John,

In a message dated 97-10-28 02:21:39 EST, you write:

Hi Bob, Do you need to upgrade to a tree blade prop to add the tip tanks....

The three blade prop is not required with the tip tanks. In some cases there will be a slight vibration or "beat" with the tanks installed on a "three blade" airplane. This doesn't seem to happen with the two blades.

I have never experienced that problem but am told it is easily remedied but I am not sure precisely how it is done. I believe it is through further balancing of the ailerons.

Incidentally you mention an "upgrade to a three blade prop", I don't think that is necessarily an upgrade!

The three blades are generally a shorter diameter and that helps minimize prop damage. They also have a different sound which some prefer and are often perceived to be smoother (in spite of the problem with the tip tanks). There is some increase in weight providing an improvement in our lousy CG situation but that hurts the useful load.

I think that saying that a two blade is always better than a three blade (or vice-versa) is like saying that a high wing is always better than a low wing. Many other factors are involved. I feel that the two blades are best for T/O and climb provided that the diameters are at the maximum allowed and that the blades have equal efficiencies.

Blade design, like aircraft design seems to be more art than science and the proof is in the testing. Some of the three blades do get out better than some of the two blades but you will notice that Jim Huff of Denton Texas has a two blade on his Duke engined Bonanza which he uses primarily for racing. It gets out and climbs like a scared rabbit.

My current propeller is a four blade Hartzell. It is unbelievably quiet for the neighbors but the T/O and climb both suffer greatly. If there was a two blade prop available for the 550 that is what I would try next. (I'm working on it but have not yet been successful).

It has been said "Three are for show and two is for go!" I really think that individual testing is necessary and it depends on whether top speed or T/O and climb are more important to you.

Well, you asked about tip tanks and here I am with a dissertation on propellers! Some of us old folks do ramble.

Yours,

Bob

[ARTICLES/19971028_085944.msg02229.tex]

Three vs. Four Bladed Prop**Wed, 26 Jan 2000 18:35:29**

In a message dated 1/26/00 4:26:59 PM Central Standard Time, commwlthsls@msn.com writes:

Good input Bob. I read somewhere that at cruise the 4 blade added 10kts to the cruise speed. I'm willing to give up some early flight performance if I can be a good neighbor.

Good Evening John,

I don't know what it will do for your S model, but on my V35B the three blade is providing at least as fast a cruise as did the four blade. The airplane is a little faster now than it was before, but that might be because it is well broken in.

I gained about ten knots in top speed with the IO-550 with both the four blade and the three blade. I wonder if that was what they were referring to?

There definitely was no speed advantage to the four blade on my airplane. If anything, it was a little slower. There were several advantages to the four blade, however. It is quite a bit quieter for the neighbors. The added 38 pounds helps the CG, but at the expense of thirty-eight pounds of useful load! It was the greatest conversation piece I ever had on the airplane. It is currently serving as a conversation piece hanging on my hangar wall!

Happy Skies,

Old Bob

[ARTICLES/20000126.183529.msg01789.tex]

Three vs. Two Blade Prop**Wed, 22 Jul 1998 10:55:33**

Good Morning All,

In a message dated 98-07-22 10:00:39 EDT, you write:

Consider the impact of a 3-blade on CG. When the old 3-blade Hartzell was installed on our S, the 27 lbs. of additional weight moved the CG almost a full inch forward.

Also, three blades are supposed to be a bit quieter since the blades are shorter.

If you think three blades help, why not go to four? My four blade Hartzell took almost seven gallons of gas off my useful load but it did move the CG far enough forward such that I am now right at the forward CG limit when I have full tanks and fly it solo. (Of course I also now have over thirty minutes less range at an equivalent payload!)

The discussion on two blade verses three blade is somewhat analagous to the argument between high wing and low wing. There are fast, excellent performing high wing airplanes and there are fast excellent performing low wings.

In the same way, there are major differences in performance between various 2 blade props and the same holds true amongst the various three blades.

So called "common knowledge" has it that, all other things being equal, the propellor that has the greatest diameter and therefore the greatest disc area will have the best takeoff and climb performance provided it is operated at an RPM that does not allow it to get to close to the speed of sound.

The fastest in level flight will be the one with the smallest disc diameter provided that it is still able to operate at a relatively efficient angle of attack and transfer the required amount of power.

Note that we haven't even mentioned the number of blades! The primary reason to add more blades is to provide the ability to absorb more power in the disc area available. If a two blade will do the job in the area chosen, that should be the most efficient. Thus the old admonition; Three for show and two for go!

I have a close friend who flies an amphibious 185. He has always tried to have the longest bladed 2 blade prop that was approved on his airplane. His primary interest is in getting it off the water and cruise performance is relatively unimportant. Such was the accepted wisdom among the seaplane drivers.

A few years ago he had occasion to fly an airplane with a shorter three blade prop and it performed better than his! After installing the same type prop on his airplane, he felt his take off, climb and cruise all improved. He also found less water damage occurred.

So what am I trying to say?

There just doesn't seem to be any fixed answer. The aircraft manufacturers have a lot more knowledge available to them than any of we amateurs have accrued. they still try a bunch of different props and then choose the one that has the best performance for the regime they are trying to emphasize or the best compromise solution.

A whole lot of people like the looks of a three blade prop so most manufacturers will offer one provided that the performance is at least adequate if not equal to the two blade.

Piper has tried everything under the sun on the Malibu/Mirage line and a relatively short two blade has always come up the winner. They were under such pressure from owners to get a more macho looking unit on the nose that this year they have finally come up with an acceptable three blade which they offer as an option.

Piper now claims you can have both the GO and the SHOW with their latest three blade prop!

Incidentally, there are currently no two blade props approved on the IO550B. If that is in your future, it should be a consideration.

Not much help was I?

You just have to try it!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980722_105533_msg03830.tex]

Three vs. Two Blade Prop**Mon, 9 Nov 1998 00:29:39**

Good Evening Marc,

In a message dated 11/6/98 9:55:54 PM Central Standard Time, mecook@ix.netcom.com writes:

Unfortunately, there doesn't seem to be any good data from Mr. Finnigan to support his feeling that the three-blade was faster. Looking at the ASI alone isn't enough.

I think it is reasonable to consider the three blade/two blade discussion in the same way one would the high wing/low wing controversy. There is a lot more to propeller design than the number of blades.

Like wings, every now and then a designer gets lucky and a certain combination works even better than planned. I am sure there are three blade props approved for the Bonanza that will out perform two blades and vice versa.

The manufacturers tend to test a broad spectrum of propellers for each model before choosing the one to be used. I understand that Piper had tried a number of three and four blade models on the Malibu over the years but the old two blade always came out with the best numbers.

This past year they finally found a three blade which will perform as well (or at least close enough) as the two blade and are now offering it on the Malibu Mirage.

The public like the looks of a multiple blade prop and if there is not too great a performance penalty, they will sell.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981109_002939_msg06789.tex]

Three vs. Two Blade Prop**Mon, 9 Nov 1998 17:30:36**

Good Evening Scott,

In a message dated 11/9/98 3:18:22 PM Central Standard Time, sderrick@yahoo-eng.com writes:

I have always heard that a big single blade was the most efficient and we don't use them because it would hit the ground during taxi. Of course efficiency and performance don't always equal each other.

That has always been the conventional wisdom and if you will remember, the speed demons of the control line set used single blade propellers. There was also a single blade propeller approved for the J-3/T-Craft set in the thirties but it was not very successful. The static balance was OK but they were never able to solve the dynamic problems.

A single blade does not, however, solve any of the supersonic tip problems so the length of the blade would still be a function of the RPM and it could be no longer than a two blade with the same restriction.

The maximum practical diameter of the tip path for 2700 RPM is about 84 inches. The very early Bonanza was designed for a 96 inch propeller which was to swing at a maximum of 2050 RPM. With a flat nose strut and a flat nose tire, I believe it had about four inches of ground clearance. I don't think any were delivered with that long a prop, but I'm not sure.

Propellor design is closer to an art than a science!

Happy Skies,

Old Bob

[ARTICLES/19981109.173036.msg06808.tex]

Three vs. Two Blade Prop**Fri, 29 Oct 1999 23:51:39**

In a message dated 10/29/99 5:47:12 PM Central Daylight Time, epoole@scoot.netis.com writes:

A few questions regarding props.

WARNING: These questions will be regarded by many as stupid. Tough. ;-)

Good Evening Eric,

As our third grade teacher said, there are no dumb questions, however I can likely provide some dumb answers!

1. M-35, IO-470CcN ... is there a 3-bladed prop that's approved as is, or is an STC required?

You could look it up in the aircraft spec sheets, or I could if I wanted to spend the time, but I am reasonably certain that none are currently listed.

There are a number of after market approvals available via the STC route. It would be unlikely that you would need a local approval, just buy the right to use the already approved STC and install and operate the prop in accordance with that approval.

You could call Hartzell and/or McCauley directly, but I would suggest contacting BDS. Scott should have all of the information you need.

2. If an STC is required, or if a 337 is executed, can I then go back to the 2-blade prop whenever I want to? I can visualize instances where I'd want a 2-blade prop for long trips (to get the extra cruise speed) but use the 3-blade prop for everything else (for better climb, shorter takeoff roll, and most importantly, less noise).

Once the prop is installed it would be best to submit another 337 if a two blade were put back on.

I have heard the argument made that one 337 could be submitted which listed both propellers and listed all of the data pertinent to both. That would be handled in much the same manner as is the installation of skies or floats. If both are listed and approved, the change can be made by any authorized entity and the only paperwork required is a log book entry. I have never known anyone who has tried it for a prop.

Oh, one more thing. Why do you feel that the two blade would be faster and the three blade get off and climb better? The number of blades has very little to do with either function. All other factors being equal, the propellor with the greatest disc area should provide the best takeoff and climb and the one with the least disc area should provide the highest speed. The propellor with the fewest number of blades that are still able

to absorb the required power should be the most efficient at transferring that power into acceleration, climb or speed. Saying that a two blade is faster than a three blade is rather like saying that a high wing airplane is faster than a low wing airplane. It depends on dozens of other factors much more than it does on the number of blades or whether the aircraft is high wing or low wing.

Every aircraft manufacturer tries to choose the propeller that will give the optimum compromise of performance for his airplane. They hire highly trained engineers who consult with knowledgeable propeller engineers and then try lots of different combinations before a propeller is chosen. I am sure some two blades are faster than some three blades and I am sure the opposite is also true. It depends!!

3. Can the aircraft owner change the prop on his/her own airplane, or is an A&P required?

There is considerable disagreement on what can or cannot be done by the owner/operator.

If you think you could support the argument that it was strictly preventive maintenance, and both props were listed in the appropriate paperwork. It might fly!

I think most FAA inspectors would say the prop should be changed by an authorized entity.

4. I would like to try to find a way to try out a 3-bladed prop on my airplane for a day, and put the 2-blade prop back on if I don't like the 3. I'd quite happily pay a reasonable fee for this, but obviously I don't want to have to buy a prop in order to do this. Can anyone think of a way I can rent one for a day to see if the performance/noise is acceptable? (Hey, I SAID these were dumb questions, but there's no telling what miracles can happen if you don't ask.) .

Once again, I would call someone like BDS and see if they have a used prop available. If they do, you should be able to work out a deal to make the swap and try it out. A couple of hours each way should handle the installation and the paperwork.

You might ask the same question of both Hartzell and McCauley.

5. Is there a legal way to put quieter mufflers on without sacrificing a significant amount of power?

Once again, BDS has glass packed straight through mufflers approved for the Bonanza. I don't think they cause any measurable back pressure, but I imagine they cause a little extra drag. I had a set on my airplane for about five hundred hours. I think they made it a little quieter for my neighbors, but I never measured it with a sound meter. I did not notice the increase in drag but they added a couple of pounds to the weight. I am not sure if BDS is still producing them or not.

Before very much longer, I may find myself in an environment where noise is a very sensitive issue, hence all these questions and the other questions

about taking off with reduced RPM, etc. Quieter mufflers, a 3-bladed prop, cranked back to 2500 RPM ... why, it'd positively whisper. ;-)

I live on a private airstrip which is completely surrounded by city homes. We do attempt to operate as quietly as possible, but we still have a complaint every now and then. Some of my neighbors make their takeoffs at reduced RPM from the standstill.

I think it works better to use full power till I am off the ground with the gear and flaps up, then reduce the RPM. I believe that puts me higher by the time I get to the noise sensitive area at the end of the runway. I have the RPM down long before I get there.

Some of my neighbors like the other way best.

Hope that helps!

Happy Skies,

Old Bob

[ARTICLES/19991029_235139_msg09865.tex]

Which Prop?**Sun, 22 Feb 1998 08:56:28**

Good Morning Charles Freese,

You asked:

I was contemplating looking on purchasing a C Model Bonanza in the future and was wondering exactly what you people feel would be a better prop Hydro or Electric and why?

Lots of possibilities! I personally have always liked the Beech prop though I have been told some of the parts are getting hard to find. It needs to be maintained and lubricated properly, but of the airplanes I have owned and worked on, I always felt the performance was better with the electric Beech unit.

I know Ray L. has said he liked the diaphragm actuated prop but that is my least favorite of the bunch. It really doesn't have enough pitch range to take full advantage of the performance range available in the Bonanza. It worked fine in the Navions and other slow airplanes but had some limitations in the Beech. The newer Hartzell with the oil transfer collar does have excellent performance and would probably deliver better takeoff than even the Beech prop due to the legal allowance of flatter pitch thereby giving a higher static RPM and better initial acceleration. I haven't checked recently but am told that the price of this prop has gone sky high.

If you are considering the electric prop remember that it is an inflight adjustable propeller, not a constant speed unit. In order to have constant speed, an additional unit must be installed and that is the automatic prop control. That was an aftermarket addition which was later added as a Beech option. A very high percentage of the current Beech electric propeller equipped airplanes have the APC. There are at least two types of APCs available. The early ones used a tube type amplifier and electric eye reading a rotating cable driven mask to determine rpm and had some maintenance problems. Most have been converted to a nice solid state unit which works very well.

The electric props are supposed to be set up with a little more pitch so as to be in a condition where a failure of the APC on takeoff would not result in an overspeed condition.

I don't have current information on the limits but the basic rules forty years ago were that without an APC unit installed the flat pitch stop was to be set so that with full throttle at sea level etc. the RPM would not hit redline until 100 mph. With an APC unit installed the flat pitch stop could be set so that redline RPM could be developed around 80 mph.

A lot of people in those days would illegally set the stops so that redline rpm was attained around 60 mph. That drastically improved the takeoff performance but the old APC units couldn't react fast enough to properly control the RPM so it was necessary to operate the prop in the manual mode and that took a pretty tricky thumb on the switch

to keep things under control. Not difficult but it took some practice. I don't know how folks are handling it today.

Does that help?

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980222.085628.msg01085.tex]

Aeromatic Prop**Thu, 18 Nov 1999 00:25:44**

In a message dated 11/17/99 10:01:06 PM Central Standard Time, aerome@onramp.net writes:

This may be a bit premature (or even wishful thinking), but there's a fellow out there that is attempting to bring back the aeromatic flottorp and beech roby props. Word is that one of these may work with the splined E series engines. Sure would breath a bit of fresh air (and relief) into all of we unfortunates that own the Classics. <http://www.aeromatic.com> My fingers are crossed!

Good Evening A J,

You definitely don't want an Aeromatic! They were used on the very first Navions and even on an airplane with as little speed range as the early Navion, they weren't worth a darn!

The Aeromatic had a place and for a few limited applications, it was great advancement.

The Beech Roby was, and is, a great propellor! It was designed by Beech to fit on the splined shaft because there were no other propellors available that would allow the Bonanza to meet it's potential. it was designed as an electric unit because Beech was used to doing things electrically. Since they were not propellor manufacturers, they tied up with Roby to get it built.

The wood blades would be fine, but the metal blades are better! The big paddles were/are slightly more efficient at very low power settings, but nowhere near as good for takeoff, climb and high cruise. While it might be possible to get someone to build the wood blades at a reasonable price, all of the rest of the components are the same as the electric version and would be at least as expensive as those components are today! I think the Beech electric prop is the best performing propellor available for the E series engines, especially if they are still at the full 88 inch length, but the economics may favor a more modern unit.

Happy Skies,

Old Bob

[ARTICLES/19991118.002544.msg10719.tex]

4.11 EQUIP-REGS

Field Approvals - Instructions for Continued Airworthiness**Sat, 17 Feb 2001 11:20:04**

In a message dated 2/17/01 1:31:18 AM Central Standard Time, KenV35A@cs.com writes:

The FAA announced that 337 Field Approved Major Alterations issued after Jan.1998 must address the Instructions for Continued Airworthiness (ICA) issue. Without ICA's, a certificated person performing maintenance or inspection on a F.A major alteration could be in violation of part 43, section 43.13(a).

Good Morning Ken,

Our FSDO has been requiring the ICA since the 1998 date. The three field approvals which I have obtained since then all were submitted with an ICA. It's a piece of cake. Just follow the guidelines and put something down for each of the 18 items, even if it is just NA (Not Applicable).

The ICA is not a bad idea. All of the pertinent data goes in with the 337 and will be available for the down line mechanic if the regular paper work is lost.

I don't mind the requirement at all, and I HATE paperwork! I doubt if it adds thirty minutes to the project.

Happy Skies,

Old Bob

[ARTICLES/20010217_112004.msg04045.tex]

Unavailable STC's**Fri, 16 Feb 2001 20:01:17**

In a message dated 2/16/01 6:45:26 PM Central Standard Time, esoteric5121@earthlink.net writes:

Shop around for a different FSDO person, if you can.

PMC

Good Evening Paul,

Good advice, but he might try the same office again. Seems to me that I heard somewhere that new guidance has recently been issued to the FSDOs concerning STCs which are no longer available on the market.

I believe they now are encouraged to use the old documentation as adequate substantiation for a local approval. The three light system is such an obvious improvement that either using the old STC data or just listing it as an upgrade to newer standards should fly in any office.

Worth a try!

Happy Skies,

Old Bob

[ARTICLES/20010216_200117.msg04025.tex]

4.12 EQUIP-TIPTANKS

Airspeed Loss**Tue, 15 Sep 1998 08:56:05**

Good Morning Eric Poole,

In a message dated 9/15/98 7:19:31 AM Central Daylight Time, you wrote:

I gained 200 lbs gross weight capability (seems to me the Osbornes would have only gained me 150) and lost three or four knots in airspeed.

Interesting.

That is the largest loss in airspeed I have seen reported for the installation of standard production tip tanks.

Was that check made at the same weight or was the difference at least partially the result of higher gross weights?

The loss in airspeed with higher gross weights is quite apparent in all Bonanzas.

Wayne Collins told me that he has noted about a four mph drop in airspeed due to his Dolly Parton tanks (100 gallons per side) when they are empty but no noticeable difference between tanks on and tanks off when he uses his Britains. He does remove the tip tanks and put on factory standard tips when participating in air races such as the Sun 'n Fun race for production aircraft.

If you will recall, Tom Turner reported a few months ago that he had observed a substantial loss in takeoff and climb performance following the installation of tip tanks.

Did you notice any change there?

Does anyone else have before and after data for any flight regime?

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980915_085605_msg05395.tex]

BDS and Delamination

Mon, 25 May 1998 14:13:57

Good Afternoon Eric and Paul,

In a message dated 98-05-25 13:33:39 EDT, you write:

I hear the BS tanks are fiberglass and that they delaminate and leak.

My BDS tanks were installed in January 1979, are of the older materials and are showing no signs of delamination YET.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980525_141357.msg02813.tex]

BDS and Delamination**Tue, 21 Dec 1999 22:43:42**

In a message dated 12/21/99 8:49:00 PM Central Standard Time, Mavitor@aol.com writes:

Didn't work. So I am going to try and patch from outside. I only use mine for long trips as I have the 20 gallon auxes too. A slosh has to be so thin it will not bridge the pin holes. Maybe under pressure somehow.

If you find something let me know

Mike M

Good Evening Mike,

That was a valiant effort! Too bad it didn't work. I have little to no knowledge of fiberglass and it's vagaries, but have been told by Allen Peterson (owner of BD'S) that the material he was using on the early tanks has a rather limited life. I don't remember precisely how long he thought the tanks should last, but I think he said trouble would not be unexpected in ten year old tanks if they lived outdoors.

Mine will be twenty-one years old in January and I imagine they will need to be replaced soon! The airplane has lived in a hangar since new and I am sure that has helped. About five years ago, when I discussed this with Allen, he told me that I should consider replacing the old tanks with a set of his new ones. They have different glass and different resins. He felt they should have an almost unlimited life. (Whatever that means!) At that time, he told me that since I had a set of the ones which were rather short lived, he would accept them in trade on a set of the new ones and the cost would be only around 1800 bucks. I now wish I had taken him up on the deal! One of these days I might check again.

Have any of you on this list ever made such a trade with Allen?

Happy Skies,

Old Bob

[ARTICLES/19991221_224342_msg12221.tex]

BDS vs. Brittian (Osborne)**Mon, 3 May 1999 14:44:47**

In a message dated 5/3/99 10:26:26 AM Central Daylight Time, flyboy_98@yahoo.com writes:

Does anyone out there have tip tanks from other vendors? If so who and how much? Or, does anyone know the scoop on the advantages/disadvantages over one "brand" or another?

Any help doing my shopping would be appreciated.

Thanks,

Jason

Good Afternoon Jason,

There are currently only two providers of certificated wing tip fuel tanks for the Bonanza series.

Beryl D Shannon is the current owner of the Safe Flight Extender approval and has made many improvements to that system over the years.

Osborne is the owner of the certificate for the tip tanks developed by Dr. Brittain.

The BDS tanks are fiberglass and generally hold fifteen gallons. Some of the newer production units are reported to actually hold 17 to 18 gallons each, but they are still only approved to carry fifteen. The Osborne tanks hold twenty gallons each and are made of aluminum.

Several different fuel feed systems have been used by both manufacturers over the years, but both are currently offering and recommending one that transfers the tip tank fuel to the adjacent main fuel tank.

Both manufacturers have gross weight approvals available. The amount of the increase, whether or not you must have fuel in the tank and whether or not the category of the airplane is changed is very model dependent.

The first thing to do is decide just how you intend to use the extra fuel. Do you need the extra gross weight capability? Does it bother you if the airplane is certificated in the normal category rather than the utility?

After such things are determined, check over the offerings from both suppliers to see which units provide the best approval for your planned use of your individual airplane.

There are a lot of variables dependent on the model airplane you have.

For details, check <http://www.dbmods.com/tip-tank-descript.html>

I like both!

Happy Skies,

Old Bob

[ARTICLES/19990503.144447.msg04269.tex]

Brittain (Osborne)

Wed, 21 Oct 1998 12:53:19

Good Morning Dwaine,

In a message dated 10/21/98 11:11:53 AM Central Daylight Time, classicbonanza@juno.com writes:

I have the Beechcraft wing tip fuel tanks manufactured by Brittain Industries 20 gal each on my D35 and if I recall correctly they were installed during the '60s. I have 3 fuel valves and to feed from the left tip that valve is "on" and the right tip valve "off" and the main fuel selector valve to "Aux", etc. The system is difficult to operate in the confined space plus the two tip valves are stiff to operate. The colder the outside air temps the worse they are. I have tried different penetrating oils on the valve stems and it helps a little but not much. Wished I had a one valve set up.

The first set of Brittain's I had were ones installed at the factory on a new V35. I believe that was in either 1966 or 1967. They had the nice one unit valve. We later had a set installed on another airplane in our own shop and it had the same valve setup. I wonder if yours might have been an earlier deal. It sounds a lot like some of the early Safe Flight Extender setups that I have seen. Some were a plumbing nightmare. I am not sure if the single unit would be adaptable to the D35 without some modification. It was designed to work with the airplanes that had the flow back to their respective tank rather than to just the left. Maybe one would be available at a reasonable cost at one of the salvage places. It could probably be installed with a local approval.

Thanks for the information.

Happy Skies,

Bob

[ARTICLES/19981021_125319_msg06157.tex]

Fuel Guages and Plumbing**Fri, 16 Mar 2001 16:30:36**

In a message dated 3/16/01 2:28:42 PM Central Standard Time, burnside@pressroom.com writes:

7. Are the sight gauges in the BDS tanks a) accurate, b) useful? Any recommendations for or against adding the panel-mounted gauges? If so, why?

Good Afternoon Jeb,

I like the sight gauges. If it were me, I wouldn't bother with the electric ones at all. I have them in my airplane as they were required in 1979 when my tip tanks were installed. On a dark night, you need a good flashlight to read the sight gauges, but about the only reason I ever look at them is to make certain that they are feeding. The time it takes to transfer the fuel is very consistent. With my current pumps, it takes one hour to empty the left tank and an hour and five minutes to empty the right.

I am a great proponent of the tip tank, but don't have a good handle as to whether or not they will affect the speed. Tom Turner has some data, which he developed, that shows a considerable negative affect on the climb rate.

Incidentally, I have the BDS units and am happy with them, but I would like to have more fuel and the Osbornes are very nice tanks. For extreme long range flight, especially those flights where you have to have the fuel to make a safe landing, the old style multiple port valve which Brittain/Osborne used before adopting the BDS style transfer system added a lot to ones comfort level.

While it takes management regardless of the style of system used, the valve is less likely to fail than a transfer pump and it allows a little easier evaluation of the fuel remaining if a fuel flow gauge or tank gauge should fail.

I had a set of Brittain's on a V35A that I had in the late 60s that had the selector valve and I loved it!

I think the most important consideration is which manufacturer has the best weight allowance for your airplane!

Happy Skies,

Old Bob

[ARTICLES/20010316_163036_msg05993.tex]

Gross Weight Increase**Tue, 15 Sep 1998 15:30:11**

Good Afternoon Bill,

In a message dated 9/15/98 1:41:06 PM Central Daylight Time, hale@lucy.fc.hp.com writes:

Isn't this because the main part of the gross weight increase comes from moving the airplane into NORMAL category from UTLILITY category?

Basically true but not completely.

The A36 with BDS tanks remains in the utility category even with a substantial increase in gross.

On the Straight 35, the gross is reduced to 2435 due to the tip plate effect of the tip tanks. With the tanks on, there is a slight increase in lift on the outer section of the wing. That creates a small increase in the bending moment which is compensated for by reducing the gross. When fuel is added to the tank, that bending moment is reduced and the gross goes back up to 2550.

Obviously the same adjustment to the bending loads are pertinent to all models of the airplane. By moving the airplane to the normal category instead of utility, the justification for the increase in gross weight becomes much easier to substantiate. The required testing is minimal. Not trivial, but much less than if the structural strength has to be verified. It consists largely of spin tests.

As we all know, the required loads for normal are not as great as the ones for utility.

It would seem that BDS has convinced the FEDs that the A36 wing is strong enough to stand up to the bending loads required in utility category even with the increased bending moment of the tip plate effect of the tip tanks.

What I would like to know is what, if any, differences are there between an A36 wing and a V35B wing?

It's all done with mirrors!

Happy Skies,

Old Bob

[ARTICLES/19980915_153011_msg05423.tex]

Gross Weight Increase**Tue, 15 Sep 1998 15:39:42**

In a message dated 9/15/98 1:42:40 PM Central Daylight Time, Jdownen@aol.com writes:

But practically, why wouldn't the Osbornes do the same from an aerodynamic standpoint. Is it a case of BDS asking for more and getting it?

Sure, It is just that BDS spent the time and money to get the approval.

I once asked Allen why he had only a 3550 gross for his tanks on my V35B where Brittain/Osborne has 3600 gross with their tanks. He told me that he had calculated that with the reduction of the bending moments allowed when going from the utility category to normal, the wing should be good for at least 3700 pounds with no other substantiation. He started out with that goal in mind but in those days, the FAA was requiring that the tests be made in fifty pound increments. He ran out of money when they got to 3550 and he had to finalize the program and sell some tanks to fill the pocketbook.

Such are the vagaries of FAA certification!

Happy Skies,

Bob

[ARTICLES/19980915_153942.msg05424.tex]

Gross Weight Increase**Wed, 21 Oct 1998 14:03:44**

Good Afternoon John Small,

In a message dated 10/21/98 12:39:19 PM Central Daylight Time, jtsmall@onramp.net writes:

Why is the gross weight increase important? Does this take away a corresponding amount of useful load (must unless it increases gross without increasing empty weight ... by at least a lesser amt).

It isn't important if you never fly near gross weight. If you occasionally find that you can't haul everything you would like to, then having a higher grossweight is a large advantage.

The greater the range between empty weight and gross weight the more useful you have. On the S35, the addition of BDS tip tanks will allow 226 pounds more useful load. A 250 pound increase in gross minus the 24 pounds for the tanks, plumbing and such. It won't all be payload unless you reduce the amount of fuel in the mains and put at least twenty-five gallons in the tips as all weight above 3400 must be fuel in the tips.

Remember that to gain that increase in gross on that particular airframe the aircraft is placed in the normal category rather than utility.

Things vary considerably on different model airplanes and different tip tanks. It takes some study.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981021_140344.msg06164.tex]

Gross Weight Increase**Wed, 21 Oct 1998 17:54:29**

Good Afternoon John Small,

In a message dated 10/21/98 2:13:27 PM Central Daylight Time, jtsmall@onramp.net writes:

Remember that to gain that increase in gross on that particular airframe the aircraft is placed in the normal category rather than utility.

This is worth a brief explanation as I have not encounter it before. I follow your msg so far.

This will have to have a disclaimer attached as I am an aviator, not an engineer. All of you who wish to argue with my statements feel free to jump right in.

The Beechcraft Bonanza has been certificated in the utility category for all except the straight 35 series.

The normal category requires that the airplane be able to withstand a force of around 3.8 times it's maximum certificated weight before things start to deform permanently. An aircraft certificated to the utility category must sustain a load equivalent to about 4.4 times it's weight before permanent deformation takes place.

If the aircraft is taken from the utility category to the normal category it doesn't have to demonstrate it's strength to as high a degree.

It doesn't change the strength of the beast, just uses different approval standards.

Most all general aviation aircraft except the Bonanzas are only certificated to normal category so changing the Bonanza to normal is not putting it in an unusual mode.

The easiest way to substantiate the structural integrity for a higher gross is to change the category to one that requires less strength. That is what both of the tip tank manufacturers have done for some of their approvals.

As I said before, there are a lot of variables to be considered as to whether or not you need or want tip tanks and which ones are best for you. There has been considerable discussion on this website about tip tanks in the last few months and you might want to check the archives for more information.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981021.175429.msg06170.tex]

Gross Weight Increase**Sun, 18 Mar 2001 19:41:13**

In a message dated 3/18/01 11:48:27 AM Central Standard Time, burnside@pressroom.com writes:

Now ... it appears that the BDS site and the materials they faxed – plus the staff, based on several telephone conversations – are masterful at something approaching a "bait and switch" tactic, namely that the gross weight increase is not included with the tank purchase. Is this the case? If so, and before I deal with BDS on this issue, does anyone know how much extra the GW paperwork is?

Good Evening Jeb,

The gross weight increase has been included in the past. If that has changed, this is the first I have heard about it.

I have found the folks at BDS to be very easy to work with, but Allen himself sometimes gets carried away and promises things that he has not yet gotten approved. I don't think he means to mislead, but that he is sometimes overly optimistic.

To me, the Osborne tanks appear to be the better built of the two and, for some airplanes, they have the better gross weight approval. For other airplanes, the BDS are better. When I last talked to BDS at the WBS convention at Oxnard, they were hoping to get their 3550 approval raised to 3600, the same as the Osbornes have. Now if they would just get the capacity up to twenty gallons or more!!

I like the folks at both. The choice has to be made on how it works for you.

Happy Skies,

Old Bob

PS It always helps to get everything in writing, but I have just relied on verbal promises from BDS and they have worked out to my satisfaction.

[ARTICLES/20010318_194113_msg06158.tex]

Gross Weight Increase**Sun, 18 Mar 2001 20:14:12**

In a message dated 3/18/01 6:57:39 PM Central Standard Time, burnside@pressroom.com writes:

For my bird, the BDS tanks result in a higher MGTOW increase (250 lbs.) than the Osborne units (200 lbs.) With the BDS units, the first 100 lbs is a freebie; the remaining 150 must be in fuel in the tips. Which simply means I take off with 150 lbs. in the tips and pump it into the mains after burning the equivalent amount.

Good Evening Jeb,

Your airplane must be about the same vintage as my son's S35. His gained 250 pounds with the BDS tanks and the weight above 3400 must be fuel in the tips. I would definitely recommend the BDS tanks to anyone with an S35. On my V35B, the BDS tanks, which is what I have, only take the gross to 3550. Osborne tanks would take my airplane to 3600.

I asked Allen one time why this is so.

He told me that he really wanted to go to 3700 pounds, but the FAA inspector who was supervising the flight tests at the time insisted that the flight tests be repeated in increments of fifty pounds for each fifty pounds above the original gross weight. He ran out of money at 3550, so that is what we got!!

Happy Skies,

Old Bob

PS My son's airplane has an empty weight of 2048.5 pounds. The BDS tanks give him a useful load of 1501.5 pounds!!

[ARTICLES/20010318_201412.msg06161.tex]

Gross Weight Increase**Sun, 18 Mar 2001 21:36:58**

In a message dated 3/18/01 7:34:59 PM Central Standard Time, foosej@oz.net writes:

Hi Bob, is not the gross on an "S" 3300, or 3350 and not 3400? That makes the gross with the tips either 3500 or 3550? I think there was something about the reason in Larry Ball's Book. Regards, John

Good Evening John,

The standard gross for the S35 is 3300 pounds. With the current BDS approval, the gross is raised two hundred and fifty pounds to 3550. BDS earlier had an approval to raise the gross to 3400 pounds with the tip tanks, but as of December 17, 1979, it was approved for 3550 provided the proper wheels and tires were installed. It can go to 3400 pounds with the tips empty.

I haven't checked in the last year or two, but last time I DID check, the Brittain/Osborne gross weight approval was for two hundred pounds for the S35. Things may have changed!

With the Brittain/Osborne tanks, the S35 grossed 3500 pounds, but there didn't have to be ANY fuel in the tips to get that gross.

For the V35 and later, Brittain/Osborne had a two hundred pound increase approval but there was a small amount of fuel (I don't remember how much) required to be in the tank to go above 3400.

So, for your V35 and my V35B we get the best gross weight increase by having Brittain/Osborne tanks. The S35 folks get the largest increase with BDS tanks. There is a possibility that BDS MAY get the V35 and later up to 3600, but I don't think they have the approval yet.

They are trying to get the S35 up there too, but it will probably require VGs to do it! Why? Because the airplane they used for those tests had VGs!

Obviously, there is no structural difference, It is just a matter of how the approval was ran through the FEDs. Most of the gross weight increases are based on reducing the structural requirement by changing the category in which the aircraft is approved. That is why Allen felt that the gross should be 3700 (or more)! The biggest problem getting gross weight increases today is meeting the new noise requirements!

Happy Skies,

Old Bob

[ARTICLES/20010318_213658.msg06166.tex]

Gross Weight Increase - Category**Wed, 16 Sep 1998 09:29:28**

Good Morning All,

Yesterday during our discussion of tip tanks, I repeated something that I had heard at STL last week. I should have checked the source before quoting the information.

It would seem that BDS has convinced the FEDs that the A36 wing is strong enough to stand up to the bending loads required in utility category even with the increased bending moment of the tip plate effect of the tip tanks.

This seemed a little odd to me and I was unable to find the verification on the DB MODS or the BDS websites so I called BDS this morning and was told that while the tanks do not have to have fuel in them to go to the higher gross weights, the airplane IS placed in the normal category. I trust that is accurate information.

The DB MODS website shows that the Osborne tanks are the ones that remain in utility category with increased gross weights but all weights above original must be fuel in the tips. The allowed gross weight increases on some 36s is not as great as the BDS tanks either.

I guess any information concerning gross weight increases should be verified by inspection of the approved airplane flight manual supplement. Verbal assurances are easy to misinterpret.

Sorry for any inconvenience this misinformation may have caused.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980916_092928.msg05440.tex]

History**Wed, 21 Oct 1998 09:10:18**

Good Morning Tom,

In a message dated 10/21/98 7:15:50 AM Central Daylight Time, tturner@vol.com writes:

It sounds like you have one of the later iterations of the BDS tip tanks—without the ultra-complicated, five-position fuel selector. You also have a cockpit fuel indicator in addition to the supposed see-through strips on the tanks. I vastly prefer your version to the earlier types.

Pardon me for butting in but I do have tip tanks as one of my primary interests.

I received Ralph's message and your reply of this morning but nothing at all as to what generated the responses. It appears that good old AOL.COM has lost messages for me once again.

Just a little history.

BDS tanks started life as Safe Flight Extenders. They were designed and built by a gentleman back east (Long Island or maybe Connecticut I think) who wanted to eliminate the 20 gallon baggage tank in his C model Bonanza. They were made of aluminum and held a little over ten gallons each. They are easily spotted by the welds which held the two halves of the tank together. The flanges of the two halves of the tank were in the vertical plane and were just torch welded together. Unfortunately a lot of leaks ensued.

Fiberglass tanks were then tried and those started out around twelve gallons slowly growing with later versions to fifteen.

The early Flight Extender tip tanks used various combinations of multiple valves which then fed into the Beech fuel valve used with the baggage tanks through the auxiliary position.

After Allen Peterson (BDS) bought the STC some twenty or twenty-five years ago, he designed the transfer system to feed from the tips to the respective mains directly, thereby eliminating the extra fuel valves or the relatively rare, for Flight Extender/BDS, one unit fuel valve.

Allen tipped the tank on it's side about the time Cessna did the same thing to it's tips, strictly for looks. When that happened, he lost a couple of tenths of a gallon capacity so he made a couple of redesigns and after two or three efforts, went to the size he currently builds which carry over eighteen gallons but are only legally allowed to be filled to fifteen gallons. Shortly thereafter, about six or eight years ago, he started using a different fiberglass product and vacuum bagging which makes a lighter and stronger tank. The new materials are supposed to eliminate any delamination problems which have affected some of the early fiberglass tanks.

Mine were installed in January of 1979 and are showing no evidence of delamination. I have been told that BDS has been known to work out a reasonable exchange deal for the new tanks for those folks who do experience delamination of the old tanks.

The approval for BDS tanks no longer requires the fuel gauge. The experience with leaving an unpainted strip on the tank to ascertain the amount of fuel left has been good enough that the FEDs have approved it as the required fuel quantity indicator.

Personally I think it is the best fuel gauge since the wire on the J-3 and the BDS one never sticks like the J-3 was wont to do.

The Osborne tanks started out as fifteen gallon tanks on a Navion for Dr. Brittain, a dentist who liked to go to the Baja and do free dentistry for the locals.

They eventually grew to twenty gallons and were adapted for use on the Bonanza, Piper Comanche and others.

In the Bonanza the Brittain's were generally installed with a large one unit fuel valve which replaced the standard fuel selector and included the extra valve for the fuel return which appeared on the Beech product some thirty or thirty-five years ago. After Osborne took over production of the tank from Dr. Brittain, he retained the one unit valve until some ten years ago when the price of the valve became prohibitive. At that time, a transfer system similar to the one designed by Allen was offered as a lower cost option. I am not sure whether the one unit valve is even offered anymore.

This has been written rapidly as I have a dentist appointment I must run to now!

If any one spots any errors or has further questions, let me hear about it.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981021_091018_msg06142.tex]

Large Capacity Tip Tanks**Tue, 15 Sep 1998 09:28:53**

Good Morning Once Again Eric,

In a message dated 9/15/98 7:51:40 AM Central Daylight Time, you wrote:

Speculation on what BD'S thinks their market is going to be for 40-gallon tanks that aren't even STC'd is left as an exercise for the reader. ;-)

Allen has made several different size tanks thus far and a few years ago was attempting to get 20, 25, 30, 35 and 40 gallon ones approved. He had the forties on display at the ABS convention in Spokane.

Getting the tanks approved is becoming increasingly more and more difficult. Frank Haile, the gentleman who has built the eleven sets of Dolly Partons that are currently operating in various parts of the world, is the pushing force behind getting BDS to build the forty gallon tanks. That is the size he really wanted when he began modifying surplus drop tanks into the Dollys. The surplus tanks just didn't adapt well to being reduced that much in size.

I do believe there are two sets of the 100 gallon per side tanks that are currently approved in standard category. One is in Germany and the other is in Belgium. They are restricted to fifty gallons maximum per side on those two installations.

One of those belongs to Guenter who asked about manpower flat rate times a few days ago so he might comment here!

I spoke to Mike Trudeau (Allen Peterson's DER at BD'S) and Frank Haile at STL. Both said that certification of the forties is still under consideration but not likely in the current FAA environment.

Happy Skies,

Old Bob

[ARTICLES/19980915_092853_msg05396.tex]

Large Capacity Tip Tanks**Mon, 19 Mar 2001 08:05:40**

In a message dated 3/19/01 5:44:30 AM Central Standard Time, epoule@scoot.netis.com writes:

I think it was Scott who told me, a year or two ago, that they had some 40-gallon tanks that were either in the fabrication stage or were ready for test flight. But the odd thing was, they had no plans (at the time) to STC them. They were going to offer them for ferry-permit flights across the ocean, then when you get where you're going you take them off and re-install your old wingtips or STC'd tip tanks.

Good Morning Eric,

I don't have all of the details, but I think you will find that those tanks were made by BDS under the sponsorship of Frank Haile of Dolly Parton or Texas Tips fame. I missed seeing them, but was told BDS had a set of them at one of the ABS conventions, possibly the one in Spokane.

It doesn't take a whole lot of work to make up a set of forms to make such tanks. The big hang up is the certification costs.

BDS has also made a set of forms for, and a least one set of, the 100 gallon per side tanks, in cooperation with Frank. They used a set of his modified drop tank Dolly Partons to make the mold.

Four or five years ago, Allen was telling of a project that was to provide a series of tanks all of the way from 15 up to 40 gallons per side in five gallon increments. Supposedly, he had convinced a FED that he could do the approval with the forty gallon tanks and it would apply to the entire series. Evidently, that contact with the FEDs didn't work out as planned, but I think that was the reason for building the forty gallon set.

He made a 25 gallon per side tank a few years ago which was almost the same shape as the standard BDS tank but had an extension which fit inside the outer bay of the wing tip. He had another project where he made a whole new fiberglass leading edge D tube which, when combined with the standard BDS tip tanks, runs the total fuel capacity up somewhere around 150 to 160 gallons.

Lot's of R&D with Allen Peterson!

His company has been close to bankruptcy several times. Many people feel that his mind is so busy thinking of ways to improve his product and come out with new gadgets that it is hard to sell what he has. Everyone wants to wait for something that is "about to be certificated."

It was expensive R&D that put Mike Smith out of business!

We are fortunate that there are people like Allen willing to try new things that don't

often become financially profitable items.

Happy Skies,

Old Bob

[ARTICLES/20010319.080540.msg06195.tex]

Plumbing**Sat, 6 Sep 1997 10:08:47**

P.S on the fuel flow.

I believe that the S35 was the first one with a double valve unit One valve on top of the other in a single casting. I am sure that all of the V35s had that arrangement.

When you switch to the left main the return line is directed to the left main and when the right tank is selected, the fuel return is directed to the right main. On the S35s , V35s and V35As that I have had with tip tanks things were a little different. There are several different metods of plumbing tip tanks but all that I have owned with brittain tanks have had the return line fed to the left main any time that you were on the tip feed.

My current V35B has the tips transfer to the respective tank, right tip to right main and left tip to left main.

There are advantages and diadvantages to both systems. The main thing is to be sure you understand how YOUR system works.

As always,

Bob

[ARTICLES/19970906_100847_msg01670.tex]

Plumbing**Wed, 20 Dec 2000 18:40:55**

In a message dated 12/20/00 2:44:28 PM Central Standard Time, Jeff_Kinder@oes.ca.gov writes:

I have a few questions that I hope you can help with. The M35 I just purchased, has the Beech/Brittain wing tip aluminum tanks #55000. I have the 337 and flight manual supplement for this, but there is not enough detail to answer my questions.

Good Afternoon Jeff,

Welcome to the Wonderful World Of Bonanza Ownership!

While there will be some difficulties answering your question due to potential differences in the type of valves and plumbing installed on your M35, I will be happy to comment based on what I have read thus far. If this does not seem consistent with the what you see on your aircraft, please question further.

First, I have 2-25g mains and the 2-10g aux tanks. I was told that these tip tanks feed into the aux tanks, correct?

That is highly unlikely, but not impossible. The Brittain tip tanks were not offered as an option on your airplane, so were obviously installed as an aftermarket item. Several different valving systems were tried by different installers, but I have never seen one in which the tip tank fuel was transferred to the aux tanks before use.

There were a few where another valve was added which had three possible positions. Left Tip Tank, Combined Ten Gallon Wing Tanks (they feed together as a single tank if the flapper valve is working correctly, but that's another story) and Right Tip Tank. The output from that valve was then led into what had been the single aux tank inlet on the factory installed fuel valve.

The newer version of the Brittain tank is manufactured by Osborne. The other system readily available is the one currently made by Beryl D' Shannon.

Most of the newer BDS systems use a transfer system whereby fuel is fed by a small transfer pump from the individual tip tank to the main fuel tank on it's respective side.

The Osborne and Brittain tanks generally have a valve with multiple ports whereby the engine may be fed directly from the tank selected. Osborne has been offering an option for the last ten years or so of using a transfer system similar to the majority of the BDS installations.

Rate of Feed?

If your system is one where the engine feeds directly from the fuel tank selected, it will feed the fuel as fast as the engine wants to use it!

If your system uses a transfer pump to move the tip tank fuel to another tank, they usually transfer at the rate of approximately fifteen GPH per pump. The rate of transfer can vary from around twelve to as much as eighteen though.

I was told that the overflow from these would flow into the left main tank, correct?

I think we must define what we mean by "overflow"!

If any of the tanks, Tip, Aux, or Main is overfilled, the surplus will drain overboard and be lost.

If we are discussing the fuel which is returned from the fuel injection system to the fuel supply source, that is something else!

There is a double valve arrangement on the factory installed primary fuel selector which directs where the excess fuel from the fuel injection system goes. If the engine is being fed from a Main tank, the excess flow will be directed back into the tank which has been selected.

If the engine is feeding from the two combined aux tanks, the excess flow will go to the Left Main.

If your airplane has the valve which allows you to select the Tip Tank directly or through the aux position of the primary factory installed fuel valve, the excess flow will go to the Left Main.

I am transitioning from a C182 and having lots of fun learning new ways to embarrass myself in front of my instructor. I really like this airplane a lot! I used to fly with my dad in his '47 model 35, but is a whole bunch different now from the left seat rather than the right.

There is nothing else which flies and handles as nice as those early straight 35s, but the newer Bonanzas do have some speed and payload advantages. I am sure you will enjoy the M35. The tip tanks may slow you down a knot or two, but they really add a lot to the flexibility of the aircraft.

Depending on the plumbing installed in your aircraft, fuel management of the six tank system can be something of a challenge, but not really difficult.

I hope this is of some help.

If It is just confusing, give me as much information as you can and I will try to answer your question.

Happy Skies,

Old Bob

AKA Bob Siegfried Ancient Aviator

[ARTICLES/20001220.184055_msg18136.tex]

Pros and Cons**Sat, 6 Nov 1999 02:22:22**

In a message dated 11/5/99 5:11:39 PM Central Standard Time, jtsmall@onramp.net writes:

Bob, do you have tip tanks on your V35B? One minute I see advantages in them, the next I see only disadvantages. What is your take on the pros and cons of adding this somewhat expensive option?

Thanks.

-jts

Good Morning John,

Do I have tip tanks? Yes. My airplane had BDS tanks on it when I bought it. They were installed in January 1979 when the airplane was just a couple of months old.

What do I consider the pros and cons?

As always, it depends! It depends on the use to be made of the airplane. If your operation includes a requirement for long stage lengths, maybe over water or over very inhospitable terrain, then I don't think there can be any question that tips are almost a necessity.

Another pilot who regularly flies over extensive low ceilings far from good alternates would also find good use for the extra fuel. It is very comforting to be sitting on four hours of fuel when the ceiling is indefinite two hundred with visibility at 1/2 variable 1/4 to 1/2. Such conditions are often found in the midwest where the closest decent alternate is two to three hundred miles away.

But even if long range is not important to you, possibly the convenience of being able to ferry fuel into that neat back country fishing hole might make the acquisition worthwhile.

I have done a fair amount of flying in the Bahamas and the Caribbean. It is not unusual to arrive at an airport only to be informed that the last aviation fuel was sold an hour ago and the next shipment won't be in for a week or two.

I can't imagine me not having tip tanks on the airplane considering the type of things for which I use the airplane!

NOTE: The following paragraphs are based on data that was applicable the last time I checked the appropriate tables. Certification status does change and either or both manufacturers may have different numbers available at this time.

Another good reason for buying tips is if you need a little extra legal payload capability. Suppose you have an S model Bonanza. You could add BDS tip tanks and gain 226 pounds of useful load. The GW increase is 250 pounds and the tanks only weigh 24. You would have to carry twenty-five gallons in the tips to get the full GW increase and there

is that stupid requirement for 26 gallons in the mains for takeoff, but that would mean that everything else could be payload. I had a fairly well equipped S model many years ago with an empty weight of just under 2100 pounds. With BDS tips you could carry that 51 gals of fuel plus 1144 pounds in the cabin. That's four hours of fuel at about 60% power. Pretty spectacular numbers! Should you elect to use the Brittain/Osborne tanks, the gross would only go to 3500 pounds, but you wouldn't have to carry any fuel in the tips to get it. You would have a useful load of 1400 pounds, subtract the minimum takeoff fuel of 26 gallons and you would be able to carry 1244 pounds in the cabin but with only a little over two hours of fuel available.

If you have no need for long range, don't fly into low ceilings, have no need to ferry fuel and little need to haul heavy payloads, then there is no reason to purchase tip tanks!

Tom Turner did some tests a few years ago that showed a considerable loss in take off and climb performance following a tip tank installation. I have always felt there was very little performance penalty with the tips, but I have never done any scientific measurements. It would be interesting to do so.

I like them so much that I would still have tips even if it meant the loss of a couple of knots of cruise. I don't think there is that much loss, especially at the cruise speeds I usually fly, but I sure don't know!

Incidentally, I like my BDS tanks, but if I were buying tanks for my V35B, I would buy the Osbornes. They give fifty more pounds of GW increase and hold ten more gallons total than the BDS ones. If I had an S35, my choice would be the BDS units.

If one is purchasing tip tanks, it is important to evaluate them based on your individual airplane and to look carefully at what the approval status is for each manufacturers product.

I believe my choice for the P model would be the BDS.

Happy Skies,

Old Bob

[ARTICLES/19991106_022222_msg10220.tex]

Stability**Sat, 6 Nov 1999 10:27:20**

In a message dated 11/6/99 8:11:43 AM Central Standard Time, jtsmall@onramp.net writes:

One thing I particularly note you did not include is stability. I have been told by one owner of the Osborne tanks (on a J35, retired Eastern Airlines pilot) that he keeps them 1/2 full for the added stability. Both in roll and tail waggle. I have also been told by others that the roll is less responsive with tip tanks and that they saw no difference in the waggle.

Let's say they do help with tail waggle. Would this effect be sufficient to make adding a yaw damper moot?

Have you an opinion on these properties?

Thanks.

-jts

Good Morning John,

You know I have an opinion!!

There is an effect on roll and it is variable depending on the amount of fuel in the tanks. More fuel and it takes more effort to get the wing rolling and more effort to get it stopped once it is rolling. (If you are flying an aerobatic aircraft, the "carry through" in an aileron roll is cool!) I don't consider it enough different to have that factor enter into the decision as to whether or not I have fuel in the tips. If I anticipate flight into turbulence, I will tend to keep the fuel in the tips as long as practical to gain the extra strength that full tanks provide.

As to an increase in yaw stability, I haven't made any effort to document a difference, but I would imagine there is some effect similar to that in the roll mode. It might take a little more to get things swinging and would likely take a little more effort to get things stopped!

All of this is highly speculative on my part. I don't notice enough difference such that it would enter in any decision to purchase or not purchase the tips.

I have an electronic yaw damper on my airplane and feel that it does almost as good a job of stopping yaw as I can do if I place all of my attention to that task. It does a WHOLE LOT better job than I do most of the time. I would comment that I don't think the skeg is worth the trouble of putting it on. It adds weight where it isn't needed, makes it difficult to inspect the tail, interferes with the tail tie down ring and interferes with cleaning the belly. Holding the rudder pedals still will do as good a job as the skeg. In fact, the directions that come with the skeg state that you should hold the rudder pedals still to gain maximum effectiveness.

Once again, the effect of the tip tanks on yaw stability is, to me, insignificant.

Happy Skies,

Old Bob

[ARTICLES/19991106.102720.msg10231.tex]

Stability**Fri, 16 Mar 2001 20:16:48**

In a message dated 3/16/01 6:46:32 PM Central Standard Time, res02xmz@gte.net writes:

How do some of you other people with tip tanks feel it affects the roll feel?

Good Evening Dave,

When the tanks are full, there is a definite heavier feel to the airplane. The ailerons actually are slightly more powerful, due to the tip plate effect, but it takes longer to get the extra weight moving. Once it is rolling, the roll rate is possibly even a little higher than before. I haven't measured it, but it does feel that way.

Back in the days when I was stupidly doing such things, I found that aileron rolls with the tips installed were even easier and nicer than with the tanks off. With the tanks full, it provided a nice fly wheel effect that made for a beautiful roll.

Happy Skies,

Old Bob

[ARTICLES/20010316_201648.msg06006.tex]

Tip Tanks Provide Lift?**Thu, 4 Nov 1999 13:55:47**

In a message dated 11/4/99 6:50:36 AM Central Standard Time, epoole@scoot.netis.com writes:

The way it was explained to me by Scott Erickson or Dave Biggerstaff, I forget which, was that the tanks are designed to provide enough lift to support their own weight at cruise when full.

Good Afternoon Eric,

I am afraid that is a bunch of salesman hyperbola. The approval is strictly based on structural and other certification data. The change in lift distribution on the wing is a function of the tip plate effect and only serves to DECREASE the structural integrity when the tank is empty. The structure is plenty strong enough on most models so that the redistribution is not a problem, but that is why there are so many different weights and approvals for the different models of the airplane. It is also a factor in whether or not fuel is required to be boarded to attain the increase. Even with that, a lot of the restrictions are based on very little engineering analysis. It depends on the inspector assigned by the FAA and how the applicant wants to develop the data.

I think you will find that any increase in lift was a fortuitous event, though the effect was expected.

Happy Skies,

Old Bob

[ARTICLES/19991104.135547.msg10157.tex]

Tip Tanks Utility**Mon, 12 Jan 1998 08:28:35**

Good Morning Paul,

I am of the opinion that tip tanks are a marvelous addition for most any Bonanza, Debonair or Model 36.

It isn't just the additional range but the ability to "tanker" fuel into those interesting but off the beaten path destinations and the comfort that comes from having two to four hours of fuel on board when executing a low approach to an airport with the nearest good alternate an hour or two away.

I have had both Brittain (Now Osborne) and Beryl D' Shannon (Was Safe Flight Extender) tanks on various personal airplanes and like them both. The Osbornes are aluminum, very well made and hold twenty gallons each. The BDS tanks are fiberglass, seem to be adequately constructed and are certificated for fifteen gallons each. It seems that most of the newest ones will actually hold a little over seventeen gallons each though they are not certificated for such.

Gross weight approvals are available with the installation of both manufacturers tanks. The amount varies with different airplanes and approvals so you need to research which tanks will do what to your airplane. Incidentally the gross weight approval is generally allowed because of the change from the utility category to the normal category. There are some cases with the tip tanks empty where the bending loads are increased and other points (especially when the tanks are full) where the structural integrity of the aircraft is increased.

Both manufacturers have had direct tank to engine fuel selection available in the past. Both are now offering pumps to transfer fuel to their respective mains which is much cheaper and has certain operational advantages.

Back to usage. Thelma Jean and I left Chicago for Tucson last Wednesday and arrived there seven hours and fifty minutes later with sixteen gallons still on board. We don't normally make that long a flight due to the necessity for comfort stops. We have on occasions made stops where the need for comfort was immediate and no service was available. It was nice to have plenty of fuel to be able to fire up and proceed to our destination without having to stop again for fuel.

On Sunday we returned from Tucson to C24 with a flight time of eight hours wheels up to touch down. Since the weather was a little more of a concern, we used economy cruise and arrived home with twenty gallons on board.

Pretty fabulous transportation capability for an old man like me.

My current airplane has eighty gallons in the mains and early fifteen gallon BDS tips. Total one hundred and ten gallons.

Look them both over and if you still have questions let us all know.

Happy Skies

Bob Siegfried

[ARTICLES/19980112.082835.msg00251.tex]

Tip Tanks Utility**Tue, 24 Mar 1998 23:41:23**

Good Evening Eric Poole,

In a message dated 98-03-24 21:17:07 EST, you write:

and while I haven't seen any claims one way or the other I can imagine a few knots speed loss with the tip tanks (extra drag, etc.).

On the other hand, I get another 200 lbs of gross weight with the tip tanks.

I feel that the tip tanks are the single finest improvement you can make to your airplane. You get an immediate increase in useful load of around 176 pounds. 200 increase in gross less the weight of the tanks and pumps etc.

I have had several airplanes equipped with tip tanks and have never been able to establish a finite reduction in speed. I have heard tales of a two mph loss at high indicated airspeeds and a draw at lower indicated speeds. I am convinced there is no more than a two mile per hour loss, if that.

The gross weight increase alone is worth the price but it is awfully comforting to have flown a two or three hour flight over marginal weather to an approach that may be missed and know that you still have enough fuel on board to hold for an hour or so, divert to an alternate two hours away and still arrive at your alternate with an hours fuel on board.

If you don't feel comfortable flying your single engine airplane in that type of weather, the tip tanks often come in handy to ferry fuel to some of those interesting out of the way fields that do not have fuel available.

A couple of years ago my wife and I flew our Bonanza from the Chicago area to Basin Harbor, a resort just south of Burlington Vermont. A very nice place with a beautiful sod strip but no fuel available. After a few days we went on down to Myrtle Beach S.C. and still had a couple of hours fuel on board on arrival. We have flown many trips to Mexico and the Caribbean where airports that were supposed to have fuel ran out just before we got there.

Having plenty of fuel on board for arrival was always nice.

Another problem that I have noted in recent years is the problem of finding adequate fuel stops for flight at night around the US. If fuel is needed at 10 PM or midnite, it is often necessary to call someone out to the airport or divert far off the desired course to find fuel. Once again the advantage of being able to ferry fuel becomes very nice to have.

I suppose if one never flies in bad weather, at night or to places that may or may not have fuel available there really isn't much reason to buy tip tanks but for the way we use our airplane, they are essential. I just wish I could afford bigger ones!

Incidentally, this subject has been thoroughly discussed over the past few months on this site and I suppose further research could be done in the Beech- Owners archives.

If they are within your budget, buy them!

Happy Skies,

Bob Siegfried

Ancient Aviator

[ARTICLES/19980324.234123.msg01362.tex]

Tip Tanks Utility**Tue, 15 Sep 1998 11:13:11**

Good Morning J Downen,

In a message dated 9/15/98 9:31:04 AM Central Daylight Time, Jdownen@aol.com writes:

As the owner of a "StretchDebbie" with GAMIs, I can only marvel at the range my plane would have with tip tanks and running LOP.

Your airplane is truly a magic carpet now. I once flew a 36 equipped with BDS 15 gallon tips nonstop from Puerto Rico to Tampa Florida and still had adequate reserves. Great fun! (And that was before GAMIs.)

I think the most useful function of the tip tank is the ability to tanker fuel. Many times in the Bahamas I have arrived at my destination only to find out that they were out of fuel and none would be available till the next mail boat came in. The tips allow me to arrive with plenty of fuel to make it back to Nassau or someplace else that will likely have fuel. A few years ago we met friends at Basin Harbor Vermont for a few days relaxation and then flew on to Myrtle Beach, SC for a flyin. The fifteen gallon tips on my V-tail provided plenty of range to go from Chicago to Basin Harbor and then on down to Myrtle Beach with IFR reserves. (No fuel available at Basin Harbor.)

Do you know which tank system is better for weight increase for the A-36?

As of the DBS MODS webpage dated March 16, 1997 (<http://www.dbmods.com/index.html>) the BDS units seem to have the edge. You get the gross weight increase without having to have fuel in the tanks.

I had BDS on my M35 and had no problems. I had a gauge installed in the cockpit that reliably told me where my tip tank fuel was. They fed directly into my mains. My aux tanks were another story, though. I miss a lot of things about my M35 but the labyrinthine fuel system is not one of them. I like the 80 gallon two tank system I have now.

It is nice. Especially now that we have such accurate and reliable electronic fuel flow units available. My middle son has a J35 with the same tanks as your M35 and he is planning on adding tip tanks soon. I came up with a method to use the tip tank transfer pumps to transfer the aux tank fuel that I think is pretty neat. I contacted Mike Trudeau of BDS to see what his thoughts were and he informed me that Allen Peterson had come up with the same idea several years ago but decided the market was too small to bother with approval. Mike thought it was a good candidate for a local approval.

Happy Skies,

Old Bob

[ARTICLES/19980915_111311.msg05409.tex]

Tip Tanks Utility**Tue, 15 Sep 1998 14:02:35**

Good Afternoon Scott,

In a message dated 9/15/98 11:49:29 AM Central Daylight Time, sderrick@yahoo-eng.com writes:

I own a straight 35 and am ready for a pit stop way before the 54 gals are close to mins....

To my knowledge the straight 35 is not approved for any gross weight increase by either tank manufacturer. In fact, the only approval I am aware of is the one by Safe Flight Extenders (Now owned by BDS). It is my recollection that the gross weight with the tip tanks empty is reduced to 2435 and all weight above that amount must be fuel in the tip tanks whenever they are installed. Thus you must have a little over nineteen gallons in the tips to go to 2550 gross. To that must be added the minimum fuel in each main required by the so-called slosh problem.

All of the later (A model on) airplanes gain a substantial amount of legal payload capability by adding tip tanks. For some people on certain airplanes such as an A36 with BDS tanks, that can amount to around a 176 pound increase in payload if they never put a drop in the tanks.

It is by far the cheapest per pound price of additional legal payload that I am aware of. BDS's vortex generator approval may be better, but I don't have the numbers available.

As I have stated often today, I think tankering fuel is the point I like best.

It is nice to arrive in a place that is down around minima and the nearest good alternate a couple of hours away with four or more hours of fuel still in the wings.

I have found that fewer and fewer airports are available for refueling late at night. I have made pit-stops where if I needed fuel it would have been necessary to get someone out to the airport in the middle of the night, often at considerable expense or at least at considerable inconvenience to the person who would come to provide me fuel. With the tips, I can make a comfort stop and then press on.

For those who have little need for more payload, never fly to remote areas, don't use airports with no fuel facilities, aren't comfortable on long range flights, prefer not to fly at night or over extensive low ceilings, the tip tanks don't make much sense. For me they add tremendously to the flexible use of my airplane.

Happy Skies,

Old Bob

[ARTICLES/19980915_140235_msg05417.tex]

Tip Tanks Utility**Wed, 21 Oct 1998 11:26:20**

Tom:

Back from the dentist and still able to navigate!

I have owned several sets of Brittain (now Osborne) tanks over the years and still think they are the best built tanks available. I also like the twenty gallon feature. If someone had thirty gallon tanks available I would buy them! Back before we had such fine electronic fuel flow gauges, the ability to run each tank dry separately so as to accurately gauge the amount of fuel burned and fuel remaining was a great feature and I really liked the single valve unit used.

The current feelings about running tanks dry being what they are, it is an advantage to have the transfer capability. I have been working on a procedure where we could use the transfer pumps to take the fuel from the aux tanks on my sons J35 instead running on the aux tanks simultaneously as we do now. As you know, there is often a problem getting the aux tanks to feed evenly on those airplanes so equipped.

When I purchased my current airplane, I considered the BDS tanks to be a negative and considered replacing them with Osborne units.

I have been pleasantly surprised with the installation and the tanks. The transfer system has been much more reliable than I thought it would be. With further evaluation of the tanks presently available on the market, I feel that it is primarily a matter of what the gross weight approval is for the individual airplane. I would look at both and choose the one that gained the most for the individual model of Bonanza concerned.

While I am very pleased with my BDS tanks and the folks at BDS, I would probably buy Osborne's for my V35B if I had none presently installed. The approval would give me fifty pounds greater gross weight and they carry ten more gallons.

If I had an S35 I would seriously consider the BDS tanks as they provide a 250 pound increase on that airframe.

For my son's J35, the logical choice would also be the BDS units as the gross weight increase is greater than the Osborne and is available whether there is fuel in the tanks or not.

Once again, it is important to evaluate both and choose the one that fits your desires best.

Both are excellent products.

Happy Skies,

Bob

[ARTICLES/19981021.112620.msg06148.tex]

Tip Tanks Utility**Sat, 6 Nov 1999 12:10:06**

In a message dated 11/6/99 8:03:31 AM Central Standard Time, jtsmall@onramp.net writes:

I do fly long legs, IMC/night and over inhospitable terrain. I would like to have the capacity for four adults (heavier than the std FAA adult) and baggage.

Good Morning John,

Flight at night is another phase where I find the tip tanks helpful. It fits into that 'ferrying fuel' category.

I find that there are not as many refueling operations available around the country after sundown as there were twenty or thirty years ago. The long range of the corporate fleet has made it uneconomical for many FBOs to maintain an allnight operation. I find that my wife and I will often make a comfort stop along the way where no fuel is available. Being able to carry enough fuel to get through the night is very helpful, though the legs may be short. Even if fuel is available, there is often a charge made for the fueler to come to the airport. I don't think such a charge is unreasonable, but if I don't have to pay it, so much the better!

Incidentally, There is something else I should mention which might be of some influence in the decision as to which tank to purchase. The older BDS tanks, such as I have, seem to have a limited life. Many have started to delaminate and cause other difficulties. They do not hold any more than fifteen gallons and some are even a couple of tenths below that. The newer BDS units are made of a lighter and stronger material which should have a much longer life. They hold seventeen to as many as eighteen gallons, though it is only legal to put fifteen gallons in them. I think the Osborne tanks are a more sophisticated construction and look a little more substantial, but I have had excellent service from my old tanks and excellent cooperation from BDS. I like both products and the principals at both companies!

The last time I spoke to BDS, (around Oshkosh time) they said they had twenty-five gallon tanks close to an approval!

I think it would be great if that happened. I would imagine we would then have a battle between Osborne and BDS to see who could get the biggest tanks approved and that would be good for us all.

Allen Peterson, the gentleman who owns BDS, told me many years ago that he felt the late Bonanzas should be able to be approved to at least 3700 pounds. The Part 36 noise restrictions may stop that from happening, but it would be nice.

Even at the currently approved weights, I find that my wife and I plus baggage normally places us well below gross. Thirty gallons on a side, sixty total in the tips would be just

perfect for us!

I would like to see a ten gallon plug stuck in the middle of the Osborne tank. Think how classy a long tank like that would look!!

Allen has made some forty gallon tanks, but they are not yet approved.

Two inches added all of the way around (four inch greater diameter) would make the BDS tank a thirty gallon tank with the same length as the current unit!

Enough rambling for Saturday morning.

Happy Skies,

Old Bob

[ARTICLES/19991106.121006.msg10233.tex]

Tip Tanks Utility**Thu, 22 Jun 2000 10:59:59**

In a message dated 6/22/00 9:13:11 AM Central Daylight Time, spindel@mindspring.com writes:

The main advantage of more fuel capacity for most folks is the ability to travel on days of widespread IFR wx and have legal alternate fuel. Days when the wx is widespread between 500-800 and vis between 1-3 miles precludes airports from being listed as legal alternates for flight planning purposes. We never intend to fly more that a couple of hours, but the closest legal alternate may be 400 miles the other way, and into headwinds. Kind of like an emergency fund.

Stuart Spindel A&P IA Baron E-55 (IO-550 powered) Stuart Spindel A&P IA

Good Morning Stuart,

I agree wholeheartedly that the primary advantage is in being able to name a good alternate, but I feel that other advantageous uses are often overlooked.

There are many destinations where the ability to ferry in enough fuel to get back out of town again is very helpful.

The obvious ones are places like some of the Bahamian Islands where the availability of fuel is often tenuous or some of the nice fishing holes in Canada and elsewhere where fuel is either not available or extremely expensive.

Not so obvious are resorts such as Basin Harbor, Vermont.

That is a very nice destination, but (at least the last time we were there) fuel is not available. It is nice to be able to leave without having to make a stop just to get fuel.

The physical requirement for a comfort stop is dependent on the individual pilot and passenger mix. I find that it varies for my wife and me. We will often start out with a plan for a long nonstop trek and then decide in an hour or two that a comfort stop is advisable.

There have been occasions where the place we picked to stop had no fuel available. Sure was nice to be able to continue the trip to our destination without having to make an extra stop just for fuel.

Another way to put it is that you don't have to worry about whether or not your comfort stop has fuel available!

These days, the price of fuel can be a consideration. While I would rarely land just to get low priced fuel, if a fuel stop is required before the destination, it is advantageous to be able to pick a refueling spot that has an easy in and out along with reasonable fuel prices.

The more one flies an airplane that has such great fuel flexibility, the more that flexibility grows on you!

Happy Skies,

Old Bob

[ARTICLES/20000622_105959_msg09991.tex]

Tip Tanks Utility**Sat, 27 Jan 2001 23:21:05**

In a message dated 1/27/01 9:29:14 PM Central Standard Time, jtsmall@onramp.net writes:

Ok, I understand. However that was the tone of the message from my mechanic as I understood it. Of course the major impediment remains the \$10k asking price!

Good Evening John,

Nice to have you active again!

The tips are not cheap, but, depending on your need, they can be a very wise investment.

If you fly the type of IFR which require alternates a long way from your destination, the tips may allow operations that could not otherwise be conducted in a Bonanza.

If you fly to points off the beaten track, the tips allow you to make those flights without the need to pick up fuel at those remote destinations.

If absolute maximum payload capability is important, the tips cost less per pound of allowable payload than any other expenditure you could make.

The tips make sense to me for my type of flying. They are not for everybody.

If you have no need for additional range and no need for additional payload, the tips are just unnecessary drag and weight.

Remember that the additional payload does not come without cost.

Beechcraft lists the S35 as being two knots faster than the V35. The only difference between the two, which would affect the speed, is the increased gross weight. The extra one hundred pounds slowed the airplane down two knots. If you have a V35B equipped with Brittain Tip Tanks, the new max gross is 3600 pounds. It would be reasonable to expect that the airplane would possibly be as much four knots or more slower at 3600 pounds than it would be at 3400.

If you want a fast airplane, keep it light. Even the best rigged and lowest drag airplane is going to be slowed down when it is heavy.

Your airplane with an IO-550, 409 prop and no tip tanks would undoubtedly run the pants off of my old V35B, even with the same load aboard, if for no other reason than your airframe is likely to be a couple of hundred pounds, or more, lighter than mine.

Every time you add a new toy without removing anything, the airplane gets slower!

Happy Skies,

Old Bob

[ARTICLES/20010127.232105.msg02050.tex]

Tip Tanks and Three Bladed Prop**Tue, 20 Jun 2000 15:49:17**

In a message dated 6/20/00 2:37:23 PM Central Daylight Time, elivermo@ktc.com writes:

Seems as if I heard a story once that the propeller on an A36 was an important factor with tips...also, that gap seals were also key. Any thoughts on this?

Ed

Good Afternoon Ed,

I have heard some stories concerning aileron flutter or, at least, a little buzz when the tip tanks are combined with a three blade. I have had several airplanes with the three blade and once had a four blade. I never noticed any unusual vibration. Additional balance weights are required on the ailerons for some installations.

I have never noted a problem with an airplane with gap seals, but I haven't flown all that many which were so equipped.

If a problem does occur, I think it could be easily rectified. There are enough of them out in the field that whatever is causing a vibration must be easy to fix.

Happy Skies,

Old Bob

[ARTICLES/20000620.154917.msg09945.tex]

Wing Strength

Sat, 26 Jul 1997 09:19:21

Hi Tom,

You're thinking, but you need to keep going.

The weight in the wing tip tanks decreases the bending moment at whatever point you decide to use for analysis. (I must step carefully here as I am not an engineer and I know the professionals can eat me alive here if I am not careful.) The usual point for consideration is at the wing root. Draw a little chart or vector diagram using that point as a fulcrum. You will note that weight added at the tip will counteract weight in the fuselage thus making the airplane stronger when the tanks are full.

All modern transport aircraft that I am aware of use this factor in their structural calculations. Most have a "Zero Fuel Weight" number and all weight above that figure must be fuel in the wing tanks, the closer to the tips the better!

In another life I had the opportunity to fly the French built Caravelle transport. It was equipped with small wing tanks within the wings but located as far out as possible. (I think they were around 500 gallons on a side), when those tanks were full our red line was 50 knots faster than when empty so we carried them full all of the time and never used that fuel except in an extreme need situation. In fact we had a schedule for draining the tanks and refilling them during ground maintenance so that the fuel wouldn't go bad!

Now back to the present.

There is an increase in the bending moment on the wing when the tip tanks are empty.

That is caused by the increase in efficiency of the outboard section of the wing due to tip plate effect This moves the center of lift on the wing panel outboard a little bit which increases the bending moment at the fulcrum. It can be compensated for by decreasing the allowable fuselage load sufficiently to counteract the longer moment arm. I have been told that it takes approximately a four percent reduction of the gross weight in the Bonanza (or Debonair or stretch Debonair) to compensate for this increased bending moment.

The reason the airplane is taken from the utility to the normal category is to avoid the structural analysis and testing that would be necessary to prove that the four percent was not a problem for the Bonanza airframe. It also allows an increase in the gross weight on some of the airframes. The straight 35 with early Safe Flight extender tip tanks was restricted to 2435 gross with the tanks empty instead of the normal 2500.

Very roughly and simplistically if you multiply the gross weight of your airplane by 4.4 then divide that figure by 3.8 and then divide that by 1.04 you will arrive at what loads could be carried and still meet the normal category requirements.

I hope you aeronautical engineers out there will forgive my pilots view. I know there are

a lot of dynamic loads and other stuff to be considered but it seems that an explanation such as this usually works for us aviator types.

As for gust load considerations, I would suggest you read "Aerodynamics for Naval Aviators". It has an nice readable section on that subject.

Have fun,

Bob

[ARTICLES/19970726_091921_msg01371.tex]

4.13 EQUIP-TOW

Winching the Airplane**Wed, 12 Jan 2000 14:42:09**

In a message dated 1/7/00 11:16:59 PM Central Standard Time, calyoung@flash.net writes:

Thanks for the ideas on towing back into a hanger. I planned to use a bridle on the mains, but like Howard's idea of letting the nose gear take the load and the tail tiedown acting as a guide.

Good Afternoon Cal,

I know I am a few days late reading your message, but I would like to comment!

I would not recommend putting any appreciable strain on the nose gear mechanism without that force being applied via the shear pins that are designed to break if the forces applied are too high.

I especially don't like the thought of those forces being applied backwards!! The factory did begrudgingly supply an information letter about thirty or forty years ago with a figure for an allowable pull on the tail tiedown fitting. I believe it was for something like a five hundred pound pull maximum.

The best bet is to pull backwards via the main gear and the older manuals do have a description of the sling required and the fittings necessary to fit in the axle stubs.

Glad to hear that the Debbie is still going strong!

Happy Skies,

Old Bob

[ARTICLES/20000112.144209_msg00677.tex]

4.14 EQUIP-TURBO

Configuration**Sat, 9 Aug 1997 13:59:18**

Interesting comment on the Turbo-normalizer, George.

I have found that you are generally right and I don't wish to question your conclusions, BUT back when I was taught such things we were told that the reason for using a reduced compression ratio in supercharged engines was that you could recover the lost cylinder pressure by using some boost and the engine would breath better and have a better SFC at the same cylinder pressures that you would get with the higher compression ratios.

As to the Cessna style turbo used by the Pagosa Springs troops, it is my understanding that it uses a high upper deck pressure at all times which leads to considerably less efficiency than the Beech style variable controller. Back in the olden days when I was selling Bonanzas the addition of turbocharging on the 210 cost about \$3000.00 and the one on the Bonanza cost \$7000.00. When I complained about the cost differential to Beech I was told the the \$4000.00 was strictly the cost of the more efficient controller that Beech used. The turbos were the same.

I would think that the most efficient setup would be the low compression engine combined with a "Rajay" style manual waste gate controller. The next best would seem to be the manual controller used with a normal compression engine as that wouldn't require any additional boost to get full takeoff power and it would not have the loss associated with the high upper deck pressure.

The Beech system seems pretty good but it is VERY expensive and can be a bear to maintain.

When I have asked Van about using a manual controller his comment was that they wanted to make the system "idiot proof". I really don't think we want idiots flying the airplane.

I think you already know that I feel your injectors go right along with tip tanks as equipment that I can't figure out why everbody doesn't have. They work great!

Always enjoy your comments.

Bob

[ARTICLES/19970809_135918_msg01511.tex]

Turbonormalizer**Sun, 27 Feb 2000 14:35:40**

In a message dated 2/27/00 1:00:52 PM Central Standard Time, jtsmall@onramp.net writes:

The TN is somewhat more complex?

If by TN you are referring to a TurboNormalizer, that term refers to the idea of never boosting the engine above the manifold pressure that it would get from ambient pressures at sea level.

The Beech and the Cessna factory setup is not really a Turbo Normalizer.

The Turbo Flite and the one currently offered by George Braly are turbo normalizers as was/is the RAY JAY.

Both Beech and Cessna have used a Continental engine that had a lower compression ratio and was "Boosted" by the supercharger to bring the horsepower back up to the power that would have been available with the compression ratio normally used. That would be considered a supercharged engine. It was generally referred to as Turbo Supercharged to differentiate from gear driven supercharged engines. Remember the designations of TSO and GSO on various engines?

My recollection is that limiting manifold pressure was in the range of 32 to 34 inches to get the normal rated power out of the Turbo Supercharged Continental engines used by Cessna and Beech.

Turbo normalizing can be done by any of several methods, the one used by TurboFlite was the same as that used by Cessna. Ray Jay installations were primarily manual waste gates though they did some work with automatic devices.

The Piper Twin Comanche was one of the airplanes that had the manual waste gates. I believe the Mooney used the manual waste gate for turbo normalizing as well.

The manual waste gate is the simplest of all and the one used by Beech is supposedly the most complicated and the most expensive.

Does that help?

Happy Skies,

Old Bob

[ARTICLES/20000227_143540.msg03730.tex]

Turbonormalizer and IO-470**Sat, 27 May 2000 18:17:33**

In a message dated 5/27/00 6:30:52 AM Central Daylight Time, epool@scoot.netis.com writes:

But, putting a turbo on my 470 to get the advantages of higher and faster flight would be possible, maybe even this year or next.

Good Evening Eric,

Since things seem to be a little slow today, I just thought I would stir up the Rajay controversy a little. I do believe it is approved for your airplane.

I don't have any idea whether or not the Rajay is available any other way other than used and I don't think it is anywhere near as elegant a unit as the one George is putting out, but my friends who do have them seem quite happy. The idea of a manually controlled waste gate has always appealed to me and I like the idea of running no higher upper deck pressure than is actually required. The system was relatively cheap when it was first available. I don't know how that would equate to today's prices, but it should be substantially cheaper. It sure isn't built as well as the Tornado Alley unit!

Anybody on this list currently operating a Rajay with manual waste gate?

This is strictly from my old memory bank, no guarantees of any kind, but I seem to recall that the Beech turbo system went for about 7500 bucks in 1968 or so, the Cessna unit (which I believe was the same type as the TAT) was around 4000 and the Rajay was under 3000.

Beech claimed that theirs was more expensive because it used a fancier controller which allowed it to use no higher upper deck pressure than was required for the mission at hand. The Cessna unit was automatic, but had a high upper deck at all times and was therefore less efficient and the RAJAY was purely manual, most efficient of all, but took some care to keep from overboosting the engine. The only one of the three that I ever flew was the Beech V35ATC. It was OK, but it sure burned a lot of fuel the way we were operating it. It was very hard to keep it properly cooled.

How about some comment from those who have used the Rajay, Cessna and factory Beech turbos?

Happy Skies,

Old Bob

[ARTICLES/20000527_181733_msg08796.tex]

Usefulness**Sun, 1 Nov 1998 15:16:12**

In a message dated 11/1/98 10:52:53 AM Central Standard Time, jtsmall@onramp.net writes:

This brings up an interesting subject. How useful is turbo(normalized) charging for weather avoidance?

Having a supercharged or "altitude" engine is always nice. It does get you up to altitudes where detouring weather is a little easier. I always felt that the move from the unpressurized DC-3 and DC-4 up the altitudes flown with the pressurized DC-6/7 and the Convair 340s was the biggest improvement we had in the airline business while I was involved.

The Jets were a thrill to fly and they put us in position to finally make a profit, but the ability to fly at fifteen to twenty thousand feet on a regular basis was operationally more significant. You can generally get above the low clouds and form a better visual picture of what is out there. In many cases, the narrowest (and most violent) part of the storm is at those in-between altitudes and that makes it easier to detour.

Turbocharging on the Bonanza adds tremendously to the cost and makes the engine much harder to work on. It also weighs about the same as 13 gallons of fuel. My experience with a supercharged Bonanza is limited, but I have decided for my type of flying and my pocket book that it is not currently a viable option.

It would sure be nice to have the performance it gives and if you can afford it, why not?

Happy Skies,

Bob

[ARTICLES/19981101_151612.msg06565.tex]

Usefulness**Sat, 26 Feb 2000 13:08:59**

In a message dated 2/26/00 10:58:24 AM Central Standard Time, epoole@scoot.netis.com writes:

Wouldn't you end up about two thirds of the way up into the yellow arc,
at cruise?

Good Morning Eric,

That obviously depends on where you cruise it!

My use of an airplane is a lot different from yours. While I always like to get the most speed practical from any certain amount of fuel, I don't like to cruise an airframe a long way above it's optimum efficiency regime. I know you want to go fast and that is fine, it just isn't my primary goal. I rarely cruise at an indicated above 150 knots and at ten thousand I am normally at 140 or less.

Any airplane that I own or fly, I try to fly at the speeds and weights that are approved for that airframe.

For the normally aspirated Bonanza, eight to ten thousand feet seems to be a nice cruising altitude.

With the 550, I can get about 150 knots IAS on 12 GPH or less at ten thousand feet when my airplane is at weights equivalent to yours. I don't have a manual for your airplane handy, but as I recall, that is still below the yellow line is it not?

The trouble is that my airplane is only that light when I am solo and about out of fuel!

Your airplane and mine will have approximately the same performance when flown at the same weights and utilizing the same power, but mine is always going to be heavier hauling the same load.

The primary advantage to me of having an early airframe with the 550 would be the increase in takeoff performance and the rate of climb. That is purely a function of airframe weight.

My experience with factory Turboed airplanes has been poor. They burned too much fuel and tended to be doggy performers at the lower altitudes. I believe that the turbonormalized airplanes also suffer a loss in performance below three thousand feet or so, and they do have to carry an extra sixty or so pounds of equipment around all of the time.

The lighter airframe would make the performance loss at low altitude less noticeable and the ability to double my operating altitude range would, I feel, be very advantageous during the icing months. It would also be nice to be able to fly out west during IFR conditions. I find that the minimum enroute altitudes are too high for my present airplane in the high mountain areas.

I don't look forward to carrying and sucking on the oxygen either. The weight of that equipment is another negative.

My purpose in getting a turbonormalized airplane would be to provide my wife and I a two place airplane that would perform as well as the one we have now down low but that would add the ability to go the higher altitudes when required. The difference in speed would be of little or no importance to my operation.

I would love to be able to give it a try!

Happy Skies,

Old Bob

[ARTICLES/20000226_130859.msg03674.tex]

Wastegate Types**Sun, 27 Feb 2000 13:39:21**

In a message dated 2/27/00 11:34:05 AM Central Standard Time, jtsmall@onramp.net writes:

Pls expand on the various wastegates and why you prefer the manual.

Good Afternoon John,

As I said before, my turbocharging knowledge is minimal. I will try to give you my perception though.

The manual waste gate is cheaper!!

Less to go wrong and less to check and repair.

It does take more care to operate and there is a greater possibility of over stressing the engine.

The folks who built and recommended the manual waste gate systems claimed that it was the most efficient.

Beech claimed that theirs was almost as efficient as the manual waste gate and a lot safer to operate.

Cessna claimed that their was almost as efficient as the others, but a lot cheaper and easier to keep in adjustment.

The system used by TurboFlite was basically the same as the one used by Cessna. They build up a pressure in a plenum chamber above that which will be used in the engine and then use air from that chamber to feed the engine with an automatic controller that will not allow excessive pressure to be used.

As an example, there might be thirty-two inches in the "upper deck" from which a constant 29.6 is fed to the engine when the throttle is wide open.

Another automatic means would be to have controllers which only built the upper deck pressure to the amount that was to be fed to the engine. I was told that the latter type is what is used by Beech and they claim it is more efficient. I sure don't know!

Both types of the automatic controller would close the waste gate enough to build the pressure required in the upper deck area from where the air is fed to the engine.

With a manual waste gate, the exhaust opening is wide open and hopefully does not increase the back pressure on the exhaust system at all.

When it is desired that more manifold pressure be developed than is available from ambient pressures, the waste gate is partially closed which redirects some of the exhaust air through the turbine which drives a compressor which feeds higher pressure air into the upper deck and then into the engine.

In actual use, you open the throttle in the normal way. After full throttle is applied, if you want more manifold pressure you adjust the waste gate toward closed until the manifold pressure you desire shows on the manifold pressure gauge. Eventually you reach a point where as much exhaust air as is allowed is going through the turbine and the manifold pressure will begin to fall. That would be the highest altitude at which that power was available. When you start to descend, you first use the waste gate control to avoid over boosting the engine. Then when the waste gate is wide open, you switch over and start to reduce the throttle to control the manifold pressure.

There is also a fixed waste gate system which is used on some of the Piper products and if you think I know little or nothing about the Cessna and Beech systems, I know even less about the fixed waste gate! With it you just monitor the manifold pressure and adjust the throttle accordingly.

The explanation above is just my pilots perception of the equipment. I have never worked on a turbo charged engine and don't pretend to have an engineering knowledge about them. All I have ever done is to push or pull on the levers!

I encourage all of the more knowledgeable folks on the list to give us the correct information on the subject.

Happy Skies,

Old Bob

[ARTICLES/20000227_133921_msg03725.tex]

Weight and CG**Mon, 17 Jan 2000 20:02:13**

In a message dated 1/17/00 6:45:55 PM Central Standard Time, shaker@employees.org writes:

I ran the weight and balance numbers for my airplane, and it wasn't that hard to keep it in CG, even without the turbo. With the added weight from the turbonormalizer installation, it was even easier to keep the CG from being a concern, even with partial fuel.

Chris Shaker

Good Evening Chris,

I believe I noted in one of your earlier messages today that you felt your Turbonormalizer added some 46 pounds to the weight of your aircraft. I wonder if you ever actually weighed the installation?

Seems to me I was at a meeting somewhere when the Pagosa Springs contingent made a statement that their weight data had been wrong on all of the units they had previously installed. I believe they said that the installation actually amounted to some 65 pounds additional weight!

Your CG situation might have been even better than you thought, but you might have been a little over gross!!!

Happy Skies,

Old Bob

[ARTICLES/20000117.200213.msg00966.tex]

4.15 EQUIP-VACPUMP

Air/Oil Separators**Thu, 25 May 2000 18:18:21**

In a message dated 5/25/00 5:06:43 PM Central Daylight Time, jtsmall@onramp.net writes:

Guess my crankcase breather is not mounted exactly correctly.

Good Afternoon John,

It could also be that your wet vacuum pump is not set up optimally. My local accessory guru claims that he can set up a wet vacuum pump so that it lasts longer and spews less oil. He is a wet pump fan and claims that he can set them up so the belly is as dry as with a dry pump. It is his thought that the bad reputation they currently have for spitting out oil is caused by the new crop of technicians who don't know how to service them properly.

I have a wet pump on my Pacer, though it is not one that he has overhauled, and it doesn't make the belly dirty.

I prefer no pneumatic pump at all, but if I have to have one, I'd rather have the dry pump. When the one on my Pacer fails, it will probably be replaced by a dry one, but I have owned a lot of airplanes with wet pumps that had no separator and still had a clean belly.

Happy Skies,

Old Bob

[ARTICLES/20000525.181821.msg08665.tex]

Cooling Jacket**Tue, 4 Jan 2000 23:29:35**

In a message dated 1/4/00 9:49:12 PM Central Standard Time, swo49@hotmail.com writes:

Bob: I have a SigmaTek Vacuum pump (about 300 hours on it), it has neither a blast tube or a cooling jacket; do you recommend a cooling jacket (my A&P tells me they are mostly for pressure system pumps (true?))?
Steve

Good Evening Steve,

Seems to me the pump works just as hard sucking as it does blowing! For pressure use, the pressure the pump works against is controlled by a pressure relief valve. When it is providing vacuum, it pulls against a vacuum relief valve. How hard it works is dependent on the number of units it is operating and the condition of those units. The less work it does, the less heat it develops and the longer it lasts. I would recommend the cooling sleeve. But I don't have any great amount of data to support that recommendation.

Happy Skies,

Old Coot Bob

PS If your back seaters note a tail wiggle, you need to practice using your rudder more and your aileron less! If you had an instructor who told you to fly the Bonanza with your feet on the floor, he/she gave you bad advice. Coordinated use of the controls is always the best, but if you are going to use one and not the other, use the rudder only and not the aileron.

[ARTICLES/20000104_232935_msg00204.tex]

No Pneumatic System?**Thu, 25 May 2000 20:24:12**

In a message dated 5/25/00 5:34:39 PM Central Daylight Time, jtsmall@onramp.net writes:

I prefer no pneumatic pump at all, but if I have to have one, I'd rather have the dry pump.

Now you've piqued my interests on two counts. Why no vacuum? I recall that you are migrating to an all electric panel but did not realize it was due to a dislike of vacuum.

Good Evening John,

I prefer to eliminate the pneumatic system whether it be vacuum or pressure. The pumps and lines take up a lot of room in the engine compartment and behind the instrument panel. Electric wires and plugs are easier to work with, lighter and, I think, more reliable. That is always open for discussion.

It isn't that I dislike the pneumatics, I just think there are better ways available to do the job. In 1920, the venturi was a tremendous advance, then some folks wanted to get their gyros spinning before they were airborne and the vacuum pump was developed. I think it is time to move to the next level.

As to my preference for the dry pump over the wet, it is lighter and less expensive to purchase. The reliability meets my requirement if the pump is adequately maintained. The wet pump might well be cheaper in the long run as it will be replaced less often, but it will always be heavier and bulkier. If you think it has to have a separator to keep the belly the way you want it, that adds weight and takes up a lot of room in the engine compartment.

How many jet transports do you know of that use the pneumatic system for instrument power?

Happy Skies,

Old Bob

[ARTICLES/20000525_202412_msg08673.tex]

No Pneumatic System?**Sun, 4 Feb 2001 12:42:17**

In a message dated 2/4/01 10:55:48 AM Central Standard Time, rhare@mich.com writes:

and, Electrical equipment, with the appropriate electron supply, is probably more reliable than wet or dry pneumatic systems.

Rich

Good Morning Rich,

That is my opinion!

The only reason I still have the pressure pump on my airplane is that it is powering my attitude gyro which is the stabilization device for my primary roll autopilot. The manufacturer originally provided an electric horizon as an option, but ceased that due to excessive failure rates.

When I get that situation resolved, to my satisfaction, the airplane will go all electric!

The S-Tec with it's TC stabilized roll unit is an option, but I really like the roll unit I now have and hate to give it up (or spend the money) if I can think of another way. I hope to find an electric attitude gyro that can feed my current roll autopilot and provide a satisfactory reliability rate. (Whatever that is!) The pump will then be history.

The reliability of the electrical system is still an unanswered question. There was an early Turbo Commander equipped with only electric that was lost on takeoff in the SLC area due to an electrical failure and a Piper Aerostar that went into Lake Michigan following an electrical failure. After that, most of the operators of all electric small airplanes added a pneumatic system as a back up.

Very few new designs incorporate any pneumatic system, but their electrical systems are a lot more sophisticated than what we have in our Bonanzas.

I will probably carry some sort of backup handheld battery powered device when I do go all electric. At least until I gain a deserved or undeserved confidence in the system.

I was a junior Captain flying the all electric Convair when Northeast airlines had a complete electrical failure on one which wiped out everything including the emergency buss and I was operating a small fixed base operation when we had a Beech Musketeer which encountered a complete and sudden electrical failure. Both of those instances were due to a dead short of a main power source.

I started to carry a battery powered T&B in my flight bag after the Northeast incident and carried it until I bid off the Convair.

Just like the engine and the dry air pump, good maintenance should have prevented both incidents, but things do happen and nothing is perfect.

Now, I think I will go fly my single engine, single pneumatic pump, dual alternator equipped, single pilot airplane and hope nothing goes wrong!

Happy Skies,

Old Bob

[ARTICLES/20010204.124217.msg02708.tex]

Vacuum Pump - Wet vs. Dry**Tue, 14 Dec 1999 15:51:19**

In a message dated 12/14/99 7:24:31 AM Central Standard Time, Txgroup@home.com writes:

Is it possible to have a wet pump on the later style engines? I would think with all the dry pump failures that have resulted in tragic results, people would take a strong look at the older wet types as a safety item, dirty belly and all.

Good Afternoon Txgroup,

There have been many failures of both the wet and the dry pumps which have NOT had "tragic results"!

But! If you want to replace the dry with a wet, this is something that many have done. It is relatively easy to do and a lot of experts recommend just that.

Alan Peterson, who owns BDS, is almost as opposed to the use of the dry pump as I am opposed to the use of a turn coordinator!

However, there are those of us who feel the dry pump is a decent, reliable unit, provided it is given the care required and if it is operated in the manner for which it was designed.

Why add a more expensive and dirty wet pump along with a separator (to keep some of the oil off the belly) when a lighter and cleaner alternate is available at a lower cost? The dry pump is not only cheaper and lighter, but it takes up less space in the engine compartment!

Keep the filters clean, monitor the time in service, watch for signs of increased carbon in the filters and the dry pump becomes a fine, reliable unit. It is somewhat analogous to operating your engine, if you disregard signs of impending difficulties, it may let you down at some inappropriate moment!

I have had failures of both the dry and the wet versions. Most were due to improper maintenance.

For what it's worth!

Happy Skies,

Old Bob

[ARTICLES/19991214.155119.msg11968.tex]

Wet Vacuum Pumps and Air/Oil Separators**Wed, 21 Apr 1999 16:31:19**

In a message dated 4/15/99 12:35:38 AM Central Daylight Time, jdeakin@avweb.com writes:

You have a dry vacuum pump, but what if you had a wet one like the 470 ... wouldn't you want it then?

I don't think that would change my opinion, John.

Good Afternoon,

I feel as John Deakin does, I don't want all of that gooky junk going back in my engine!

As to needing the separator with the "wet" vacuum pumps, if the pumps are set up right, they will spit out very little oil.

Terry Norris of Rockford Illinois based Aircraft Systems Inc. is my guru on accessories and he feels that if the wet pumps are properly setup they will not only not throw off excessive amounts of oil, but will also last longer. Very likely to at least the engine TBO.

Personally, I would like to dump the whole pneumatic system and go to a full electric system. Emergency back ups and all! When I get Bill Bainbridge's standby alternator approved on my airplane, I'll start on that project next.

Happy Skies,

Old Bob

[ARTICLES/19990421_163119_msg03950.tex]

Wet vs. Dry**Sun, 4 Feb 2001 11:29:32**

Good Morning Rich,

In a message dated 2/4/01 7:31:30 AM Central Standard Time, you wrote:

Why did we switch from wet pumps to dry pumps?

Cheaper, lighter, smaller, no oil separator and no oil on the belly.

Why don't we go back? (at least for vacuum systems)

Some do!

It seems that the track record for wet pumps is pretty good. Only problem is venting oil, and an oil separator seems to handle that OK.

True, but they are still more expensive, heavier, bigger (especially if you add the big BDS separator) and still spit out some oil on the belly. On top of that, they are not recommended for instrument pressure systems and those are supposedly better at altitude. (no personal experience on that at all)!

Now we've got strong concern about the life of dry pumps (Sigma-tek seem to be a little better than Airborne)

It has been my experience that the dry pump is rather like the engine, treat it well, maintain it according to the maintenance manual, replace it when recommended or when it show signs of distress, whichever comes first, and it's reliability is acceptable.

and the fix seems to be: "Put TWO of the questionable products on the airplane".

I think the fix is to reduce the reliance on the pneumatic system, be it wet or dry, vacuum or pressure.

That can be done by various methods. The one I like the best is to go all electric.

By that, though, I mean that the aircraft has to be equipped with a more reliable electrical system than most Bonanzas have at this time.

However, that is another story!

When I discovered that the V35 I recently purchased had a Garwin WET pump on it, I said: "Wow, a bonus!".

It is an acceptable and well regarded alternate to the dry pump.

Anything else I don't know about? (concerning this topic, only)

Rich

Probably not!

Happy Skies,

Old Bob

[ARTICLES/20010204.112932.msg02704.tex]

4.16 EQUIP-WXAVOID

RADAR Verses Sferics (Stormscope, Strikefinder, etc.)**Sun, 1 Nov 1998 11:00:23**

Good Morning Once Again John,

In a message dated 11/1/98 9:49:40 AM Central Standard Time, jtsmall@onramp.net writes:

BTW, I have no doubt a color display that overlays a moving map GPS with Strikefinder and radar would be way cool ... but I really can't afford such a setup in the foreseeable future.

Bells and whistles are always fun!

I have had the opportunity to utilize a broad spectrum of weather avoidance devices including Bonanza mounted RADAR systems and both the Stormscope and Strikefinder units.

My choice considering my finances and the ease of installation along with compactness and light weight was the Strikefinder.

It would be nice to have both it and RADAR but then again, it would be nice to have pressurization. Something else that I can't afford.

Happy Skies,

Bob

[ARTICLES/19981101_110023.msg06555.tex]

Chapter 5

GPS

5.1 GPS-ANTENNA

Antenna Location**Tue, 18 Aug 1998 19:42:37**

Good Evening Greg Blanck,

In a message dated 98-08-18 19:16:59 EDT, you write:

What have others done for GPS antenna mounting?

I like to put the GPS antenna right on top of the cabin. If you have an airplane that has the little aft venting cabin vent located there, I would put the GPS antenna right behind it.

If you still have that big old noisy and inefficient rams horn V on top of the cabin, I would take that off and mount the GPS where it had been.

Then I would mount blades on the tail for the VOR/ILS/GS reception. They are lower drag and more efficient.

That leaves you short one comm antenna that was in the vertical portion of that big old V. I like a bent whip on the belly to replace it.

There is a potential for interference from some of the VHF frequencies that will knock out the GPS signal and it is advantageous to keep the comm antennas as far away from the GPS as possible. That interference is more commonly from the face of the box than from the antenna but you never know for sure till it is tested.

Remember that Mike Smith always said to get everything possible off of the top of the airplane.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980818.194237.msg04513.tex]

5.2 GPS-APPROACH

DME Location Fix**Mon, 26 Apr 1999 12:03:38**

In a message dated 4/26/99 8:19:56 AM Central Daylight Time, glenno@sgi.com writes:

Too quiet... I bet it would be tough to get a word in edgewise if this group gets together in one room...

Glenn

Ralph Requa wrote:

I sent myself a test message too.

Kind of quite around here today.

Cheers, Ralph

Good Morning Glenn and Ralph,

Maybe we are the only ones left!!

In any case, I will mention something that I have been working on for a little over a year having to do with GPS and see if we get any response.

As has been mentioned many times, the location of DME transmitters associated with ILS, LOC, SDF or similar approaches has not been available in our IFR GPS database.

To address that problem, the FAA issued guidance on how to utilize a waypoint along the designated approach course to determine the distance to step-downs, missed approach points or other fixes associated with such approaches.

That was a wise and helpful thing for them to do, but it would be better still if the actual location of the DME transmitter were in our database so that we might get the mileage information we desire without having to add and subtract from the published figures.

I made a suggestion that the position be given a name and published in the database on whatever page was used for all of the "Intersection" waypoints.

I am not sure if the title for the repository of such waypoints is called by the same name in all of the sets, but I think they all list such information by some readily identifiable means.

The first response I received from officialdom was that there just were not enough five letter names available and the ones available were too important to be used to aid those few of us, who do not happen to have DME receivers, execute approaches.

I suggested that since every ILS/LOC associated DME already has an identifier comprised of four letters of which the first one is an "I", all we had to do is find some five letter combinations wherein the combination of the chosen letter and the letter "I" was

not widely used. This latter suggestion has been endorsed by some, but not all of the folks at the FAA.

The letters XI are only used in the North American database six times as the first two letters of an intersection name.

'UI' and 'II' are used even less.

Since I like the sound of "X marks the spot," I suggested that X be chosen as the letter to add to the ILS/LOC associated DME identifiers to provide a five letter name which could then be added to our Intersection/Waypoint list of waypoints so that we might read the required distance directly.

An example of the usage would be the ILS DME Rwy 35R approach to DEN International.

In order to execute this approach, DME is required since it is in the title of the approach.

The FAA allows us to substitute GPS for this purpose, so if we meet the IFR GPS usage requirements, we are legal to accept the approach.

If the use of X plus the existing ILS DME identifier to provide a name for the position of the DME site is approved, all we have to do is find XIDPP in our database and make it the active waypoint. From then on, one would read the GPS distance and use it in lieu of the DME distance. Same location, same distance, therefore no addition, subtraction or calculations required.

The same localizer and DME frequency is used for Denver's ILS Rwy 17L approach.

Even though DME is not required to utilize that approach, waypoints along the course are delineated by reference to the associated DME and it is helpful to be able to use the DME distance for identification of those waypoints. The same transmitter is used for the DME distance to both 17L and 35R, but the identifier changes when the tower switches from one to the other, therefore a different identifier is used and I have recommended that the associated identifier be used in the database to avoid any confusion. If that were done, the location could be entered by making XIBXP the active waypoint. All of the mileage's would then be exactly as published on the chart.

Why do I mention this to the Bonanza group?

Many of us are active instrument pilots and even though we currently have aircraft equipped with DME, realize that repair or replacement funds might better be spent on obtaining an IFR GPS. Every increase in utilization of that equipment makes the fiscal rationalization of purchasing that IFR box a little easier.

I have been working closely with AOPA to implement this suggestion and have been encouraged by the response of the manufacturers who I have been able to contact.

I am hoping that I might be able to recruit anyone on this forum who may have contacts with any of the manufacturers of GPS to encourage them to back the inclusion of ILS/LOC/SDF etc. associated DME transmitter sites as waypoints in our database.

Whether the letter X or some other letter is used is not material, but hopefully a consensus can be reached by those involved.

I believe that if we can present a united front to the FAA, we have a good chance of getting it done.

Questions and comments are eagerly solicited!

Happy Skies,

Old Bob

[ARTICLES/19990426_120338.msg04024.tex]

GPS/NDB Approaches**Mon, 2 Oct 2000 16:08:08**

In a message dated 10/2/00 1:38:47 PM Central Daylight Time, tturner@vol.com writes:

MikeM86949@aol.com wrote:

It's clearly illegal to fly the approach.

That's the way I've been leaning, and why I asked the question. Thanks for confirming my thoughts with your opinion!

tt

Good Afternoon Once Again Tom and Mike,

Since you, Mike, have such a strong opinion as to the legality of shooting the approach, I feel I must comment further.

There are a plethora of NDB approaches where the NDB facility has died and where the approach is being kept active by the FAA for just the reason herein discussed.

Since the overlay approach was approved based on the NDB criteria, they can let the approach remain active. It may then be used by folks who have the proper GPS equipment. Under the criteria for an overlay Phase Three approach, there is no requirement that the underlying approach equipment be available and no requirement that the aircraft be equipped with equipment to use the underlying approach or any other approach at that airport. The Phase three approach is just as legal as any other approach ever approved. Flight checking would be required at the time intervals that meet the criteria for the underlying approach with a Phase Three GPS overlay, whatever those requirements are. Should flight checking find that the obstacle clear zone has been violated, the minima could be raised or the approach may be abandoned. If the NDB is out of service when the flight check is conducted, that would be noted and the only check made would be of the GPS overlay and the obstacle field. Should the NDB be placed back in service, it may or may not require an additional flight check. It depends, but I know not on what!

A standalone GPS or VOLPE style RNAV approach requires that a new obstacle survey be made of the entire area so that the different, new, criteria can be applied. That is an expensive, primarily ground based, survey and is usually paid for by local authorities. After the survey is conducted, the approach is created and flight checked by the FAA. The approach is then published for our use. It is a long and costly process. By leaving the overlay Phase Three approach in place, even though the underlying approach equipment has failed, it supplies us with a legal means of utilizing the IFR system to attain access to that airport.

I applaud the FAA for being so bright as to think of doing it!

Happy Skies,

Old Bob

[ARTICLES/20001002.160808.msg14339.tex]

GPS Stuff, RNAV Approach Plates**Fri, 4 Aug 2000 16:35:14**

Good Afternoon All,

The following information was presented on another forum which I frequent. It was sent by a Mr. Curt Keedy who, I believe, works for the FAA. This is sent without his permission, but it was on a public forum so I hope it is OK to send!

The information is very close to my understanding of the current status of the approach charts. Since they are so new, a lot of problems have surfaced and I would expect some changes to be made.

Hope you find it of interest.

Happy Skies,

Old Bob

COPY_____

I will try to respond to the several questions I have received.

First, I am sure you are all aware of the new RNAV approach chart format. All GLS (GNSS Landing System, i.e. WAAS), LNAV/VNAV (GPS/WAAS, GPS, DME/DME, and baro-VNAV), LNAV (GPS or DME/DME) and circling approach minima are contained on the chart. GPS non-precision approaches now published will be converted to the RNAV format.

The GLS minima pertain to a precision approach with both lateral and vertical guidance based on GPS/WAAS guidance. The WAAS receiver (or sensor) continually calculates horizontal and vertical alert limits (HAL and VAL). These calculations are based on the accuracy requirements for precision approach. Maintaining the accuracy is based on healthy satellites in view, satellite geometry, and interference.

Indications from the receiver are similar to an ILS. If the VAL cannot be met, the vertical guidance (glideslope) will flag and the vertical cue will go off scale. The same is true for the horizontal guidance.

Most WAAS receivers will also utilize baro-VNAV. When the VAL is not satisfied, the receiver will automatically shift to baro-VNAV. This will be announced on the receiver/FMS and the crew will fly the approach to the LNAV/VNAV minima. If baro-VNAV is not available on the aircraft, the approach minima used will be LNAV.

In addition, WAAS receivers also calculate projected alert limits based on where the satellites will be in reference to the aircraft position. If the alert limit cannot be maintained throughout the procedure, the approach minima level will be enunciated (LNAV/VNAV or LNAV). This is an extension of the Receiver Autonomous Integrity Monitoring (RAIM) built into all TSO'd GPS receivers.

FMS equipped aircraft with multiple sensors adds more opportunity. Mainly for LNAV. LNAV can be based on GPS/WAAS, GPS, or DME/DME. The FMS will make the decision which system to use based on required accuracy levels. The new name for these accuracy levels is RNP.

Also, in the Pilot Briefing Information blocks of the new approach charts (upper left-hand corner) you will see several types of restrictions. One the a temperature limit for baro-VNAV use. Other information may include authorization for DME/DME and may further identify specific DMEs that must be available.

All runways served by GPS and GPS/WAAS will (or have been) surveyed to WGS-84 standards.

The good news is that the GPS Local Area Augmentation System (LAAS) will not be included on these approaches charts – they will be published separately.

Clear as mud but it covers the ground!!

Curt

[ARTICLES/20000804_163514.msg11739.tex]

IFR GPS Desirability**Tue, 16 May 2000 22:09:05**

In a message dated 5/16/00 7:32:35 PM Central Daylight Time, Mavitor@aol.com writes:

So now I am thinking I will take my 6 g's and buy a Gamin 295, mount it where I was going to put the 155, and get a stormscope with the change. I have an area 4" by 6.5" to put a moving map GPS – is there something better than a 295?

Mike McGahan

Good Evening Mike, (And John)

The big thing is whether or not you have a need for an IFR approved GPS.

If your IFR flying is primarily enroute and you only shoot approaches either at big airports with lots of different approaches or don't shoot low approaches at all, the 295 is fine. I use one as a moving map and as a back up to my panel mount in case of an electrical failure.

However, if Grass Valley, California is one of your common destinations and you like to be able to arrive there when the weather is down, the IFR GPS box can be a big deal!

The minima for a VOR approach to O17 is one and a quarter mile for those who operate at or below 90 knots on the approach. For those who prefer to be above ninety but below 120, the minimum required visibility is one and one half mile. The MDA in either case is 1128 feet above the ground.

Should you happen to be equipped with an IFR GPS, the minimum required visibility is one mile for aircraft as fast as 140 knots and the MDA is 272 feet AG. That's a difference of 856 feet.

As always, it depends!!

Happy Skies,

Old Bob

[ARTICLES/20000516_220905_msg08248.tex]

IFR GPS Desirability**Wed, 17 May 2000 12:11:23**

In a message dated 5/17/00 10:38:29 AM Central Daylight Time, jtsmall@onramp.net writes:

Old Bob, is this a typical difference between non-precision VOR or VOR/DME and GPS approaches? This seems a bit extreme and I had not noticed such differences across the board.

Good Morning John,

That is definitely NOT typical!

I chose Grass Valley because it is the most glaring example of which I am aware.

I suppose I could have mentioned that there are a large number of airports that have NO other approach than the GPS. That may be even more important than having lower minima. Without any approach, an airport is not easily accessed via the IFR system.

In my own case, one of my daughters lives near Dover, Delaware. The airport which serves GA for that area has minima for the VOR approach of one mile visibility and an MDA of 465 feet AG. There is a GPS to each end of the runway. One direction has an MDA of 404 AG and the other direction allows 385 feet. That lower MDA has allowed me to complete an approach on several occasions when I would have missed with only a VOR. Eighty feet can make a big difference.

For me an IFR approved GPS makes financial sense. If you don't shoot low approaches, it is a totally unnecessary expense.

While most GPS approaches that are drawn to a runway that has some other type of Non Precision Approach do have lower minima than the approach they replace or supplement, that is not true in all cases.

I am currently working with the folks at AOPA on a project to locate and bring to the attention of the FAA approaches which do not seem to have taken maximum advantage of the TERPS in construction of the GPS procedure.

The FAA has been very receptive to our concern, but not all of the discrepancies are being rectified. There are number of policy decisions that have been made concerning the application of the new RNAV style of approach which are detrimental to full utilization of the applicable TERPS.

I urge all instrument pilots to actively monitor the construction of approaches at their local airport. If it seems that the FAA boys are drawing the approaches less aggressively than TERPS allows, don't contact the local FEDs! Bring it to the attention of the folks at AOPA.

Happy Skies,

Old Bob

[ARTICLES/20000517-121123.msg08266.tex]

IFR GPS Desirability**Sat, 26 Aug 2000 14:23:59**

In a message dated 8/26/00 12:12:34 PM Central Daylight Time, avion@worldnet.att.net writes:

"There are a "large number" of airports where the only approach approved is a GPS approach. No GPS, no approach".

Seems, in fact, you'll find GPS overlays now coming on line coinciding with many small airport approaches. Are you saying non-precision, VOR, ADF, etc approaches will be deleted in favor of GPS? I doubt it - for years at least.

Good Afternoon Ron,

Actually there are a large number of airports where the ONLY approach is a standalone GPS or one of the new VOLPE format RNAV approaches which is approved for GPS or an RNP-0.3 FMS LNAV approach and no other.

I have never counted the actual number, but I would say it is at least one hundred in the lower 48.

The overlay program has been out of business for over a year, maybe closer to two. You may be seeing some new Jeppesen plates which are just getting around to listing the overlay, but that is because they haven't been reprinted recently and the overlay approval was listed in the Terminal Procedures Section on pages US-1 through US-5 under the heading 'Approved Phase Three GPS Approaches'.

I have been encouraging the FAA to reinstate the overlay program to at least place an overlay on any NDB approach when that is the only approach available at that individual airport. So far, my request has fallen on deaf ears, but I am still trying!

I doubt if the VOR and NDB system will be replaced anytime soon, but I would not buy an ADF today unless I were planning extensive flight outside the contiguous 48 states. The GPS will do everything the ADF can do except shoot a non overlaid NDB approach and it will also do everything that can be done with a DME. An IFR approved GPS is a lot cheaper than the ADF and DME combined. The only drawback of which I am aware is the cost of the updates. That is a chicken and egg thing, the price won't be reduced substantially until there are more users and it appears that there won't be more users until the price comes down!!

Must admit, I'm ignorant to see your concern about GPS minima being an issue with non-precision MDA's. Whats "substantially lower minima"? Is 100' feet that important? Or, is this another issue of political correctness safety?

Well, I do think 100 feet is important! The nonprecision MDA is delineated in 20 foot increments. If twenty feet gets me in and twenty feet higher does not, then that twenty

feet is important. The FAA has a policy that they will not add a step down fix unless the step down will provide at least a sixty foot lower MDA. I think they should add the step down fix if it will provide at least a twenty foot lower MDA. But, as I said before, not everyone flies to the minima and, unfortunately, not everyone abides by the rules. Some folks violate the minima we have. I don't like to see that happen, but I do want to see the approach built to provide the lowest safe minima consistent with the current TERPS.

The minima provided by GPS is sometimes no lower than that of other nonprecision approaches. In some cases it is even higher! But there are a few cases where I think even you would admit the difference is substantial.

My favorite example is Grass Valley, California, O17. It has a VOR or GPS A to circling minima with a MDA of 1128 feet AG and 1 & 1/4 mile visibility. The standalone GPS to O17 is a GPS to Rwy 7 with an MDA of 272 feet AG. It only requires one mile visibility to execute.

I am sure I can find several hundred approaches in the lower 48 that have one hundred or more feet lower minima with the GPS than with the other NPAs they compliment or replace.

If anyone has the need for regular IFR flight to or from those airports, it can make a big difference in dispatch reliability.

Incidentally, the basic minima for all non precision approaches is 250 feet above the controlling obstacle. Regardless of the height of the MDA above the airport elevation, there is something out on that approach that is somewhere between 250 and 269 feet below the MDA. It is not something to be trifled with, regardless of how high the MDA may seem.

I like the GPS. It makes all of my approaches smoother, easier and more likely to result in a safely completed procedure. Several places I frequent have lower minima which means I can land when other may not. Last week I went to a flyin at Cable Union Airport in Wisconsin. The MDA for the NDB is 920 feet AG, for the GPS to Runway 36 it is 800 feet AG. I shot the GPS and broke out at about 840 feet.

Now, had I not been equipped with a GPS, I probably would have missed the first approach, but since I had plenty of fuel, there were good alternates and the conditions were quite variable, I probably would have stuck around and eventually made it in.

The GPS made it nicer.

Happy Skies,

Old Bob

[ARTICLES/20000826_142359_msg12617.tex]

IFR TSO**Tue, 25 Apr 2000 23:22:14**

In a message dated 4/25/00 9:27:31 PM Central Daylight Time, farrarwd@tca.net writes:

I do not understand how the GX60 and the 430 can both be "TSO 129a Class A1" and the 430 be advertised as certified for "approach" and the GX60 for "non-precision approaches."

Help!

Good Evening Will,

The A1 approval is the one that allows approaches. The only approaches approved for GPS are all non precision. They are overlays of NDB, VOR, VOR DME or VOR DME RNAV approaches as well as all designated GPS approaches and the "New Style" RNAV approaches.

There are no precision GPS approach approvals at this time.

The A2 approval is for enroute and terminal purposes only. That means that you can use the set to get from town to town and to help find intersections and other locations enroute and in the terminal area up to the Final Approach Fix, but not for guidance inside the FAF. You can use the A2 set distance in lieu of DME for any purpose including all DME requirements on any approach except an MLS. You can also use it in lieu of any required ADF bearing on any approach and for missed approach guidance but not for guidance during an NDB approach.

The various uses are spelled out more completely in the AIM.

Does That help? If not, let me know and I will try to expand the explanation.

Specific questions would help!

Happy Skies,

Old Bob

[ARTICLES/20000425_232214.msg07064.tex]

New RNAV Approaches**Wed, 16 Feb 2000 11:57:32**

Good Morning All,

This is something that all instrument pilots, whether GPS equipped or not, should be concerned about.

I just started to do my 03-00 Jeppesen Revision which has the first of the new RNAV style approach plates.

The very first one that I came across gave me heartburn!

I am afraid that the problem I was worried about has come to fore.

The airport in question is at Lawrenceville, Illinois. It is listed as the Lawrenceville-Vincennes International Airport, KLWV.

Four new RNAV approaches were added. That is good and they do have reasonable minima.

However, the runway 18 approaches have the problem that I was afraid would happen.

There was a VOR to runway 18 with a step down at 4.0 DME that allowed a MDA of 470 feet AG.

It was redrawn with a step down fix at 1.7 DME which allows a MDA of 410 feet AG. Great!! The person drawing that used good sense and applied the criteria to good advantage.

Unfortunately, it appears that when the criteria for the new RNAV approach are applied to the same runway and obstacle environment, it comes out with an LNAV approach which has a MDA of 510 feet!

The RNAV Rwy 18 LNAV MDA is a full one hundred feet higher than the VOR approach to the same runway! That is a major decrease in the capability of IFR flight to LWV.

I agree that it will cause no immediate loss to those of us who are equipped with VOR and GPS as we could shoot the VOR and use our GPS for the distance requirement of the stepdown fix.

But, does this mean that every place the FAA is drawing a combo RNAV approach, there could be an old style VOR DME approach with a one hundred foot lower minima?

I rather doubt that is the case, but I do think that this criteria needs to be revisited.

I urge all of you to look closely at what type of minima are built for the LNAV minima portion of the new RNAV approaches at your airport. Those approaches will be the ones replacing your VOR, LOC, ADF and other Non Precision Approaches when the VOR/ADF system is shut down.

The non-glass cockpit types have a lot to lose if the criteria, as applied, will raise our minima by that, or possibly a greater, amount.

It will take me a couple of hours to complete the revision and If I find any more horrible examples, I will try to pass them along!

Meanwhile, back at the ranch.....

Happy Skies,

Old Bob

[ARTICLES/20000216.115732.msg03035.tex]

New RNAV Approaches**Fri, 25 Feb 2000 13:05:09**

Good Morning All,

I received the message below from another source, but thought some of you might be interested in my response.

We who fly to and from many small off the beaten path airports are likely to lose considerable operational capability if the way the approaches are built is not carefully monitored.

In a message dated 2/25/00 6:35:15 AM Central Standard Time, Peter.J.Beaty@USA.dupont.com writes:

Good observation! I would be surprised if the FAA isn't planning to downwardly-adjust the RNAV minima once WAAS and/or LAAS is in place. One would hope this happens before they pull the plug on VOR and ILS. Surely, this is their plan for ILS replacement. But, what about non-precision approaches, as you point out?

Good Morning Peter,

Thank you for the kind words!

This may be somewhat repetitious as I don't remember precisely what I wrote in the other message.

There is no doubt that present policy has the FAA choosing FAF points and alignments that will work well with the Constant Angle Non Precision Approach. The LNAV/VNAV combo and the GLS PA procedures will have a strong similarity to that concept.

In order to have a minima below four hundred feet, there has to be a reasonably clear obstacle zone associated with the approach.

The glideslope style approach has an advantage where the obstacles are a considerable distance from the field, but the smaller tunnel where the approach actually is located will require a lower obstacle field than a non-precision approach built over the same area that utilizes maximum angles of descent and step down fixes.

They are trying very hard to accommodate all three styles of approaches on the same planform and that requires compromise.

It seems the compromises thus far have favored the glide slope style of approach at the expense of the pure non-precision.

If the obstacles in the area are such that 400 feet is going to be the lowest descent minima associated with the glide slope style approach, the accompanying visibility minima will be around a mile and a quarter. The visibility requirement is determined by the distance to the threshold when the airplane is at the MDA on a glide path of around three degrees.

Not only that, but there will only be a second or two to locate the threshold or other approved runway environment cues that are required on an approach that uses a DH or DA. Unless there is some sort of approach lighting, spotting the required cues in that small amount of time with the actual weather right at the limits will be unlikely.

A light wing loaded, maneuverable airplane, such as a Cessna 182, Bonanza or DC-3, does very well at the older style of non precision approach. Rates of descent exceeding 400 feet per mile are not difficult, if properly planned for, which makes the minima of one mile visibility practical for a non-precision approach with MDAs of five or six hundred feet, even higher for part 91 operators, depending on the runway length and markings.

When a circling approach is considered, minima of one mile visibility and MDAs of eight hundred to a thousand feet become very practical. All three of the airplanes listed above can comfortably fly a downwind at way less than a mile from the field. A descent can legally be started on the downwind leg for a normal approach and landing, if obstacles permit, without straying outside of the minimum visibility zone of one mile.

Small and/or remote airfields which are unlikely to qualify for extensive obstacle removal programs, sophisticated approach lighting and expensive runway markings are not likely to benefit at all from the glide slope style of approach and may even suffer a significant loss of IFR capability.

I think all of us would prefer a two hundred and a half glideslope style approach with full approach lighting at our destination, but if that is not financially practical, I would prefer that the well proven non-precision approach minima originally designed around the capability of the Douglas DC-3 be retained for the benefit of those aircraft which are capable of making good use of the provisions!

Once again, thank you for your interest and comments.

Happy Skies,

Old Bob (Bob Siegfried)

[ARTICLES/20000225.130509.msg03620.tex]

5.3 GPS-HAD-MISC

Garmin 295**Sat, 20 May 2000 22:55:27**

In a message dated 5/20/00 9:35:03 PM Central Daylight Time, newmanb@rocketmail.com writes:

Mike - Looking forward to your report on the Colour Skymap. I looked at it a while back, and I really like the display quality and the ergonomics. But its 8 channel receiver (vs Garmin 12 channel) and lack of approaches in the database held me back from purchasing it. If your experience is positive, I'll have another look.

Best Regards,

Good Evening Bob,

I am not taking a stand on the relative merits of the 295 against the Skymap as I have never seen a Skymap, But! The map on the 295 is a little small for me. I have to put on my reading glasses to see detail and the unit does need to be shaded from bright sunlight. Over all, In think the Garmin is a great unit and does the job for which I purchased it adequately. For my old eyes, another half inch in both dimensions would be a god send!

I would not worry about the difference between a twelve channel and an eight channel receiver. It is highly unlikely that any noticeable greater accuracy can be attained by a couple of extra channels.

Once the set has acquired five or six satellites, the accuracy is about as good as it is going to get. The eight channel one will pick the best eight of the ones that are available for use and the fringe satellites are unlikely to add anything to the solution.

Picking up twelve channels is a PR ploy.

Happy Skies,

Old Bob

[ARTICLES/20000520_225527_msg08412.tex]

5.4 GPS-HANDHELD

Garmin 295**Sun, 30 Jan 2000 11:50:48**

In a message dated 1/30/00 9:41:05 AM Central Standard Time, epoole@scoot.netis.com writes:

John,

Please report back and let us know how it works out in bright sunlight. That would be one of the most important considerations for me.

Also, does it come with a way to mount it on the glareshield?

Good Morning Eric,

Excuse the intrusion, but I did fly my 295 yesterday. It was a bright sunlit day with snow on the ground. I had the unit mounted on the top of my throw over column and found no difficulty reading it at any time. There are adjustments for both intensity and contrast. I didn't change anything from the default setting while flying, but I did try the feature later at the kitchen table. It seemed to have quite adequate range. I drove around for a couple of hours with the 295 in my car on Friday. It wasn't a real sunny day, but there was never a time that I felt it was at all hard to read. As with all such displays, it is best if the observer is looking at it straight on. When I was flying, my oldest son was in the right seat and we were both able to read it without repositioning the GPS. It was a little better though, when you were looking at it straight on. I felt that the view from one side was less critical than the Sandel. I was a little disappointed in the cross cockpit viewing of that unit. The Sandel can be adjusted to bias the best view to one side or the other.

As to mounting the 295 on the glare shield. It comes with something they call the automotive mount as well as a rather large clamping device designed to attach to a control column or cross bar. That little automotive thing could be mounted on the glare shield, but unless your airplane is awfully smooth, I think it would wiggle a lot. I used the automotive mount to fasten it to a small platform that I had previously used for a small pocket computer which I used for a moving map program. My 295 wiggled excessively in that position and I think my mount would be stiffer than something mounted on the glare shield. I have not decided quite what my final fastening will be. The vibration was distracting. I want it stiffer than the way I had it yesterday. The unit is rather large for a handheld, yet the screen is smaller than the 195. With my ancient eyes, the screen is a little small, considerably smaller than the pocket unit I am replacing. Of course, there is a lot more capability and detail available.

I have some reservation as to the advisability of mounting it on the glare shield. It is big enough that it would block the view ahead rather dramatically. You could hide a rather large hunk of traffic in the shadow of the unit!

I have never purchased a piece of computer driven equipment that I found easy to use and this one is no different.

I feel that the Pilots Guide is rather hastily thrown together and it appears to be a quick adaptation of the one they use for their Street Pilot version.

The packing list contained does not reflect the stuff in the package. The directions for the aircraft column mount are terrific but the ones for the auto mount are hard to find and speak of a different mounting pad package than was in my container.

The directions for use tell you how to put it in a simulator mode. I managed to accomplish that OK, but I have been unable to locate any directions to tell me how to operate the unit in that simulator mode!

I learned the most by taking it out in the car and playing with it. It is not too difficult to make the unit do what is desired after you decide what you want it to do. The biggest problem is making that decision!

Incidentally, the Street Pilot version looks identical and has a price at the local Sports Authority store of \$699.99.

So far, so good!

Happy Skies,

Old Bob

[ARTICLES/20000130_115048.msg02070.tex]

Garmin 295**Mon, 14 Feb 2000 09:36:15**

Good Morning All,

John Small sent me a message with the following address concerning a review of the Garmin GPSMAP 295. It was written by the owner of an electronics shop on the west coast. I wrote the following reply to John. After finishing it, I thought there might be others on the list who would find the review and my comments interesting as well, sooooo....

<http://www.avionicswest.com/articles/garmins295.html>

Good Morning Again John,

That is a nice review. Most of it is factual and similar to what I found.

I did not like the mount that came with the unit. I think it is too big and clunky, but then, I rather like to make mounts and such!

I did not find the screen difficult to read in bright sunlight, but that might be due to where mine is located. The night time view is fantastic! Dimming is great!

There is an error in the text though.

While discussing the Status page, he mentions that the unit can be put in either track up or north up mode. He follows up with a reference to using the map in either mode. That is not completely correct. Placing the unit in Track up or North up mode from the Status page affects only the Sky View function of the Status page. It does not change the orientation of the Map page. To change the orientation of the Map page, you must go to the Setup for the Map page.

The Map page selection provides one more option as well. From that page you may select Track up, Course up or North up. The mode selected on the Map page does not affect the Skyview mode and vice versa.

I also had the unit lock up once. I am not sure what I did to make it lock up, but the only way I could make it do anything was by removing the batteries.

I am not happy with the lack of a method to supply external power while hooked up to the computer.

It would be especially nice to have that capability while learning to use the two together.

Even for a normal upload of data from the Map Source to the GPS, the book says it can take as long as an hour. It took my unit a little over thirty minutes to load the maps for the Chicago area and the next one west. That eats the power from the batteries in a hurry!

I should mention that I got five an a half hours out of the first set of batteries. It was

starting to get a little flaky though, so I changed them.

The Map Source function is fun to play with, but it would take a lot of \$139.95 16 MB modules to hold enough data for a one day automobile drive. I counted a minimum of twelve different maps between Chicago and Miami. That was with a fixed course and if you wanted to provide a little latitude for choosing a slightly different route, it could easily require 15 or 16 maps. Since each cartridge will hold only two maps, that means a minimum of eight cartridges. I suppose one could carry a laptop and reload cartridges enroute, but if you were going to do that, it would be easier to use the lap top with a GPS feed and forget about the 295!

I also find that I can't drive and operate the 295 at the same time, but then, I am old and kinda stupid!

I found another anomaly while flying and using the Map Source with the GPS in Aviation mode. When I flew close to the edge of the map I had loaded and with a scale of less than three miles set on the GPS, the area for which I did not have a map showed a crosshatch instead of ground data. The aviation stuff was still there, but with no ground data. If I selected a scale of greater than three miles, it was OK and when I flew off the Map Source map and into the area without a loaded map, it went back to normal 295 presentation even at a scale of two miles or lower.

Over all, I like the unit. I wish the screen were bigger, but if it were a lot bigger, it might be hard to find a place to put it. I had a pocket computer mounted on my column before, and it did block a couple of instruments. The 295 doesn't block anything! I think the screen area could be doubled and it would still be easy to find a place for.

That's about it!

Happy Skies,

Old Bob

[ARTICLES/20000214.093615.msg02944.tex]

Yoke Mount**Fri, 31 Oct 1997 16:09:15**

Hi Dave McGuire,

In a message dated 97-10-31 15:44:45 EST, you write:

I attach the mount to the horizontal "bar" part of the yoke rather than the round "shaft" part that goes into the panel.

I think I would KILL anyone who even suggested mounting anything on the beautiful shiny horizontal bar part of my control column!!!

Seriously, are you able to do that without marring the finish?

The Autel mount goes right on the little chrome coupling that holds the unit to the shaft and can be installed or removed with just two screws. Even on a rental airplane it would not take more than a minute to install or remove and eliminates any chance of marring or scratching either column. It will not slip and does not rely on friction to hold it in place.

I would imagine there are others on the market that would fit there also.

Please guys, don't scratch up these wonderful pieces of equipment!!

Bob

PS – I suppose I should caution anyone who might do as I suggest and remove the screws on the column to install the GPS mount that it could be construed to be an action which would require an A&P approval and a log book entry. I don't think it would, but others might disagree. In any case, slightly longer screws are used to fasten the mount than those that hold the column coupling on. If those long screws were to be installed instead of the original screws after removing the mount, the aileron action could be jammed. Careful!!!

[ARTICLES/19971031_160915_msg02301.tex]

Yoke Mount**Fri, 8 Dec 2000 09:36:21**

In a message dated 12/8/00 1:24:20 AM Central Standard Time, doug@rds.com writes:

Questions about the 295 in Bonanzas:

1. How does it mount on the throw-over yoke? I've got an old Garmin 90 and it's attached to the arm, close to the aileron trim knob.
2. In whatever position you have it, does it work with the built-in antenna or do you need an external one on the glareshield?

Thanks!

...doug

Good Morning Doug,

I made a mount that places my 295 right over the center column biased slightly to the left. I made the mount so that the angle at which the set is mounted is normal to my line of sight in the up and down plane and it is adjustable from 11 degrees to the left over to five degree to the right. For normal flight, I have it set for my vision. If the passenger is interested, I can swing it to the five degree right position and we can both see it. None of the commercial mounts that I looked at would allow me to set it close enough to the control yoke so as to keep the 295 out of the way of my view of the instruments and controls on the instrument panel. There was a photo of my installation on John Small's photo website. I don't know if it is still there or not. Maybe John will let us know?

I use the remote antenna placed on the glare shield right in front of the magnetic compass.

I have not tried it with the antenna mounted on the set, but I wouldn't think the coverage would be anywhere near as good as it is with the antenna up on the front of the glare shield. The 295 normally has about the same number of usable satellites as does my panel mount IFR approach GPS.

I am very pleased with the 295 except for the size of the picture. Even another eighth of an inch in each direction would be a big help. The Black and White unit that Garmin made using the same box had just a little bit bigger screen and it is much easier to read. The color road version uses the same small screen that we get and it makes a big difference. Your younger eyes may not notice the difference as much as I do.

Happy Skies,

Old Bob

[ARTICLES/20001208_093621_msg17395.tex]

5.5 GPS-HISTORY

IFR GPS Navigation**Thu, 6 Aug 1998 01:17:04**

Good Morning Hal Hammond,

In a message dated 98-08-06 00:34:01 EDT, you write:

The purchase price for an approach-certified IFR GPS isn't too bad but the cost of ownership (including the depreciation associated with obsolescence) is out of sight.

Just a little more comment from an old aviator.

When we were using low frequency ranges for navigation, a radio was available for some where around fifty bucks which was more than adequate to receive the signals and fly the "Beam". We strung as much wire around the wingtips and fuselage as possible to get a much signal as possible, made a log book entry and away we went.

There were a lot of screams when it became necessary to install those new fangled "omnis" in order to fly the airways. Narco came out with the Omnihomer which provided a handcrank tunable VHF receiver, a VOR converter (No ILS, LOC or GS), and a four channel VHF transmitter. The cost was an exorbitant \$350 or so. By todays inflated dollar that would be equivalent to around \$4200.

I doubt if many today would be willing to go back to the Low Frequency range station regardless of how much pride we could take in being able to find the airport after a "True Fade Orientation Procedure"

The cost of moving to the GPS system is nowhere near as big a step up in investment as it was from the LF to the VOR.

Surely there will be some method found to lower the cost of updates for our data.

It would help tremendously if more were to be sold so that there would be a bigger market over which to spread the cost.

The benefits of the current TSO C129 sets are really quite impressive and there is considerable operational flexibility to be gained in addition to the comfort of precise knowledge of ones position and the extreme accuracy available.

I urge everyone to look the market over and get something that won't cost an arm and a leg. Don't try for the final solution, but try rather to get the minimum cost installation so that you will be able to get into the new system and help in it's development.

If you are outfitting an airplane from scratch, the cheapest entry into the system is one VHF Nav Comm and one IFR Approach Approved GPS. More approaches per dollar than any other navigational investment.

Try it! You'll like it!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980806_011704_msg04063.tex]

5.6 GPS-IFRFLIGHT

”Direct” with VFR GPS**Wed, 29 Apr 1998 17:38:20**

Good Evening Dwaine and All

In a message dated 98-04-29 12:57:59 EDT, you write:

I fly with an in panel VFR loran and recently have added a handheld GPS90 (you might know, just before the GPS92 came out) and fly IFR direct frequently in what I believe to be a legal manner. I file /A (all that equipment is IFR approved) and then when enroute I request direct to where ever and suggest to the controller a heading to fly.

I have been telling my students to file /A but to put the following statement in the remarks section. ”Aircraft equipped with VFR GPS” or Loran as the case may be.

This was at the suggestion of some air traffic controllers. My friends have been telling me that the controllers are regularly offering direct to various destinations, VORs and even intersections. If it is not offered, just state that you have the VFR equipment on board and you will probably get the routing you want. Works just fine and I have been assured it is legal! You are still operating on the controllers radar authority.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980429_173820.msg02186.tex]

”Direct” with VFR GPS**Tue, 21 Dec 1999 11:10:58**

In a message dated 12/21/99 9:09:40 AM Central Standard Time, sderrick@tnstaafl.net writes:

My GPS state specifically that it is approved for IFR ”En-Route” operations. Why would it do so if all GPS were approved?

Good Morning Scott,

I don’t think we are disagreeing at all!

I agree that the VFR units are not approved as primary or even supplementary navigation devices for IFR use in the NAS.

The controller has the authority to accept a flight that files direct planning on maintaining track via DR. I can’t imagine that many would won’t to do it though!

The reason that I caution everyone who asks for direct flight cooperation from the controller to tell the truth is so that the controller is not put in the position of being the fall guy in the event of an incident.

I have discussed this informally with controllers and supervisors at Chicago and Atlanta centers and have never found one that disagreed with my interpretation or who were uncomfortable with the procedure. In fact, I can’t remember one who didn’t encourage the practice!

I am sure there are controllers who don’t want to accept such flights and that is their right.

As I am sure you remember from your days as a controller, moving traffic is a cooperative affair based on trust and acceptance of responsibility.

The system is alive, well and growing!

Happy Skies,

Old Bob

[ARTICLES/19991221_111058.msg12179.tex]

”Direct” with VFR GPS**Tue, 21 Dec 1999 17:40:22**

In a message dated 12/21/99 3:16:44 PM Central Standard Time, sderrick@tnstaafl.net writes:

After that if somebody asked for direct and didn't have /r as equipment, I asked um how they were going to get there.

Good Afternoon Scott,

I'm with you! One of the reasons I have written on this subject so often is that I constantly hear others telling folks how they can trick the controllers into giving them a direct course. As you know, almost every controller will do everything he/she can to help if they just are let in on what is going on.

Thanks again,

Old Bob

[ARTICLES/19991221_174022.msg12199.tex]

Enroute Navigation**Mon, 22 Jan 2001 17:38:31**

In a message dated 1/22/01 3:35:55 PM Central Standard Time, YAKpilot@aol.com writes:

A question has come up on GPS in practical IFR applications that I haven't seen an answer to. If a necessary ground based component of an IFR approach fails, can GPS be substituted for that components indication? Or is the approach unusable? For this question assume the GPS receiver is both enroute and approach approved and installed correctly in a certified aircraft. As an example, use the ILS RY 2 approach to Santa Fe, NM (SAF), and the failed component being the NDB. The approach requires ADF.

I realize that one could use the GPS RY 2 approach instead, but the precision approach would be preferable. I also understand that DOMAN can be defined by several other cross-checks, if one is already on the approach.

Carter DuBois

Good Afternoon Carter,

Any IFR approved GPS, even one that is only approved for enroute navigational purposes, may be used to substitute for any fix in the US National Airspace System that is published. Such use may or may not be approved in other countries. I have been told that Canada either has approved that use or is close to doing so, but haven't seen anything official yet.

The GPS may be substituted for a DME any time and at all altitudes.

It may be used in lieu of any ADF for any purpose except to shoot a non overlaid NDB approach. For that you have to have an ADF.

The only kicker that I know about is that the point which you want to reference either has to be in the database or there has to be a point in the database that some approved chart shows as being usable to delineate the waypoint in question.

On the approach in you mention, if DOMAN is in your data base, it may be used in lieu of the NDB and an ADF is not required. If DOMAN is not in your database, (though I can't imagine it not being there) you could use the VOR and DME. If the VOR is out or, if you don't have a DME, you could use the VOR location waypoint as the datapoint for the GPS and the bearing and distance therefrom via the GPS to determine DOMAN. Lots of possibilities and all legal!

It is all explained in the AIM, Chapter 1, Navigation Aids, Section 1, Air Navigation Aids, Paragraph 1-1-21, Global Positioning System, Sub paragraph c, Use of GPS for IFR Domestic Enroute, and Terminal Area Operations, sub paragraph 5.

The information was added to the AIM in February of 1999 so any issue newer than that should have it!

Any more questions, please ask!

Happy Skies,

Old Bob

[ARTICLES/20010122.173831.msg01478.tex]

Enroute Navigation**Mon, 28 Aug 2000 07:36:35**

In a message dated 8/28/00 12:02:54 AM Central Daylight Time, res02xmz@gte.net writes:

So yes, you do need the capability to navigate via NDBs in Alaska. Whether an IFR GPS can legally provide that capability without an ADF aboard I don't know, that's a regulatory question.

Dave

Good Morning Dave,

Great information! I had no idea there were such differences considering MEAs along those routes.

There is no question that you could legally fly the NDB airways in the USA National Airspace System that you have described using an IFR enroute approved GPS. The VOR airway would be the alternative navigation method. The VORs would have to be in operation (or a suitable alternative VOR option available) and your aircraft would have to be equipped to receive the signals.

There is no requirement that an ADF be on board unless there is no other alternative method of navigation.

There could be a question concerning the legality of your conducting such an operation if the aircraft you are flying did not have the operational capability to fly the VOR airway due to icing conditions or performance problems. That is true any time we fly aircraft which are not approved for flight in known icing and icing is known or forecast. I think there would be a good argument, based on the MOCAs being so low, that there would be a good alternative if icing conditions were encountered at the VOR MEAs, but that would have to be decided at the hearing!

Just as anyone can sue anyone else for anything they want, a FED can take action against any airman for anything they perceive as a violation. Nothing is cut in stone, but there are restraints in place that should stop frivolous lawsuits and frivolous violations. Once again, if no problems are encountered, no action is likely.

While I have no current knowledge of the availability of VOR airways in Northern Canada, I have been told recently by Canadian authorities that they consider an ADF to be required when flying the NDB airways in the northern portions of Canada. Based on my observations many years ago concerning the number of VORs up north, their position seems reasonable to me! Does anyone have more current information?

Happy Skies,

Old Bob

[ARTICLES/20000828_073635_msg12697.tex]

GPS Direct was ADF**Tue, 21 Dec 1999 12:10:33**

In a message dated 12/21/99 10:10:38 AM Central Standard Time, KR2616TJ@aol.com writes:

Can anyone find FAR text that states you cannot do this. This information came from an A.T.P., CFII, ASMEL, FAA Designated pilot examiner and FAA Designated CFI examiner. When I asked him to reiterate, he emphatically assured me it was legal.

Good Morning Dana,

I don't think there is any regulation which specifically prohibits that use.

There is however, rather complete regulatory guidance as to what is acceptable for primary and supplementary navigation in the US National Airspace System.

I hope that one of our barristers will chime in on this one as I know I am treading on dangerous ground, BUT!!

It is my understanding that the FARs are permissive rather than restrictive. Just because something is not listed does not make it illegal. Nor is it automatically legal!

As we tend to say so often: It Depends.

I would think that if we press the FAA for an interpretation that says a handheld is authorized as an IFR navigation device provided the flight is conducted under VFR conditions, we would end up with a restrictive rule that says "don't do it."

Right now it's use has been accepted by most individuals under the controllers authority. The umbrella of permissiveness that the FARs provide gives room for such an interpretation.

Don't push it!

Happy Skies,

Old Bob

PS This information is from an old guy with an A.T.P, CFI -RAIG&ME, ASMEL&S and former FAA Designated pilot examiner.

[ARTICLES/19991221.121033.msg12181.tex]

GPS In Lieu of ADF/DME**Sat, 30 Sep 2000 01:45:56**

Good Morning All,

As I am sure most of you are aware, GPS has been approved to be used in lieu of ADF and DME for almost all purposes in the US National Airspace System.

There are numerous airports in the USA, and elsewhere, that have a DME that is associated solely with a particular localizer or pair of localizers. The location of that DME unit is not published on any of the charts readily available to we aviators.

When the NOTAM spelling out the method to be used to allow the use of GPS in lieu of ADF and DME was published, no GA GPS manufacturer had the locations listed on their datacards.

The FAA, to their great credit, did provide a method whereby another fix along the same route could be used to determine the required distances along the localizer course. It is rather cumbersome, but workable.

The AOPA, and others, worked with the FAA and the manufacturers to gain agreement on a method whereby the location of the localizer associated DME site could be placed on the datacard.

The FAA agreed that they would go along with anything reasonable which could be agreed upon by the manufacturers.

AOPA hosted a meeting to that end in the spring of 1999. As of the summer of 1999, Jeppesen had placed all of those datapoints in their master database. They are now available for any manufacturer who wants to use them. The DME sites are listed as an intersection using the same ident as the localizer and the DME broadcast over the air.

Honeywell (King) and Garmin modified their packing software last fall so that the sites are now available to users of their IFR approved GPS units which have a current database.

All you have to do is search for a waypoint with the same ident as the localizer and DME identification.

As an example, if you are planning an approach to runway 1 at Rockford Illinois, you would insert the letters IRFD into the IFR GPS. That will come up as an intersection located at the DME site and distances will be available to use instead of the DME distance.

I have tried it on the Garmin 530 and the King 90B.

It works great!

I called UPSAT this afternoon to inquire whether or not they would place the information in their database programs and was assured that it is in the works.

Why don't you who have UPSAT equipment give it a try and let us know if the information is available or not?

When Trimble was contacted, I was told that their equipment had the capability of adding those waypoints, but they doubted if management would approve the expense of writing the new software program which would be required to place those four letter identifier waypoints in the Trimble database. It was suggested that I write a letter requesting that they do so.

I wrote a letter today. It might be helpful if other Trimble GPS users would also make such a request. I don't know how much leverage we have, but it won't hurt to try.

The information is available in the Jeppesen master database. The FAA has bought in on the concept and all the manufacturer has to do is modify their packing software to extract those waypoints at the same time as they extract the rest of the intersections each 28 days.

I am not a computer person, but it doesn't seem that such a modification should be a major project!

Happy Skies,

Old Bob

[ARTICLES/20000930.014556.msg14248.tex]

IFR GPS Utility**Tue, 1 Feb 2000 18:19:06**

In a message dated 2/1/00 4:18:14 PM Central Standard Time, jtsmall@onramp.net writes:

But is what's needed is a larger moving map, like a MFD, and/or an IFR certified gps? As you are constantly watching the new technology with an eye toward IFR bang-for-the-buck I would be really interested in what you may conclude along these lines. I assume you will need to fly with your 295 for several months before reaching an opinion.

Good Evening John,

No, I think I have an opinion right now!

If you are really considering IFR bang for the buck, an IFR GPS is the way to go! Moving maps are fun, they do aid in situational awareness, but they don't allow you to do anything you couldn't do without them. There are dozens of airports that have only GPS approaches and others where the minima on the GPS are the lowest available. If you are not planning on shooting approaches, but are primarily interested in enroute IFR, all you need is a VOR. The rest of the stuff is just for fun!

It appears that most of the newer IFR GPSs are going to have a moving map whether you want one or not! Overall sales of IFR approach approved boxes is so slow right now, that there is very little incentive for the manufacturers to spend the time and money it takes to get a simple IFR GPS unit approved. There doesn't seem to be a market for it. The best selling thing on the block is the rather high end 430. If you are starting from scratch and need everything, it is not priced all that bad.

If you already have all the things you need except IFR GPS, I would imagine the only economical way to gain IFR GPS capability would be by buying used equipment. I haven't priced the market recently, but I doubt if there are any new full approach approved boxes that could be installed for less than five grand and I am not sure that would cover everything.

There just isn't any way of comparing an IFR capable unit to a non IFR moving map!

Happy Skies,

Old Bob

[ARTICLES/20000201_181906_msg02270.tex]

5.7 GPS-MISC

Annunciator**Fri, 28 Apr 2000 21:48:05**

In a message dated 4/28/00 4:45:02 PM Central Daylight Time, newmanb@rocketmail.com writes:

Now can you stand one more question? Can you provide a perspective on the little annunciator/switch panel? I think this is required with all GPS's except the Garmin 430.? Are there any conditions under which it can be eliminated? What if a CDI is dedicated to the GPS and not switched?

Good Evening Bob,

If you have a dedicated resolver and CDI, there is no reason for switching. If you have a resolverless GPS and have a dedicated CDI there is no need for switching.

Almost all of the sets will require some sort of annunciator device. The 430 has them built into the unit.

Mid Continent has an instrument which contains the required annunciators, a dedicated CDI and a To From indicator for something around eight hundred bucks the last time I checked.

I used my existing HSI for the CDI and added a switching arrangement to change it over from indicating for my KNS-80 to the GPS. I then installed four little lights, which cost about ten bucks a piece, to serve as the annunciators. I added a zener to set them up for dimming and the whole setup cost me less than a hundred bucks.

The Trimble has the annunciators on the panel unit and I think they could be used if the panel unit was placed in the pilots normal line of sight and the FEDs were pressed a little. Mine was an early approval, the first one after the factory as far as I know, so we didn't argue too much.

Very little labor involved as well.

Things can be done economically if there is a desire to do so.

If John Small still has my instrument panel available on his picture board, you can see the lights in the upper right corner of my floating panel.

Happy Skies,

Old Bob

[ARTICLES/20000428.214805.msg07261.tex]

Barometric Data Input**Sun, 16 Apr 2000 19:24:41**

In a message dated 4/6/00 10:54:26 AM Central Daylight Time, n5qvq@email.msn.com writes:

Yes, most encoding altimeters have the output RS-232 stuff for the IFR GPSs', I think. I do know that MOST of the cheap blind encoders do not have that output, and that units make by Shadin and a few others are necessary. I have the GX-50 and leard that from the install. Hope that is clearer. Ed, N5769K.

Good Afternoon All,

I think this subject has been quite well covered over the last few weeks of my absence, but I would like to comment.

The IFR Approach Approved GPS units do require a barometric input which is generally provided by an altitude encoder. It can be, but doesn't have to be, the same one that feeds the transponder.

The early sets required that the raw data put out by the encoder in a parallel stream be converted to a serial format that the GPS set could use.

This was initially handled by the insertion of a serializer in the stream to the GPS. The output of the altitude encoder is called the gray code and requires eleven wires for transmission. The stream going to the GPS was serialized so that it could be transmitted on one wire.

Many manufacturers of encoders added a serializer inside of their encoder box so as to combine the functions. These combination encoder/serializers sold for 250 to 400 bucks and were widely used. Shadin went around and bought up the small manufacturers and then raised the price to eleven hundred dollars or so. Fortunately, most of the GPS manufacturers realized that this move by Shadin was hurting GPS sales and they installed serializers within the newer generation IFR GPS receivers. For most of the boxes, that meant that an extra fifteen pin connector be provided, but it at least nullified the highway robbery that Shadin had imposed on the industry.

Most current IFR GPS Approach boxes will accept the gray code from any encoder, even the cheapest, without the requirement for a serializer.

Does that help, or did I just muddy up the waters?

Happy Skies,

Old Bob

[ARTICLES/20000416.192441.msg06457.tex]

Certification**Thu, 1 Feb 2001 08:57:09**

In a message dated 2/1/01 7:06:58 AM Central Standard Time, rhare@mich.com writes:

Can the GX60 GPS be substituted for a VOR receiver to legally fly VOR airways?

Good Morning Rich,

GPS is currently authorized only as a supplementary navigation system. It is not approved as a primary or "stand alone" method.

The interpretation of that status by the FAA is that you must have some other approved method of navigation pertinent to the route to be flown on board the aircraft.

You don't have to look at it, use it or monitor it. You just have to have it aboard so that it may be used if the GPS unit fails or the satellite system goes out of specification.

The argument has been made that you could use visual navigation as a back up if you were in severe VFR conditions flying over an area endowed with a plethora of easily identifiable visual checkpoints.

I don't think such a position would fly at the hearing!

If you were flying in an area that had a suitable low frequency delineated airway, the ADF would provide the alternate method of navigation.

In the lower 48, it is my opinion that a VOR receiver would be required, but that is not stated in then regs.

So, to answer your question:

Sure, you can fly down the airway between waypoints which are located at the same place as the VOR stations, provided those waypoints are derived from the database of your IFR enroute (or better) approved box, but you must have another legal navigation source available as well.

You can even do it with an out of date datacard if you first verify that the location shown in your database is the current location of the VOR over which you intend to fly or from which you wish to determine the airway.

The FAA charts work better for the verification process as they have the Lat/Long available. The Jepp charts do not. (Unless you are using the "Flight Levels")

Any help?

Happy Skies,

Old Bob

PS If I wanted to equip a small airplane for IFR flight at the lowest reasonable cost today consistent with the ability to execute the maximum number of approaches at the greatest number of airports, I would have one VHF NAV/COMM, one IFR Approach Approved GPS, one Transponder and carry hand held COMM and GPS backups. Today, it would probably be a GX-60 for the GPS as that would allow me two full blown COMM units, but there I go raising the cost!

[ARTICLES/20010201.085709.msg02423.tex]

Certification**Sat, 3 Feb 2001 00:35:23**

In a message dated 2/2/01 10:50:58 PM Central Standard Time, Mavitor@aol.com writes:

I understood that the annunciator is to tell you when you are operating your HSI -CDI with the GPS verses the regular VOR. If the AP is hooked into the HSI - CDI same thing. This was when I was considering the Garmin GS155.

Good Evening All,

The methods used to comply with AC 90-94 and TSO C129 vary widely. Not only is there a lot of difference between how the different manufacturers have elected to satisfy the FEDs, but there are many options for the customer for each manufacturer's product. On top of that, many installers take it upon themselves to formulate a plan for the installation that fits with their idea of how the unit should be installed.

Sooo-, you are probably all correct – for your installation!

One of the real big factors is whether or not the panel unit is located in a position that is within the area which the FAA describes as within the pilots normal field of vision. That one is open to all sorts of interpretation.

Somehow, Garmin has managed to get their supervising inspector to agree that the annunciator function that is located within the confines of the panel unit will meet the FAA criteria when it is mounted in the common Beech radio stack.

Not all of the installers or all of the FSDO folks agree with the interpretation and they apply pressure to get additional, or at least different, indicators and annunciators involved.

The thing to remember when evaluating what is required is that the requirements are open to as many interpretations as there are people involved.

The basics are that there must be some sort of a CDI and three to five annunciators.

As for the CDI, the one within the panel unit could possibly used, but I don't know of anyone who has gotten an approval to do that.

If the CDI is used for both a VOR and a GPS, there needs to be some method of determining which is being used at any particular time.

Some FSDOs even insist that a relay be installed so that if a localizer frequency is tuned on the receiver which feeds the CDI for the VOR/ILS function it will show the localizer function whether the pilot has selected it or not. Most FSDOs realize that such a relay is not required, but there are a few who still ask for it.

Now for the annunciators.

Most GPS units need somewhere between three and five annunciators to advise the operator of the status of the GPS unit. There are a plethora of devices to accomplish this task, but most of the sets have some form of annunciation within the panel mount unit which will suffice if the unit is placed within the normal scan of the pilot. (Whatever that is!)

Once again, not all installers and FSDOs like that provision and will try to have it done their way, whatever that is.

Many installers use a CDI that includes all of the annunciators within the CDI instrument, but there are tons of other possibilities.

Nothing is easy, is it?

Happy Skies,

Old Bob

[ARTICLES/20010203_003523.msg02609.tex]

Cost**Thu, 22 Jan 1998 00:26:55**

Good Evening ADM,

In a message dated 98-01-21 17:13:53 EST, you write:

Lets stretch the fantasy and look forward to \$500.00 panel mount IFR units.

I think they could easily be built for that price if it weren't for the problem of FAA certification. That is not to knock the FEDs!! They do need to be checked and certified, it's just that we are such a small market that the certification costs must be spread among a very small number of customers.

I think the thing we must do is to see that the sets are kept as simple as possible. No moving maps or external switches or inputs should be required. All of those extra and generally very desirable features should be extra cost NON approved additions that therefore do not have to go through the approval process.

Look at the improvements that have been made in the nonapproved handheld maps in comparison to the lack of improvement in the maps that are available in some of the IFR approved sets.

The FEDs should only be involved in the check on integrity of the signal and evaluation of reasonable reliability. All functions concerning user interface and presentation of information should be the province of the manufacturers to evolve and the purchaser to decide which system is the best.

Let the market decide!!

Happy Skies,

Bob Siegfried

The gyros do look exciting don't they! Andrew Corporation had one for a while for a couple hundred bucks but they have dropped it from their line. It has to come soon, they are just to neat not to work!

[ARTICLES/19980122.002655_msg00444.tex]

Cost**Sun, 29 Mar 1998 15:01:34**

Good Afternoon Graham Haddock

In a message dated 98-03-29 13:33:09 EST, you write:

I have seen an individual satellite send subtle error information that would cause a GPS receiver without RAIM [Receiver Autonomous Integrity Monitoring] to happily calculate very bad location information. (And I mean miles in position error.)

What a very well constructed and easy to read explanation of the reason behind RAIM.

In well over one thousand hours of flight with my GPS I have never perceived error beyond the expected limits, but my next door neighbor had a position that was approximately fifty miles off occur with his set five or six years ago. He checked for adequate satellites and there appeared to be plenty. He then turned the set off, waited a couple of minutes and fired it back up. Worked perfectly! It has not had a significant error since. His unit is an early ARNAV panel mount VFR only set. The situation you comment upon may well have been his problem.

I agree completely with your comments on the cost of certification.

It is a reasonable assumption that in our present litigious society, no system will be accepted for IFR navigation that has not gone through the required FAA approval process. Even if that were an efficient process, and we all know that it is not, the cost of such approvals must be spread among the persons buying the sets. With the sale of only some 4000 IFR sets so far, that means that the cost per set has to be rather high. I know that it is a "chicken or egg" situation and that lower prices will come with higher sales and that higher sales will come following lower prices, but how do the manufacturers stay in business in the meantime?

I recently received a catalog and price list in the mail from Allied Signal (it had my N number on the mailing label so you all probably received it) in which the following prices were listed.

KR 87 ADF with the cheapest indicator available – \$5360.00
KN 64 DME Kings cheapest and not a very good set – 3280.00

Total – \$8640.00

There are at least four and probably many more IFR approved GPS units available which list for less than \$5000.00 and should be able to be easily installed for less than the price of the cheapest ADF and DME that King has available.

The GPS provides considerably more capability today than the DME and ADF. In addition to all of the enroute functions and GPS approaches available, it can currently substitute legally for most IFR DME and ADF uses and will likely be approved by fall

for all functions.

I have a Trimble TNL 2000 Approach Plus installed in my airplane and I called my local dealer to ask what he would charge to duplicate my installation. There is a caveat that costs could rise if antennas had to be moved etc, but that a straight forward installation could be done for less than \$6000.00 and he would still make a decent profit. He would be willing to make that a gauranteed price following inspection of an individual airplane and on a clean airplane with no old equipment he might be able to do it for less!

The absolute "cheapest cost per approach available" today is to buy one VOR/ILS/GS unit and one IFR approach approved GPS.

The VOR/ILS/GS/DME/ADF system is not cheap!! Things are expensive, but entry into the IFR system has not been cheap since we folded the low frequency range!

Thanks again for the concise report.

Happy Skies,

Bob Siegfried Old GPS lover.

[ARTICLES/19980329_150134.msg01572.tex]

Cost**Sun, 29 Mar 1998 23:02:02**

Good Evening Dwaine Moore

In a message dated 98-03-29 22:01:18 EST, you write:

I believe that the GPS manufactures stay in business by selling to the boating, hiking, automotive industry, military, etc. At a local Dallas chain electronics store one can buy a no data base GPS for less than \$100. The new handheld Garmin GPS III that lists for \$799 and is \$699 on the street with near zero accessories can be had without the aviation data base and different software for \$250 + - and I believe is called the GPS II. Aviation is now only a small part of the GPS business.

That is precisely the point I was trying to make. If we had the market in the aviation business that there is in "boating, hiking, automotive industry, military, etc.", our costs would be similar. In some ways I am surprised that the manufacturers are staying with us as much as they are.

The nicest thing about GPS is the fact that we are a very small minority user. That is the best assurance we have that the system will stay and evolve. We will have the advantage of being able to share something instead of having to justify the existence of a navigation system for our exclusive use.

I would not be surprised if there is as much or more profit to the manufacturer in the \$250 Hiker II, or whatever it is called, as there is in the \$699 Pilot III.

The difference in the cost of the handhelds and the IFR approach approved sets is primarily the cost of FAA certification. When you consider the tiny market for the IFR sets, it is amazing that the prices are as low as they are, It is possible the "boating, hiking, automotive industry, military, etc." are subsidizing us already!

It can only get better. Magellan has a set selling for under a hundred bucks. There is nothing that brings the prices down like competition in a high volume business.

There is nothing that will run prices up faster than a requirement for FAA certification in a low volume product but how many of us want a set that has not been certified to some integrity standard?

How much do you think Allied Signals ADF would sell for if there was one in every Chevrolet that came off the line? \$100? \$500? I'll bet it would be closer to 100 than 500.

GPS is currently the cheapest IFR equipment available. It will definitely get better and cheaper.

Happy Skies,

Bob Siegfried Old GPS lover

[ARTICLES/19980329_230202_msg01593.tex]

DGPS**Mon, 30 Mar 1998 13:36:45**

Good Morning Ron Davis,

In a message dated 98-03-30 12:15:37 EST, you write:

The FAA could create a network of ground-based Differential GPS stations (probably in the same huts used for VORs) to build a nationwide network of free-flight navigation "relatively cheaply" as far as the FAA budget goes, and throw away those out of date and expensive-to-maintain VORs.

Sounds interesting, I do believe though, that you will find that the differential just reads the clock error in the military system and sends the appropriate correction to the inflight (or ground based) navigational receiver, thus the FAA ground system you propose would not be usable without the full satellite configuration and would not be a stand alone system.

It was hoped that the WAAS system would do much of what you envision at a much lower cost. Unfortunately, the costs have risen dramatically and development has been much more difficult than originally thought.

There are currently hundreds of private differential systems in use throughout the country used primarily by the survey industry. That industry uses GPS along with Glonass and the military frequency carrier but without the secret code. Since theirs is a non-dynamic use, they can use averaging techniques and doppler based carrier phase shift analysis on the military frequency without using the "secret" code and still get accuracies in the one or two centimeter range.

The Coast Guard transmits differential corrections for the marine interests on low frequency beacons situated to cover most navigable waters of the USA.. I have never used the current differentially corrected marine units, but am told that they regularly count on accuracies in the fifty to one hundred foot range and completely eliminate the dither of the signal introduced by "selective availability."

Our problems in the aviation arena stem from the small size of our market along with a mandate from congress which tells the FAA that they are responsible to see that we do not endanger ourselves or the general public with our actions. Thus we have the certification procedure with a large bureaucracy to regulate a very small segment of the population.

Trimble was selling early experimental differential units to Petroleum Helicopters for use on the Texas Towers for \$25,000 in 1991. By the time they modified them to meet FAA mandated redundancy, integrity and warning requirements the price had risen to \$450,000. I wouldn't be surprised if further development has gotten the price back down to the \$250,000 that you quote and I would imagine that considering the rapid improvements in electronics, the cost will continue to fall, but the small market and the need for certification are still tremendous cost problems.

In the long run the best thing we have going for us is the fact that Global Navigation Satellite Systems are being embraced by the general public for numerous uses that none of us thought about.

Whatever system the world chooses, whether it is GPS, Glonass, a combination of both or something not yet developed, it will be there for our use and we will not be saddled with the cost of a system designed exclusively for our use.

It may take a while to sort out and I may not live to see it, but the future is bright. Thoughts and involvement such as you suggest are important and often lead to new applications. Keep it up!!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980330.133645.msg01631.tex]

GPS In Lieu of ADF/DME**Mon, 15 Mar 1999 17:26:19**

Good Afternoon All,

Last summer on July 16, 1999, the FAA published guidance for the use of GPS in lieu of ADF and DME.

That information was in the July 16, 1998, edition of the Notices To Airmen, Domestic/International publication.

That document did not have clear instructions on the use of GPS in lieu of DME on ILS DME approaches where the DME was associated with a localizer and the location of the DME transmitter was not published.

A correction was published a few days later with an amendment covering that specific situation. It was inserted in the text as follows:

Original stuff- "If the fix is identified by a five letter name which is not contained in the GPS airborne database, or if the fix is not named, you must select the facility establishing the DME fix or another named DME fix as the active GPS WP."

New stuff added— "NOTE- An alternative, until all DME sources are in the database, is using a named DME fix as the active waypoint to identify unnamed DME fixes on the same course and from the same DME source as the active waypoint. CAUTION: Pilots should be extremely careful to ensure that correct distance measurements are used when utilizing this interim method. It is strongly recommended that pilots review distances for DME fixing during preflight preparation."

This information was supposed to have been published in the January revision to the AIM.

When that did not occur, I started to ask questions. I contacted Norm Lefevre, the gentleman who wrote it, and asked what happened.

It seems that something had been lost in officialdom and when that was discovered, another NOTAM was published which includes the new language with the "Interim" note.

That NOTAM is in the current edition, published February 25, 1999, and scheduled to be updated on March 25, 1999. It is in the section devoted to General NOTAMs on page GEN-3. The interim "NOTE:" is in the middle of page GEN-4 and printed in italics.

I had never heard of the publication before the guidance was issued last summer and the publication is not available from the GPO in single copy form. You must subscribe at a price of \$85/year in the USA, higher for other countries. This publication is not widely available to we mere mortals and therefore, the full import of the use of GPS in lieu of ADF and DME has not been widely recognized.

I bring this to the attention of this august group as there have been several magazine

articles recently in which the authors have stated that GPS could not be used for the distance information required in ILS DME approaches wherein the distance is derived from a DME associated with the ILS and not a nearby VOR.

While I haven't read the article myself, I am told that even venerable Jeppesen expert Jim Terpstra made a statement to that effect!

As you can see from the above quoted "interim solution or alternative," such is not the case!

You can use the GPS for that purpose, provided that a waypoint along the course which is delineated by the ILS associated DME is available in your database. All that is required is that you count up or count down from that point in the same manner as would be done for a VOR DME approach with a GPS overlay.

The above referenced document is the only authoritative source for that information that I know of. I am told that every FSDO has one available for public inspection (that is where I found it) and that every Flight Service Station should also have it.

When I contacted my local FSS, the person I talked to could not find it and was unfamiliar with the publication.

There are some IFR approved GPSs that do not have all of the waypoints published, but most of them do.

I have not found an ILS DME approach in the USA NAS that could not be flown using my IFR approved GPS set to determine the DME distance.

It works and it works well and easily.

If we don't use it, we may lose it!

Please help to get the word out to all of your friends and acquaintances that an IFR approved GPS CAN be used for the DME function on an ILS DME approach.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990315.172619.msg02873.tex]

GPS In Lieu of ADF/DME**Mon, 26 Apr 1999 18:28:59**

Good Evening Eric Poole,

Earlier today, I wrote:

If you want to save a little money and still have the capability of executing almost all of the ILS, LOC, SDF and other such approaches in the country, buy the VHF Nav Comm and an Enroute approved IFR GPS. That will provide all of the ADF and DME functions, but will not allow you to execute overlay or standalone GPS approaches.

Then, in a message dated 4/26/99 4:51:52 PM Central Daylight Time, you wrote:

Are you sure?

Yes

I thought that you needed an IFR-approach-certified GPS if you want to use it in place of ADF/DME.

No. That was originally suggested by some in the FAA, but a study was done by the Mitre corporation which showed that the accuracy required for enroute purposes was adequate for the approach purposes requested.

There are two provisions that are different from normal enroute use.

For this use of an enroute approved box, it must be able to be configured to show full scale deflection of the CDI for a one mile displacement instead of the normal five mile full scale indication. That requirement is only necessary if a track is to be flown. That is, if you are going to use the GPS to fly to a missed approach point and hold or something similar.

If you are using the GPS to determine a bearing from an NDB for a step-down or for verifying passage over a fix, the one mile CDI width is not required.

In addition, it must have a current datacard installed. Pilot verification of the data is not allowed as it is with most enroute approvals. That is being worked on and we MAY get it changed.

Good Question Eric!

Any more comments or suggestions?

Happy Skies,

Old Bob

[ARTICLES/19990426.182859.msg04041.tex]

GPS In Lieu of ADF/DME**Tue, 27 Apr 1999 22:23:40**

Good Evening John Mills,

In a message dated 4/27/99 7:31:46 PM Central Daylight Time, you wrote:

Bob: 1. Does this mean that an enroute approved GPS can be used in lieu of ADF where ADF is required for an ILS or other approach? (I have no ADF.)

Yes, but it must be capable displaying a full scale deflection of the CDI at one mile. (terminal mode sensitivity) Two mile total width, left to right. It also must have a current data card, Hopefully we will be able to get this card restriction lifted in the future.

2. I have an Apollo GX-55 which the literature says is approved for enroute IFR, but there was no flight testing, and there is no specific logbook entry that says it can be used for enroute IFR. Would this be usable when ADF is required for an approach other than ADF?

It needs to be approved for IFR flight. That requires an Approved Airplane Flight Manual Supplement and certain connections for CDI capability and some annunciators. A simple flight test is also required. A 337 will have to be prepared for the system installed in your airplane to be approved for IFR flight. It really isn't all that difficult, but it does take some effort.

3. Can I really use it for IFR enroute?

Absolutely! But the same answer as above applies, you have to go through the approval process for your individual airplane. That problem is being addressed and there is some hope that the procedure may be simplified.

4. If so what suffix is appropriate for my flight plan? John Mills

I am not sure about this question. When the codes were changed a year or so ago, "G" was designated as the proper suffix for GPS aircraft that had approach, terminal and enroute GPS capability. I know of no code for enroute GPS only. I have been told that there are some changes that have either recently been published or are soon to be. I haven't been able to find anyone who knows for sure what the current situation is, including a couple of FSS personnel that I asked. The AIM still has the same information as was posted a year or so ago and the page has a publication date of February 12, 1999.

In the meantime, I would file a suffix as if you had no IFR GPS capability. Just state in the remarks that you have a VFR or IFR enroute capability as the case may be.

Since that information is not often forwarded to the controller, it doesn't hurt to let the controller know your capability when you are switched to his/her frequency. Until you

get the IFR approval, just tell them that you have a VFR GPS available and after you get the IFR approval list it as an IFR enroute only GPS.

I wouldn't be surprised if the FEDs come up with a suffix for the IFR enroute capability soon.

I would check with the person who installed your unit about getting it approved. If they are familiar with the procedure, it shouldn't be too expensive, but if they are new to the process, it could get rather dear. I would go to someone who has done several installations before yours.

Some shops have made something of a standard installation that includes some rather high priced components. Others have made an effort to use twenty dollar indicator lights instead of 250 dollar switch lights. The low-cost method works just as well as the high priced spread. Check around carefully!

Happy Skies,

Old Bob

[ARTICLES/19990427_222340.msg04082.tex]

GPS In Lieu of ADF/DME**Sat, 3 Jul 1999 10:18:35**

In a message dated 7/2/99 2:50:45 PM Central Daylight Time, hale@lucy.fc.hp.com writes:

Ok, guys like Siegfried....

We all know the Jepp Briefing bulletin neatly outlines when you can use a GPS to = DME... that is when things are in its database and the GPS is IFR, etc.

I read the bulletin and it doesn't cite a FAA source directly.

Do we know what that source is?

Good Morning Bill,

Yes, by golly we do know the source!

It is the Flight Standards folks at the Friendly Aviation Agency.

Led by fellow Bonanza pilot Bob Wright, they wrote an interpretation of the pertinent rules which was published last summer and expanded upon in February of this year.

I guess those who did not read that fact in the message I sent to this site in March won't bother reading this either, but I will quote the previous information anyway.

"That NOTAM is in the current edition, published February 25, 1999, and scheduled to be updated on March 25, 1999. It is in the section devoted to General NOTAMs on page GEN-3. The interim "NOTE:" is in the middle of page GEN-4 and printed in italics.

I had never heard of the publication before the guidance was issued last summer and the publication is not available from the GPO in single copy form. You must subscribe at a price of \$85/year in the USA, higher for other countries. This publication is not widely available to we mere mortals and therefore, the full import of the use of GPS in lieu of ADF and DME has not been widely recognized.

I bring this to the attention of this group as there have been several magazine articles recently in which the authors have stated that GPS could not be used for the distance information required in ILS DME approaches wherein the distance is derived from a DME associated with the ILS and not a nearby VOR."

This interpretation by the Flight Standards office is very helpful to those of our group who may not wish to expend their funds on ADF or DME equipment at this time but who do have the need for operations to airports which require those devices.

An 'enroute only' GPS will suffice for these purposes, but those units don't sell for a lot less than the ones which include approaches and the approach unit will allow access to hundreds of airports which have no other approach available than the GPS.

The NOTAM publication mentioned is available for your perusal at all FSDO offices and should be available at all Flight Service Stations. The information is planned to be published in 90-94 and in the AIM, but that will take some time to get accomplished.

I hope this is helpful to some. If any of our friendly FSDO folks need more information than is found in the NOTAM, you might suggest they contact the Flight Standards folks.

Happy Skies,

Old Bob

[ARTICLES/19990703_101835_msg05692.tex]

GPS In Lieu of ADF/DME**Thu, 8 Jul 1999 19:50:27**

In a message dated 7/8/99 6:20:43 PM Central Daylight Time, burnside@erols.com writes:

Just speculating, but perhaps when a DME is co-located with an ILS/LOC facility? Depending on the GPS, it may not "know" about the ILS/LOC facility.

Good Evening Jeb,

That situation is covered by a note on the second page of the NOTAM explaining the interpretation which allows the use of GPS in lieu of DME. Basically, if the site of the DME transmitter is not available in the database, you may use another point along the same course that is in the database, from which to establish the various distances, much in the same manner as step down fixes are located on a VOR/DME approach with a GPS overlay.

If you don't have the NOTAM available, maybe you have Jeppesen Briefing Bulletin DEN 99-F which was issued 2 APR 99. If you will look on the second page (DEN 99-F2), right hand column, third paragraph from the top you will see the following:

"NOTE: An alternative, until all DME sources are in the database, is using a named DME fix as the active waypoint to identify unnamed DME fixes on the same course and from the same DME source as the active waypoint."

There has also been some question as to whether the GPS was allowed to substitute for the DME requirement for flight above FL240. That has been answered in the affirmative and was listed in the early drafts, but the wording was taken out due to the feeling it was redundant since the first paragraph of the interpretive NOTAM covers the allowance of the GPS for all such purposes in the US National Airspace System.

Any questions, please let me know!

Happy Skies,

Old Bob

[ARTICLES/19990708_195027_msg05805.tex]

GPS In Lieu of ADF/DME**Thu, 1 Feb 2001 20:41:26**

In a message dated 2/1/01 6:55:18 PM Central Standard Time, KR2616TJ@aol.com writes:

I'm kinda reluctant to give up my second VOR if I go with a GX60. In your (anyone's) opinion, am I relying on old technology here. If I go with the GX60 I could dump one ADF receiver plus indicator, one old backup comm and nav., one loran and be able to move the GX60 up more on the panel. This would move it more closely into eye sight, as opposed to having to look down for it.

Good Evening Dana,

The GPS can substitute for the ADF in all cases except for an NDB approach which does not have an overlay.

There are a few airports around the country whose only IFR approach is a non overlain NDB approach.

The good folks at the FAA have assured us that they are working hard to get stand alone GPS or the new RNAV (GPS) approaches approved at all of those fields.

In order to use a GPS as a substitute for the ADF or a DME you do need a current database.

If you have regular need for the ADF, maybe to shoot some ILS that requires an ADF or at a field that has only a NDB approach, it might be a good idea to keep it.

There are still some parts of the world where the major airways are established using NDBs. If you are doing extensive flight outside the lower forty-eight, there might be more reason to retain the ADF.

If it should die or need extensive repair, I would dump it in favor of the GPS.

If you have a good ADF, I would consider dumping the second VOR and retaining the ADF. The only advantage that I can see for having a second VOR is so that you can legally continue IFR flight should your VOR fail. Operationally, the GPS is what you will use all of the time. The VOR is just there in case the GPS quits or to shoot a localizer based approach.

Happy Skies,

Old Bob

[ARTICLES/20010201_204126.msg02480.tex]

GPS In Lieu of ADF/DME**Thu, 1 Mar 2001 11:38:57**

In a message dated 3/1/01 9:59:21 AM Central Standard Time, swo49@hotmail.com writes:

Jerry: Do you know if the IPRC distances are the same as those on the plates? Steve

Good Morning Steve,

Sorry for interrupting, but the distance derived from the intersection called IPRC is exactly what my last seventy-five or so messages have been all about!

Jeppesen has placed a waypoint in the database at the location of every localizer associated DME transceiver site in the US National Airspace.

Garmin, King/GE and now, UPSAT, have modified their packing software to include those waypoints in their respective databases.

If you will look up the intersection in your database using the identifier of the localizer and DME, in this case, IPRC, you will get the waypoint that is co-located with that DME transceiver site.

Nothing magic, just a simple waypoint. The FAA has approved the use of a GPS distance in lieu of a DME distance any time that the source of the distance information is in the database or if there is another waypoint along the same course and derived from the same point, a distance may be computed to use instead of the published distance.

Obviously, if you set your GPS to a waypoint located at the same point as the localizer associated DME transceiver, the distances will be identical except for the difference in slant range. The FAA has determined that the small difference between the slant range and the horizontal range is not significant and need not be considered in the use of the information.

The main thing to remember is that the DME transceivers are not necessarily located at the site of the localizer with which they are associated. The distances published on the charts for all approaches in the US National Airspace System WILL give the distance information from the actual DME site, not necessarily the localizer transmitter site.

As long as you are using either the GPS distance to the waypoint called by the same designation as the DME or the DME itself, you are legal and the distances will be the same as published on the approach plates!

One example in your area would be Hagerstown. Select IHGR in the same manner that you select any other intersection and you will have all of the information that will guide you to the localizer associated DME transceiver site.

Baltimore Martin State has a good example of a DME site that is not located at either end of the runway and is used with two different approaches. Select either IBQG or

IMTN and you will be getting a waypoint located at exactly the same point and the respective distances will be exactly those that are shown on the respective approach plates.

Give it a try, if your database is current, it should work. If it doesn't let me know!

Happy Skies,

Old Bob

[ARTICLES/20010301.113857.msg04959.tex]

Grey Code Converter

Mon, 30 Oct 2000 21:05:16

In a message dated 10/30/00 7:36:22 PM Central Standard Time, Ernie_Ganas@email.msn.com writes:

What is a grey code converter?

Good Evening Ernie,

This may not be a technically correct answer, but for we non-techies, here goes! The information delivered by most altitude encoders to various boxes in the airplane which can use that data is in a form which is called grey code. It takes some eleven wires to deliver it to the units which then decode the data to provide the desired result. One other method of transmitting the data from the encoder to a GPS is to run the eleven wires that contain the parallel data into a magic box which will take the information required by the GPS and turn it into a serial stream of data which can be delivered via one wire.

That magic box is commonly called a serializer.

Some years ago, many manufacturers built those serializers and they were relatively cheap. Eleven wires from the encoder to the serializer and then one wire for the output to the GPS. Pretty neat! Then someone had the brainy thought to make an encoder which had the serializer contained within the unit. It would still send out the "grey code" via the eleven wires to the transponder, or other equipment which required the full data, but the serializer supplied the simpler data needed by the GPS via one wire.

Most manufacturers sold the unit for a couple of hundred bucks wholesale and everybody was satisfied.

Shadin was one of the more successful manufacturers of such units and they proceeded to buy out all other manufacturers of encoders which incorporated the serializer.

Once they had eaten up all of the competition, Shadin raised the price of the unit to around twelve hundred bucks

That meant that the price of an IFR approved installation increased drastically.

Most of the manufacturers retaliated by including a decoder within the GPS which would accept the "greycode" via the eleven wire set up and decode it internally to provide the data they needed, thus negating the requirement for the unit on which Shadin held a monopoly and was thereby holding the industry ransom!

The only problem with that approach was that everybody had to add another connector, usually a fifteen pin Sub D connector, to handle the eleven wires.

If you will look on the back of an early Trimble Approach unit, you will note that there is only one fifteen pin connector. On the later 2000 Approach Plus boxes, there are two of those connectors.

Everyone except UPS has made that change, thus eliminating the need for the serial box for which Shadin was charging usurious prices.

I am not up to date on the current price of encoders containing a serializer or a serializer by itself.

Any help?

Happy Skies,

Old Bob

[ARTICLES/20001030.210516.msg15509.tex]

IFR GPS Desirability**Sat, 8 Aug 1998 21:45:43**

Good Evening Eric Poole,

In a message dated 98-08-08 17:46:40 EDT, you write:

There is still some access to many such areas, IF you can afford the equivalent of six months' mortgage on your house to buy your way into the club.

That's my point.

This time I don't think I see your point.

If there was no GPS available would the approach capability be any better?

Can you buy a VOR/ILS/GS comm unit for any less than you can buy a GPS? If you don't have an ILS you can't shoot ILS approaches. No ADF, no ADF approaches. No DME, No approaches that utilize the DME.

I received a catalog from Allied Signal a couple of months ago and while I can't locate it just now, I believe the price for a KX155 was around five grand with glide slope and indicator. The ADF was close to that price and the DME was around 2500 bucks.

The GPS is the lowest cost method available to execute the greatest number of IFR approaches.

There is a cost to join the IFR club. As I mentioned a few days ago, the low frequency range was awful nice for we low income people. It went the way of the dinosaurs and we had to either pop for a VOR or quit flying instruments. Some how, most of us managed to find the way to a VOR and eventually even ADFs, ILSs and DMEs when they were invented.

I was happy flying along with needle ball and airspeed. In 1956 they went and mandated a full panel with DGs and Horizons. It wasn't something I wanted but I will admit that it does make instrument flying a lot simpler than it was before. It did raise the cost of entering the club. Was it a good move or a bad one?

A simple VOR cost some six to eight times what a LF receiver did and that was without ILS, Localizer or glide slope. Was dropping the LF and embracing the VOR a good move or a bad one?

The GPS is cheaper than VOR and it has a lot more capability. If you are championing low cost flying you should get on the GPS bandwagon. It is by far the most economical way to go.

If you already have working ADFs and DMEs I would think your access to the system would be pretty good. It doesn't seem productive to knock a lower cost alternative just because you don't need it.

Happy Skies,

Bob

[ARTICLES/19980808.214543.msg04135.tex]

IFR GPS Navigation**Fri, 23 Oct 1998 14:30:10**

Good Afternoon John Small,

In a message dated 10/23/98 12:15:12 PM Central Daylight Time, jtsmall@onramp.net writes:

Frankly, I'm somewhat confused by the 'approved' issue as I've seen many heated arguments on what's actually legal or not. The arguments seem to indicate that a non-approved GPS can be used so long as you have the minimum equipment to file IFR in the first place. I've read the regs on this and it seems unclear to me there too.

It is really quite straight forward. In order to use a GPS to execute an approach, the GPS must be IFR approved in the aircraft that is being used. Being IFR capable is not enough. There must be an individual approval for the individual aircraft. There are some different rules for experimental, but we will not discuss that here.

In order to identify a fix on an airway, or for any other use directly related to operating in the IFR system, the unit must have the IFR approval for the individual airplane.

If, however, the only use to be made of the unit is to fly direct courses enroute, then it has been accepted by the FAA that one may navigate via a VFR only GPS or a VFR only Loran system.

The flightplan should be filed stating the equipment code based on the legal IFR equipment in the aircraft to be used. The notation "VFR GPS (or Loran) available" should be listed in the remarks section. That may not get to the controller so if one asks if you can proceed direct to any specific point, tell them yes. If they ask what you will be navigating with, tell them you will be using a VFR GPS or Loran as the case may be. The clearance will be at the discretion of the controller and based on his authority to accept such a flight. Don't file slash "G" or slash "I" unless you actually have the required equipment onboard. Don't tell a lie, even a small white one. It isn't necessary.

To use the GPS in lieu of an ADF or DME in the manner approved by the FAA this past summer, it must have at least an approval in the individual airplane for IFR enroute and terminal use.

At the current time, the cost of enroute and terminal only sets does not seem to be much lower than the cost of full enroute, terminal and approach approved units.

The only equipment required to be in the aircraft to operate IFR in the lower forty-eight is that which is necessary to navigate and communicate in the environment to be flown. In the lower forty-eight states that is accepted to be one VOR receiver and one 720 channel communication unit.

That would allow you to operate almost everywhere enroute and to execute maybe half of the approaches published.

Add to that equipment an ILS with glideslope (generally included in most current IFR VOR navcomm units) along with one IFR approach approved GPS and you could fly almost every approach there is.

Dual VOR is not required (there are a very few approaches which individually specify dual VORs but they can generally be flown legally with one VOR and one IFR approach approved GPS) nor is dual communication capability. No DME nor ADF is required for most operations. The only place an ADF is required is to execute an NDB approach which does not have a GPS overlay and there are not very many of those. If you know of one, speak to the authorities at the airport and if they will request it from the FAA, an overlay or a standalone GPS with the same or lower minima will probably be commissioned.

If I were equipping a bare airplane for IFR flight today I would buy one combination VOR/ILS/GS/COMM unit such as a KX155 or equivalent, one marker beacon receiver and one TNL2000 Approach Plus GPS or Northstar M3.

I would prefer the Trimble but there is some question as to whether it will be supported in the future.

The marker beacon might be able to be substituted for by a GPS but I really haven't analyzed the approaches with that in mind.

I would then add a hand held GPS as navigation backup and moving map source. My current choice would be the Garmin 195 due primarily to the large size and ease of viewing for my ancient eyes. To that I would add a good handheld comm with a standby external antenna on the airframe. I like the I-Com but there are lots of good ones around.

While I think the visual presentation on the King moving maps is as good as any, I feel the price is too high for what you get and the moving map nowhere near as good as those found in any number of non IFR approved handheld units. I also do not like the resolver which is required with the King, Garmin and the new Trimble. Apollo has several nice units but they all require an altitude serializer and that seems rather unnecessary these days when everyone else has placed the gray code converter within the GPS box.

I probably answered more questions than you asked!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981023_143010_msg06219.tex]

IFR GPS Utility**Fri, 25 Aug 2000 23:22:16**

In a message dated 8/25/00 9:56:04 PM Central Daylight Time, avion@worldnet.att.net writes:

As a technology stopgap measure, I find the Garmin 295 an impressive color moving map. For a relatively low price it certainly expands my old IFR onboard equipment to the point that I'll wait for new developments rather than piecemealing units/upgrades/panel.

Whats your opinion?

Good Evening Ron,

All of your points are well taken, but the most important one is that individual needs should be the deciding factor.

If you do operate in a venue that includes a fair amount of IFR flying to relatively low minima, the IFR approved GPS may well be worth the money required to obtain it.

There are a large number of airports where the only approach approved is a GPS approach. No GPS, no approach. If you are based at such a field or have occasion to operate to that field often, it may fit your style of flying. However, if you are based somewhere that has an ILS and most of your flying is to an airport with an ILS, the GPS has little use.

There are many fields where the GPS minima is substantially lower than any other approach approved at that field. But if you don't fly low approaches, who needs it?

If you are equipping an airplane from scratch and don't want to buy used equipment, you can buy one VHF NavComm and one IFR GPS and gain more IFR capability than with any other expenditure of dollars.

As always, IT DEPENDS!

The vast majority of pilots flying Bonanzas can get by very well with one VOR, one transmitter, one transponder and a handheld GPS. Even a one hundred dollar GPS from K-Mart will do the trick. You don't need an ILS, a glide slope, a Loran, an RNAV, a Strikefinder or anything else to do the type of flying that most of us do.

That minimum equipment will likely allow you to operate at least 95 percent of the time that the best equipped airplane in the country could operate. Maybe even 99 percent as much!

Every little improvement in operating capability carries a price tag, the lower the minima and the more sophisticated the equipment, the higher the cost per foot of improvement.

The one hundred dollar GPS from K-Mart is as accurate as your Garmin 295. It just doesn't have as many toys to play with!

You pays your money and you takes your choice.

Happy Skies,

Old Bob

[ARTICLES/20000825_232216_msg12589.tex]

IFR Installation**Tue, 23 May 2000 19:17:20**

In a message dated 5/23/00 1:00:21 PM Central Daylight Time, db4397@dragonbbs.com writes:

I believe it is but you will need the annunciator panel which indicates what source your navigation is coming from be it nav. rec. or GPS.

Good Evening All,

Perhaps a little rehash of what is required for IFR certification of an IFR approvable set would help.

There must be a Course Deviation Indicator of some type located in the pilots direct view forward without undue squirming and/or leaning from his/her normal seated position. There is nothing that says the one contained in the panel unit cannot be used, it says that the panel unit CDI is not likely to be approved.

I know of no one who has obtained an approval for that thus far, but it could be done.

Right now it appears most practical to have a CDI on the primary instrument panel which can display the course functions. This can be an instrument which is used for other CDI functions as well, but if it is multifunctional, there must be a device which will advise the operator of what type information is being presented. Early in the program, some of the FAA inspectors were requiring that any multifunctional indicator which was also used as the primary VHF navigation indicator had to have a relay installed which would automatically switch the CDI to indicate localizer deviations any time a localizer frequency was selected on the primary navigation radio receiver. That is definitely not required!

If the CDI is dedicated to the GPS and has no alternate function, no annunciation (other than labeling) of it's indication is required.

There are indicator lights or annunciators on all of the manufacturers panel mount GPS sets which tell the operator what is happening. Those must also be in the pilots direct line of sight. Since most of the panel mounts are not in the pilots direct line of sight, most installations have some type of indicator lights or annunciators mounted on the primary instrument panel. The number of required devices varies from three to five depending on the set.

The GARMIN 430 is the only set that I am aware of that has a blanket approval recommendation to accept the annunciators in the panel unit as adequate regardless of where the unit is installed.

Mid Continent makes a number of units which will provide switching and annunciation for almost any combination you can think of.

If you are installing a set which requires the heading to be input from the primary panel,

a resolver will be required.

If you do not need a resolver (the Apollo does not) and have the panel space, the simplest and probably easiest installation to get approved would be to buy one of the Mid Continent units which has the CDI, To/From Flag, Master Warning Indication and all required annunciators mounted in one two and a quarter inch instrument.

The installation and approval procedure is not all that difficult, but there are lot's and lot's of options, not all of which are adequately presented by some of the installation shops.

Hope that helps!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/20000523_191720_msg08528.tex]

Jamming**Wed, 21 Jan 1998 11:12:09**

Good Morning George,

In a message dated 98-01-21 10:03:05 EST, you write:

Of course, somewhere in about 2001, the day after the first person turns on one of the \$4,000 Russian GPS jammers in the NY area, the price of used VORs/ILS units will soar.

How true! But think how much more interesting it will be if he waits till 2010 to do the jamming after all of the VORs and ILSs are shut down, if that happens.

There are LOTS of problems to be solved, but in the meantime there is a great amount of capability available at relatively low cost for operation in the current unjammed National Airspace System.

I can't see buying dual VORs or an ADF or a DME in the face of the FAA moving toward an all space based nav system. If one has need of instrument flight today, the cheapest way to go is one VOR/ILS and one IFR GPS. That still gives excellent redundancy along with hedging of your bets for the future.

As I said earlier today, there are several hundred approaches today that allow either access to an airport that did not have any approach before or availability of substantially lower minima by using the IFR GPS.

If the signal is jammed, you will get a RAIM warning and reversion to the missed approach would be proper along with a diversion to the alternate that is required to have an approach other than a GPS.

Still seems to me to be the best and cheapest move for the economy minded user.

Happy Skies,

Bob

[ARTICLES/19980121.111209_msg00423.tex]

Moving Map

Sat, 13 Dec 1997 19:00:34

Good Evening Bob Briggs

In a message dated 97-12-13 10:35:39 EST, you write:

It seems to me the FAA has completely ignored the value of a moving map display. How many accidents have resulted from lack of positional awareness! I'll take a GPS with a moving map any day over one just coupled to a course deviation indicator. The CDI is a relic of VORs and primitive display technology. Yet the FAA seems to be saying the IFR unit with CDI is safer than a VFR unit with moving map.

I feel I must comment on this statement.

The FAA has not ignored the value of the moving map, in fact there are a number of FEDs both in the US and in NAV CANADA who are pushing to require the moving map as a mandatory feature of the next generation of GPS navigators.

I am very strongly opposed to that requirement and this is why.

If the moving map is included in the IFR approval process, it not only drives up the cost of the set but the cost of getting the approval. On top of that, if the manufacturer wants to improve the map, he must go through the FAA approval process again to make those improvements available.

It seems to me that it is better to make the IFR approved GPS as simple as possible and relate only to those functions absolutely necessary to get the job done. The fantastic improvement in non-certified moving maps is evidence of how well the system works if it is not necessary to gain government approval. The current crop of handheld moving maps is nothing less than phenomenal.

My vote is for one IFR approach approved GPS without a moving map and without an OBS resolver and without the necessity of pushing buttons to enter and leave hold mode. Such sets are now available on the market and they are the cheapest to buy and the cheapest to install. (and I think the easiest to use)

Combine one of those with any of the modern handheld moving maps (or panel mount maps if you have the bucks) and you have the best of both worlds. If the FAA had required moving maps for the first generation of IFR approved sets we would still have the little stick maps without all of the great detail and flexibility available on the handhelds.

You knock the CDI quite heavily, but we must remember that the autopilot is going to follow a needle. All it knows is a plus or minus voltage. When on course the potential is generally zero. Same thing for a CDI. Simple and cheap.

I like looking at the moving map, it is great for the current catch word "situational awareness" but my autopilot can't follow it!

I personally find the neatest thing to use for handflying to be the actual "track made good" digital display on the GPS. If the course is 045 degrees and I am on course, if I just fly 045 degrees on the "track made good" indicator, (don't forget declination error, but that is another story) I will get to where I want to go. Wind changes at low altitude are a snap, just maintain the same "track made good" and to h___ with the heading! Perfectly legal and easy. I use that indication when flying the ILS to help me hold a stable inbound course. I wish there were something similar to help me with the glide slope!

PLEASE! PLEASE don't ask the FAA to add anything to the requirements for certification. The major expense now for an IFR set is the difficulty and expense of FAA approval. The market is tiny and the procedure difficult and expensive. KEEP IT SIMPLE!

There are integrity problems with the VFR hand helds. I doubt if any one who has studied the situation thoroughly would recommend them for approaches. At our current state of technology, the panel mount is a necessity for IFR use and our only current method of attaining integrity is the RAIM procedure. The FAA is insisting on current data from a self contained database and the FAA, along with most industry experts, is fighting the type of "self load" we were allowed to do with the KNS-80 style RNAVs or the old INs. That would be the cheapest way to go but I don't think it is in the cards!

I believe it was Ray L. who mentioned that it is not a lot more expensive to manufacture an IFR set than the VFR ones. That is probably true. The big problem is who will pay for the engineering and approval costs on such a limited market piece of equipment?

Lets all get together and urge maximim use to be made of the current C-129 sets. We have a chance of getting that.

I urge any interested parties to sign up for the GPS for Aviation forum and read the archives for the last six months. It will take a couple of hours, but all of this has been hashed over there already.

I had rather hoped that this discussion would move to the GPS web site, but since it is here, I just had to get my licks in!!

Old KEEP IT CHEAP,

Bob Siegfried

[ARTICLES/19971213_190034.msg02733.tex]

Nav Data**Thu, 1 Jan 1998 17:50:02**

Good Afternoon Bob Briggs,

In a message dated 97-12-30 14:16:08 EST, you write:

I don't know how much, if anything, Jepp pays the gov't for the raw data. Of course, Jepp originally created and maintained their own database. I don't know the history of when the gov't got involved or whether Jepp still creates updates from non-gov't sources in the USA. Bob Siegfried - is this info available on the GPS web site you keep referring us to?

I haven't seen any reference thus far on the GPS for AERO site but it might be a good question to ask! Why don't you sign up and try?

It is my understanding that the information as delivered by the government is in a form that needs considerable modification before use. In addition, each GPS manufacturer needs the information applied with slight differences to work with their individual software. I have been told that part of the cost of the updates is paid to the GPS manufacturer for the part they play in the update process so the cost is not totally determined by Jeppesen.

A large part of the cost has to be whatever "set-aside" Jepp makes for liability reserves. They have been sued and have paid some pretty hefty settlements. As Shakespeare said "First we kill all the lawyers" (or something like that) Oh Well!

I too would like to pay a lot less for my Jeppesen supplied data but I have not yet found a competitive source with equivalent product. I fly less than two hundred and fifty hours per year and spend about \$1400 with Jepp. That's \$5.60 per hour just for information! (I should fly more to get the cost down!)

AOPA has obtained a promise from the FEDs to do something about the data situation and I would imagine eventually the problem will be solved. Unfortunately there seems to be something of a chicken and egg situation.

Very few people are buying the data so the cost of supplying it has to be spread over a small paying base. If more people were using the TSO C-129 equipment and obtaining updates the cost per user could be a lot lower. Most people are waiting for the cost to come down before they commit to the system and that won't happen as long as there are so few users!

I was told by one manufacturer at Sun n' Fun last year that there were only around one thousand IFR approvals in the whole USA and a lot of them don't maintain a current card. When that number is spread out amongst all the manufacturers, the market for each individual data card becomes very small and I sometimes wonder how Jepp keeps the price as low as it is!

Not very comforting is it?

Happy Skies,

Bob Siegfried

[ARTICLES/19980101_175002_msg00008.tex]

Nav Data**Mon, 10 Aug 1998 19:59:32**

Good Evening Mike McGahan,

In a message dated 98-08-10 17:42:49 EDT, you write:

Looks like an opportunity for somebody. Doesn't the data come from the FAA or NOS and is just formatted by Jep?

I have been told that the NOS data is just part of it. Jepp evidently does a lot of processing and collating to put it in an ARINC format that is the industry standard for FMCs and such.

Each manufacturer then writes an extraction program which is applied to Jepp's master database to take out that information which you and I want in our little black boxes.

We are still collectively a very small market and so far no one has decided to enter into competition with Jeppesen for our business.

Possibly the answer is to eliminate all of the "nice to have" things like frequencies, availability of fuel and such. Maybe if all that was in the database were things like VORs, intersections, NDBs and things that are actually needed to execute the approach, the government data could be used directly?

If it were simple I suppose somebody would be doing it. Surely there must be one among us who has the capability to evaluate whether or not competition is viable at this time?

Another problem that complicates things is the diversity among the various manufacturers cards. Even the various versions of the same box from the same manufacturer take different cards. I don't know about the others, but for my Trimble there was a different card for my TNL 2000, TNL 2000A, TNL 3000, TNL 3000T, TNL 2000 Approach and TNL 2000 Approach Plus. That is seven different cards that have to be made available for just these few very similar Trimble products! The overall market is very small and terribly fragmented.

Can anyone tell us if the same problem exists for the other brands?

There is no doubt that the cost of the updates is one of the major stumbling blocks to widespread use of the GPS.

How about some innovative solutions guys and gals!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980810.195932.msg04182.tex]

Nav Data**Wed, 23 Dec 1998 13:24:01**

Good Morning Mike Mork,

I spoke to a lady at Jeppesen this morning and while she was not directly involved with the problem, she provided some good information concerning the process used by Jeppesen to get the data to we users. She advised that she will be looking into this further and that we can expect more information soon.

Jeppesen has a master data base which contains just about everything imaginable that anybody ever wanted to know but was afraid to ask!

They run an extraction program that pulls the data desired by any particular client (the manufacturer or whatever) and that goes to the entity that provides the data to us. It is then processed by a packing program provided by the client which puts the information into a form to be used by the boxes we aviators use. That packing program may include a lot of other things besides the data such as upgrades to the box etc.

One thing that came out in our conversation is that they have had several calls from users complaining that certain terminal NDBs were not in the database when the operator wanted to use the GPS in lieu of an NDB as provided by the July 17th interpretation.

Not all of the GPS manufacturers had included that information in their request for the extraction of material and not all had elected to install it with their packing program.

Jeppesen has all of the information, but the client has to request precisely which information they want and the manner in which it is to be presented.

So far it seems that II Morrow is the only manufacturer who doesn't have a program to utilize the approaches you want.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981223_132401_msg07796.tex]

Nav Data**Tue, 27 Apr 1999 12:59:10**

In a message dated 4/27/99 10:40:16 AM Central Daylight Time, sderrick@tnstaafl.net writes:

For the II Morrow this is not the case. The operators manual specifically states you need to verify the data is up to date for the fixes being used, not that the data card needs to be up to date. This was a major concession that II Morrow got by the FAA.

Scott

Good Morning Scott,

If you have been following this GPS thread for a while, you will have noted that the II Morrow [UPSAT] approval has been mentioned several times.

The approval to allow the pilot to ascertain the currency of the data for enroute functions has been in the TSO C129 since it was first written. Not all of the manufacturers have taken full advantage of that provision, though most have.

II Morrow, on August 4, 1997, received approval on a flight manual supplement which allows the pilot to ascertain the currency of the data to be used for approach purposes as well as enroute. Not all of the folks at the FAA are happy with that approval and many local FSDOs have resisted approving that language in the individual airplane approvals that are conducted through their office. I do believe that anyone who argues hard enough and long enough will prevail and the II Morrow language will be ultimately accepted.

You must remember that when you buy an IFR approvable unit from any manufacturer, it is not approved for use in IFR conditions. The individual installation and the POH for that individual airplane must be approved, usually through the "local approval" process. Many in the FAA agree that if the wording is approved for II Morrow, it must also be approved for all who submit that same language.

The requirement that the card be current for the "GPS in lieu of ADF and DME" function was inserted DUE to the approval that II Morrow had obtained. All of the evaluations for suitability for IFR use had been conducted with the thought that a current card would be used. When they found out about II Morrows approval, (Unfortunately, I was the one who told them about it.) they added the requirement for a current card rather than holding up the approval. That is why I said in my previous message, that action is being pursued to allow the pilot to ascertain currency of the data in the database for the "GPS in lieu of ADF and DME" function.

While that is not currently on the fast track, it is being pursued.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990427.125910.msg04066.tex]

Nav Data**Fri, 6 Aug 1999 19:23:16**

Good Evening Doctor Rogers,

In a message dated 8/6/99 4:38:12 PM Central Daylight Time, dfr@usna.navy.mil writes:

I am going to add my 'vote' to those that don't have an approach certified GPS simply because of the cost of the database updates and subscription services.

You pays your money and you takes your choice!!

To me the hundreds of additional approaches and the accuracy of navigational information for the older style approaches is well worth the cost for the type of flying I do.

I do remember when a Narco Omnihomer sold for \$375 and the Omnigator sold for \$975. Pretty cheap, but then, I was only making seventy-five cents an hour.

A Bonanza sold for about \$9875, that made the Omnigator roughly ten percent of the cost of a brand new high performance airplane.

Aviation has never been cheap, however the purchase of one IFR approach approved GPS will allow more IFR approaches for the dollar spent than any other expenditure you can make in navigational equipment. In today's dollar, the GPS is cheaper than the VOR was when it first came on the market and it compares favorably with new VOR sets today.

I said:

The FAA has committed to attempting to put together a "standard" database, but that would still have to be something that would work with the different manufacturers boxes. They all use different approaches to handling the data and that is the problem.

I don't particularly want the FAA to force a standard on the industry as that would stifle the innovation and advancement that we have enjoyed so much in the last few years. Still, something has to be done to bring the cost down.

You said:

I do and I consider it the FAA's or NOAA's responsibility to do just that. This is what standards are all about. If the format is simply enough and flexible enough, then there is really no issue with ALL the manufacturers conforming to it if they want the unit certified.

Doctor David, I certainly can't match your academic credentials, but I think you are dead wrong in asking for standards to be set at this stage of the game. What that would accomplish is to force us all into using equipment built to the lowest common denominator.

The costs are dropping now and there will be standard when the time is right and it will be available over the Internet, but it won't be free because there is just too much intellectual effort necessary to put it all together.

When there are ten thousand customers for each printing instead of a few hundred, the price will come down to a reasonable level and the providers will make a decent profit. I think it is rather unreasonable to expect Jepp, or anyone else to provide the data at a loss just so that we may have a lower cost until such time as the market is big enough to justify those lower costs.

I dare say that if you want to start a business supplying that data at a lower cost than Jeppesen is providing it, you will find a number of customers knocking on your door!

Give it a try, competition generally helps the consumer.

Happy Skies,

Old Bob

[ARTICLES/19990806_192316_msg06734.tex]

Nav Data**Sat, 7 Aug 1999 08:50:15**

In a message dated 8/6/99 9:36:36 PM Central Daylight Time, dfr@usna.navy.mil writes:

ok, but I have served on a number of standards committees and understand the standards process quite well. The standards process does not seek the lowest common denominator but rather attempts to formalize what is actually out there and to fill in the blanks when necessary. For example, in this case JEPP might very well propose their format as a 'straw man', the FAA/NOAA something somewhat different and then the industry, government, users (alphabet groups) sit down over a period of time and hash out an initial standard which is then submitted for public comment, hashed some more and finally published as a national standard.

Good Morning Doctor Dave,

What I perceive to be the meat of the paragraph quoted above is that you agree that the industry will eventually boil this thing down to a point where it will be acceptable to all and then the FEDs will stick their nose in and make that standard mandatory! I would prefer that it be done without the intervention of the federal authorities. We arrived at a standard VOR presentation without government edict. I think we could get there without federal intervention for the information we use with our GNSS.

In any case I do think it will, and should, be the market that determines what we have.

On a slightly different note, if you would like the absolutely cheapest method of data presentation that I can think of, why don't you champion the cause of allowing self load of the data?

That was the method we used in our Allied Signal KNS-80s and 84s and, I believe, the RNAVs manufactured by others.

The airlines are still operating a large number of aircraft equipped with 9 channel INS units that require manual loading of the data for navigation.

A set designed to that technology would require NO datacard!

The detractors of that scheme feel that we aviators are not sharp enough to avoid loading the wrong data into the machine and must have datacards to protect us.

That is a STANDARD that was decided upon and imposed by the industry leaders and the FAA when the GNSS was first proposed for civilian use.

I punched the numbers into an INS system for over twenty years and felt that the errors were reasonable and the procedures established adequate to bring the operation to an acceptable level of safety. Errors were made, but we always seemed to find them before a problem developed. There is some supposition that an error in utilizing the INS may have contributed to the KAL disaster.

I have been told that modern "check digit monitoring" technology could be applied to the dataloading process to bring the loaded data to an integrity that would rival that of the datacard.

Those among us who are financially challenged could selfload and not have to worry about the datacards and the folks who feel their time is better spent elsewhere could pay a provider for the service they offer.

I will admit that at my present level of usage, I would still be buying the card monthly, but selfloading could be an option during the time it would take to bring the cost of the cards down to a lower level.

Sounds like a good place for a trained mathematician to spend some time figuring the odds!

Happy Skies,

Old Bob

[ARTICLES/19990807_085015.msg06754.tex]

Nav Data**Sat, 7 Aug 1999 09:54:01**

In a message dated 8/6/99 11:44:39 PM Central Daylight Time, jtsmall@onramp.net writes:

But I am puzzled that the charges are so high currently. After all they HAVE spent that effort but seem to shoot themselves in the foot with the low volume. If the charges were down they're not only sell more subscriptions but likely more boxes which beget more subscriptions, etc.

Good Morning John,

All very true, but I rather doubt there is any profit for JEPP at the current price and production levels. The chicken and egg thing again!

I also wonder just how big the market really is for the full IFR set? Is it big enough to justify selling a product far below market price to establish market share? That is one heck of a gamble for a company to take!

I think most of the IFR approved sets are still being sold to we who feel we must have the latest, finest and fastest in our machines. I can't bring myself to pop for the next generation of TSO C129 sets, but I imagine I will belly up to the bar when a WAAS set becomes available.

A single VHF NavComm along with a good handheld GPS allows one to fly IFR most anywhere in the USA almost all of the time. Throw in a hand held Comm as a backup and even the integrity numbers get pretty good!

When the major air carriers and then the third level carriers get into the act, the volumes may get up to where we can obtain some benefit from the numbers. Even then, it is a small market.

The primary reason handheld units are so cheap is that they are so similar to the stuff being sold to the public for hiking, camping, fishing and such. We are the beneficiary of that large market.

To bad we can't figure a way for the IFR approach sets to be adapted for use in the automobile!

Happy Skies,

Old Bob

[ARTICLES/19990807_095401_msg06759.tex]

Nav Data**Tue, 23 Jan 2001 17:09:40**

In a message dated 1/23/01 1:19:36 PM Central Standard Time, foosej@oz.net writes:

Also, do not some GPS updates only affect those that are updated? In other words, aren't the approaches that haven't changed still legal to use after the update expiration date? I think Bob went into that scenario once.
John

Good Afternoon John,

It Depends!

UPSAT has managed to get an approval to allow the use of out of date datacards for approaches provided there is a method of assuring that the data is correct.

To my knowledge, no other manufacturer has a similar approval.

We must remember, though, that how the manufacturer got his set approved is not necessarily the way yours will be approved.

The local FAA folks have received guidance that says they MAY use the same procedures and restrictions as the manufacturer did when an installation is presented for local approval.

As I think we all realize by now, each GPS IFR installation must go through the local approval process and that process is very much dependent on how the local inspector thinks it should be done.

In actual practice, if your installation is substantially the same as the one the manufacturer got approved, yours will likely be approved. That applies to your individual FAA Approved Airplane Flight Manual Supplement as well as the nuts and bolts installation.

If you have an Apollo/UPSAT installation that was approved before August 17, 1997, chances are that your flight manual does not allow the use of an outdated datacard for any approaches, anytime, regardless of any method you may use to verify the accuracy of the data. If you have one that was approved after that time, it may have the approval to self check. If it isn't listed that way in your flight manual, it isn't legal even for the Apollo/UPSAT boxes.

If you have any other IFR approved GPS than some model from Apollo/UPSAT, it is highly unlikely that your flight manual supplement will allow any sort of self check for approaches, but it will likely show that you can self check for IFR use for enroute purposes. That approval has been in every flight manual supplement I have ever seen.

If you are intending to use the GPS in lieu of an ADF or a DME, the datacard must be current, regardless of what it says in your supplement, for enroute, terminal and approach purposes. The authorization for that substitution specifically requires the current datacard and that restriction overrides the flight manual supplement information.

All in all, I think that anyone who intends to rely on the approach capability of their IFR box pretty well needs to get a current datacard.

If your major use of GPS is for enroute, the card is probably not necessary, but if you want to shoot approaches, it can be pretty nice to have.

Happy Skies,

Old Bob

[ARTICLES/20010123.170940.msg01575.tex]

Nav Data

Wed, 28 Feb 2001 17:57:56

In a message dated 2/28/01 4:50:10 PM Central Standard Time, MikeM86949@aol.com writes:

Think so?

I'm getting the datacard from Jepp. Is Jepp giving a kickback to Northstar?

Northstar hasn't sold a datacard in over 2 years.

Mike McNamara

Precisely!

Every card that is provided by Jeppesen provides a royalty fee for the manufacturer.

That is where the real money is. A continuing regular expense. Isn't that the way the cell phones work? You can give away the phones. The money is made on the monthly fees.

I am not saying that is bad, it is just the way the economy works!!

Happy Skies,

Old Bob

[ARTICLES/20010228_175756.msg04879.tex]

Nav Data Alternative**Tue, 11 Aug 1998 15:55:59**

Good Afternoon Mike McGahan,

In a message dated 98-08-11 13:45:46 EDT, you write:

Develop down load standards to up date data bases through the satellite transmissions. Basic approach data only. This would be a major safety enhancement, guaranteeing current approach data.

Something very similar has been proposed for the LAAS system. We would have no charts in the airplane for the approach we were going to shoot and all of the information would be sent to the box when we tuned in to the differential station to shoot the approach. Sounds a little scary doesn't it!

The mathematicians who are conducting the risk evaluation assessment are rather skeptical though, so I imagine it would be a while before we would see such transmissions.

Just think, no Jepp charts and no database costs!

Happy Skies,

Bob

[ARTICLES/19980811.155559.msg04215.tex]

Northstar**Fri, 25 Aug 2000 19:42:04**

In a message dated 8/25/00 4:34:21 PM Central Daylight Time, k5hmd@worldnet.att.net writes:

Bob, what's happening with Northstar? I love the ease of use of the M-1 and was planning to upgrade to their GPS sometime in the near future.

Thanks, Joe Christian P35 N61JC

Good Evening Joe,

First, you must realize that this is all rumor and speculation, but is based on some factual observations.

Northstar had no presence at Sun 'n Fun or Oshkosh this year.

The rumor is that Canadian Marconi has the Northstar line up for sale. I have heard that the unit they designed to use the JeppView charts has some air carrier and heavy iron corporate takers, but the price is keeping it out of serious consideration for most of the GA types.

They have/had a president of that division who was/is very impressive. I believe his name is Scott Lewis and I would like to hear what he has to say.

At least they haven't made any stupid announcements like Trimble did about their desire to get out of GA. Trimble made that announcement and then put the division up for sale. They had received such bad publicity that there were no serious takers.

Since they got out of GA, Trimble stock has doubled in price and they still claim to be manufacturing more GPSs than any other manufacturer in the world.

I am sure the Trimble performance has not been lost on the directors of Canadian Marconi. Why should they spend time and money on a small niche market like GA when the rest of the world is clamoring for GPSs that require no approval from anybody to use?

I wouldn't buy a Northstar until they put out some information concerning their future plans.

Remember to look at the above information from the perspective it deserves. It comes from someone who felt that Trimble had the best technology and Northstar the most user friendly operating system. When all of them were in production, my choices were Trimble first, Northstar second, Apollo third, Garmin fourth and King last.

I, obviously, don't understand the market at all!

Happy Skies,

Old Bob

[ARTICLES/20000825.194204.msg12576.tex]

Outages**Mon, 1 May 2000 17:28:49**

In a message dated 5/1/00 4:08:39 PM Central Daylight Time, swo49@hotmail.com writes:

Larry and Bob:

On my return trip from LAL (Lakeland, FL) to KANP (Annapolis, MD), I lost all GPS capability at 3,500' when in the area of Jacksonville, FL for about twenty minutes on my 430 - any thoughts? (First RAIM warning, then no vertical help warning, then all was lost; returned in about 20 minutes; rest of the trip was fine). Steve

Good Afternoon Steve,

I understand the DOD is still running tests concerning their capability to shut down GPS in areas of limited dimension in the event defense requirements dictate such an action.

I have never had it happen to me, but I have heard reports of that sort of thing before. If it was a scheduled test, it should have been in the NOTAMs for the area. Possibly AOPA or somebody would be able to find out if a test was being conducted in that area on the day you came through.

There have been some accidental shutdowns as well. A couple of years ago, they were supposed to be doing a one or two minute test in the Poughkeepsie area on a Thanksgiving weekend. The technician who threw the switch didn't get it properly restored and he went home for the holidays. GPS was blocked in a fairly large portion of New York and Connecticut until he went to work on Monday. We have been assured that current monitoring of the tests will not allow something like that to happen again.

I was flying out west one day when a couple of folks in the area reported a lack of RAIM on their 90Bs. My Trimble worked fine in the same area. When I got to the show I was heading for, I asked a King representative what was going on. He told me that King uses a more conservative algorithm than does Trimble to evaluate the suitability of the signal. That the 90Bs were correct in warning of an unsuitable signal. I called Trimble and they said the King algorithm is way off base and will reject a perfectly usable signal. I guess there are still differences of opinion in how things should work.

Who Knows?!!

If you find out anything from AOPA or anyone else, please let us know.

Happy Skies,

Old Bob

[ARTICLES/20000501.172849.msg07445.tex]

Panel Layout

Mon, 30 Oct 2000 15:40:43

In a message dated 10/30/00 1:37:08 PM Central Standard Time, guntalk@guntalk.com writes:

I'd like to see a picture of your panel so I can see how you positioned everything. I just wonder if you wish the 530 were farther left, to be a part of your scan.

Good Afternoon Tom,

Please excuse me from butting in on your conversation, but the area of discussion is close to my heart.

I too prefer that my GPS be in the center panel and not over in the common Beech canted radio stack.

My Trimble is mounted there, right next to the floating panel. It clears the control column mechanism by about a half inch. John Small has kindly provided a photo of my installation on his photo page.

Both the Garmin 430 and 530 are listed as being eleven inches deep, the same as the Trimble. I do believe a 430 could be located in the center panel, but I think the 530 is too tall. It is possible that it could be done by raising the center panel up higher to put the bottom of the set above the mechanism behind the panel, but that would take major surgery to the panel and the glare shield. A local approval would probably be required.

If all you really need is an IFR approach approved GPS, why not check to see what is available on the used market. It seems that the majority of the buyers of the Garmins are folks who already had some other brand IFR approved GPS. I would imagine there should be many available.

I noted this morning that someone had listed a nice Garmin 155 quite reasonably on this Bonanza site.

While I don't particularly care for the Garmin 155 due to it's operating architecture, the price seemed right.

I absolutely love my Trimble but it is on the way out. Trimble is supporting it as is, but has stated that there will be no updates or enhancement of it's features.

It appear that Northstar is about dead also. That leaves ??Bendix/King?? General Electric, Garmin and UPS as the only games in town.

If I were buying an IFR GPS today and wanted the simplest and lowest cost installation, I would probably go with the UPS unit. If I were fitting out a new airplane and had to buy the whole stack, I would probably go with the 430. It is probably the cheapest way to get all of the feature it provides.

For my old eyes, the screen on the 430 is too small. The extra bucks that the 530 costs are more than I care to spend when it doesn't allow me any additional operating capability. A simple IFR approach approved set of any kind would allow you to execute all of those nice GPS approaches that our tax monies are providing.

Well, that is a lot more than I meant to say!

Happy Skies,

Old Bob

[ARTICLES/20001030_154043_msg15492.tex]

Panel Mount IFR GPS Advice**Wed, 29 Apr 1998 09:25:26**

Good Morning Larry Grimm,

In a message dated 98-04-28 23:19:33 EDT, you write:

Tomorrow I find out if I am to be the proud owner of a 1978 A-36. It has no Loran, let alone a GPS. First order business is to install a panel mounted unit. Since I am spending most of my money on the plane, keep that in mind when you make a recommendation (and give me a cost estimate if you recommend something).

First, congratulations on your choice of the A36, an excellent Beech product. Is this your first or are you moving from another Beechcraft?

Before I give you my highly biased opinion concerning your posted questions, I must mention that I am the owner of a Trimble 2000 Approach Plus and have flown the GPS around 1300 hours since 1991 when I installed the first Trimble panel mount unit in my Bonanza.

Just as I have become an irrational devotee of the Bonanza over the years, I am rapidly acquiring the same sort of attachment to my Trimble. It and I am sure ALL of the IFR sets are truly magic.

1. Given the way things are going, I suppose I should be considering only an IFR certified unit. True?

That would be my recommendation.

Whatever set you decide on will be obsolete the day you buy it. Such is the way of electronics today. It will, however, be usable for many years to come. Most of the changes are in the form of bells and whistles, things that are fun to have, but that do not affect the usability of the set for IFR functions. The electronics from the satellites change slowly. There is a seven year time frame from the time changes are decided upon until sufficient satellites are in place to accomplish a major change in operation. There are some changes being made to the new satellites which will allow program changes to be made from the planet Earth, but that is still in the future.

The fact that we in aviation are a tiny minority of the GPS users will assure that the present type of signals will be available for many years to come and the powers that be have promised that the new WAAS style of approaches will include NPAs in the same way as today's ILS approaches include a "no glide slope" approach.

Purchasing a TSO C-129 set today will allow you to get used to the operating philosophy of the new Flight Management Computer friendly "To-To" system that the industry is adapting. (I personally don't think we lightplane types need it, but the system is being designed for the glass cockpit boys, not us.)

2. What manufacturer and model would you recommend? (keep in mind that the unit is not replacing anything, so there is no slot)

This is always a tough one. I personally don't like having the moving map in the panel mount unit. On Beech Bonanza style aircraft it is difficult to get the panel mount unit where it is in the normal pilot scan. On my airplane I mounted it in the center panel so that it is in normal view but that is a rather difficult and expensive solution. The buying public has decreed that they want the moving map in the panel mount and all of the newer boxes are going in that direction. I really don't think you should have to look all of the way over to the radio stack to see your moving map but a lot of people have it that way and are deliriously happy with such equipment!

I rather like having a handheld such as the Garmin 195 or Lowrance unit as a moving map. That not only gives a higher quality, easier to read map, but provides a backup GPS with battery power capability. My map mounts on the center of the control column.

There are several new units on the market with list prices below \$4000. A good shop can install any of the units in a perfectly clean brand new airplane for the list price, BUT if there are any radios, antennas or other equipment that have to moved, the price can escalate rapidly.

The Trimble 2000 Plus currently lists for \$4895 (it was \$5995 last september when I installed mine) My local electronic guru says that he could install one in a new airplane for around \$6000, all indicators, annunciators, connections to baro and full IFR approval included but he recently quoted \$6950 to put one in a friends P35 Bonanza.

I have seen quotes on the internet as low as \$4000 for a complete installation of some of the cheaper sets but I wonder if that really includes all of the required equipment and approvals?

3. Should I be considering a used unit?

I wouldn't. There is so much going on and the prices are dropping so rapidly that the cost of installation and approval are becoming an ever larger percentage of the total and those costs would remain the same for a used box.

I highly recommend that you do purchase an IFR approved box but there are some other things that should be addressed such as what type equipment your airplane currently has and what type of IFR flying you do.

If you would rather not tie up the Beech net with GPS stuff, feel free to contact me directly and I would be happy to discuss this further.

Bob Siegfried Ancient GPS Nut

[ARTICLES/19980429_092526_msg02172.tex]

Panel Mount IFR GPS Advice**Wed, 29 Apr 1998 10:41:04**

Good Morning All,

Some time ago there were questions concerning difficulties getting IFR approvals (and other local approvals) from the west coast FAA FSDOs.

Good news!

My son received full IFR approval on March 27, 1998 for installation of a Trimble 2000 Approach Plus in his Beech 18.

The work was done by Avtronics at San Carlos Airport. The supplement is signed by Nicholas E. Pearson from the San Jose FSDO.

Incidentally my son is very pleased with the capability and operation of the set and has flown a couple of actual IFR trips with it already. He found it very easy to learn to use. The dealer included the Trimble Trainer CD-ROM disc program for training but my son has not found time to try it out. I did show him the basic functions of the set in my airplane.

Incidentally, Trimble sells the entire training program for around a hundred bucks but they will give you the simulator portion free (good advertising). It is available to be downloaded off their website. There are two programs available, one for the older TNL 2000 Approach and a separate one for the newer TNL 2000 Approach Plus.

Even if you have another brand of GPS, the program is fun to play with and will allow you to shoot all of the approaches in the USA. Besides, it's FREE.

Happy Skies

Bob Siegfried Ancient GPS Nut

[ARTICLES/19980429_104104.msg02175.tex]

Panel Mount Unit Comparison**Fri, 25 Aug 2000 10:36:49**

In a message dated 8/25/00 9:12:24 AM Central Daylight Time, rob.breitbarth@ocsblount.com writes:

I have a general GPS question. I'm looking into finally replacing my KLN88 Loran with an IFR GPS.. Possibly an Apollo 2001 or KLN89B, which my budget will afford. Does anyone have any experience on which one is easier to use IFR.

Thanks for the help, Rob F35/PDX.

Good Morning Rob,

For ease of use, you might find the 89B slightly more familiar. Some of the concepts are similar to those used for the KLN88. The 90B is just a warmed over 88 so it would be very familiar, but it is awfully expensive and rather outdated.

The 2001 is also an outdated piece of machinery.

I think the best choice for pure economy currently available is the UPSAT (Apollo) GX50 or if you need a new comm, the GX60.

If you are going to replace everything, ILS, glideslope, VOR, comm and all, it is hard to beat the Garmin 430. I find the screen hard to read with my old eyes, but the 530 will solve that dilemma.

One more thing that might enter into your decision is the capability of being able to use S-Tec's new autopilot coupler. It uses an output which is available in the KLN88 and KLN90B. I believe it is available in the 430 and 530, but am not sure. It is not available for the Northstar, Apollo, lower priced Allied Signal/Honeywell and Trimble offerings.

If you will allow me to state a personal prejudice, I don't like any set that requires a resolver.

Allied Signal/Honeywell and Garmin are the only manufacturers which require that abomination for all of their offerings.

UPSAT/Apollo, Northstar and Trimble do not. Unfortunately, it appears that Apollo is the only likely survivor of that trio, so the possibility of finding a resolverless set which meets your requirements is lessened.

I won't go into all of the details of why this is so, but the resolver is not as onerous in the 430 and the 530 as it is in the rest of Garmin and Allied Signals offerings.

My choice for the lowest cost and easiest installation would be the GX50.

If you have any need for another transmitter, the GX60 adds a transmitter at relatively low cost. That would probably be my over all first choice today, but I have never flown

one!

Any help?

Happy Skies,

Old Bob

[ARTICLES/20000825_103649.msg12556.tex]

Panel Mount Unit Features**Sun, 24 Dec 2000 18:34:56**

In a message dated 12/24/00 4:59:52 PM Central Standard Time, sderrick@tnstaaf.net writes:

With the Garmin 430's(I have a lowly GX55) or whatever there number is with the big color display way over on the right side of the panel, drawing your attention away from the really important instruments, seems like a real waste to me...

Wouldn't it be "better" to get a no frills display IFR approved GPS at a much cheaper price, and replace the DG with a sandel type display that provided DG, MAP, ect...

Good Evening Scott,

I guess we all have our own priorities as to what we want to watch at various times.

I don't care for a moving map all of the way over in the stack either.

I have a hunch that the modern 430 or 530 might be best if it were mounted in one of the early Bonanza panels where the old original LF radios were mounted. That would place it in a prime viewing area and eliminate all of those extreme eye movements.

But, having said that, I also wonder how good of an idea it is to be looking at the moving map while flying IFR anyway!

The system is based on our flying the CDI. The moving map is merely an orientation tool. It really doesn't need to be used very often.

I have my IFR approach approved GPS mounted in what I consider to be a prime viewing area. It is on the left side of the center panel right next to the floating panel. If I ever do decide to spend the money for some sort of an MFD, it will most likely be mounted in about the same spot. The MX20 will fit there very nicely, but the Garmin 530 is too long. It would hit the control column mechanism. Still, on a low approach, I am watching the needles, not the moving map. The map gives great orientation, but does not allow the precise on course tracking that is possible following a needle. If the scale is set so the course can be flown via the map as closely as it can be with a needle, the map covers such a small area that it is useless for orientation. I use my moving map primarily to keep me out of various types of airspace when I am flying VFR.

For me, the GPS is a valuable tool which adds considerable flexibility to my operation.

The moving map is a toy which is fun to play with and is very useful for VFR flight. It adds little or nothing to low approach capability.

As to the Sandel, for those who have money to burn or who have a major problem finding panel space, the Sandel can solve some problems, but for real increased capability, I place it in the fun to have, strictly a toy, category. Who knows, if the market starts back up,

I might get one myself! I love to play with toys.

Happy Skies,

Old Bob

[ARTICLES/20001224.183456.msg18299.tex]

Portable vs. IFR Panel Mount**Tue, 27 Oct 1998 20:41:19**

Good Evening Bob Briggs,

In a message dated 10/27/98 6:14:09 PM Central Standard Time, rcb@appsig.com writes:

I haven't bought a panel mount because my handheld GPS with moving map is much cheaper and does the job.

And you are typical of the vast majority of the pilots in the country. Very few have the need to execute approaches to the lower minima available with the IFR approved GPS and most seldom have need to fly to those small airports which have no other approach capability.

As I have stated many times before, the person who can gain the greatest economic benefit by purchase of an IFR approach approved GPS is that person who needs to equip an airplane from scratch.

However, even that operator has no need for anything other than a VOR if all he/she does is operate in the enroute environment and to VFR ceiling and visibility requirements. Just the ability to operate IFR enroute provides a vastly greater operational capability than is enjoyed by the strictly VFR pilot.

At least half of the ILS and VOR approaches in the country can be executed without an ADF or a DME, so if one restricts their operation to flights of that sort, no further equipment purchases are justified.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981027_204119.msg06375.tex]

RAIM**Sat, 27 Jan 2001 22:46:17**

In a message dated 1/27/01 8:09:27 PM Central Standard Time, cgalley@qcbc.org writes:

O.K. What is RAIM???

Good Evening Cy,

RAIM stands for Receiver Autonomous Integrity Monitoring.

That means that the receiver is capable of monitoring itself to compute the required integrity and warn the operator when the integrity falls below the standard for IFR navigation (or something close to that)!

It has to have at least six spheres to compare, one of which can be the planet earth via a barometric altitude evaluation. Four satellites for 3D position, one to check the others for reasonableness and one more to check the fifth one for reasonableness. You electronic experts feel free to correct my interpretation, but that should suffice for we dumb aviator types!

Happy Skies,

Old Bob

[ARTICLES/20010127_224617_msg02045.tex]

Resolver/Serializer**Sat, 24 Oct 1998 00:24:20**

Good Evening John Small,

In a message dated 10/23/98 9:36:33 PM Central Daylight Time, jtsmall@onramp.net writes:

What is a resolver and serializer?

The resolver is the connection between an instrument on the panel and the GPS set that will allow you to set various courses in the panel mount GPS to be flown as desired. Sometimes a dedicated OBS type of instrument is used and in other cases an existing VOR head or HSI is utilized to input the desired course. The Garmin, Allied Signal (King) and the newest Trimble all use this type of input.

The proponents feel that it is an easier transition from the VOR to GPS operations since it is necessary to set in the desired course as one would with a VOR.

Northstar, II Morrow (Apollo) and the older Trimble units do not use that setup and the courses are either input automatically or if a change is desired, the action is taken directly with the panel unit.

I think the later is a simpler system to use and it is a lot cheaper to have installed. It also makes for one less thing to go wrong. Fewer actions are required on the part of the operator.

The serializer is a device that takes the parallel information from the altitude encoder, which requires eleven wires to transmit, and changes it into a serial form, transmittable over one wire, for use in the GPS solution. Barometric input is required on all of the IFR approved sets to attain the greatest accuracy of position possible. Having a Barometric input makes the earth one of the required satellites. An adequate RAIM computation can be acquired with one less satellite if Baro information is available.

Hope that helps.

Happy Skies,

Ancient Bob

[ARTICLES/19981024_002420_msg06235.tex]

Resolver/Serializer**Thu, 27 Apr 2000 19:43:47**

In a message dated 4/27/00 3:40:19 PM Central Daylight Time, newmanb@rocketmail.com writes:

Exactly what does the resolver do and why might I need one?

Good Evening Bob,

I'll see if I can totally confuse the issue, you know I am good at making a long story out of a short one, I wish I could do it the other way, but here goes anyhow!

For all of the sets except the King/Honeywell and Garmin, the course to be flown is normally set automatically by the panel unit. If the pilot wants to set a course other than the one chosen by the set, he/she can do so by twisting a knob on the panel unit itself. You might have to punch a button or two as well.

On the Garmin and the King/Honeywell, there has to be some sort of a device on the pilots primary panel which will allow that course to be set in the same manner as one would set a VOR course. I have never flown an IFR Garmin and only used the King stuff a couple of times, but to the best of my recollection, the set will tell you what course to set and then you do the twisting on the little knob on your primary panel and the course that the set told you to use is active. Having that capability of setting the course via something on the primary panel is what they call having a resolver. Many of the current VOR navigation heads can be used for the resolver function, but not all. If the existing head can be used, there will be a switch to change it from VOR use to GPS use. (Even if you have a resolverless GPS, if you are using an existing head for a CDI, there will be a need for a switch, but the setup is simpler and should be cheaper.) The knob will set the desired course and the CDI will reflect the position relative to the type navigation selected.

When the first IFR approvals were being obtained, having to do the wiring and the modifications to the existing VOR heads added about a thousand bucks to the installation costs. On top of that, it just adds another thing to go wrong.

Now why do I say that it is not such a big deal if you use an HSI? The VOR mechanism is not in the HSI, so all HSIs are equipped to provide the heading information to another source. They need to do that for the VOR already. It is a relatively simple job to just install a switch to send the information to either a GPS or the VOR. Consequently, it is cheaper than having to modify an existing VOR head or provide another device to provide the function.

On top of that, if you have a resolverless GPS and an HSI, you will find that you still have to keep resetting the HSI every time you make a turn so that the HSI will continue to give you that properly oriented picture for which you paid so much money! Depending on the brand and sophistication of your autopilot, you may have to make adjustments to the heading bug to make the autopilot work properly. If your autopilot is very simple

and doesn't have a heading reference, it may track the GPS just fine without turning any knobs at all! I can hook my GPS up to my back up Century I roll unit and it will track the GPS around arcs and all sorts of things without me touching anything! When I use my primary roll autopilot, I have to keep resetting the heading bug because that autopilot feeds from the HSI and uses the heading information as part of the solution.

If you don't have an HSI, but you do have the resolverless set, you can just sit there and watch everything being done automatically. There is no need to twist any knobs at all.

How did all this stupidity come about?

When the first IFR approach approved GPSs were up for approval, there were some folks in the industry and a lot of folks in the FAA who felt that the operation of the GPS should be made as much like the operation of a VOR as possible so that we stupid light plane pilots could adapt to them without having to learn anything new. Most of the technical folks who were designing the set were of the opinion that we should design the sets so that they took advantage of the new techniques that they were capable of and not try to make the GPS just a simple substitute for the VOR.

All of the manufacturers were designing a panel mounted GPS unit which had the capability of setting the desired course via a knob on the panel mounted GPS set. The FAA person who was in charge of the program at that time was insisting that the course should be set by turning a knob on an instrument mounted on the pilots flight panel and that there must be a CDI on the pilots panel as well. Most of the manufacturers went along with the requirement to have a CDI in the pilots direct view, but balked at the requirement to put a device in that location to set in the desired course to be flown. Nobody was getting anywhere on their approvals. Garmin finally caved in and agreed to install the device the FED wanted. They got their approval.

Bendix/King then caved in as well and they got theirs approved. Trimble, Northstar and II Morrow held out for the system that all of the manufacturers had originally wanted. It took almost another year until wiser heads in the FAA finally saw the light and the Trimble was approved without a resolver. Within months of Trimble getting their resolverless design approved, Northstar and then II Morrow had their unencumbered approvals as well. Garmin and King screamed foul at first, but then decided that they would claim that the resolver made the set work more like a VOR and tried to turn the debacle to their advantage. It was easier and cheaper than trying to do a redesign at that stage.

Whjat make and model is typically used if an external resolver is needed?

Not sure I can answer that, maybe you could expand the question?

Why is one not needed if the GPS is driving an HSI?..

I hope I have covered this!

Why is it that one might or might not be needed if driving a VOR CDI? ..

I think I covered that as well.

I don't have an HSI. My thought is to use a Mid Continent MD200 indicator, which is a 3 inch CDI that can support the GPS and the VOR/LOC/GS. I thought GPS units like the GNS430 or UPSAT GX60 interfaced directly to this indicator.

I don't have a catalog handy, but you are probably correct. I don't know the cost structure right now, but Mid Continent should have a three inch CDI that would work with a resolverless set at a substantially lower price than the one that must provide the heading information to the GPS. I would imagine that the economies of supply are such that there isn't as big a difference between the two types as there was in the early days.

The 430 needs the resolver for both the VOR function and the GPS. No big deal either way. The GX60 has no need for the heading information and should be able to use a much cheaper CDI than the 430, possibly even an existing VOR one or a standalone that also includes any required annunciator lights. The 430 also handles the need for annunciators within the set

Where does the resolver fit in?

I hope I have covered this.

Why is it built into some GPS sets?

It is not that the Trimble, Northstar and II Morrow units have the resolver built in, it is just that they have no need, or provision, for an external input!

Not sure about this, but I THINK all of the panel mounts have the capability of setting courses via the panel unit.

If you have stuck with me this long, I hope it has helped.

Happy Skies,

Old Bob

[ARTICLES/20000427_194347.msg07188.tex]

Resolver/Serializer**Sat, 26 Aug 2000 11:54:17**

In a message dated 8/26/00 10:06:38 AM Central Daylight Time, MikeM86949@aol.com writes:

I like the M3 a lot. I was shocked to learn, on my friends Garmin 430, that he had to keep twisting the OBS on every course change while shooting an approach. I don't have to touch anything, which reduces my work load at a critical time.

Good Morning Mike,

That knob twisting is a result of the design which requires a resolver. If the airplane is equipped with an HSI, the knob twisting is not quite as onerous, you have to adjust the HSI to make it look right anyhow. Most autopilots will need the heading and course input as well.

The disgusting thing is that neither Garmin or King wanted to use a resolver in the first place, but there was an idiot in the FAA who insisted that the resolver be used to make the operation more like a VOR. Garmin finally caved in and installed one. Allied signal followed suit a couple of weeks later. Trimble, Northstar and II Morrow held out and it took almost another year until Trimble finally got their resolverless design approved. That was followed in a few weeks by approvals for the Northstar and the Apollo.

My informants tell me that Garmin and King were furious when Trimble got their approval, but finally decided to stick with the resolver design and pedal it as a better system!

Now that modern navigation is going toward a to – to design philosophy, there is little need for an HSI other than to free up some panel space. A pure CDI does the job very well and there is no knob twisting required at all! I love my HSI, but would never buy another one for any reason except panel space.

Another anomaly concerns the use of a simple wing leveler with tracking capability. It will follow the CDI indication of a resolverless design just fine and needs no heading or course input at all.

This is a case where the cheaper system can actually be the one with the lowest workload. You just never know what is going to happen with this industry.

Happy Skies,

Old Bob

[ARTICLES/20000826_115417_msg12612.tex]

SA

Mon, 1 May 2000 12:12:32

In a message dated 5/1/00 10:35:25 AM Central Daylight Time, flyinglo@msn.com writes:

Does this mean my GPS will be much more accurate tomorrow? If so, how much more accurate?

Good Morning Jerry,

It will gain no basic accuracy.

The SA [Selective Availability] has been turned off occasionally over the last couple of years, usually when a new satellite has just been put in orbit. They would shut it down so as to have an uncluttered system while the existing satellites were repositioned and checked for proper signal propagation and positioning.

I have noted very high accuracy during those times. It was generally followed by a few days of large errors, some as high as 800 feet. I assume they were checking the extremes of the error input following the satellite realignment.

I have a spot where I do my runup for which I have a very accurate survey. Supposedly within a foot.

When I do a GPS position check at that point, I find that the error is generally 120 to 180 feet, occasionally 300 to 400 feet.

I am expecting that the error tomorrow should be less than 100 feet and hoping that it will be less than 60 feet!

It will be interesting to see.

Happy Skies,

Old Bob

[ARTICLES/20000501_121232.msg07413.tex]

SA

Tue, 2 May 2000 14:21:29

In a message dated 5/2/00 1:05:06 PM Central Daylight Time, beech_35@yahoo.com writes:

Cool! So perhaps deactivating SA [Selective Availability] results in an order of magnitude greater precision.

Hi Again John,

In reality, the FAA should establish new tighter TERPS requirements for GPS approaches. I don't think it will happen unless we in GA fight for it. The airlines couldn't care less. They are getting precision approaches almost everywhere they want now and have little interest in out of the way non precision approaches.

I am going to be gone till Sunday, why don't you stir up some interest in bugging the FEDs for recognition of the new capabilities of GPS?

Happy Skies,

Old Bob

[ARTICLES/20000502.142129.msg07530.tex]

Serializer**Thu, 13 Aug 1998 15:57:20**

Good Afternoon Scott,

In a message dated 98-08-13 11:57:03 EDT, you write:

Why is this?? GPS is non-precision so theres no altitude information for the approach? It adds \$600/\$700 to the installation.

The following is my non-techie explanation so take it for what it's worth!

The altitude (Baro) input is used to increase the integrity of the signal. By having a baro input, the earth is used as another satellite. You can get RAIM with as few as five properly located SVs (space vehicles) instead of six. Thus the baro really has nothing to do with altitude as we pilots use it.

The price quoted seems high to me.

Shadin produces a combination encoder and serializer unit which was selling for around \$375. It works great, but when they found out that they were basically the only game in town, they raised the price to \$1100 or so.

This unit puts out a one wire (serialized) stream of information.

There are numerous boxes on the market into which you can feed the output of the encoder (I believe it is eleven wires of data) to convert it to a single or serialized stream. They sell from around \$150 to \$400.

Since Shadin raised the price so drastically, most of the manufacturers have added a "grey coder converter" to their GPS so that the data from the encoder you already have can be fed to the box and converted to what they need internally.

I believe II Morrow is the only one who still needs the serializer or additional encoder.

Personally, I would avoid any unit that requires a serializer or a resolver, but there are others who think the extra cost is worth it.

Hope that helps!

Happy Skies,

Bob Siegfried Ancient Aviator.

[ARTICLES/19980813.155720.msg04302.tex]

Vertical Guidance Data**Wed, 27 Dec 2000 15:39:03**

In a message dated 12/27/00 12:27:03 PM Central Standard Time, sderrick@tnstaafl.net writes:

Would be nice because I believe the gps database has that information in it, for vertical guidance display.

Scott

Good Afternoon Scott,

I don't think that information is currently in the Jeppesen database. VNAV, when it is authorized, is obtained by a computation based on the altitude at the FAF, the altitude at the DA(H) and the distance between those points. As I am sure you are aware, many flight management computers are capable of providing that information now. Some use barometric altitude in the solution and others do not. In any case, approval for the VNAV operation is not currently available to we vast unwashed masses. Hopefully, WAAS will bring it down to a price and weight we can handle.

Happy Skies,

Old Bob

[ARTICLES/20001227_153903.msg18455.tex]

Vertical Guidance Data**Wed, 27 Dec 2000 18:38:48**

In a message dated 12/27/00 4:08:56 PM Central Standard Time, sderrick@tnstaafl.net writes:

I wasn't asking if the VNAV needle was available.

I just wanted to see what the minimum altitude for that leg is. In other words it would show 1520 if the minimum alt was 1520 ft. Then after sequencing to the next leg it would change to the altitude for that leg. And icing on the cake would be to get the altitude data from the GPS and color code the display output, yellow above, green within 25 ft above, low FLASHING RED!!! Or maybe a skull and cross bones icon if you went low!

Scott

Good Evening Scott,

Sorry if I misinterpreted your question.

I think the system you describe would be great!

In your statement "Would be nice because I believe the gps database has that information in it, for vertical guidance display." I assumed that you were under the impression that the minimum altitudes for a step down fix were already in the Jeppesen Database from which most, if not all, manufacturers gain the information to apply to their data cards.

I was merely trying to point out that such altitude information is not required for the calculation required to use the VNAV program and I am under the impression that it is not currently available from that source.

It would be nice if all of the approach information was presented in the approach box. We wouldn't have to be bothered with carrying all of the approach data in the aircraft!

There have been proposals that the approach data be stored on the satellite. When you punched up a GPS (or other) approach, that data would be transmitted to the aircraft for use on the approach. That way, the pilot would always have current data and no approach plate or Jeppview would be required. Great idea, isn't it?

All of the neat things like that are possible. All it takes is money and a desire to develop the equipment. I would imagine the technical problems would be relatively simple to solve, but the availability of adequate communication channels could be problematical.

Happy Skies,

Old Bob

[ARTICLES/20001227.183848.msg18461.tex]

WAAS**Mon, 1 May 2000 11:56:41**

In a message dated 5/1/00 10:11:06 AM Central Daylight Time, farrarwd@tca.net writes:

Does this mean WAAS is not needed and what does WAAS stand for?

Good Morning Will,

WAAS stands for Wide Area Augmentation System.

As to whether or not it is still needed, that depends!

I hope that WAAS is implemented.

When it was first proposed, it was felt by the powers that be that WAAS would provide a signal source which would increase the integrity of the signal to such a degree that we could use GPS as a "sole means" navigation source.

Unfortunately, someone within the power structure came up with a figure that any navigation system used to replace what we have now had to have an integrity, or reliability factor, such that any failure would be presented to the operator, in a very short period of time, with a certainty of 10 to the 7th power.

It is reasonably certain that the accuracy of a GPS signal adjusted for positional and atmospheric errors by a WAAS signal could give us guidance with an accuracy of six to eight feet anywhere within the coverage sphere of the WAAS signal. That's good enough for at least "300 and three quarters" and possibly even "200 and a half" provided proper obstacle clearance, adequate lighting and IFR runway markings are available.

So far, no one has figured out how to guarantee that the short warning of failure time will occur with a probability of one in ten million times.

We have put ourselves in a position where we have the technology available to provide a very accurate and useful system. But, we have difficulty proving it will work with to a reliability factor so high that it has never been attained by any current navigation system.

It is politically difficult for those folks in the ivory tower to either admit that they set the goals too high or to admit that the goal is unattainable at this time.

Have I said too much already?

Happy Skies,

Old Bob

[ARTICLES/20000501_115641.msg07409.tex]

WAAS**Mon, 1 May 2000 13:43:15**

In a message dated 5/1/00 12:08:36 PM Central Daylight Time, ltemplet@slip.net writes:

One of the perceived flaws of the GPS system is that its satellites move relative to the earth and it can't guarantee that enough satellites will always be visible everywhere to meet the availability criteria required for precision landing guidance. This is one of the things WAAS is intended to fix. WAAS provides full-time availability because the WAAS satellites will be in geostationary orbits instead of the lower altitude moving orbits of the GPS birds. The WAAS satellites will always be in the same place in the sky and never disappear from view. Thus, it augments the coverage of the GPS birds.

Larry Templeton '63 Deb

Good Afternoon Larry,

I have absolutely no argument with the thought that the WAAS [Wide Area Augmentation System] satellites will provide additional coverage. I think it is misleading, though, to state that the coverage of the normal system is not adequate for the guidance expected from the primary system. The coverage worldwide is now very good. I find that I am usually utilizing at least eight and quite often ten satellites for a solution. The system was originally designed to be able to provide full world wide coverage with a constellation of 21 satellites. There was to be 3 extra ones provided so that coverage would be available should one of the 21 be unavailable. I believe the number of satellites planned for "normal" coverage is now up to 24 and that there are currently somewhere around 31 usable SVs up there.

The primary advantage to the Geostationary WAAS satellite system is to be available to receive corrections from the ground stations that will, or have been, located around the country to provide time corrections on a real time basis. The satellites are put in a geostationary position because that is the most cost efficient method to cover a relatively small area of the earth such as the hemisphere in which the US is located. It is assumed that other areas of the world will be covered by WAAS type systems provided by governments in those respective areas.

The accuracy of the current GPS constellation is not limited by the number of satellites, but rather by the atmospheric anomalies introduced by the passage of the signal through the earth's atmosphere and a few other positional problems. By placing a few (somewhere around twenty or thirty) ground based receivers at well surveyed strategic sites around the country, a determination of the position error in the signal may be determined for a relatively small geographic area. That information is then transmitted to the geostationary satellite from where it may be sent to the aircraft's individual receiver and used to provide a corrected position.

An even better idea of the accuracy of the basic constellation at an individual landing

site may be had if there is a receiver based on the ground at that landing site. That could provide an accuracy in the order of a foot or less. Such a system, if installed, would be called LAAS, Local Area Augmentation System. It is hoped LAAS will provide adequate guidance and integrity to allow Cat IIIC approaches. Both WAAS and LAAS are still in the development stage and the names of both may change. They are both methods of providing differential corrections in the same manner as are currently provided for marine interests by the Coast Guard and by numerous private companies for the use of farmers, surveyors and numerous other entities.

Additional satellites always help, especially in mountainous areas, but the big need is for some method of correcting for the atmospheric and positional errors.

Happy Skies,

Old Bob

[ARTICLES/20000501_134315_msg07422.tex]

WAAS and Accuracy**Mon, 1 May 2000 15:24:12**

In a message dated 5/1/00 1:36:22 PM Central Daylight Time, ltemplet@slip.net writes:

Improving the percent time availability of the required positional accuracy is certainly not the only reason for WAAS, but it is one of the reasons.
Larry Templeton

Hi Larry,

No argument with that statement either.

The accuracy that can be obtained via the current constellation, even when augmented by more satellites, is still only in the order of twenty meters. They originally hoped for fifteen meters, but are a little more conservative right now.

For two hundred and a half, they want something in the order of one meter both vertically and horizontally. Some experts say that two meters would do it, others say two meters would only be good for around three hundred and three quarters.

I guess it means that we need to define what is meant by a "precision approach."

The current GPS guidance is good enough, and is currently approved for, a non precision approach MDA of 250 feet. That can only be utilized if there are absolutely no obstacles in the approach zone and missed approach plane which are higher than the runway threshold. The current minimum visibility requirement for a non precision approach is one half mile, provided suitable lighting is installed and utilized. The lowest Non Precision Approach of which I am aware has an MDA of 263 feet AG and a visibility minimum of one half mile.

The GPS signal we civilians are currently using was originally called the Coarse Acquisition signal. By common usage it has become accepted as the Course Acquisition signal due to both words being pronounced the same and the word "course" being associated so strongly with navigation language. (Even the AIM has it misspelled)

It was called the Coarse Acquisition signal as it was sent to provide the military a position which they could then refine with a signal called the P or Precision signal.

The basic Coarse Acquisition signal has a best case accuracy of around fifteen meters anywhere on the planet earth when at least four satellites are in position for reasonable spherical triangulation.

We need a couple of more satellites to get the required RAIM computations performed. While the extra satellites also add to the accuracy of the solution, it still comes nowhere close to the guidance required for even a CAT I approach.

Modification by the military P code brings that accuracy down to something around seven to eight meters. That is still nowhere near good enough for ILS style approaches down to and below three hundred feet.

Two more civilian signals have been authorized. When those are implemented on a suitable number of satellites, we should start getting accuracy as great as, or better than, the military has now. However, it is still likely that some sort of differential signal will be required to get the accuracy required for the CAT I approaches and some sort of local differential, or possibly even some sort of locally ground based satellite (pseudolite), may be required for Cat II and on down to Cat IIIc.

The two new frequencies won't do us much good for some time because it takes around seven years from the time a decision has been made to modify the satellites until a sufficient number are in place to institute a new mode of guidance.

Until some sort of augmentation or differential is in place, the approaches won't get much better or lower than they are now.

Happy Skies,

Old Bob

[ARTICLES/20000501_152412.msg07431.tex]

5.8 GPS-REGS

Non-Certified Navigation Equipment**Sat, 24 Oct 1998 23:43:23**

Good Evening Kenneth David Burrows, Attorney-at-Law,

In a message dated 10/24/98 6:45:54 PM Central Daylight Time, kburrows@pipeline.com writes:

That I should contradict the Ancient Siegfried, heaven forfend! But I think I should report verbatim a "Reminder" on the monthly Aviation Safty Program mailer I got from the Windsor Locks CT FSDO:

"USE OF NON-CERTIFIED NAVIGATION EQUIPMENT Briefers at the Flight Service Station have noticed a trend in pilots filing IFR flight plans requesting direct routing that is dependant on non certified navigation equipment (i.e. hand held GPS's [sic]). Kenneth David Burrows, Attorney-at-Law

While I agree with Bob that controllers do have the authority to issue a "direct" to a pilot who can only fly it with a non-certified unit, given what this paragraph suggests that the author is thinking (and presumably has been instructed),I predict that it is only a matter of time until some boy scout at a FSDO or GATO violates a pilot for flying such a direct IFR. And I doubt the disclosure in the 'remarks' section will help since as we know, the controller probably will not have that section of the flight plan in front of him.

Be careful,

Far be it from me to ever argue with an Officer Of The Court!

I think the statement our barrister is quoting is eminently correct. Remember that I said to always tell the truth. Never file as "/I" or "/G" if you don't have the appropriate equipment. Personally I would not file for a direct clearance if it was not something that I could do legally with the equipment certificated in the aircraft.

However, if the controller offers a direct routing I would take it. He has the authority to authorize that flight. Should a negotiation take place wherein you ask the controller if he would be able to authorize a direct route from your present position to some point downline and he asks what equipment you might have that would allow you to navigate to that point, I would tell him what type of VFR navigation equipment was available.

I think it is a true statement to say that all laws are arguable. There are many interpretations applied to 'most every action we take with an airplane or other flying machine. Almost all of our actions could be cited by some very zealous "representative of the administrator" as violating some rule or procedure.

Once again, I would not recommend ever filing an IFR flight plan and telling the briefer or writing on the flight plan that you intend to navigate by utilizing a non-certified piece

of equipment. But there is nothing wrong with noting in the remarks section that you have such equipment on board the aircraft.

An argument could be made that you intend to fly a direct route by computing and following a course based on deductive reasoning. I think that is somewhat Clintonesque and is stretching the point to where it wouldn't hold much water in most of the congested airspace in the lower forty-eight. That is why I would file my flight plan based on following a course navigable by certified equipment on the aircraft.

The statement from the FSDO is:

"Remember, only equipment that has been approved for IFR use can be used to file and fly IFR. It is the pilot's responsibility to ensure they [sic] have the required equipment on board to meet legal flying requirements."

Once the aircraft is airborne and operating in the IFR system, if the controller offers and the pilot accepts a direct clearance to a point beyond the capabilities of the certified equipment on board the aircraft, that would have to be done on the controllers authority to authorize direct flight while in radar coverage or his acceptance of a DR flight path. In either case, if the pilot is aided in following that course by observation of an onboard VFR piece of equipment, it seems that the letter and the intent of the rules are being followed.

While I think that doing so is safe and currently accepted as a viable procedure by the nation's controllers, I would have to agree that there is always the possibility of someone trying to make, quite literally, A Federal Case out of it.

As Ken says, Be careful,

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981024_234323_msg06254.tex]

5.9 GPS-RULES

Nav Data**Wed, 5 Jan 2000 22:19:23**

In a message dated 1/5/00 7:11:20 PM Central Standard Time, diamondlil@diamondlil.seanet.com writes:

I questioned the local Faa rep. and he says it's legal to use and fly IFR GPS With out of date database as long as you have up to date charts on board for the route and approaches you are using. Cheers Carmine Pecoraro

Good Evening Carmine,

Unfortunately, very few of the local FSDO folks are really up to speed on the rules concerning the use GPS with or without a current data base. If you could get an opinion from your local FED in writing that would be great!

I think if it came down to a hearing before an Administrative Law Judge, the Approved Airplane Flight Manual Supplement language would prevail. The sad thing about that is very few of the manuals are properly written! I would suggest reading your manual carefully and complying therewith always keeping in mind what you will say at the hearing. If you are confident enough in your interpretation of the guidance given, press on!

Every supplement that I have read allows pilot evaluation of the currency of the data for enroute use. The only ones that allow pilot determination for approach use, that I have seen, are UPS manuals written after August of 1997. All of the II Morrow/UPS sets are eligible for that language, but they must be rewritten and approved before that provision may be used.

I have been told that some local FSDO inspectors wouldn't even approve the sets for enroute use, but I have never actually seen such an example. May be an Old Wives Tale.

I am quite confident that my interpretation of those rules was the one accepted by the Washington, DC powers that be as of a few months ago. You never know when things may change, for better or for worse!

The FAA runs on interpretations!!

The reason the GPS for ADF function requires a current database is because the fellows who wrote it didn't find out that most sets (if not all) don't require a current card for enroute use until the day they had to send their data in for processing. Rather than re-evaluate the data, they added the provision requiring the current card. I tried to get it changed and thought things were going quite well, but I wasn't able to get sufficient support from the AOPA or industry folks to get it done and I gave up.

That is just the way things work, right or wrong!

Happy Skies,

Old Coot Bob

[ARTICLES/20000105.221923.msg00292.tex]

5.10 GPS

IFR GPS Navigation**Mon, 12 Jan 1998 10:46:50**

Good Morning Dave,

In a message dated 98-01-08 16:28:55 EST, you write:

I find IFR approved GPS a fantastic addition to my capability.

I guess we are preaching to the choir, aren't we?

The sets are all fantastic, even the hand holds. My fear is that the powers in the FAA and the associated Canadian authorities are trying to decide what we need based on their own preferences of equipment that they like.

I would rather that they certify the accuracy and integrity of the system and stay out of the human factors and methods of use of the equipment.

I prefer that we users and the market place determine the presentation and operation of the various sets. I want a moving map but I don't want it to be required. If someone prefers to manually select radials and bearings externally to the set, let them do it, but don't require that capability on all installations. Every addition beyond the bare minimum is an extra cost item.

The best thing that can happen is for more people to get involved so that the input can come from actual IFR users like yourself who buy the equipment with their own hard-earned dollars.

Even the most dedicated public servant will never have the same viewpoint that a regular user of the system has.

I am not a basher of the FAA. They have a very difficult position. Our elected representatives in DCA want to ring their necks every time an accident occurs and there is very little incentive for any FAA employee to put his signature on any piece of paper that says "yes, let's do it". I think they do an excellent job considering the present attitude of our nation toward finding someone to blame for all occurrences.

Having said that, I think we must remain vigilant and continue to press for the simplest and least costly system to be approved. The rest can be provided by the market forces. Very few of us fly an airplane equipped with only one instrument power source or with only one navigation radio or with only one comm unit and yet that is all that is required for IFR flight.

I think that is the proper regulatory position. It provides room for the user to adapt the equipment to his individual requirements, competency and risk tolerance.

The system has worked in the past and I feel it will continue to work if the FEDs (including Congress) will just let it do so.

Thanks again for the comment and keep telling your friends of the joys of GPS.

Happy Skies,

Bob Siegfried

[ARTICLES/19980112.104650.msg00254.tex]

IFR GPS Utility**Mon, 26 Feb 2001 10:19:00**

In a message dated 2/26/01 7:07:22 AM Central Standard Time, flyinglo@email.msn.com writes:

Bob, I guess the best solution is to get an IFR Appch GPS. Better start saving my pennies now. Maybe I can sell an ex-wife or a kid.....

Good Morning Jerry,

If you do decide that the operational advantages of an IFR approved GPS are worth the funds to be expended, I think you would be happiest with the approach version. The overall cost for the approach box installed and approved is so little more than the enroute only approval installation that I would recommend the extra expenditure.

The other side of the coin is whether or not you really need the ability to execute those relatively low approaches!

The vast majority of the Bonanzas flown around the lower forty-eight never see anything much below VFR minima on the approach. Most destinations have an approach to reasonable minima that can be handled with nothing more than a VOR.

If your occasional destination requires a DME, ADF or GPS to execute an approach, The IFR GPS starts to make a little more sense. However, if your need is only occasional, you can still file for those destinations, provided that you have a good ironclad alternate with minima suitable for an alternate using only the VOR.

The move to an IFR box, either enroute/terminal or approach certified requires a commitment to the ongoing expense of updates and that can be a killer! Hopefully, that cost will be addressed by AOPA and others, but right now it seems to require an expenditure of \$350 to \$650 per year to feed the slot.

Now, to be realistic, if you are based somewhere that has only a GPS approach or if the local field needs an ADF or a DME to execute the approaches and you tend to fly when the destination weather is well below VFR minima, the rationalization of making the expenditure comes much easier.

Maybe you could convince the ex-wife that you need to spend the money to gain more consistency in your life so that you can make more money which she can then go to court and try to get her hands on!

Happy Skies,

Old Bob

[ARTICLES/20010226_101900_msg04643.tex]

Mailing List**Thu, 29 Jan 1998 10:36:00**

Good Morning Larry,

In a message dated 98-01-29 06:50:52 EST, you write:

Hello Bob,

Sometime in the past didn't you post an address for GPS site or mail list?
Please post again with a short description. I missed it the first time.

Regards, Larry Robbins, 1/29/98, 5:46:04 AM

Ah Yes! My favorite subject.

The site name is GPS for AERO and it is sponsored by the University of New Brunswick,
Canada.

There is an archive available so that you may peruse what has been posted in the past
and decide whether you wish to participate or not.

I urge you to check out the site. You can look it over without signing up at: <http://listserv.unb.ca/archives/aero.html>

Some dumb stuff, but lots of good also. Check the months of December and January.

There is posting in the December archive from George Dewar titled "Welcome" and it
states the intent of the site and how to sign up.

I just tried to hook up and was unable to do so. This has happened in the past and it
usually straightens out in a day or two. If you don't get to it right away, try again soon.

Happy Skies,

Bob

[ARTICLES/19980129.103600.msg00632.tex]

Nav Data**Sun, 28 Jan 2001 10:48:38**

In a message dated 1/27/01 11:13:57 PM Central Standard Time, raylockhart@tconl.com writes:

The POH supplement for the GX60 says that "IFR enroute and terminal navigation is prohibited unless the pilot verifies the currency of the data base or verifies each selected waypoint for accuracy by reference to current approved data." When I purchased the GX60, one of the strong deciding factors was the ability to use an expired database if necessary.

Good Morning Ray,

The language you quote above is that used by the FAA in the guidance AC (I believe it is AC 90-94) that they issued for all manufacturers and others to use before any GPS sets were approved for IFR use.

Enroute and Terminal operations do not include approaches.

I don't have the precise definitions available right now, but the following is my interpretation. Hopefully, someone will chime in with corrections and a reference.

Enroute is considered along the airways or direct routes between points of the airway system.

Terminal operations include the transition routes, and such, which take the flight from the Enroute (airway) structure to the vicinity of the FAF if an approach has an FAF.

Approach is that portion beyond the Terminal segment that allows for the actual down through procedure. If there is a FAF, that is the start of the Approach segment. If there is no FAF, then the Approach segment starts over the last facility or fix prior to the approach descent procedure.

The first time I heard about the Apollo approval to legally use an outdated datacard for an approach was at the Wichita ABS convention in 1997. The rep there told me about it and offered to send a copy of the Flight Manual Supplement which they had gotten approved for the II Morrow Apollo NMS. He also gave me a copy of a pamphlet which told of the method you described as one way of complying with verification of the data for approach use.

I asked whether the approval was to be extended to all of the II Morrow units or if it was specific to the NMS. He wasn't sure, but gave me a contact at the factory.

I called and was informed that it did apply to all of their products, but that it would be necessary for the individual FAA Approved Flight Manual Supplement to be adjusted, submitted to, and approved by, the FAA before that function could be used.

The new language in the NMS manual is as follows:

”6. GPS Approaches (APR) Instrument approaches may be conducted only using instrument approaches loaded from the Apollo NMS equipment database into the active flight plan. Approach data must be current. The Pilot/Crew must verify that the Apollo NMS approach data is current.”

Prior to that language change, it stated that the set had to have a current datacard.

If your Flight Manual Supplement does not have language similar to the language for the NMS, chances are that you are not legal to use the outdated card.

I would check with UPSAT directly for the latest word.

Unfortunately, most install shops have a boiler plate approval that they know will slide through their local FSDO and don't do as good a job as they might to customize the paper work to the greatest advantage of the user.

If your set was installed before August of 1997, it is very doubtful that it would have the new language. After that time, it was eligible to use that language, but it would have to be inserted in the paper work and approved by the FAA.

If your shop was sharp, they should have used it, but who knows! In addition, I have been told some local FSDO inspectors have refused to approve the new language regardless of the approval UPSAT obtained from their supervising FAA inspector!

Nothing is easy.

Happy Skies,

Old Bob

[ARTICLES/20010128.104838.msg02062.tex]

Chapter 6

HISTORY

Airliner A/P and Loss of Control Authority

Fri, 6 Aug 1999 23:02:57

In a message dated 8/6/99 8:49:07 PM Central Daylight Time, hilltop@raex.com writes:

I have more curiosity than knowledge , and this may be beside the point
, but , if the autopilot works so well , why don't they use it all the time ?
or do they ?

Good Evening Mr. Jordan.

It wasn't that the autopilot necessarily worked better, it was a matter of what controls were available.

First it is reasonable to look at the culture of the day. It was generally considered that direct control by the operator at the controls was the most reliable control available. Whenever a control anomaly would occur, it was generally considered good practice to turn off the autopilot and hand fly the aircraft until things were sorted out.

Control systems have developed on modern aircraft to the point where that may no longer be the consensus position.

In the case being discussed here, the hydraulic control valves were mounted on or rather incorporated in the master control module. They are actuated by small cables which run from the cockpit area to the rear of the aircraft where the module is located. When the cargo door blew out, the floor of the cabin on which the cables were mounted deformed and the cables were rendered unusable.

The autopilot operated the hydraulic module valves electrically through wiring that was routed along the top of the cabin and those wires were unaffected by the collapse of the floor. Thus the autopilot had control of the hydraulic system even though the cables connected to the control column were unusable. Interestingly, the DC-10 had a rudimentary Control Wheel Steering system (I guess it still does) which relied on pressure sensors in the control column to transmit the signals to the hydraulic control module. That meant that you could control the aircraft through Control Wheel Steering even though the column could not be moved!

It could also be flown via the normal full autopilot functions, but the autoland on the DC-10 left a lot to be desired.

At least that is the way I remember it. Ralph and all of the other young bucks may have a more recent view of the system.

Happy Skies,

Old Bob

[ARTICLES/19990806_230257_msg06744.tex]

Airliner Engine Operation and CHT

Mon, 29 Jan 2001 00:20:25

In a message dated 1/28/01 10:49:56 PM Central Standard Time, jdeakin@avweb.com writes:

I have run into some old Flight Engineers who rant and rave about 190C (or something else) being some sort of magic number, and they will bust their tails to maintain that within a degree or two, constantly fiddling with the cowl flaps, mixtures, power settings, etc. Sure smells like yet another OWT, to me (Old Wives' Tale). I know of NO data to suggest any one temperature is better than another, within that broad range between maybe 100C and 200C, either from an engine longevity or engine efficiency standpoint.

Good Evening John,

We also had some Flight Engineers who had a fetish about maintaining fairly high CHTs on the big round radials. I think it stemmed from a desire to show how important it was to have an engineer on board since the DC-6 was originally certified as a two man crew.

The DC-7 had the much more critical R-3350. We all tried to fly it very close to the companies recommendation.

The company recommendation for cylinder head temp was relatively high, I think around 195 or maybe even 200 or so, but that was because each degree of additional cowl flap opening on all four engines slowed us down a couple of knots!

In fact, the recommended temperature was raised a few months after we got the first airplanes just to help with the eight hour "coast to coast" problem. (But, that is another story!)

The insistence of our keeping the engines up near the maximum desired temperature was not because the engine needed to be operated that warm, but to make the airplane go as fast as possible on the fuel being used.

What we need on the Bonanza series is better control of the air going through the engine compartment. Read as more efficient cowl flaps! (Yet another story!)

Happy Skies,

Old Bob

[ARTICLES/20010129_002025_msg02108.tex]

Airliners and Hydraulic Failure

Fri, 6 Aug 1999 14:10:21

In a message dated 7/23/99 5:48:23 PM Central Daylight Time, dcoleman@flyinterlease.com writes:

There is absolutely no-way you could have a complete hydraulic failure in an L1011.

Good Afternoon Mr. Coleman,

I just can't let this one go by, I think you will find that a Delta flight departing LAX had a hydraulic problem which precluded any control of the elevator. I don't remember whether he had any control of the other surfaces or not. The Captain quickly learned how to fly the airplane using differential power and declared that he was going to attempt a ditching offshore near LAX. After a few more minutes, he had developed enough technique via engine thrust control that he decided to take the aircraft to Edwards for the landing. As arrangements were being made, he continued to develop his technique and after some 45 minutes, felt he was able to control the aircraft well enough to take it into LAX. Some of those details may be in error but the basic story is correct. He had lost aerodynamic control of the airplane, but unlike the poor souls at UAL, he had three good engines to work with. Nevertheless, a masterful performance.

There was an American DC-10 that lost all control of the hydraulics following the collapse of a cabin floor following the failure of a baggage door. He managed to handle it well enough by differential power that he got it back on the ground at DTW. Incidentally, had he turned on and used the autopilot, he would have had complete control of the aircraft hydraulically. Things happen and no one knows it all!

It shows what a pilot can do if he has to, but it also shows that nothing is absolutely foolproof and there is always a possibility of complete failure of any system.

I am sure that many have mentioned by now that the DC-10 does have a RAT in all models. My recollection is that we had to maintain at least 160 knots to make it work right.

They are both fine airplanes, but I doubt if there is any substantial difference in the safety records. A weak point in the DC-10 was the location of a master hydraulic module in the tail section. It was a marvelous design, very light weight and the designers felt that it just could not allow a complete loss of all control, yet it happened when the disintegrating engine threw shrapnel through that fail-safe device.

I always thought the 747 was a safer layout with all of the components scattered about around the airplane, yet JAL lost one when the rudder was blown off and since all of the hydraulic systems had components in the tail, all control was lost on that aircraft as well.

A Caravelle was lost in Europe when a tire blew and knocked out the hydraulics, that

resulted in shrapnel guards in the wheel well and two more hydraulic systems on the later Caravelles. Don't you imagine SUD EST thought the original system was built so that it could not possibly have a complete hydraulic failure?

The primary reason the 1011 never made it as a successful airliner is the same one that has plagued all of the Lockheed designs. They are marvels of sophisticated engineering that turn out to be heavier than the competition. Light weight means more payload and that is where the money is.

Happy Skies,

Old Bob

PS We had hydraulic fuses on the DC-3 as well, some places they will work and other places they will not. I believe it depends on the flow rate and volume of fluid required for actuation of the device being controlled.

[ARTICLES/19990806_141021_msg06714.tex]

Aspen Operation

Sun, 1 Apr 2001 09:29:06

In a message dated 4/1/01 7:13:54 AM Central Daylight Time, klosetke@kc.rr.com writes:

I was there 20 years ago. It is my memory that the runway is basically at the end of a canyon with a mountain on the south end of the runway. A go around is not a option unless you can turn around in the length of the runway, and then you really have to stay close because of a big hill on one side.

Good Morning All,

Just as a historical reference concerning the Aspen operation, you might be interested to know that when Aspen Airways was operating Convair 340s in and out of Aspen, they did land to the northwest on runway 33 most of the time.

That was the only way they could comply with the FAA requirements for a single engine go around and still carry any economically viable payload.

They also had an instrument approach procedure that was theirs alone, not available to the general population.

I don't know what auxiliary guidance they used, but I think it started out as a homing beacon and I believe they had a private localizer for a while.

I don't remember the details, but a couple of things stick in my mind. One is that they did have an approach that made the descent from the southeast. That one had such a high MDA that it was basically a VFR operation, somewhat similar to the current Roaring Fork Visual leg that comes through, or near, Independence pass.

The other approach was also almost a visual one, but it relied on getting down to the minimum altitude along V8 near Glenwood Springs and heading up the valley to Aspen. There was a series of step down fixes along V-8 that provided a much lower minimum enroute altitude in that area than is presently available.

Once they got up to the airport, they proceeded on to the southeast and made a course reversal in the valley to align themselves with runway 33. I know they used full flap during the course reversal, to get the speed as slow as possible, and the rumor at the time was that they had approval from the FEDs to use up to a forty-five degree bank, if required.

UAL had some pilots furloughed at the time and one of them took a job with Aspen.

When he was taken up to Aspen to get checked out on the course reversal maneuver, he quit!

Must have been a real "E" ticket ride!

In order to accommodate the Convair, the northwest end of the runway had a gravel

overrun section added. The FAA did not allow the use of reversing for runway certification tests in those days, so the proving flights had to be done with brakes only. Even with new brakes and tires, they blew them all during the certification tests. The aircraft did get stopped on the overrun, so the operation was approved. By using heavy reversing for normal landings, it was possible to get the airplane stopped with light to moderate braking.

The operation with the piston powered Convairs didn't last long. My recollection is that they were replaced fairly quickly with ones that had been converted to turbo prop power plants.

By the way, Aspen Airways started out using DC-3s with Jato bottles on the belly. The Jatos weren't fired unless an engine was lost, but that was how they met the go around requirement. The DC-3s landed up hill and took off downhill, just like most of the rest of us!

The Jato firing lasted about fourteen seconds. That was enough get the gear up and attain sufficient altitude to make the one-eighty back toward Glenwood Springs

No bearing on the current accident, but I thought some might like to know what has been done.

Happy Skies,

Old Bob

[ARTICLES/20010401.092906.msg06996.tex]

Bonanza Super V

Wed, 7 Feb 2001 10:38:50

In a message dated 2/7/01 9:03:14 AM Central Standard Time, sderrick@tnstaafl.net writes:

I thought I saw a picture of a twin "V-tail" Bonanza in either ABS, or AOPA or Custom planes.

Anybody else seen this animal.

I'm on the line with the local airport crowd on this. Gonna have to buy lunch soon if I can't produce the evidence..

Good Morning Scott,

I believe you are referring to the "Super V."

It was a modification of the early V tail that was originally STCd by some folks out in Oakland.

I am a little fuzzy on the corporate details and who owned what, but the STC, at least for a while, belonged to some folks up in Canada and some of them were produced either in Buffalo or in Canada near there. I believe that company was associated with the old Fleet Corporation.

Every one of the Super Vs that I have seen had terrible workmanship and looked very doggie.

I doubt if there were more than a dozen or so conversions performed.

There has been one at Oshkosh and Sun n Fun the last couple of years and it looks just as beat up and crummy as any that I have ever seen.

Beech squashed the effort by developing the Travel Air.

The moral?

Don't mess with the big boys.

Happy Skies,

Old Bob

[ARTICLES/20010207.103850.msg03051.tex]

CQ From an Airplane

Wed, 30 Dec 1998 09:46:05

In a message dated 12/30/98 2:31:12 AM Central Standard Time, n5kxi@ionet.net writes:

As a Ham Radio Operator I still HF radio in my plane. I also have VHF/UHF in my plane. Don't get to use it much but do some operating when someone helps with the flying...

Hi Lee,

Another comment if you don't mind the ancient history.

I had a friend many years ago who was an avid ham. He rigged up a rig in his OX-5 powered Jenny, flew it up over Elmhurst airport (Suburban Chicago) as high as it would go and then shut down the engine so as to get rid of the electrical disturbances from the engine.

He would then send "CQ from an airplane" (via code of course) and log as many contacts as possible until he got low enough that he had to get back to flying and land the airplane.

That was long before even my ancient days, but he loved to tell the story. Being a ham seems to involve a lot of fun!

Happy Skies,

Bob

[ARTICLES/19981230_094605.msg07974.tex]

Caravelle

Tue, 17 Oct 2000 08:43:10

In a message dated 10/16/00 11:58:00 PM Central Daylight Time, raven@tminet.com writes:

They seemed to have a very different approach to the jet design problem than any of the other manufacturers.

So, which is more fun to fly- the Caravelle or the Bo?

Good Morning Bill,

That's kinda like asking if one likes Blondes or Brunettes. They are both wonderful!

Like the Bonanza, it is extremely easy to fly, almost makes the landing all by itself and has very honest stall and handling characteristics. The Bonanza needs that little extra wiggle compensation technique.

As you note, the design was a little different.

It was very much inside the state of the art. The primary electrical was still DC. Almost all of the components of all systems were ones that had already been used on other jets or piston aircraft. The sweep back of the wing was almost exactly the same as the leading edge taper on the DC-3.

The nose section was purchased from Dehaviland (sp?) and was from the ill fated Comet series (including the section whose failure doomed the Comet career as an airliner). The landing gear also was taken from the Comet. I don't remember if it was actually identical or just an adapted design.

The redundancy was very high and the systems were easy to understand, but there were a lot of them.

The transition training course was seven to eight weeks in length. The oral exam generally lasted about eight hours.

If we had been required to know the 747 as well as we learned the Caravelle, the transition course would have taken a year or more!

Unlike the Bonanza, the airplane was very inefficient.

It had a higher dirty stalling speed than the 727-100, was slower in cruise, didn't fly as high and had a lower rate of climb. It carried half as many people and yet it burned the same amount of fuel on a trip from Chicago to New York!

But you could close the throttles and glide like down to a landing just as comfortably as any Beechcraft. Of course, if you did misjudge that easy approach and wanted to add some power, it took fourteen seconds for the engine to accelerate from idle to full power.

There was no usable thrust for the first ten of those fourteen seconds.

The 727 would go from idle to full thrust in less than four seconds and had usable thrust in around two seconds.

We used full flaps and full speed brake on the approach so that we could keep the power up around seventy to eighty percent. To go around, we relied on reducing the drag. Bring up the flaps and retract the speed brakes and she would go around without touching the throttles. It was characteristics like that which led the airline industry to adopt the now almost universal stabilized high drag approach. That technique was rarely used in the Days Of Yore.

Yes, it was a wonderful airplane to fly, but nowhere near as efficient as the Bonanza!

Thanks for asking.

Happy Skies,

Old Bob

[ARTICLES/20001017.084310.msg14962.tex]

Certificate Tests From the Ground?

Wed, 24 Jan 2001 10:28:05

In a message dated 1/24/01 1:54:01 AM Central Standard Time, jdeakin@avweb.com writes:

Sorry, I don't see it. When George said "Glider," and you posted yours, it triggered a very dim memory that this may have been possible back in the dim past, but I don't think it can be done today. I could be wrong, I don't examine in gliders.

Interesting question.

Best... John Deakin

Good Morning John And All,

It was possible in the past. I don't have data other than my memory, so consider the source!

I recall that shortly after W.W.II, somewhere around 1950 I think, there was a young lad who showed up at the local CAA (predecessor to the FAA) office with a Douglas DC-3 for his Private Pilot flight check.

It seems that his father owned the three. It was used as a corporate aircraft and flown by a professional pilot. In those days, it was not uncommon for the DC-3 to be flown single pilot, so the lad had spent a lot of time in the right front seat. He did so well, that the pilot, who held an instructor rating (no instructor certificate in those days) started letting him fly from the left seat.

A student certificate was obtained for the young man and he eventually soloed the three and completed all of the required training in that aircraft.

The CAA Inspector had no DC-3 time at all and didn't feel up to riding in a Douglas Racer with a kid (on his seventeenth birthday no less!) so he elected to monitor things from the ground.

The certificate was issued.

The event was reported in most of the aviation rags of the day. Maybe some of you computer whizzes could search the media of the day and prove me right or wrong?

Back in the Ancient Days of Yore, when I was an FAA Designated Glider Pilot Examiner, my recollection is that I had the authority to issue a certificate by observation from the ground, but I THINK, not sure, that I was supposed to fly with the applicant in an airplane which had stall characteristics similar to the glider and observe stall recoveries and recovery from incipient spin situations.

I also recall that there was a change a few years ago which would no longer allow me the option.

CHAPTER 6. HISTORY

It has been at least twenty years since I quit being an examiner, so all of this is getting a little hazy!

Happy Skies,

Old Bob

[ARTICLES/20010124_102805_msg01642.tex]

Continental Engine Flight Test

Tue, 30 May 2000 23:41:34

In a message dated 5/30/00 10:13:53 PM Central Daylight Time, raven@tminet.com writes:

This actually seemed like a good low risk way to flight test a new power-plant. Redundancy enough to get you back to base if the wonder machine stops whizzing. No asymmetry to fret about if it happens at take off. Big enough plane to carry all of the instrumentation (but, a Quickie could do that anymore...). A known, if not too fabulous airframe.

Cheers!

Bill

Good Evening Bill,

Just thought you might like to know how Continental did it in the 'Good Old Days' of Muskegon, Michigan.

They had a nice old Model 18 Beechcraft with two very comforting R-985s out in the usual position.

On the nose, instead of baggage, fuel and or radar, they had a nice big flat firewall on which they mounted and faired in all of the bullet proof engines that were developed in those halcyon days of yesteryear!!

Must have been a very comforting feeling for the aviators.

Happy Skies,

Old Bob

[ARTICLES/20000530_234134_msg08911.tex]

Continental History

Wed, 31 May 2000 10:20:15

In a message dated 5/31/00 8:38:33 AM Central Daylight Time, flyinglo@msn.com writes:

Bob, so Continental started out in Muskegon, Michigan? When did they move to Mobile, Alabama?

Good Morning Jerry,

The flip answer would be: Just before they started to build crummy engines!

Actually, I don't remember when the move was made. If my memory is at all valid, Continental Motors was a basic Detroit corporation which made lot's of engines for various uses. One of their most successful products was the engine used in the original "cast iron" Yellow Cabs which you young whipper snappers may remember seeing in some very old movies.

I believe the Aircraft Engine Division was set up in Muskegon around the start of WWII, but that could be totally in error. It may have been as early as the production of the little 36/40 hp engine they built in the middle thirties. I think the move to Mobile was around 1975. Hopefully someone much more knowledgeable than me will give us the correct dates and history.

Happy Skies,

Old Bob

[ARTICLES/20000531_102015.msg08923.tex]

DC-3 Two Man Crew

Thu, 24 Aug 2000 15:33:50

In a message dated 8/24/00 1:27:33 PM Central Daylight Time, tturner@vol.com writes:

the Twin Beech does not appear in the report. Struck by taxiing or landing aircraft. Interesting that there was reportedly only one person on board the landing DC-3, which requires two pilots.

Good Afternoon Tom,

Actually, the DC-3 does not always require two pilots. It depends on the certificate and regulations under which the aircraft is being operated. At the time that I was flying them for United, our specifications noted that we required a two pilot crew for scheduled operations and a single pilot crew for ferry test and training. There was a UAL note suggesting that a flight operations knowledgeable person be carried in the right seat if one was available. They described a flight operations knowledgeable person as a mechanic, dispatcher or other such person. It was not unusual for one to be flown solo.

Some years later when a few of us were operating a DC-3 as a family/club airplane, we were authorized to fly it single pilot, but were unable to find an insurance company who would insure us that way.

Remmert Werner of STL was a big modifier of DC-3s and they regularly flew them single pilot until they ran up against the same insurance problem which stopped us from doing single pilot operations.

The DC-3 is an easy one man machine, but in both it and the Twin Beech, visibility in a right turn is a problem.

Of course, if the airplane was not being operated for the purpose of flight, just taxiing for a reposition, one crew member can easily handle it and there is no certificate of any kind required by the FEDs.

Happy Skies,

Old Bob

[ARTICLES/20000824.153350.msg12515.tex]

DC-3 Two Man Crew

Thu, 24 Aug 2000 17:48:21

In a message dated 8/24/00 3:07:19 PM Central Daylight Time, tturner@vol.com writes:

I assumed (bad word, I know) that the -3 weighs more than 12,500 pounds at max gross and therefore requires an ATP and a two-pilot crew (like the KA-350, for instance).

Good Afternoon Tom,

Your assumption isn't bad! The DC-3 has various gross weights approved, but the most common one is 25,200 without boots and 25,346 with.

It was originally approved with a one man crew for non aircarrier use and, to my knowledge, has never had a mandatory recertification. There was a Special Federal Air Regulation approval available that allowed a gross weight of 26,900 if the operator agreed to use balanced field lengths and a two man crew. Back in the mid to late sixties, the FAA sent a letter to all of the insurance providers that stated that the FAA thought the airplane should be operated with a two man crew. No recertification was done, but most of the insurance companies decided to cease issuing policies if the operator did not use a two person crew.

It is one of those cases where one or two folks in the FAA can effectively make a change in how we do things without following the accepted procedures for rule making. There weren't enough of us doing the single pilot thing to make an effective fight and we lost that privilege by default!

When the DC-3 and the Lockheed Lodestars were the pride of the corporate fleets, quite a few of them were operated, at least on occasion, with a single pilot crew. By the time the FAA issued their notice to the insurance companies, most of the big boys had gone to the jets and we didn't have much support. I don't think the rules were ever changed, but they might have been. In any case, without insurance, it's tough to operate a business.

Happy Skies,

Old Bob

[ARTICLES/20000824.174821.msg12525.tex]

Diesel Engines?

Thu, 20 Apr 2000 16:39:09

In a message dated 4/20/00 2:53:23 PM Central Daylight Time, wabpilot@yahoo.com writes:

I did, Tom. But, I'm always a bit amused when someone promises a super engine, when the wizards in Stuttgart, or Detroit, with their production volumes can't deliver the same thing. By the way, my wife reminds me that VW does have a great small diesel. She swears by the little motor in her Golf, TDI.

Good Afternoon Tom and Alan

Packard built a successful aircraft diesel in the thirties. The Germans used diesels on airships. There may have been others. The light weight gasoline engines may have been more cost effective at the time for aircraft uses, but if we can't get gasoline, something just a little less efficient than what we now utilize may be very welcome.

Don't give up on the diesel!

Happy Skies,

Old Bob

[ARTICLES/20000420.163909.msg06781.tex]

Diesel Engines?

Thu, 20 Apr 2000 18:55:20

In a message dated 4/20/00 5:03:51 PM Central Daylight Time, s2@brilliantmedia.com writes:

In any case, diesels are indeed generally heavier and require a more robust (and probably coolant-based) cooling system. They're also most efficient at a fixed RPM

Good Evening Steve,

The diesels have generally been heavier and I don't have current data available on the 1930s Packard diesel weight, but it was competitive with gasoline engines of the day. It was an air-cooled radial. My recollection is that it was an eight cylinder unit. Packard decided not to produce it in quantity because they felt the market was already well covered by P&W and Wright.

I believe the German engines were water cooled, but the extreme economy they delivered made the slightly heavier weight acceptable for the long duration flights of the lighter than air ships on which they were used.

Happy Skies,

Old Bob

[ARTICLES/20000420_185520_msg06791.tex]

Diesel Engines?

Thu, 20 Apr 2000 23:41:07

In a message dated 4/20/00 9:54:08 PM Central Daylight Time, gwbraly@gami.com writes:

The vibration on the crankshaft from the enormously sharp and high peak pressure pulse from the diesel engine combustion event is going to play the devil with almost any prop now available and I suspect that these engines will take a major re-design effort in order to get props that will work and live with the harsh environment.

Good Evening George,

Based on my knowledge of the thoroughness with which you gather your data, I have no doubt that your facts are correct concerning the current crop of diesel engines, but I wonder how that fits with some of the facts I remember from my far distant past.

I recall being taught many years ago that one of the advantages of a diesel engine was that the power pulse could be very closely controlled by judicious adjustment of the timing of the injection and rate of flow of the fuel even to the point of making a more broad and extended power pulse than was possible with the gasoline engine. Was my perception of what I was hearing inaccurate or is the efficiency of such fuel directed combustion so poor that such control is not currently used?

Happy Skies,

Old Bob

[ARTICLES/20000420_234107.msg06812.tex]

Diesel Engines?

Fri, 21 Apr 2000 10:02:38

In a message dated 4/20/00 11:46:17 PM Central Daylight Time, mcognata@home.com writes:

Old Bob is very correct.... I just completed a three-year stint at Detroit Diesel Corporation(DDC).

Good Morning Matt,

It is comforting to hear that some of that stuff I absorbed fifty plus years ago is still valid!

I tried to find some data on that old Packard engine in the type specification pages. I guess they have it stuck away where we less than proficient computer users can't locate it. Maybe Cy Galley could find it for us.

My recollection was that the weight of that engine was very competitive with the gasoline engines of the day. I have no doubt that if adequate funding is applied, a suitable diesel could be produced using either air or liquid cooling.

I believe it was Alan Bradley who mentioned that diesel fuel weighs more than gasoline. That is an advantage, not a disadvantage. It means that we can pack more power in a smaller space.

Diesels have historically produced more power per pound of fuel than have the gasoline engines.

While at Sun 'n Fun, I had the pleasure of watching George Braly demonstrate the excellent results that he is attaining with his electronic ignition system.

It was controlling the power pulse so well that he could introduce substandard fuel and the spark timing would change rapidly enough that no damage occurred. He was showing so many good things that I couldn't absorb them all, but I do believe one of the fuels on which he was successfully running the engine was diesel fuel!

The internal combustion engine, whether the fire is lit by a spark or by Doctor Diesel's method seems to have a secure future as long as people like George, you and your compatriots in Detroit are willing to spend the time, effort and funds to adapt it to the use we envision.

As always, the drawback is the difficulty we have in getting things approved for use in aviation and those difficulties are largely driven by our litigious society wherein we have all been led to believe that we are assured that the powers in Washington will see to it that we are protected from cradle to grave.

Fortunately for us, George works on both sides of the fence! Hopefully he will figure out away to get around those lawyer inspired obstacles and get his ignition module approved for our use at a competitive price.

Between your diesels and George's ignition, something ought to work!

Happy Skies,

Old Bob

[ARTICLES/20000421_100238_msg06831.tex]

Diesel Engines?

Fri, 21 Apr 2000 11:25:41

In a message dated 4/21/00 10:10:09 AM Central Daylight Time, cgalley@qcbc.org writes:

Here is a site for Woolson, the designer... <http://home.earthlink.net/~ralph-cooper/pimage24.htm>

Hi Cy,

What an interesting site!

The Packard was used a lot more than I had realized! It is hard to believe that it was never certified, but it appears to have been dropped before the act of 1936 which, I believe, was the time when things got so formalized. Must have been when the lawyers arrived on the scene!

Happy Skies,

Old Bob

[ARTICLES/20000421.112541_msg06844.tex]

First Beech? High Wing Beech?

Tue, 28 Oct 1997 11:15:50

Hi Paul,

In a message dated 97-10-28 10:26:29 EST, you write:

 primarily because Beech hasn't built any high wings.

Yes and no,

Beech Aircraft Corporation has built a few high wings but I don't think any of them made it to production. As I recall, the the four engine commuter airplane was a high wing.

Beyond that. Walter Beech was the chief driving force of the Travelair Corporation and built several very fine high wing airplanes.

The first Beechcraft was called the model 17 because it's design was started while Walter and Ted Wells were still with the Travelair division of Curtis Wright and was the 17th design in the series that included the high wing record setting Woolaroc (not sure I spelled that right).

Picky, picky, picky!!!

Yours,

Love em all,

Bob

[ARTICLES/19971028_111550_msg02238.tex]

G Model Twin

Wed, 7 Feb 2001 23:01:14

In a message dated 2/7/01 7:24:01 PM Central Standard Time, carminefp@home.com writes:

I beleive that Beech converted a G model to a twin as a proof of concept and later converted it back to a single. I understand it is still flying as a single G model. Cheers Carmine Pecoraro

Good Evening Carmine,

It was more than a "proof of concept." It was the actual prototype that they used for the certification flight tests.

All of the components were not as strong as the production airplanes, but that was compensated for in the data submissions.

John Allen was the manager of plant two at the time. (or close to that, don't hold my feet to the fire on that one). The thing was disassembled, usable parts put to good use and the rest left to gather dust. John bought the fuselage and some other parts, I don't remember whether he used the prototype wings or not. In any case he scrounged and purchased enough pieces to get it recertified and the airplane was still active a couple of years ago. We camped next to it at Sun 'n Fun some time ago.

While it was strictly John's deal, (there was no factory involvement at all) it didn't hurt that he was something of a big wheel.

Happy Skies,

Old Bob

[ARTICLES/20010207.230114.msg03104.tex]

Geraed Lycoming Engine

Thu, 15 Mar 2001 22:59:42

In a message dated 3/15/01 9:41:06 PM Central Standard Time, farrarwd@tca.net writes:

My Dad tells me this is about the same engine put in the Queenair and that they were %\$#@ to keep from tearing apart. I believe it is geared and supercharged.

Good Evening Will,

The engines used in the Queen Air were all Lycomings. In addition to being geared, they were supercharged via a mechanical blower on the rear of the engine, not via an exhaust driven turbine system.

While I have absolutely no experience with the Continental GTSIO engine, I think you will find that they are all turbo charged.

The Lycoming that was used on the Queen Air and many of the Twin Bonanzas was a good engine IF it was flown everyday and operated as designed. They didn't take well to sitting around. Those that were flown in the early commuter airline service did quite well, but they were flown six to eight hours everyday.

Happy Skies,

Old Bob

[ARTICLES/20010315.225942_msg05956.tex]

Hangar Floor Covering

Sat, 16 Jan 1999 11:06:14

Good Morning All,

This is a little off the Bonanza thread, but my excuse is that Bonanzas appreciate a nice home!

First a little history. (Surprise! surprise!)

During the twenties and thirties a lot of the hangars built had wood plank floors. They were very comfortable under foot, generally slip resistant and things that were dropped tended to fare a lot better than things that are dropped on concrete.

Many of the major factories that I visited during and after WW II had floors that were made of end grain wood bricks set over a concrete base. These were very nice and they must have worn well. Lift trucks and all sorts of heavy equipment rolled around on them in good form and often. I don't know if those floors are still common, as I haven't spent any time in factories in the last fifty years.

The painted concrete floors seem to be quite high in cost and the paint still doesn't last very long. Things that are dropped break easily and the concrete is still hard on these old feet.

I was wondering if any of our group have any experience using some of the modern floor covering materials in a hangar. Maybe a layer of cork covered by some sort of vinyl or one of the new modern thin wood floors?

Surely there are flooring experts among such an august group of fearless airmen!

Waiting breathlessly for help,

Ancient Bob

[ARTICLES/19990116.110614.msg00635.tex]

Instrument Panel Color

Thu, 14 Dec 2000 12:16:20

In a message dated 12/14/00 9:12:03 AM Central Standard Time, rshare@mich.com writes:

Old black, let alone crinkled reminds me of steam trains! In my (not so humble) opinion, FLAT gray reflects no more light and is MUCH more appealing. That how my last Bonanza panel was painted, and what I am considering for my present one.

Good Morning All,

For what it's worth.

Many years ago in a land far, far away, there was an airline which was operating Douglas DC-3s and DC-4s that had the traditional military flat black instrument panels installed.

There came upon the scene new, powerful, high performing and pressurized DC-6s. Now the minions of old felt that everything they had and everything that they had been doing was obviously the best that any one could hope for, but the extra speed and altitude capability of the DC-6 was a welcome addition, except that those new, fast, powerful and pressurized airplanes were equipped with instrument panels that had been painted a flat light gray!

Now the airplanes were warmly welcomed, but our stalwart aviators convinced the powers that be that those instrument panels would have to be repainted to a flat black so as to be acceptable. The powers that be agreed to do the job the first time the aircraft was in for refurbishment.

Well, I think you can see what is coming, after a few months of operating the aircraft with the light colored panels, the attitude of the old timers had changed so that they besieged the powers that be to not only leave the light gray alone, but requested that the DC-3s and DC-4s have their panels painted with the much more comfortable light gray.

Since I was a lowly DC-3 copilot at the time, I didn't presume to voice any opinion on such a weighty subject, but after a few months of operating with both the flat black and the light gray, I found that I definitely preferred the light gray. That was the color used by that mighty airline until the advent of the glass cockpit on the 767 which had an instrument panel painted a nice flat beige not unlike the color used in some of the later Bonanzas.

Now at the time of the introduction of the 767, a certain fat old guy who flew a lot of Bonanzas happened to be the most senior pilot flying for that

airline who flew the new 767.

I thought the gray we had been using was great, but the beige was even better.

If you like the look of the W.W.II flat black, by all means use it. I am sure Walter Mitty would.

My vote is for a nice light color that harmonizes with the rest of the aircraft.

Just make sure it is flat and not gloss or semigloss.

Happy Skies,

Old Bob

PS I put the crinkle finish right up there with tail skegs and turn coordinators. If people want them, that is their right, but if any of those three were on an airplane I purchased, they would all be removed immediately.

[ARTICLES/20001214_121620_msg17776.tex]

Last Radio Range

Tue, 23 Mar 1999 10:48:23

Good Morning Howard,

In a message dated 3/23/99 9:28:42 AM Central Standard Time, hgp@madaket.netwizards.net writes:

When was the last radio range switched off? Also, do you know if there are any airway beacons still in operation?

I am not sure of either.

The last time I shot a low frequency range approach was at Gore Bay, Ontario in 1965 and I was flying a Beech straight 35, serial number D-273, N2868V. The weather was right at minima and it worked just as well as it had years before.

VOR was better and GPS is better yet!

I believe the last LF ranges were in Canada and Alaska and may have been around as recently as the late eighties, though I can't say for sure.

I believe the last actual airway beacon course was the one maintained by the state of West Virginia westbound from DCA toward Pittsburgh. I think that was shut down some ten years ago. Hopefully some of our members will have better information.

Many of the original beacons are still operating at various airports around the country.

When the enroute structure was dismantled by the government, the beacons were offered to local authorities and if there were no takers among that group, they were given to any airport, private or whatever, who wanted to use them as airport beacons.

I occasionally note them in my travels, though they are getting expensive to maintain and are being replaced with more modern lights at many fields.

Happy Skies,

Old Bob

[ARTICLES/19990323.104823_msg03191.tex]

Losing a Blade

Tue, 30 Jan 2001 14:47:10

In a message dated 1/30/01 12:16:10 PM Central Standard Time, epoole@scoot.netis.com writes:

Have any of you heard of anything like that happening? Is it at all likely that the situation would be at all salvageable and survivable?

Good Afternoon Eric,

It has happened fairly often. That's why you want to take good care of your prop!

Bobby Younkin's air show Twin Beech lost a blade a couple of years ago when it was being flown by a ferry pilot back to Arkansas.

On a twin engine airplane there is some possibility of it making it safely to the ground. We checked the accident record of the Twin Beech at that time. While I don't have the exact numbers handy, I believe the records show around eleven airplanes had lost a blade section which was big enough to rip the engine from it's attachment points on the airframe. On some, the engine fell completely away from the airframe and on others it was just left dangling. I believe there were four airplanes that made it to a safe forced landing and the rest were lost with all occupants. My recollection was that the ones where the engine fell away completely did slightly better than the ones that had the engine dangling.

In the case of Bobby's airplane, the pilot had it under control with the engine dangling, though with a high rate of descent. Unfortunately, he hit some trees while trying to get it on the ground and was killed. There aren't a lot of good places to land such a rig in Arkansas.

On a single engine airplane, control is not likely to be available due to center of gravity problems if the engine falls away. If it stays with the airframe, survival is possible, but not easy.

It was widely reported in the press just before W.W.II that a prop blade had been lost on a J-3 which resulted in the engine being ripped from the airplane, but most of the engine mount remained. The flight instructor climbed out of the front seat and hung onto the engine mount while the student flew it down to a safe landing.

Truly the days of Iron Men.

The event was later chronicled as an event in the comic strip "Smilin' Jack"

Happy Skies,

Old Bob

[ARTICLES/20010130.144710_msg02229.tex]

Meyers 200

Tue, 15 Feb 2000 01:27:22

In a message dated 2/14/00 6:20:30 PM Central Standard Time, new-manb@rocketmail.com writes:

Do any of you have experience with the Meyers 200? The designer was Al Meyers, Meyers Aircraft, Tecumseh, MI.. The airplane was produced in from 1959 to 1967. Only about 133 were built.

Good Evening Bob,

You know I just have to add my two bit's on this one!

I had the pleasure of meeting Al and touring the factory about the time the 200 was first introduced. We went to dinner with he and his wife. They were a delightful couple and very pleasant company.

He later sold the design to Aero Commander and the last ones were built as Commander 200s.

Al didn't actually design the airplane, he was just the boss and guided the program along. It was actually a spin off from the Meyers 145 and that started out as a homebuilt one of a kind which he and some of the others at the factory were going to build for Al's wife who was also a pilot. Al was primarily a pilot and flight instructor fixed base kind of guy. When the war started, he saw the need for a good trainer for the CPT and WTS programs and he got together a design team and came up with the Meyers OTW (Out To Win). 103 of those were built. I believe they all went to the CPT program.

There was one Meyers 200 built for Peter Glukman as a long range world traveler. It had special wings that were about four feet longer span and were completely full of fuel. There were the same number of ribs, just spaced further apart! That airplane was later returned to a standard configuration and the wings were stored in the loft of Als hangar in Tecumseh at the time of the sale to Commander. I wonder what happened to them?

Aero Commander sold the design to a fellow out west who's name escapes me just now. He put a 675 (or so) horsepower Garret turboprop in the nose and derated it to 400 HP. I don't think he ever got it approved, but it did tour the country on a promotional tour. I had the opportunity to fly it from Chicago to Lafayette Indiana and back. What a blast! As you say, the controls are a little stiff and the airplane is small, but what a performer. The only other one I flew was one built by Commander and had the IO520. It was substantially faster than the V35A that I had at the time.

A little off topic I guess, but fun to reminisce about.

Happy Skies,

Old Bob

[ARTICLES/20000215_012722_msg02987.tex]

Meyers 200

Tue, 15 Feb 2000 10:36:11

In a message dated 2/15/00 1:05:29 AM Central Standard Time, raven@tminet.com writes:

Say, did I get the part about the tooling in the rafters right?
I hear this stuff second and third hand.

Cheers!

Bill

Good Morning Bill,

I don't remember that specifically, but it could well have been true.

There was a shop area at the rear, west end, of a large, but not overly large, hangar. A lot of small component jigs and fixtures were in that area with small pieces in various stages of construction. There was a large loft on the southeast corner. Various large components were on the eastern, open section, of the loft while the area west of that position had an enclosed storage area for smaller stuff.

At least, that is the way I remember it!

I was never there when an airframe was being constructed and I wouldn't be at all surprised if there was stuff stored in the rafters as well as the loft areas.

Using the space in the rafters was a common thing to do in the thirties and forties. It seemed that most radio shops of the day were so located. Hot as Hades in the summer and generally cold in the winter as most of the hangars were unheated. Insulation was poor and space heaters not very efficient. Fires were not unusual.

Yup, those were sure the "Good Old Days"!!

Happy Skies,

Old Bob

[ARTICLES/20000215_103611_msg03003.tex]

Model 17

Thu, 11 Jan 2001 14:11:13

In a message dated 1/11/01 11:53:45 AM Central Standard Time, swo49@hotmail.com writes:

Any comments about a bo driver buying one who does not now have taildragger time (obviously I would go get time in a piper cruiser or the like before flying the 17)?

Good Afternoon Steve,

As I think you are already aware, the Model 17 Beechcraft is my all time favorite airplane.

In the late fifties I owned both a C17R Beechcraft and a straight 35 Bonanza.

The 17 was by far the most fun to fly and the best performer of the two. It could land shorter, get out faster, climb higher and cruise faster.

But the Bonanza was the more practical and far easier to fly.

It is not that the Model 17 is difficult to fly, it definitely is not, but it does take technique that is not commonly taught to today's aviators.

Should you decide to take the plunge, I sincerely hope that you will join the Staggerwing Museum Foundation. We have available many back issues of our newsletter. There are articles in there about how best to handle the Beechcraft Model 17.

Some months ago, I posted an article on this forum which was a rewrite of one that I had originally written for the Staggerwing/Twin Beech group. The technique described therein works in all aileron equipped aircraft, but it is especially beneficial when applied to the early Beechcrafts.

Should you like an extra copy, let me know and I will E-mail one directly to you.

If you want to get some tail wheel experience that will aid in the transition, I would suggest that you find a Luscombe to fly. All of the Pipers are so easy to fly that lousy technique can be used and they will still not bite!

The Luscombes are not hard to fly, but they are more demanding and you are more likely to develop proper handling technique than you are with a baby carriage like a Cub or a Cruiser.

I do hope you find the Staggerwing of your dreams. They are a fabulous piece of equipment and the great granddaddies (or maybe, grandmothers?) of our beloved Bonanzas.

Happy Skies,

Old Bob

[ARTICLES/20010111.141113_msg00747.tex]

Model 36

Sun, 1 Oct 2000 00:17:10

In a message dated 9/30/00 10:44:32 PM Central Daylight Time, Ernie_Ganas@email.msn.com writes:

So you don't like my Model 36??? The only one still in production

I didn't say I don't like them, I just wish the Beech marketing people could have come up with a name worthy of the aircraft instead of lamely adapting one that was already in use.

I have owned a couple over the years and if I needed an airplane that had the characteristics of the 36, I would buy one again.

They are an excellent piece of equipment.

They just aren't Bonanzas.

It all depends!

Happy Skies,

Old Bob

[ARTICLES/20001001.001710_msg14279.tex]

Model 36 Name

Wed, 14 Feb 2001 20:08:47

In a message dated 2/14/01 6:09:17 PM Central Standard Time, ajw@CYBERNEX.NET writes:

Excuse me Ol' Bob but my 1984 B36TC is definitely a Bonanza and does not have cowl flaps.

Allen

Good Evening Allen,

Just because the Beechcraft Public Relations and Advertising folks couldn't think of new name for that very fine and excellent stretch Debbie, doesn't make it a Bonanza. That is not meant to take anything away from what a fine and useful aircraft it is.

It just Ain't No Bonanza!!

Happy Skies,

Old Bob

[ARTICLES/20010214_200847_msg03863.tex]

Mooney Mite and Crosley Engine

Mon, 17 Jul 2000 17:58:23

In a message dated 7/17/00 4:30:11 PM Central Daylight Time, bonanza@dec.lynxnet.com writes:

Were not the original M-19 Mooney Mites powered by the Crosley four cylinder engine?

Hi Carter,

Yes, but it was an entirely different 4 cylinder engine!

The one used in the Mite was made of stamped steel parts that were placed in an oven stacked together with a brazing strip between.

The whole thing was heated up and the steel plates ended up brazed together. It was called the COBRA engine for COpper BRAzed.

Didn't work worth a darn and the Crosley automobile went to a Cast Iron conventional style engine. That was called the CIBA engine and was quite successful. Since the little light weight engine was not available, Mooney went to the Lycoming and later the Continental 65s.

Another good idea that was never developed!

Happy Skies,

Old Bob

[ARTICLES/20000717.175823_msg11060.tex]

Squawk 1400 Above 10,000 feet?

Tue, 11 Aug 1998 16:04:43

Hi Tom,

In a message dated 98-08-11 13:50:16 EDT, you write:

Any verifications from an "ancient aviator"?

I really don't remember when the requirement for 1400 above 10T was dropped but I do remember squawking 1400 in the early jets when we canceled on the way down and I used it a lot in my Bonanzas in the seventies. I think Dwaines estimate of around twenty or twentfive years ago is pretty close.

Ancient Bob

[ARTICLES/19980811.160443_msg04217.tex]

Staggerwing Museum

Tue, 20 Oct 1998 09:10:02

Good Morning Dwaine,

You asked;

Like the song a couple years ago about the old folks. "Where you been?"

These old folks were at the Midwest Bonanza Society fall get together at Deerfield resort after which we DROVE around the Great Smoky Mountains and then over to the combined Beechcraft Staggerwing and Twin Beechcraft annual convention at Tullahoma, Tennessee.

If you or any of the rest of our Bonanza lovers are ever in the vicinity of Tullahoma, try to stop and visit the museum. It is the only place in the world where Beechcraft history is retained. Raytheon certainly has no interest in the origination of Beech Aircraft Corporation.

The Staggerwing Museum has serial number one Model 17 along with several newer examples including one of the last G17s built. There are artifacts from the early Travel Air days as well as displays of engines and uncovered components of model 17s.

The Twin Beech hangar has three examples of the type starting with serial number 11, the second oldest 18 in existence.

There is a small fee for nonmembers and it is best to call and find out when it will be open. There are no full time employees. Everything is done by volunteers. (Makes sense since Tennessee is the Volunteer State!)

Normal times are 1 to 4 PM Saturday and Sunday, March through November. It is worth a call to see if anyone might be there at other times. For a good size group, special arrangements can be made.

Phone: 615 455-1974

Thanks for asking!

Happy Skies,

Bob

[ARTICLES/19981020.091002_msg06129.tex]

Twin Beech

Wed, 28 Feb 2001 17:43:42

In a message dated 2/28/01 2:46:57 PM Central Standard Time, guntalk@guntalk.com writes:

But . . . I don't have that many friends. It did, however, give me a chance to once again consider the "benefits" of a twin. As I wing my way from Louisiana to Las Vegas this Saturday in the Bonanza, I'll consider that topic, I'm sure.

Good Afternoon Tom,

They are a wonderful airplane.

Our youngest son has an early E18S. He bought it a few years ago to haul his family around in. He remembered how much he had enjoyed playing in the back with all his toy cars and such when he was four or five years old so when his kids came along, he just had to have a Twin Beech.

Most of the time he is all by himself and it doesn't have an autopilot. Keeps him pretty busy, but he flies it all over the country for business and pleasure. When his wife is on board, he burns about forty-two gallons per hour. She wants to go fast. When he is alone, he usually burns about thirty-six GPH. He enjoys the flying and doesn't mind building the time!

Try to get up to the Beech Party at Tullahoma this fall.

Happy Skies,

Old Bob

[ARTICLES/20010228.174342_msg04869.tex]

Twin Bonanza

Wed, 7 Feb 2001 08:34:51

In a message dated 2/7/01 12:42:21 AM Central Standard Time, Pete.Bedell@aopa.org writes:

The Twin Bonanza uses the Beech 18 landing gear??? Doesn't look like it to me. As far as I can tell the T-bone wing is a Queen Air wing, including the gear. In addition, those are all Lycoming engines, some of which were supercharged and not turbocharged.

-Pete

Good Morning Pete,

All of what you say is true, but wouldn't be reasonable to put it the other way?

The Queen Air was a development of the Twin Bonanza which was a development of the single engine Bonanza. The King Air was a development of the Turbine powered Queen Air that they built for the military.

The last two were being developed at the same time and I am not sure which actually went into service first, but that was the way the engineering development proceeded.

The wings on all are built on jigs that were originally designed and built for the Bonanza wings. If you really want to, you could unbolt the wing on any Twin Bonanza and bolt a wing from any Bonanza onto the center section.

Kinda like the DC-3 which could use a DC-2 wing!!

Happy Skies,

Old Bob

[ARTICLES/20010207_083451_msg03036.tex]

Twin Bonanza Stairs

Wed, 7 Feb 2001 11:09:35

In a message dated 2/7/01 9:39:48 AM Central Standard Time, sderick@tnstaaf.net writes:

I think that's the kind of stairs the Twin Bonanza had I saw at grants!

It was a short 3 or 4 step affair that led you to the wing, then you got in like a normal Bonanza.

It drops out of the belly and then slides out to position itself behind the wing.

Scott

Yep, that's it!!

If the one you saw was operative, you had a rare sighting.

Most of them have been long retired. It is a maintenance nightmare.

Only a purist Twin Bonanza lover would bother to keep it serviceable.

The Mamie step came about due to a fall that Mamie Eisenhower took while trying to board the T-Bone that had been assigned to take Ike up to Camp David.

It had the original T-Bone boarding step which consisted of three small pads on a steel tube which extended with the landing gear.

Ike owned and flew a straight 35 during the time that he was president of Columbia University.

When he went to tour Korea, after he won the election and before he was inaugurated, the army assigned a T-Bone and a pilot to get him around the country.

Well, being an avid private pilot and a retired general, he flew it from the left seat and had a ball.

He asked for one to be assigned to him in DCA.

After Mamie slipped on the access steps and skinned her shin badly, she used uncharacteristic language to advise any and all that she would never get near one of those things again.

That was when the Aero Commander folks got the order which saved the company from failure.

The Army bought a couple to use for transportation in lieu of the T-Bone. It was easy for Mamie to get in and out of and we all know how important it is to keep the boss happy.

Beech quickly designed the new monstrous kitchen stair mechanism, but it was too late. They lost the best booster they had ever had and Aero Commander reaped the benefits.

The translating stair was always referred to at the factory as the Mamie Eisenhower stair.

And so is history made!

Happy Skies,

Old Bob

[ARTICLES/20010207_110935_msg03057.tex]

Twin Engine Beechcraft

Sat, 30 Sep 2000 18:58:25

In a message dated 9/30/00 4:03:15 PM Central Daylight Time, john-mills@sprynet.com writes:

There was a Twin Bonanza (V-tail) parked next to me in OSH two years ago. It was owned by a fellow that flies for one of the overnight delivery services. Seems like he was from Ohio or Michigan.

Cheers, Ralph

Good Evening All,

The proper name for the Bonanza with two engines on it is the Super V.

Beech had already built the Twin Bonanza model 50, which, as we all know, is a much larger airplane and does not have a V tail.

It is rather like the situation with the Twin Beech.

Beech Aircraft Corporation has built many different twin engine airplanes, but only one series is properly entitled to be called a Twin Beech.

That is the model 18.

Twin Beech is what Beech called it and Twin Bonanza was the name they gave to the model 50. (I still have never forgiven them for trying to use the Bonanza name on the stretch Debbies)

Happy Skies,

Old Bob

[ARTICLES/20000930_185825_msg14272.tex]

Two Man Crew

Thu, 24 Aug 2000 18:00:52

In a message dated 8/24/00 3:36:39 PM Central Daylight Time, tturner@vol.com writes:

Sorry to open a can of worms, but hey, that's how we learn!

tt

Good Afternoon Again Tom,

One more possibility exists. There was a date in 1958, I believe it was in the fall, when the FAA issued the two pilot rule for jets. The Moraine Saulnier (sp?) 760 Paris Jet was certificated before that time and does not require a two man crew or a type rating. There was conjecture that a Sud Est 210 Caravelle could be flown single pilot under the same "prior approval" status but I doubt if anyone ever did it!

I would imagine the FAA has added some rules somewhere to tighten up some of the neat things that have been done in years past, but there was a story going around the industry that the Dodgers had a pilot flying their B-720 who had only a private pilots license with an instrument ticket and a type rating in the airplane. It seems he was the son of one of the owners and flew the airplane only incidental to his other duties with the team!

Who knows for sure?

Happy Skies,

Old Bob

[ARTICLES/20000824_180052.msg12526.tex]

Two Man Crew - DC-3

Thu, 24 Aug 2000 23:51:22

In a message dated 8/24/00 10:24:15 PM Central Daylight Time, spindel@mindspring.com writes:

I am trying to visualize how the single pilot would adjust the cowl flaps on the DC-3

It depends on where the valves were located and how long ones arms are.

While most were located behind and to the right of the copilot seat, many others were just forward of the copilots side window, below the windshield, and a few were to the right of center aft of the instrument panel and below the windshield.

I could reach the ones behind the copilot seat and I have short arms, but not all folks could.

I have seen a couple of airplanes where the valves had been relocated to a position just to the left of the copilots seat and slightly toward the forward side of the hydraulic panel. They were a little in the way of getting into the cockpit, but most of us were younger and more agile in those days anyway!

They were very rarely adjusted to any position other than open, close or trail anyway. No one that I ever flew with attempted to adjust them with the fine tuning that we used on the six and seven.

I always thought the toughest thing for single pilot operations was raising the gear. I had to lean over far enough when unlatching the spring latch such that I couldn't see over the glare shield. My procedure was to establish a pitch attitude which I would be happy with in case of an engine failure, then concentrate on holding that attitude on the artificial horizon during the one or two seconds my gaze was below the glareshield. Some guys with longer arms than mine could reach the latch and still see over the glareshield. There were a very few folks who would place the uplock latch in the spring lock position before starting the takeoff roll. United Air Lines did not approve of that procedure, but I have been told it was common on some carriers. It did allow the gear to be unlatched and retracted faster than the way we did it. The fellows that used that procedure would make a final check of "tail wheel locked, spring lock and trail, " just as they took the runway for takeoff.

It all brings back fond memories! Thanks for asking.

Happy Skies,

Old Bob

[ARTICLES/20000824_235122_msg12543.tex]

Two Man Crew - DC-3

Thu, 31 Aug 2000 11:09:13

In a message dated 8/31/00 8:49:37 AM Central Daylight Time, requa@attglobal.net writes:

Bob,

In reference to your "The DC-3 is an easy one man machine, but in both it and the Twin Beech, visibility in a right turn is a problem." Wouldn't you want to solo a DC-3 from the right seat? Access to the landing gear down latch would be simpler as it's located under the Captains seat, as I'm sure that you know. Also, the cow flaps were on the far right side, kind of hard to reach from the left seat.

Love this memory lane stuffg.

Cheers, Ralph

Good Morning Ralph,

My airline DC-3 experience was all as a copilot except during my initial ATP training and Captain checkout. When we bought our own DC-3, I was the designated check pilot and instructor so I flew the airplane quite bit from both seats.

As I mentioned before, I have seen a fairly large number of DC-3s where the cowl flap valves were located below the right windshield and a few where they were located closer to the center, beneath the right windshield and just aft of the instrument panel. I even saw a couple where they had been relocated to a position just ahead of the hydraulic panel and to the left of the copilots seat. They made access to the cockpit more difficult and I am sure that cowl flap position was one that was done by one individual operator to accommodate the single pilot operation. The positions on the right side forward of the copilot had the look of a long time and fairly permanent installation, so I don't know if they were factory installations or not. I saw enough of them to make me think they might have been.

In any case, all of the Mainliners (passenger airplanes) which we had at UAL had the original cowl flap position far to the right and aft of the copilots side window. I think some of our Cargoliners had them just forward of the copilots side window, but those were all military C-47s, not DC-3s.

I have relatively short arms, but a long trunk. I did not find it difficult to operate the cowl flaps located behind the copilots window, provided there was no one sitting in the copilots seat. If I had a passenger there, I would brief them on the operation of the cowl flaps.

To my best recollection, the spring latch for the landing gear is located just ahead and slightly to the right of the pilots seat right front seat attachment point. I have operated it from both seats and I recall it being a slightly longer stretch for me if I was in the

copilots seat. In both cases, my head would go below the glare shield when I reached for it. I knew some long armed folks who could still look outside while unlatching the lock, but I couldn't.

On the UAL airplanes, we had a flight instrument grouping only on the captains side and, as copilots, we flew by looking across the cockpit at his instruments. We became very good at handling parallax!

There were additional flight instruments added around the panel to meet FAA redundancy requirements, but they were not grouped together to provide any sort of an alternate instrument panel capability.

Due to insurance requirements, I never actually flew our part 91 DC-3 single pilot. However, the insurance only required that we have another commercial rated pilot on board. He/she did not have to be instrument rated or have any training in the aircraft.

I found it relatively easy to find someone who would be willing to get a ride in the DC-3 any time I needed to fly it for a maintenance or repositioning flight.

Since, as you know, the landing gear can get really screwed up if the levers are not sequenced properly, I never briefed a warm body copilot or a new transition student to handle the gear on the first takeoff.

If it was to be just a single flight, I flew the airplane one hundred per cent single pilot style with the exception of having the right seater handle the cowl flaps. If the person was to be trained in the airplane, I would brief landing gear operation before the flight, but would make the first retraction myself and also flew the airplane. Once we were in flight and stabilized at an appropriate altitude, I would do the landing gear training and allow the student to cycle the gear a few times until they were comfortable in the operation.

I never even considered flying the thing solo from the right seat, but I guess it would have worked all right. That is basically what I did anytime I was checking a new student out in the left seat who had never flown a DC-3 before. I always did my single pilot thing for the first takeoff and initiated the training after we were airborne.

I was a fun time!

Happy Skies,

Old Bob

[ARTICLES/20000831_110913_msg12875.tex]

WWII pilot's Total Time

Fri, 22 Jan 1999 17:28:06

In a message dated 1/22/99 3:46:30 PM Central Standard Time, diamondlil@diamondlil.seanet.com writes:

Has anybody noticed that practically all the ex military fields had crosswind runways? Cheers Carmine Pecoraro —Original Message—

Yes, and on top of that, most of the Navy primary fields of WW II had a double fan layout that allowed landings and takeoff to be performed dead into the wind the vast majority of the time. The last time I flew over Glenview Naval Air Station (Now closed completely) the layout of those double fans was still visible.

Remember also, that it was not unusual for those young men to be "shooting at and being shot at" to protect the rest of us with a little over two hundred hours of total flying time, sometimes even less. One of my instructors when I was working on my private ticket was a young man named F. A. Jones. He had never flown before he went into flight training. He was trained to be a P51 pilot, went to the South Pacific, took special training which allowed his P51 to be launched from a carrier for invasion purposes, supported the ground troops as they took a beach head and had no place to land if the Seabees didn't get a metal landing strip down on the beach for them before they ran out of fuel. After all of that he came home, went to a local flight school, obtained a civilian commercial and flight instructor rating and proceeded to teach we dummies as much as possible. He had been working at the place where I was flying at the time for several months when he rode with me for the purposes of a recommendation ride for my private pilots certificate.

As we were both filling out our logbooks after the flight, he commented that the flight had taken him over the three hundred and fifty hour mark!

Those gentlemen did a fantastic job of making the world a safer place for all of us, but they did it with very little training and experience. Every little help that could be given was appreciated by all.

Happy Skies,

Bob

[ARTICLES/19990122_172806.msg01009.tex]

Walking on Water

Sat, 5 Sep 1998 14:24:16

In a message dated 9/5/98 9:04:54 AM Central Daylight Time, grahamh@gte.net writes:

I just ran across an extremely thought provoking article. I am referring to the October '98 issue of Mountain Pilot magazine. There is an article in there about a bush pilot in Alaska that uses tire hydroplaning as a method to land, taxi and takeoff his wheel equipped airplane on water, such as a river.

Hi All,

This is one of those things that keeps being reinvented over the years. I remember reading about it in Popular Aviation in the early forties and then an iteration appeared in the fifties when some tests were done with Federal wheel/ski combinations. As I recall, they were able to get by using an early small engined Super Cub with about twenty-five or thirty feet of run on a beach. After they hit the water, the wheels were retracted and maneuvering on the water was a snap.

As I recall, the outfit that was doing it was All American Airways which was the predecessor of Alleghany which, of course, turned into USAir. There were some problems with water getting into the engine combustion air intake and it was relocated to a position above the engine cowl.

I do remember some of my friends who had instructed in the military making the statement that they used to take Stearmans down on various lakes and make touchdowns after which they would roar around the lake setting up a beautiful rooster tail and impressing all of the ladies about. The claim was that after touch down at around fifty or sixty mph, they would add full throttle and could then shove the stick forward as hard as they wanted and the wheels would go no deeper.

Sounds like fun but I never had the guts to try it!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980905.142416.msg05270.tex]

Water Injection

Wed, 2 May 2001 09:18:04

In a message dated 5/2/01 12:20:01 AM Central Daylight Time, flyinglo@msn.com writes:

Bob, when I was a kid I worked summers loading crop dust in Stearmans with 450hp engines. Maybe this is what the guy was using. Do you suppose it was injected into the intake manifold, similar to our fuel injection? With water weighing 8.3#/g, and alcohol 6.9#/g(sp=0.83); it must have been about a 50-50 mixture, to end up weighing 7.5#/g. Jerry Osborne, PRC, Az, J35, N8323D, IO-470-C.

Good Morning Jerry,

I probably didn't question the subject as deeply back in 1951 as I would today, or, if I did, senility has driven the knowledge from my mind. We were told that the reason for the alcohol was to avoid freezing. Supposedly, plain water would have done the job as far as preventing detonation. The question always came up during ground school, since there were always a few car folks in the group that had some experience using alcohol in their cars. I was, and still am, just a listener.

A lot of hot rodders liked to run straight alky, but that was used as the primary fuel. It took an awful lot of gallons to get the power. I guess the reduced potential for detonation allowed them to use higher compression ratios and the high fuel burn wasn't a problem!

On the version of the P&W R2800 we had on the DC-6, first the CA-15 and later, the CB-16, the fuel was injected into the blower section of the engine. One thing I do remember was that the setup was very similar to that used in the PS5C injection carburetor used on the Bonanza at the time. I have no memory of where the water was injected, but suppose it was in the blower section as well. John Deakin is currently operating some of these engines. Maybe he will let us all know!

On the version of the Turbo Compound Wright R3350 we had on the DC-7s, direct cylinder fuel injection was used and UAL never had any of the ones which used ADI. My wild guess would be that the water was injected into the blower section. I believe Jim Northcutt and/or Ralph Requa may have more current experience than do I with those engines.

I do have recent experience with the P&W R985 and have never heard of any water injection being used there, but who knows??

That's about all that I have from my ancient memories and I don't have any documentation from those days to check for accuracy.

Thanks for asking and jogging my memories.

Happy Skies,

Old Bob

[ARTICLES/20010502.091804.msg08706.tex]

Meyers 200

Sun, 29 Oct 2000 15:31:44

Paul McCracken wrote:

We actually are a Meyers "specialty" shop in light of the fact that our boss/owner is a Meyers 200D owner and works on 3 different other Meyers aircraft from the A model to a D. I can tell you, they are an impressive machine built very Beech-like with a comfy, spacious cabin very UNLIKE a Mooney and more like a Bo. The visibility is awesome, too, with all that glass surrounding you. I'd LOVE to have one in addition to my C35, after working on 'em and flying them (once). Stable and truck-like, so it doesn't handle like a Bo, but handles very pleasantly nevertheless. Very fast, too, with the IO-520 in the D model. IO-470 and the O-470 in the older ones, I think.

PMC N76BB

Good Afternoon Paul,

I was planning on staying out of this conversation.

The Rangemaster, Meyers and the stretch Debbies are all fine airplanes with pluses and minuses like everything else. It all Depends.

But, I can't help mentioning that I did have an opportunity to fly the Meyers Interceptor in the days of yore.

I flew it from Chicago's Midway Airport to Lafayette, Indiana and back. The airplane was being taken there for a demo and I was allowed left seat for the legs down and back.

As I recall, the engine was rated at something around 775 shaft horsepower but was derated for use in the Meyers. The derate was done by watching the torque meter and not exceeding the allowed torque. I was told by the demo pilot that the only problem with using the higher horsepower was one of being able to control the torque with the rudder. He said that as soon as we were above one hundred miles per hour indicated, we could go to full power as long as we observed the Tail Pipe Temperature and did not exceed the basic engine limitations. Needless to say, we gave it a shot!

We departed MDW with full tanks and three of us on board. The rate of climb using four hundred horsepower was around fifteen hundred feet per minute. About the time we went through five thousand, he suggested that we go to full power and the rate of climb went up to over 3500 feet per minute. The fuel flow went out of sight!

My recollection was that the airplane was comfortable enough for four, but that there wasn't much space for baggage. I also have some memory that we were rather short on fuel. He fueled it at LAF before the demo and again before we came back to MDW.

I also think that we were at, or a little over, gross for both takeoffs with three guys around 180 on board.

The airplane was equipped with a blow down turbine air-conditioning and bleed air pressurization unit, but neither was working at the time. I imagine that added quite a bit of dead weight.

It was an experience!

Happy Skies,

Old Bob

[ARTICLES/20001029_153144.msg15449.tex]

Wartime Training and Lindbergh

Fri, 9 Feb 2001 15:09:45

In a message dated 2/9/01 1:41:24 PM Central Standard Time, HWatson712@aol.com writes:

I think it was Lindbergh that used the low RPM technique to get extra range out of P-38s in the Pacific and that "wartime expediency" gained the range necessary to take the war to the Japanese.

Good Afternoon Hal,

Col. Lindbergh was one of the few who was around who knew how to operate an engine and he did what he could to teach the aviators with whom he had contact that there was more to operating an engine than what they had learned in their wartime expedited training program.

His actions and the necessity of such training as he provided are evidence of how great was the problem.

Unfortunately, Roosevelt had so poisoned the minds of the American public concerning Lindbergh's activities prior to the war, that his only method of helping his country was to gain assignment as a civilian pilot assigned to military units. He managed to provide a very important service to his country in spite of the difficulties FDR heaped upon him.

It's too bad that he wasn't allowed to teach that which he knew via the official training command.

Happy Skies

Old Bob

[ARTICLES/20010209.150945.msg03273.tex]

Chapter 7

MAINT

7.1 MAINT-ELECTRICAL

Alternator Discharge**Sat, 27 May 2000 19:42:58**

In a message dated 5/27/00 5:19:04 PM Central Daylight Time, LLAMASCOOP@aol.com writes:

With a full load, the [50 amp] alternator goes into the discharge mode. He is looking for a 70 amp or even a 60 amp alternator 12 volt to put with the IO 470 N to ease the electrical situation.

Good Evening Alan,

Just had another thought, if your friend is actually getting the full fifty amps and still feels he needs a little more, he might consider adding the B&C standby alternator. That is supposed to pick up the load anytime the primary alternator can't deliver enough poop! I don't think I would want to rely on that for normal operation, but for an occasional heavy load, it should work OK. If he is interested, he should check with Bill Bainbridge at B&C.

Happy Skies,

Old Bob

[ARTICLES/20000527.194258.msg08807.tex]

Alternator Discharging

Sat, 27 May 2000 18:31:09

In a message dated 5/27/00 5:19:04 PM Central Daylight Time, LLAMASCOOP@aol.com writes:

With a full load, the [50 amp] alternator goes into the discharge mode.

Good Evening Alan,

Any idea what he is calling a full load? Fifty amps should handle all continuous loads unless he has some awfully high draw equipment on board. Has he checked to see that it is putting out the full fifty amps? If there is a diode out, the amperage capacity will be down, but the unit will still put out normal voltage.

Happy Skies,

Old Bob

[ARTICLES/20000527_183109.msg08799.tex]

Battery Box Removal**Tue, 4 Jan 2000 10:42:53**

In a message dated 1/4/00 8:34:41 AM Central Standard Time, flyinglo@email.msn.com writes:

Old Bob, on a related subject, what is the trick to removing the battery box, for really good access?

Good Morning Jerry,

Do you mean to remove it and replace it with one mounted forward of the firewall or just to remove it for routine maintenance?

I rather like the factory installation if you don't need the space between the panel and the firewall for something else. It opens up the engine compartment and allows easier access to the cowl flap mechanism and such. I also like having the battery box being removable with just a few screws for easier access behind the instrument panel from the engine compartment.

Speaking of access to the front end, I always considered the addition of the kidney panel to be one of the biggest improvements on the A35 over the straight 35. Unfortunately, so many mechanics have considered it to be the easy place to hang additional equipment that many kidney panels are quite difficult to remove. What that means is that the area is not well inspected and the control mechanism is not properly lubricated. I wish that the modifiers would be a little more cognizant of the requirements of continued maintenance.

I try to remove the kidney panel and the "buried" battery box for every annual on airplanes so equipped. They are then the easiest ones to inspect adequately! We find many pieces of additional equipment hung on the battery box which discourages one from removing it at annual time. Pity!

Happy Skies,

Old Coot Bob

[ARTICLES/20000104.104253.msg00162.tex]

Battery Charging**Fri, 26 Jan 2001 23:07:50**

In a message dated 1/26/01 9:46:20 PM Central Standard Time, YAKpilot@aol.com writes:

I think 13.8 to 14.2 is the norm for 12 volt systems using alternators. At least in automotive applications it is. 13.6 might cause a slightly shorter battery life due to increased sulfation in a normal lead-acid battery.

I think gel batteries might like a different charging voltage.

Carter DuBois

Good Evening Carter,

Seems to me I remember reading that a fully charged lead acid cell using a 1.285 acid mix would have a potential of 2.1 volts. 6 cells should be 12.6 volts and 12 cells should be 25.2 if the preceding is true.

I would imagine that any charge well above that amount would tend to push out the water a little faster than would a charge just a little above that amount. I know that the cell can hold a potential above that amount for a few hours after a higher voltage charge, but won't it settle down to the theoretical voltage after a day or so?

I've always figured Beech recommends a charging voltage of 14 plus for the 12 volt system and 28 volts plus for the 24 due to losses in the wiring, etc., so as to assure that the potential will be at the max. The extra voltage probably does shove some extra water out and that is why they ask that we check the water level as often as they do.

Maybe the Zefronics folks figure the modern systems have less loss and a more stable output that allows a lower voltage, thus reducing the need to add water and yet still maintain the maximum potential output of the battery.

Any of your electrical gurus care to comment?

Happy Skies,

Old Bob

[ARTICLES/20010126_230750.msg01928.tex]

Battery Master - Old Style**Sun, 16 Apr 2000 17:15:01**

In a message dated 4/16/00 7:44:01 AM Central Daylight Time, Ron@Koyich.com writes:

Seems like I remember that the battery master circuit runs through the mag switch on some of the earlier birds.

Curious if so, Joe. Haven't come across that. Let us know what you find. If so, I don't know about it causing a "spike," but it could turn off all electrics.

Good Afternoon Ron and Joe,

I believe that style switch was used up through the P model, maybe even later. The switch has a battery position and if the airplane is still wired as it came from the factory, anytime you move the ignition switch, the battery wafer switch will break then make again. That will cause modern electronics to drop off the line and really screw things up. Most decent electronic shops have made an alteration that eliminates the battery function from the keyed switch. It is easy to do. I have written copiously about this in the past so I won't bore the folks by repeating the data, but I would make the alteration on any aircraft so equipped.

That is likely to be the problem that dropped Joe's autopilot off the line.

Happy Skies,

Old Bob

[ARTICLES/20000416.171501.msg06448.tex]

Battery Master - Old Style**Sun, 16 Apr 2000 19:44:58**

In a message dated 4/16/00 5:55:17 PM Central Daylight Time, Ron@Koyich.com writes:

Thanks, Old Bob - and welcome back - imagine you were away vacationing in the warmth somewhere!

As mentioned to Joe, I've never seen this before - and curiously don't remember reading about it here either - a senior moment at my age is a bit of a worry (to me). g

Cheers - Ron

Good Evening Ron,

Since I am now unemployed, I no longer have days off or vacations. I find it much more difficult to get anything done than when I was gainfully employed!

I did manage to circle high over Bill McCune's house up in the hills near Tehachapi, but since the winds were up near 50 knots from the east, I didn't get very low! After that we were down at Lakeland doing the Sun n' Fun thing. Tough life!

The ground wire actuates the battery solenoid and that wire runs from the solenoid to the master switch to the wafer on the keyed switch and then to ground. It is duck soup to just remove the wire that goes from the master switch to the wafer switch and run it directly to ground. That solves the intermittent power problem. The question is whether it is a minor or a major alteration and whether it requires a 337 or just a log book entry.

In any case, it is widely done and probably not always documented!

Happy Skies,

Old Bob

[ARTICLES/20000416_194458_msg06458.tex]

Battery Master - Old Style**Sat, 5 Aug 2000 09:42:15**

In a message dated 8/5/00 8:04:08 AM Central Daylight Time, mcognata@home.com writes:

Thing is, I would like to change the ignition switch to be OFF-L-R-BOTH, and also alleviate the problem where my electrical power cuts out to the radios when switching between mags. This is a major headache I'd like to get rid of.

Good Morning Matt,

Regardless of what you decide to do about the ignition switch, I would definitely run the wire from the "master" switch directly to ground and not through the "ignition" switch as it was originally wired. It is a very simple job. All that needs to be done is to look at the master switch and see which wire runs to the ignition switch. Take that one off and deactivate it suitably. Run a new wire of the same size to ground. That will eliminate all of the chatter of the electronic stuff when your mags are checked. I consider that to be a minor alteration which only requires a log book entry by a licensed mechanic or repair station. Many of my IA and FAA friends consider it to be a major alteration which requires the submission of a 337. In any case, I have never found anyone who does not consider the change to be a worthwhile improvement to the aircraft and it is nice to have a 337 on file that shows the change.

As to eliminating the rest of the garbage that Beech had on the monstrous wafer switch unit, that is somewhat dependent on the starter that is installed on your airplane. Some used a latching relay to avoid accidental rapid reengagement of the starter if your finger slipped off the starter button. You will have to research exactly what is currently installed on your airplane and many changes are likely to have been made that were not listed in the ships paperwork.

I would suggest you make contact with a good electrician and figure out what is required on your airplane.

There should be no problem with the FAA if you decide to install a more modern standalone ignition switch provided you document the manner in which you have eliminated all of the superfluous wafers.

It has been done many times with no paperwork being submitted!

I would suggest, however, that you just file a 337 and note that you are bringing the aircraft wiring up to the specifications of the newer aircraft built by Beech/Raytheon.

Happy Skies,

Old Bob

[ARTICLES/20000805_094215_msg11768.tex]

Battery Selection**Mon, 30 Jun 1997 19:30:47**

Hi Dave,

The concord battery to which you are refering is a recombinant battery. It is NOT a gel cell but it is a "no service" battery.

It sounds real interesting.

I have not used one personally but it was brought up for discussion at the January meeting of the World Beechcraft Society in Tucson.

There were a couple of people who hated them and several who had them that were very happy. My limited research tells me that they are in need of very careful charging and maintenance but if that is given, they have long life and good service.

Most of us don't take care of the batteries we have properly anyway so proper care of any battery would probably lengthen it's life considerably.

I am planning on trying one the next time I need a battery for my own airplane but that really isn't a recommendation, I would just like to see how it works!

Good luck with whatever.

Bob

[ARTICLES/19970630_193047.msg01253.tex]

Chasing Shorts

Tue, 9 Nov 1999 09:54:25

In a message dated 11/9/99 8:14:00 AM Central Standard Time, flyinglo@email.msn.com writes:

The 3-amp circuit breaker on my King DME pops when I turn on the key. If I assume this is the only device on this circuit, there's only three things that could cause it: 1, the DME; 2, the Circuit Breaker; & 3, the wire between the two. Am I right on this? I ruled out the DME, because it still does it when the DME is removed from the panel. I suppose it could be the CB, but other than connecting it up to a power supply and gradually increasing the amperage thru it, how do you check a CB? To check the wire, it's going to be a pain in the ***.

Good Morning Jerry,

Even if your CB is popping at a much lower current draw than it should, it wouldn't pop if there was no place for the power to go, so there must be some sort of a current draw downstream of the CB besides the DME.

I suppose there is an outside possibility of that current draw being internal to the CB, but that is highly unlikely.

Depending on which end of the wire is the easiest to get to, I would first disconnect it from the CB or the DME box with the DME removed. If you have disconnected the wire at the CB and there is no continuity to ground, the problem is in the CB. If you disconnect the input at the DME box, pull the CB (or leave it popped if can't be pulled) and check for continuity to ground. If the line is clear, the problem is in the DME sleeve attachment hardware. If you find that the wire itself is the culprit and you are certain there is nothing else on the circuit, the easiest thing to do would be to just disconnect it and run a new wire to the DME box. I would caution, though, that you still wouldn't know what was causing the problem and whatever point is grounding the DME wire might be causing difficulty with other wires in the same bundle. More trouble could be lurking to bite later. I rather think the highest probabilities are for some difficulty with the hardware of the DME sleeve.

Hope that helps!

Happy Skies,

Old Bob

[ARTICLES/19991109.095425.msg10358.tex]

Chasing Shorts**Tue, 9 Nov 1999 10:39:12**

In a message dated 11/9/99 8:14:00 AM Central Standard Time, flyinglo@email.msn.com writes:

The 3-amp circuit breaker on my King DME pops when I turn on the key.

Good Morning Once Again Jerry,

I meant to comment on this sentence, but hit the send key a little too soon! If your aircraft is still wired so that the key must be on to ground the master relay, I would suggest that it be changed.

That was done in 1945 to make the airplane more like a car. Every time you move the key switch, power is broken to the relay and it clicks on and off. With vacuum tube radios and heavy cathode heater circuits, it didn't cause many problems. As more modern electronics were installed, it has caused many problems with databases, user stored information and other rapid processing electronic equipment.

You can load a flight plan in your fancy flight management navigation computer and when you check the mags, all will be lost!

The ground from the master relay goes from the relay to the master switch, then to a wafer on the ignition switch and on to a ground.

To fix it, disconnect the wire at the master switch which goes to the wafer switch. Run a wire from the master switch direct to ground and the problem is solved!

That is the way all of the Modern Bonanzas are wired.

As to the legalities of doing this modification, I consider it to be a minor modification and feel that all that is required is a log book entry by an "A" licensed mechanic or other entity authorized to perform minor alterations. Many IAs and FEDs disagree and feel that a 337 should be prepared and submitted. In either case, I have never found anyone who did not feel that the change was desirable!

Happy Skies,

Old Bob

[ARTICLES/19991109_103912.msg10363.tex]

Circuit Breakers**Sun, 12 Jul 1998 10:17:54**

Good Morning John,

If you are replacing original Beech CBs, I would stick with the Potter&Bromfield units, but if you are adding more new ones, I would use the mini units made by Klix-On. They are about half the size and much easier to install.

I used twenty or so in my last panel rebuild and they have worked very well.

As I recall, they were somewhat cheaper than the P&Bs but I don't have a price list handy.

Happy Skies,

Bob

[ARTICLES/19980712.101754.msg03620.tex]

Electroluminescent Panel Repair?

Mon, 10 Jul 2000 13:45:31

In a message dated 7/10/00 9:55:26 AM Central Daylight Time, doug@rds.com writes:

Anyone had experience repairing/replacing these things?

Good Morning Doug,

Eight or ten years ago, Beech was repairing those at the factory. I don't know if that service is available from Raytheon or who you would call to find out.

If you take the thing out and look it over carefully, you may be able to see the damaged area and clear the short yourself.

Happy Skies,

Old Bob

[ARTICLES/20000710_134531_msg10753.tex]

7.2 MAINT-ENGINE

Break-in**Fri, 17 Oct 1997 11:51:46**

Hi Gerry and all,

In a message dated 97-10-17 10:53:23 EDT, you write:

1997 wisdom seems to be that you run for five hours, or whatever the warranty specifies, then change oil, and filter, and go to AD oil. If the warranty doesn't say anything against it, many suggest AD oil from minute one.

This stuff, like ground run ins and additives is all full of a lot of old wives tails, It probably doesn't make a whole lot of difference what we aviators do but we all want the best possible for our engines.

Many years ago I got a fair amount of my flying time free by going up and "slow timing" newly overhauled engines.

The last two engines that I personally had overhauled were done by Blueprint Engines in Chicago. They did not run either engine before we installed it in the airframe. It was specified that I was to run the engine for a maximum of five minutes to check for leaks and proper setting for pressures etc.

The engine was then allowed to cool for the rest of the day and was test hopped the next morning so as to have the benefit of the cool morning air. (It was summer time with both engines.)

The oil specified was Aeroshell 15W/50 with Lenkite additive added. The first flight was a twenty minute flight at about 80 percent power. After landing the engine was checked visually and any discrepancies adjusted. The first oil change was at five hours, next at twenty and then into normal oil change intervals. The first 50 hours were at 75 % power or better. I stayed below six thousand feet to keep the manifold pressure high for proper ring seating. (Tough to do for Denverites!)

The first of these two engines was a 150 Lycoming in a Piper Pacer that one of my sons and I own together, the other was an IO520BA in my V35B Bonanza.

Both engines have done quite well. The Pacer was done about twelve years ago and only flies 50 or 60 hours per year. Compressions are great and oil consumption is nil.

The 520 was overhauled in 1990 and replaced in 1996 by a reman IO550B. The 520 had 950 hours SMOH on it when I swapped engines and was running great using about a quart every 15 hours or so. Oil analysis was good. (I replaced the engine due to old age. MINE!! I was afraid I wouldn't live long enough to fly out the time on the 520 and I wanted to try the 550. Just spending my kids inheritance!)

Certainly the experience of two engines is not significant in the over all scheme of things but it was interesting to me to note the difference in philosophy that had come about

in the intervening fifty or so years. Oil formulations and ring and barrel materials are much improved since those earlier days which make direct comparisons difficult but I do feel many "experts" are still hanging on to ancient procedures just because it has always done that way.

My engines were not run on a test cell but if a really high tech one was available I think that is still best. If a tin cover is going to be erected over the engine to scoop air into the cylinders or if it is going to be run on any old fashioned portable or fixed runup stand with a test club and without proper pressurized air flow through the cylinders I would opt for early flight.

Well that's about it for this old mans musings!

What say all of you?

Bob

[ARTICLES/19971017.115146.msg02117.tex]

Case Cracks**Sun, 1 Nov 1998 09:19:38**

Good Morning All,

Just a couple more comments on the cracked case situation.

The last one that I am personally aware of was on a friends 1976 airplane which he purchased new. This is the story to the best of my recollection.

A crack was discovered by the owner after some 250 hours of operation. Continental provided an engine and paid for shipping and installation. In another three hundred hours, (approx.) he discovered another one. The engine was changed once again and that engine now has around 1650 hours with no problems at all.

Both of the cracks were ones which could have been left in service by stop drilling and filling the hole and crack with epoxy but the owner didn't want to do that and Continental went along with the engine swap. They did ask for owner participation on the price of the third one to the extent of a proration based on the hours flown on the second engine. Needless to say, my friend was very pleased with Continental's attitude.

The 520 case and the 550 case have always been the same casting, The major differences concern the way they are machined, More metal has to be taken out of the 550 case to allow for the larger swing of the stroked shaft and therefore the 550 will always be the lighter of the two.

Over the years, the case has been beefed up several times. I do believe the last time was only four or five years ago, so any 520 or 550 that has been the recipient of a new case in that time has as heavy a case as is available. The factory and several of the overhaulers have even been adding the seventh stud to the 520s ever since the last case beef up. (Or thereabouts, the stud can be added to the earlier case as well.)

Is that enough rambling for this morning?

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981101.091938.msg06548.tex]

Compression Test**Wed, 10 Mar 1999 13:01:56**

In a message dated 3/10/99 9:24:34 AM Central Standard Time, tturner@vol.com writes:

Bob:

Fair enough.

Good Morning Tom,

First I must apologize to the group. I meant to send the comment to Tom concerning compression ratios and "compression" tests directly to him and not to the group.

His discussion of the pros and cons of turbo flight operation were excellent and inclusive.

Please accept my apology for my lack of computer efficiency and proficiency.

I will attempt to answer the questions raised.

Question: if you pump 80 psi into a "high compression" cylinder, and 80 psi into a "low compression" cylinder, should they have similar "output" compression values?

If the cylinders are the same size, the valves are the same and they are both in the same condition, the leakage will be identical.

What you are measuring is the amount of air that goes past the rings, valves, leaky sparkplugs or other cracks and holes that are in the cylinder assembly.

Am I completely missing the boat about what a "low compression" cylinder means?

I don't think so. Low compression just means that there is a bigger space in the head area for the contents of the cylinder to be squished into when the piston is at top dead center. Less head volume, higher compression, more head volume, lower compression.

Or should low compression cylinders be tested at a lower "input" air pressure to begin with?

No, that is not necessary but it should be noted that different engines will have different standard or acceptable "compression" test results. The air loss or pressure drop across the orifice is affected by the diameter of the bore, the fit of the piston, rings, valves and any leaks that might be around the spark plugs or cracks and other failures in the assembly.

As an example, the orifice size recommended for checking a P&W 1340 is larger than the one we use for our normal GA sized engines,

The Comparative Compression Tester consists of two air pressure gauges mounted to a

manifold with a calibrated orifice between the gauges. If my memory serves me correctly, it is bored to around .060 inches for our little engines.

The reading of 75 over 80, or whatever the number, is a measurement of the air pressure applied just before the orifice and the air pressure as it comes out of the orifice. If 80 pounds is applied to the input side and the outflow after the orifice is completely blocked, the output gauge would also read 80 pounds. If there is any leakage in the system to which the downstream side of the orifice is connected, the pressure will drop by an amount that is in a ratio dependent on the total amount of air that is lost through whatever device is being tested. In our case we are generally testing a cylinder assembly.

I know the output numbers in the 58TC are "low", but then again, those engines are old and now sitting on the floor in Fairhope.

IF they use the same rings, valves and fits of the comparable normally aspirated engine, the comparative compression's would be the same, therefore your low compression's are likely a result of them being just plain worn out!

Please help me better understand this. As I've tried to make clear many, many times, I'm not a mechanic, but I try to pass along the best possible information I can find from those like you who are. Thanks for helping Gene, and educating me, by responding.

Tom, you do a great job for the industry, I just wish I had sent that message to you directly instead of broadcasting it to the world!

Happy Skies to ALL,

Old Bob

[ARTICLES/19990310_130156_msg02724.tex]

Condensation**Thu, 15 Jul 1999 12:19:35**

In a message dated 7/15/99 10:32:55 AM Central Daylight Time, rcb@appsig.com writes:

Now that my IO 520 BB has been overhauled, it collects condensation around the oil filler cap. The filler tube has been replaced with a different type to accommodate the extra cylinder stud fitted with the new cylinders. The engine did not collect this condensation prior the full overhaul. Any clues please? Bill Finlen

Good Morning Bill,

I think the primary problem is a low in-flight oil temperature.

It's a tough deal, the vernatherms don't seem to be able to hold the temps as consistently warm as one would expect. I wonder why the thermostats in cars, that only cost a couple of bucks, are capable of doing so much better job than the vernatherms at a couple of hundred?

Happy Skies,

Old Bob

[ARTICLES/19990715_121935_msg06040.tex]

Engine Vibration**Mon, 5 Jan 1998 12:34:09**

Good Morning Kyle,

In a message dated 98-01-05 11:49:27 EST, you write:

The vibration is not bad at 2450 RPM but as you slow the RPM the vibration increases. It is also noticable during high power climbs after takeoff and on missed approaches.

Any suggestions?

One thing that is occasionally missed when looking for vibration is the possibility of the engine being "tied" to the airframe by throttle cables, hoses etc. Some mechanics in their zeal to clean up the engine compartment will bundle and tie wrap so many things together that it actually stiffens the engine connection to the airframe and transmits vibration to the airframe that should be dampened or absorbed by the mounts. Be sure that everything connected to the engine is done so in a manner that will allow the engine to move freely. They really do jump around!

Happy Skies,

Bob Siegfried

[ARTICLES/19980105_123409.msg00093.tex]

Field Overhaul**Sun, 7 Nov 1999 10:35:14**

In a message dated 11/7/99 9:19:49 AM Central Standard Time, Sweld11111@aol.com writes:

I have a "field overhaul" in my K-35 and that I would put up against any factory reman. In the end it all depends on the person doing the work, their standards and integrity. Skip Weld

Good Morning Skip,

Absolutely true!!

Unfortunately, not all of the field overhaulers do all of the requisite measuring and checking before assembly. It is too easy to assume that whoever you sent the components to for machine work did everything correctly. The care taken in fitting the rings, checking valve seating and all the other fits and measurements is what makes an overhaul a good one.

It is not at all certain that those assemblers at the factory will use the care required to fine tune the assembly or that they will do the quality control inspections that are the last defense against a substandard part being used.

As you stated: "In the end it all depends on the person doing the work, their standards and integrity. "

Happy Skies,

Old Bob

[ARTICLES/19991107.103514.msg10272.tex]

Fine Wire Plugs**Tue, 11 Aug 1998 11:33:17**

Good Morning Ray Lockhart,

Thanks for the RAM information.

In a message dated 98-08-11 11:11:17 EDT, you write:

That aside, I am unhappy that I let my FBO talk me out of fine wire plugs for the new engine.

I started using platinum fine wire plugs in my E185 engines back in the middle 50s. The common old wives tale was that they would fire a very lean mixture more comfortably and as I was operating considerably on the lean side of best power in those engines, I was very interested. I was able to buy used ones rather economically and would run them another couple of hundred hours before the electrodes got so thin that I wanted to replace them.

I don't know if it really helped or not, but I did find them easy to clean and long lasting. Whether it is financially viable or not, I don't know. I am still using the current crop of fine wire plugs in my IO550. I clean them carefully as per the latest Champion instructions, rotate them as suggested and now have over five hundred hours on one set and about four hundred on another. They are showing very little wear and I expect they will last a long time. I have run well over a thousand hours on other sets over the years.

I keep one set cleaned and ready to go. Then when I swap, I don't have to spend time doing the reconditioning, that is done at my leisure before the next inspection.

It works for me!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980811_113317_msg04201.tex]

High CHT

Fri, 25 Aug 2000 09:45:14

In a message dated 8/25/00 12:24:12 AM Central Daylight Time, HemOncMD@aol.com writes:

For one I am not very familiar with the unit, however, on climb cylinder 2 showed temp which were above the alarm limits, at about 490. At cruise, with full mixture, this cylinder continued to show temp at 400 plus. The other cylinders in cruise were about 320 to 360 F.

Good Morning Rajesh,

I am looking forward to George's answer, but in the meantime:

I assume you have the stock Beech baffling? With that setup, the number two cylinder is generally the hottest. In fact it is often atrociously so. Since the rest of your cylinders are at reasonable temperatures, the possible culprit is likely to be baffling, the probe or a mixture problem, in that order.

While the better answer to the baffling problem is to modify the baffling, there are some things that will help even with the stock junk.

The first thing is to make sure that the baffling you do have is fitting properly and that there are no little holes or gaps which are allowing any of that precious air to escape without being warmed as much as possible!

Some folks have had good luck lowering number two cylinder temperatures by rotating the left magneto gear a tooth or two so that the mag is almost touching the cowl door when it is at the proper firing index. That opens up the area and allows in more air to number two. I haven't tried it myself though.

Another avenue is to relocate the wiring harness up higher off the engine. Some folks feel the wires are blocking the airflow. Raising them allows a more direct path for the air to get to the back of the engine.

There is always the possibility of a faulty probe. I would try just switching the probes between number four and number two cylinders. Don't rewire them, just put the number four probe, still hooked up to the number four position of the gauge, into the number two well and vice versa.

If the temp follows the probe, it is faulty. If the number four indication becomes the hot one, the cylinder is running warm!

To check the Gamijector for proper flow, switch the number one and number two injectors.

If the high temp sticks with number two, go to work on the baffling. While I am certain George's new baffle system will be the greatest ever, I think the best presently available on the market is the one supplied by BDS. Don't let anyone talk you into putting those

extra louvers in the side skin or the new style louvers on the side cowl plates. They just aren't necessary if the baffling is properly installed and sealed.

Good luck!

Happy Skies,

Old Bob

[ARTICLES/20000825_094514_msg12553.tex]

Idle Speed**Thu, 24 Feb 2000 09:17:06**

In a message dated 2/24/00 6:07:47 AM Central Standard Time, skolacz@nh.ultranet.com writes:

Could someone please tell me what is an appropriate "idle" speed for the IO520-BA? 1970 V35B

Good Morning Steve,

From the P/N36-590001-9A19 Bonanza Maintenance Manual dated March 29, 1996, Chapter 71-00-00, Page 7, " The engine tachometer should indicate 625-650 rpm (normal idle setting)."

Personally, I tend to set them on the low side or a little lower but recommend that they normally be operated a little faster. Why, well I prefer to have the engine idle as slow as practical if I am trying to get stopped on a slippery surface, but I think it is advisable to operate it a little faster, around a thousand RPM or so, for best lubrication. If it tends to die about the time you turn off the runway, either the idle is too slow or the idle mixture is a little off! If it doesn't tend to die or lope, it is probably OK.

My friends who have the same basic engine on their seaplanes get them to idle down in the 350 to 400 range with judicious tweaking and careful operation!

Did somebody say, it depends?

Happy Skies,

Old Bob

[ARTICLES/20000224_091706_msg03494.tex]

Iridium Plugs**Fri, 4 Aug 2000 14:03:13**

In a message dated 8/4/00 9:39:42 AM Central Daylight Time, inyomono@telis.org writes:

It is coming up time to replace the sparkplugs on my IO-520. Does anyone have any opinions on whether Iridium plugs are worth the money??

Peter Tracy Bishop, California A36 N54DG

Good Afternoon Peter,

This is not a recommendation either way, but I do use Iridium plugs in my own airplane.

I have two sets which I alternate each time I clean the plugs. One set is always cleaned, reconditioned, rotated and ready to go.

My 'A set' currently has 809.4 hours on them and the 'B set', which is currently installed, has a little over 850 hours.

Both sets are showing very little wear. The fine wires are a little easier to clean and I have been told they will fire a lean mixture more easily. That may be an Old Wives Tale, but I heard it about fifty years ago and have used fine wire plugs in my personal airplanes ever since.

I found one broken insulator a few years ago and I had one plug fail last January. Over all, I am happy with the results.

Happy Skies,

Old Bob

[ARTICLES/20000804_140313_msg11733.tex]

Oil Leak**Tue, 8 Feb 2000 09:19:03**

In a message dated 2/7/00 11:33:29 PM Central Standard Time, bfaught1@elp.rr.com writes:

Has anyone had similar problem, or have any ideas on how to locate this leak? It is currently minor, but the engine has run very clean for the 600 hrs since factory overhaul. It is the IO-520BB engine and uses very little oil; maybe 1 qt per 20 hrs. Thanks Bill S-35 N8985M

Good Morning Bill,

Occasionally, a minor oil leak around the front crankshaft oil seal will be hard to spot. That can be a bad seal or too much pressure in the crankcase.

Have you checked the gasket in the oil dip stick cap? If it is not sealing tightly, the higher pressure in the plenum above the engine may increase the crankcase pressure enough to cause a minor front oil seal leak.

Another potential problem that will increase crankcase pressure is a restricted breather line. Even repositioning the pipe as it leaves the cowling can make a difference.

If everything else is OK, try replacing the front oil seal. It isn't all that bad a job. I would check to be sure that your mechanic has experience in replacing them though. There is a fair amount of technique involved. Not a difficult job, but it is easy to damage the seal.

Happy Skies,

Old Bob

[ARTICLES/20000208_091903_msg02572.tex]

Oil Temperature

Sun, 18 Jan 1998 11:02:06

Good Morning Alex Weeks,

In a message dated 98-01-18 10:19:42 EST, you write:

I'm perplexed and feeling a sense of urgency to get this [low oil temperature] resolved. I suspect that I am causing engine damage as we speak.

I would go easy on the methods you have used to try and get the oil temperature up. The oil cooling system is just that, an OIL COOLING system. Trying to develop more heat in the engine for the purpose of raising the oil temp is not a good idea.

The answer is to cool the oil less.

You didn't mention what airplane and engine you have. On the early airplanes there was a tube running from the engine baffles to the oil radiator in which a damper could be installed and the oil temperature was relatively easy to control. Unfortunately that took pilot attention which was not always there. The newer machines use a "Veratherm" valve to control the flow of oil through the oil radiator and regulate the temperature. They don't seem to work very well. I have replaced them and found some improvement but most engines still seem to run too cold. I will occasionally cover a portion of the radiator to help warm things up.

Be careful to make sure that the temperature gauge you are relying on is accurate. The factory units are notoriously inaccurate. The temperature probe can be put in a container of water and heated up to check the accuracy.

I am sure there are better methods, but I usually steal two or three candy and baking thermometers from my wifes kitchen. With them in the same container I heat the water slowly and take readings from all of the thermometers and the aircraft gauge as the water warms up. When the water boils you can get a fair idea of the relative accuracy of the thermometers you are using.

I don't think it is legal, but I generally end up covering a portion of my oil radiator in the winter to raise the oil temperature. I would much prefer an adjustable air flow limiting device such as were found on the very early airplanes but I don't know of any that are approved. Perhaps we will get some other ideas from the group.

Your method of checking for the white residue is valid. I try to look at the oil cap after every flight and if the stuff is on the cap, I'd take action to reduce the engine oil cooling. Be careful though, that you don't get the oil too hot. I would love to put a controllable shutter or other airflow limiting device on my personal airplane. The disadvantage is that it would be another control that might be forgotten when one is busy.

When you consider how easy it is to control the water temperature in our automobiles it is amazing to me that we don't have the capability of controlling the oil temperature better. The Veratherm units cost one hundred times as much as the automobile

thermostats and don't seem to work anywhere near as well. I am undoubtedly missing something here and would love to learn what it is.

Happy Skies,

Bob Siegfried

[ARTICLES/19980118.110206.msg00355.tex]

Oil Type**Wed, 9 Feb 2000 11:06:15**

In a message dated 2/9/00 9:11:00 AM Central Standard Time, wes@mailzone.com writes:

The bottom line: You can use single weight, multi-vis, petroleum based or synthetic, it really makes little difference. What is important is to have enough of it and to change it on a regular basis. Many people believe that the synthetic and semi-synthetic last longer, pick up fewer impurities and are not as susceptible to changes in pH values. As a consequence, they tend to go longer between oil changes and that is deadly on an engine.

Good Morning Wes,

I am certainly no expert on oil or lubrication, but my current thinking parallels the thoughts expressed by you in the message from which I have excerpted a paragraph.

I would like to add an anecdotal comment that likely has absolutely no bearing on the subject at all!

Many years ago in land far, far away I was gainfully employed as a pilot for the United Air Lines. We were operating a bunch of airplanes with those big round P & W and Wright engines. The ones I flew ranged from the R-1830 up to the Turbo Compound R-3350.

The interesting thing is that United Air Lines did not change the oil unless they found metal in the sump, changed a cylinder due to a hole in a piston or otherwise had an indication that foreign substances might have found a way into the crankcase!

I guess it could be said that there was a constant oil change as we added a LOT of oil almost every time the aircraft were fueled, especially on the R-3350.

(When the DC-7 first came out, we started flying them nonstop all of the way across the USA. It wasn't unusual to feather an engine because of low oil quantity before we made it to the west coast, an eight and a half hour trip. As I recall, the oil tanks held some 46 gallons of oil per engine!)

The thing we had going for us was that the airplanes flew regularly. They averaged eight to ten hours a day for the long haul ones.

When I started with UAL in 1951, the R-2800s were being overhauled each 600 hours. There was a procedure (probably still is) whereby time extensions were granted on the TBO by monitoring engine wear. A few engines were allowed to go an extra hundred hours or so, torn down and evaluated. If all was well, we were granted dispensation from the Pope, oops, I mean the CAA, (now the FAA) to raise the TBO another hundred hours. By the time the fleet was retired, we had the R-2800 engines up to something close to 4000 hours TBO and the R-3350s close to 3500.

The procedure to never change oil always bothered me based on what I had observed at a flight school where I instructed before I went to flying the big iron. We were operating a fleet of twenty brand new Piper PA-11 aircraft for primary instruction.

The usual argument as to how often oil should be changed was waged vigorously and often. (Nothing changes, does it?)

My boss decided to run an experiment. Most of the fleet was put on the usual every one hundred hour oil change schedule. Two of the airplanes were placed on a regime of oil changes each twenty-five hours. The thought was to see which engines had the least wear at the mandatory six hundred hour TBO.

The amount of oil added to each airplane, including the oil changes, was meticulously recorded.

The experiment never went to TBO as it became obvious after a couple of hundred hours that the airplanes whose oil was being changed every twenty-five hours used less oil, including the oil changes, than did those which were changed each hundred hours. All of the aircraft were switched to the twenty-five hour oil change program.

I tried to get UAL to give the idea a try, but never got anywhere at all. I still think they would have used less oil and gotten even better engine life by changing oil, but I certainly can't prove it!

Primarily due to observing the success of the PA-11 experiment, I have been a proponent of changing the oil when it gets dirty. That generally seems to be around twenty-five to thirty hours.

I have read all of the data proving that oil never wears out. I am sure that is true. The additives are another story and the dirt won't go away by itself!

It does seem a shame to throw all that good stuff away with the bad. I wonder what happened to all of the re-refiners?

Happy Skies,

Old Bob

[ARTICLES/20000209_110615.msg02655.tex]

Static RPM

Wed, 22 Nov 2000 10:04:44

In a message dated 11/22/00 7:17:28 AM Central Standard Time, flyinglo@email.msn.com writes:

I just don't understand why the static rpm is so important, after all, the environment that it's going to be operating in, is moving thru the air, similar to take-off; where I would think my 2650 would be even better than the 2600 called for.

Good Morning Jerry,

I am going to tackle this one first! I may not find the time to get to the rest during the Holidays.

If you will recall, I commented that the static RPM may tell you if the power output of your engine has changed.

Let's first assume that you are flying an airplane equipped with a fixed pitch propellor, possibly a Piper J-3 Cub. You are parked at some spot, say sea level, and the atmospheric conditions are at the level considered as the standard day. If you run the engine at full throttle, the tachometer will read some certain RPM. If you come back another day, and the conditions are the same, when you make the same static check, the RPM will be the same as the other time, provided that the power output is the same. Should something go wrong with the engine, when you try the full power static check, the RPM will be less. The engine can't turn that propellor as fast because it is developing less power.

If you take off the propellor you used the first time and replace it with one that has a flatter pitch, the RPM will be higher, maybe even as high as it had been with the original propellor, but the power output will still be less because the torque is not as high. The engine is not doing as much work even though the RPM is the same.

If you take the propellor off and replace it with a flywheel, you could turn it up to a point where the internal friction of the engine either equaled the power being developed internally or the thing exploded, but the engine would be providing no work at all and would therefore effectively be producing no "power."

The propellers on all Bonanzas that I have ever seen have been controllable propellers. Most have had some sort of a governing device so that they became a "Constant Speed Unit."

Every controllable propellers that I am aware of comes equipped with some sort of maximum and minimum pitch stops. Any time the engine, airframe and propellor is being operated in a condition where the propellor blades are against the blade pitch stops, the propellor is effectively a fixed pitch prop, just like the one on the Piper J-3 Cub.

If the flat pitch stops are adjusted to a pitch whereby full throttle at static will not bring

the engine up to redline RPM, the resulting static RPM will give a good indication of the power output of the engine, just like on the J-3.

If you move the stops back to a point where the engine could reach redline RPM, the governor should come into play and control the pitch so that the engine remains at the redline. If the flat pitch stops were removed entirely, the propellor could move to such a flat pitch that it would be no more effective in providing thrust than would a flywheel. The engine could be at redline RPM and be producing no thrust at all.

Your engine is turning 2650 during a condition where the load on the propellor is considerably less than it is with that "fixed pitch" prop during the static runup.

You are correct when you say that your engine is producing more horsepower at 2650 than it would be at 2600, but it is still way below what it should be producing. It is only turning that high because the load is low.

RPM alone does not provide the power, the engine must also be supplying torque, yours is not supplying enough torque.

Most modern engine, propellor and governor combinations are capable of reaching full redline RPM in the static condition. Consequently, making a static power check is not as good a power check as it once was, but the relativity of the check is still valid. If the static check RPM is lower under your normal runup conditions, something has changed and it should be investigated.

It appears that it is normal for the J-35 with a stock engine and prop to be below the governing range during a static runup. That would mean that the static RPM check would be an excellent method of determining the relative power output of that engine, propellor and governor combination.

On most of the Big Round Engines that are equipped with superchargers, we would note the manifold pressure before engine start. At Denver it might be 24.5 inches. We would then make a power check during the run up by setting the manifold pressure at the same setting noted before engine start. The RPM was then checked to see if it was within the limits specified. If it was within those limits, we knew the power was close to what it should be. At that relatively low power, the propellor blades were still against the flat pitch stops and the propellor was effectively a fixed pitch prop, just like on that old J-3. When we opened the throttle up to full takeoff manifold pressure, the engine would develop enough power so that the governor had to tell the prop blades to take a bigger bite to keep the RPM below redline. Since we had been able to make a power check while the propellor was still in its fixed pitch position, we could be reasonably confident that the constant speed provision of the governor was not masking a power loss condition.

When you are in the air and the rpm is showing 2650, the only indication you have as to how much power is being developed is the performance you are getting from the aircraft. If it is less than it should be, the power is not there regardless of the RPM.

Incidentally, on the Douglas DC-4, we had very minimal engine instrumentation. We

could have an engine fail and, in some cases, the only way we could tell which one had failed might be to watch the cylinder head temperatures to see which ones decreased. Since the governor was happily changing the pitch of the prop to maintain the RPM and the supercharger was busily pumping air into the intake system, the manifold pressure and the RPM were still the same as when the engine was running! The missing ingredient was torque and on those old R-2000s, we had no torque meter.

Any help?

Happy Skies,

Old Bob

[ARTICLES/20001122_100444_msg16557.tex]

Teardown - Prop Strike**Sat, 11 Mar 2000 16:50:31**

In a message dated 3/11/00 3:33:15 PM Central Standard Time, epoole@scoot.netis.com writes:

Bob, in a case like that, once your mains are on the pavement and you're holding the nose off as long as you can, wouldn't it make sense to go ahead and pull the mixture and try to stop the prop before the nose drops down?

Good Afternoon Eric,

Our local overhaul shop (G & N at Griffith Indiana) says that he has never had crankshaft fail the teardown inspection that was idling at the time of the prop strike, where he has had shafts fail that had stopped rotating. He hasn't formulated a firm opinion as to why that is so, but feels it must have something to do with the motion causing a dynamic that makes the pressure applied to bending less extreme.

Who knows?

Happy Skies,

Old Bob

[ARTICLES/20000311_165031_msg04596.tex]

Turning Prop Backwards**Sun, 5 Dec 1999 10:34:33**

In a message dated 12/5/99 8:04:46 AM Central Standard Time, flyinglo@email.msn.com writes:

(Sorry, Old Bob. Besides, I thot turning your prop backwards ran the risk of breaking either the vanes in your vacuum pump, or something in your mags).

Good Morning Jerry,

I hadn't thought about the Brand "C" oil filter adapter. All of the airplanes that I have maintained have had the stock factory set up or Lew Gage's unit. They all seem plenty strong enough to accept the small pressure required to punch a hole in the filter. I use a standard punch awl, which could probably be punched through by hand, but I generally use a light tap from a small ball peen hammer. The pressure required is about the same as would be used for centerpunching light metal before drilling. I punch the hole at the top alongside the tangs used for safetying the filter.

As to problems of turning the prop backwards, I realize that is rather controversial. I can only offer anecdotal information based on my experience.

I started working on airplane engines in 1946 as an apprentice mechanic. I went through Aviation Mechanic training in the military shortly thereafter and have been actively working on flying machines ever since.

Each and every time that I have either assisted another mechanic or timed a magneto to an engine by myself, it has been standard procedure to rotate the propellor forward and backward during the process to locate top dead center, "drop off" the impulse pawls, if installed, and eliminate slack in the gears.

I am not aware of any condition where turning a magneto backwards will cause a problem, but then, I am not familiar with all magnetos either!

There was an AD many years ago cautioning against turning the E engine backwards due to the possibility of an oil check valve hanging up that would blow an oil line. That worried us at the time, but it was pretty well determined that the gentle slow backward rotation of the propellor during routine maintenance was not the problem. It was when the engine misfired and spun rapidly backwards during the start procedure that the line would blow off. As I recall, removing the offending valve eliminated the problem.

As to the failure of the dry vacuum or pressure pump vanes being caused by backward rotation, that is only a consideration on some of the pumps. Others can be rotated in either direction. The ones which are canted will not break unless they are very well worn and close to failure anyhow. Once again, the problem generally occurs following a misfire or other event wherein the prop is spun backwards rapidly.

Personally, I change the pump about every 800 hours. I installed one of the clear filters

and if starts to show a rapid increase in carbon dust accumulated, I will change it early. The only pump failure I have had on this airplane was on the pump which was on the airplane when I bought it. I don't know what the history was on that pump.

My Cessna friends have been discussing a problem with some of the starters on the late model six cylinder Continental engines. It appears that when the engine is rotated backwards, there is the possibility of the spring which grips the starter drive shaft hanging up and causing scoring and eventual failure of the starter drive unit. I have never had one of those assemblies apart and can't speak to the problem from personal experience, but I did ask one of the Continental reps about the situation at Sun 'n Fun last spring. I was told that it could be a problem, but once again, that it generally only occurred during a misfire or other rapid backwards rotation. I was told that if I was turning the prop backwards, I should note the force required and if it seemed to hang up, the starter drive was likely to be the problem.

I change my oil when it gets dirty or at around thirty to thirty-five hours, whichever happens first. That means that I change my oil about eight to ten times a year and I do take every move I can to keep it as easy and clean as possible! That includes the GENTLE backwards rotation to pump the residual oil out of the filter base as I described in the earlier post.

An oil sample is submitted and the filter is changed each time. I don't open the filter every time, but I do save the filter. If the oil sample were to show a problem, I would open and inspect the filter. I do open and inspect it at each one hundred hour inspection, but I don't do those every one hundred hours!

As always, each of us must determine what works best for us!

I have been doing it this way for over fifty-three years. If I find something that works better or come upon a problem that I have not recognized, I will be glad to change.

Happy Skies,

Old Bob

PS Have you tried to straighten your door yet?

[ARTICLES/19991205_103433_msg11628.tex]

7.3 MAINT-ESERIES

AD 98-13-02 - Slippage Mark**Wed, 1 Jul 1998 18:21:14**

Good Evening Scott Derrick,

In a message dated 98-07-01 17:37:21 EDT, you write:

It also requires a "white slippage mark"??? The text from the AD reads as follows:

- marking a white slippage mark on the outside surface of the airspeed indicator between the glass and case;

What does this mean in plain english?? What airspeeds are the lower and upper limit?? Do they mean I have to remove the glass from the airspeed indicator to make the mark?? What is a slippage??

You may mark the AD mandated speeds on the outside of the glass, they do not have to be on the instrument face. Hopefully this will be just a temporary restriction until the problem is further researched.

The white mark on the case should be placed on the glass and the case in such a manner so that if the glass should rotate, it will be obvious. Since the marks for the speeds are only required to be on the glass, if the glass should rotate or slip, the speed marks would be inaccurate.

The white mark to detect slippage is a standard method of compliance when limitations are place on the glass and not on the instrument face.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980701.182114.msg03464.tex]

Power Setting/Weight**Thu, 15 Mar 2001 09:52:59**

Good Morning Thomas,

In a message dated 3/15/01 2:14:52 AM Central Standard Time, you wrote:

Question a.)

Original engine's cruise power setting for example was at SL 2050 RPM
25.1 IN HG at 139 HP standard day (ISA) so what will be the setting now
???

As far as the engine is concerned, the maximum allowable cruise power would be 27.5 inches at 2050 RPM. However you must not cruise at any power which would drive the airplane faster than any limiting airspeeds that are applicable to your airplane. Has your airplane gone through the procedure to lift the speed restrictions yet?

To set something around 139 horsepower, try 23.3 inches of MP.

The relationship between power settings for the E-225-8 and E-185-1 can be roughly determined by dividing 27.5 by 29.6. That gives just under 93 per cent. Multiply any of the manifold pressures given on the E-185-1 chart by that number and it will be close to the manifold pressure required to get the same horsepower from the E-225-8. Obviously, it would be helpful to get a power chart for the E-225-8, but the above number will get you going.

Question b.)

Beech Germany made the weighing after the plane was painted back in 1995. The record says, that the weight with the fuel (19 gal - 114 and 34 gal - 204) was 2241 lbs. So decreasing the weight of the fuel - 318 lbs they came up with 1923 lbs empty.

(Me, my girlfriend and pilot bag makes me nearly come out of the envelope.)

The procedure they used is a common and acceptable procedure, but I don't like it!

Getting an accurate empty weight is not an easy thing to do.

Your wing fuel tanks most likely hold between 20.5 and 21 gallons each. Fuel will weigh somewhere between 5.8 and 6 pounds per gallon. The only way to get precise figures is to drain the tanks completely. That isn't perfect. There may still be a discrepancy between the amount of fuel that can be drained out and that which will be taken out by running the engine dry, but it will be closer than the procedure of weighing the airplane with the tanks full. If you figure that you had 60 gallons on board, use 6 pounds per gallon and subtract 360 pounds from the 2241, you arrive at 1881. Still not good, but not as bad as your numbers show!

The scales used must be certified and accurate.

I have seen electronic scales in good high priced maintenance shops which had directions which showed that their accuracy was only certified to be within two percent. Two percent of 2241 is 44.82 pounds. That is a big error! And that is only if the scales are within their certified accuracy!

There are scales available which have a certified accuracy of one-tenth of one percent.

There is no unusable fuel in the Bonanza wing tanks. The 1550 target empty weight by Beechcraft was with the tanks empty. They then added one half gallon of unusable fuel per wing tank to arrive at the 1550 weight. To be able to compare your weights with those of other early Bonanzas, you need to use the same techniques.

The unusable fuel in the aux tank is harder to determine. How much gets used is dependent on how the tank was installed and how the airplane is flown while the tank is being emptied. If it were my airplane, I would take the tank out for the weighing procedure, weigh it separately when empty, then use that number for the precise empty weight.

Look the airplane over carefully and get rid of anything that you don't need for your regular operations.

Do you really need all of the radios that are installed? Are there modern, lighter weight units that could be installed instead of some old heavy stuff?

The E-225-8 weighs only three pounds more than the E-185-1, but there are starters and generators that are much heavier than others. Be sure that you have the lightest ones that are available.

I don't know anything about the German rules, but in the U.S. National Airspace System, a single modern GPS can replace an ADF and a DME. You could get by with one NavCom and one GPS quite well.

You might even consider leaving the baggage tank out unless you are going to fly a trip which really needs the range.

The straight thirty five Bonanza can easily get 160 mph on eight gallons per hour. That allows a four hour trip with a one hour reserve. For longer range, six and a half GPH will generally deliver about 140 mph or better.

Fly the airplane at the power settings, speeds and loads for which it was designed and it does a very nice job.

Question c.)

I guess, I will install the flaps and weigh the plane again. (probably the girlfriend will have to stay on ground:-)

Once again, weigh the flaps while they are off of the airplane and make the proper adjustments to the weight and balance. The first fourteen Bonanzas built had fabric covered ailerons and flaps. Beech went to the magnesium units because they were lighter and stronger. Unfortunately, the magnesium has proven to be susceptible to corrosion,

if not properly cared for.

If you want maximum payload capability from your airplane, use the flaps which Beech planned for it. Get magnesium ones. There is nothing wrong with them if they are properly maintained! It does take an extra effort though.

Greetings Thomas BE35 D-EBCM (S/N D-1497)

And Greetings to you Thomas!

That airplane is a wonderful, light weight flying machine. Don't try to make it into a heavy, high powered machine that it wasn't designed to be.

My last straight 35 had a full W.W.II era gyro panel with 60 pounds of 1950s style radio equipment. I didn't have an aux tank because I needed the weight to haul my family. I flew it IFR in all weather all around the USA. Many times I couldn't even carry the full forty gallons due to the weight of wife and kids, but we still seemed to get every place we wanted to go. A stop every couple of hours for fuel isn't so bad with a bunch of little kids.

Happy Skies,

Old Bob

[ARTICLES/20010315_095259_msg05922.tex]

Rear Seat**Fri, 3 Oct 1997 11:02:01**

To Frank Kelly

It sounds like you have a model 35 with the steel tube brace across the back of the rear seat.

The bar is part of the structure of the airplane. As you probably know, the airplane is not legal to fly without that bar installed. When those early airplanes were used for hauling litter patients, there was a steel bar to be inserted between the sidewalls to keep them from collapsing inward! What this tells us is that flight load pressures are shoving the sides in.

When I have to take the rear seat out of the older airplanes, I put a jack between the sidewalls (properly protected of course) and GENTLY spread them out about an eighth of an inch. I can then ease the seat out without too much trouble. I know it seems terrible to do that to a beautiful Bonanza but it seems to work!

I remember years ago I was at a shop where they had made a real neat unit to do that job. It consisted of some steel tubing with padded fittings on the ends and a nut and bolt jack screw arrangement to carefully and gently spread the sidewalls apart.

A short comment on the retractable step.

Many years ago I rigged one up so that it could be retracted and extended in flight by my oldest son while he sat in the baggage compartment. (He was five then, he is forty seven now!) We found that there was about 5 mph difference at 140 mph indicated.

Definitely drag worth getting rid of.

Yours,

Bob

[ARTICLES/19971003_110201.msg01915.tex]

Wobble Pump Problem

Fri, 28 Aug 1998 02:31:03

Good Morning Mike McGahan,

In a message dated 98-08-27 21:44:07 EDT, you write:

The wobble pump generates sporadic pressure but not enough to prime the engine. So now I keep a can of starting fluid to get going.

I would start off by determining the cause of your hard starting problem. If the wobble pump is working properly and the PS5C is set up correctly, the priming should work fine, and I think better, with the hand wobble than with the electric pump.

How long has it been since the PS5C was overhauled?

How about the seals in the wobble pump?

Happy Skies,

Bob

[ARTICLES/19980828_023103.msg04914.tex]

Wobble and Electric Boost Pumps**Thu, 12 Aug 1999 13:24:14**

In a message dated 8/12/99 10:23:36 AM Central Daylight Time, kehlerb@cadvision.com writes:

Has anyone actually flown the Bonanza's on the hand pump?? can it be done and for how long? physical fitness would play a role but, if you were in the mountains could you maintain altitude?

Just A Follow Up,

I have noted a fair number of hand pumps which have been allowed to wear to the point that they aren't really doing their job. Just as with any other component, proper maintenance is required if the unit is to be available when needed.

The proliferation of electric boost pumps being added to the early airplanes has led to the situation where many folks never use the hand pump for starting. I think that is a mistake as starting is the time when you can tell if your hand pump and carburetor are doing their thing properly. If the pump is pumping properly and the carburetor enrichment mechanism is performing as it should, starts in all temperatures should be a piece of cake. I would make it a practice to start the engine with the hand pump and then after the engine is running and stabilized, turn on the electric pump to check its operation. The engine should be a little flooded and stumble. Another method to check the operation of either the hand pump or the electric is to shove the mixture to full rich and the throttle wide open. Place a container at the point of outflow of the manifold drain and note the amount of fuel that is pumped out with ten seconds of operation.

Do that every few months and if the amount of fuel pumped decreases, the pump is wearing out or the enrichment function of the carburetor is deficient!

Obviously, that check should only be done when an engine start is NOT imminent!

As to the ability to maintain altitude, the unsupercharged engine takes a lot less fuel at altitude than it would at sea level. The amount of hand pumping required would therefore be much less also.

Happy Skies,

Old Bob

[ARTICLES/19990812.132414.msg06891.tex]

7.4 MAINT-EXHAUST

Muffler Rebuild**Mon, 6 Oct 1997 00:48:14**

Bob Newman,

In a message dated 97-10-05 20:19:17 EDT, you write:

Looking for recommendations for muffler rebuild. Also, any PMA suppliers of new mufflers at a reasonable price?

I have been using Dawley Aviation of Burlington Wisconsin for the last several years and have been pleased with their quality, service and price.

They do not have the authority to build a new muffler but I have sent them units for repair that were sent back to me "repaired" but there were NO components of the original left!

Generally I have had no more than a couple of days turn time.

Their address is – 140 Industrial Drive, Burlington, WI 53105

Phone 800 338-5420 FAX 414 763-3725

Yours,

Bob

[ARTICLES/19971006.004814.msg01952.tex]

7.5 MAINT-FLAPS

Drooping Flap**Wed, 16 Aug 2000 23:08:36**

In a message dated 8/16/00 5:58:01 PM Central Daylight Time, inyomono@telis.org writes:

I also remember noticing that in cruise the plane has been a bit left wing heavy in cruise (drooping flap?) and that the autopilot carried a bit of right aileron in level flight. So perhaps the situation has been gradually deteriorating—although perhaps not.

Does anyone have any ideas? Any thoughts would be appreciated.

Thanks,

Peter Tracy Bishop, California A36 N54DG

Good Evening Peter,

Lot's of possibilities! The limit switch for the flap system is on the left flap. Both flaps are driven by the same motor. The shaft goes through the drive unit and a fitting is located on both the left and right side which drives the associated flap. If something should happen that made the right drive cable fitting slip or jump a little bit, the condition you describe could occur.

There was an AD or service bulletin that concerned the fitting a few years ago, but I don't have it handy. As I recall there were some that came out of the factory with a missing piece or maybe the wrong fitting.

I would check on the applicable SB or AD and go from there.

There is no reason the flaps should change their position relative to each other unless one or the other of the drive cables has slipped a cog or two.

Another possibility might be if the right flap actuator fitting is in the process of breaking off. When big fat guys like me step down too hard on the trailing edge of the flap, it puts a tremendous strain on the point where the flap actuator attaches to the flap. They have been known to tear out. If it were starting to fail, there might be a noticeable difference before it fails totally. Run the flaps down and look at the fitting.

Off the top of my head, I think the most likely scenario is a cable that has slipped a cog!

Happy Skies,

Old Bob

[ARTICLES/20000816.230836.msg12244.tex]

Drooping Flap

Wed, 16 Aug 2000 23:15:46

In a message dated 8/16/00 10:11:08 PM Central Daylight Time, BobsV35B@aol.com writes:

If something should happen that made the right drive cable fitting slip or jump a little bit, the condition you describe could occur.

Good Evening Peter,

The statement above is in error. If either fitting slips, the condition you describe would occur. The flap limit switches are actuated by the left flap position and will stop that flap in the right spot regardless of any slipping of the shaft. Both right and left drives need to be checked.

Happy Skies,

Old Bob

[ARTICLES/20000816_231546.msg12245.tex]

Flap Markings

Thu, 17 Feb 2000 09:35:17

In a message dated 2/17/00 7:16:17 AM Central Standard Time, jtsmall@onramp.net writes:

I have yet to find instructions but Graham Haddock informed me that they are placed on the flaps near the fuselage.

Good Morning John and Bill,

I prefer to place them on the left flap just inboard of the outboard flap track.

Whatever works for you!!

Happy Skies,

Old Bob

[ARTICLES/20000217_093517_msg03069.tex]

Right Flap needs reskinned?**Thu, 20 Aug 1998 13:20:55**

Good Afternoon Rob Condon,

In a message dated 98-08-20 12:52:15 EDT, you write:

Any other options for repairing? Finally, are there aluminum flaps available for my aircraft?

It is not uncommon to find cracks on the right flap since it takes all of the loads of fat old men like me jumping up and down on it.

Repairs are definitely practical. Find a good BONANZA mechanic in your area and ask his opinion.

There is no reason to replace the magnesium flap if you don't have to. They are plenty strong enough for the loads applied and considerably lighter than the aluminum ones.

Once again, make sure you check with a knowledgeable mechanic who has considerable experience with the early Bonanzas. Some of the younger folks have an unjustified fear of the magnesium surfaces.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980820_132055.msg04601.tex]

7.6 MAINT-FUEL

Blue Dye Around Injectors**Sun, 9 Jul 2000 12:42:54**

In a message dated 7/9/00 11:26:13 AM Central Daylight Time, raven@tminet.com writes:

At my last 100 hour inspection, we found blue dye around all of the injectors. I assumed that this was associated with fouled injectors, so all of the injectors were cleaned and reinstalled. I did a visual inspection yesterday, and two of the injectors are showing signs of leaking again.

Is this normal?

Good Morning Bill,

Perfectly normal, it's just the residual fuel in the lines boiling off after shut down. Remember that there is an aeration inlet in each nozzle to allow ambient air to mix with the fuel.

Happy Skies,

Old Bob

[ARTICLES/20000709.124254.msg10706.tex]

Erratic Insight GEM**Sat, 3 Jun 2000 00:24:36**

In a message dated 6/2/00 10:45:13 PM Central Daylight Time, inyomono@telis.org writes:

Thanks, but could you expand a bit on the ground wire issue.

Good Evening Pete,

There is a wire which goes from the panel unit to the engine case to provide a positive ground or base circuit for the transducer to work against. The potential or voltage that has to be measured is very small, so any resistance (especially if it is variable) in the system can cause large errors. The ground wire provided by Insight that goes to the crankcase is a very small black covered wire. As I recall it is around a twenty-four gauge, possibly smaller. I substituted a larger wire. I believe a 16 gauge or so. In any case, as someone else suggested, you need to check that the continuity check from the plug on the panel unit to the case of the engine is close to zero.

Happy Skies,

Old Bob

[ARTICLES/20000603_002436.msg09079.tex]

Fuel Bladder Installation Tape

Mon, 28 Feb 2000 17:54:39

In a message dated 2/28/00 4:42:56 PM Central Standard Time, grahamh@gte.net writes:

Beech put some tape (looks like duct-tape, but you have to order the real stuff from beech)

The proper tape is available from Aircraft Fuel Cell Repair Of Eagle River, Wisconsin.

It was fifteen bucks a roll when I last bought some a couple of years ago. That is a lot cheaper than Beech/Raytheon charges and it is a lot better than using duct tape (which really shouldn't be used).

Call them at 1-800-437-8732 (great people)

Happy Skies,

Old Bob

[ARTICLES/20000228.175439.msg03842.tex]

Fuel Cap "O" Rings**Mon, 17 Jul 2000 11:54:13**

In a message dated 7/17/00 9:39:17 AM Central Daylight Time, raven@tminet.com writes:

The large O-ring for the N35 is a 37617-339. RAPID has none in stock, expect some in about 90 days. I did not try to find an equivalent MS number, since mine are in good shape.

The smaller O-ring is an MS9021-110 (actually, this cross references to a /XX number, which I don't have here). They are in stock at .44 ea. I'm still waiting for mine; meanwhile I soaked the old O-rings in LPS 3 while reassembling the cap mechanism.

Good Morning Bill And Joe,

I am not sure if you are looking for the "fat" or the "skinny" large diameter O ring. Both are listed in the manual for the two different fuel caps which might be used. The fat one is MS29513-338, the skinny one MS29513-232.

Performance Aero has them, but at a price that reflects their repackaging costs.

Happy Skies,

Old Bob

[ARTICLES/20000717_115413.msg11046.tex]

Fuel Cap O-Rings**Sat, 17 Mar 2001 14:32:31**

In a message dated 3/17/01 1:10:19 PM Central Standard Time, grahamh@gte.net writes:

Performance Aero, and some others in the ABS magazine will sell you a kit of the O-rings for a reasonable price.

From your description, the ones that are leaking are the small ones inside the cap that seal the vertical shaft that goes through the center of the cap. The large ones around the outside of the cap are much easier to get to.

Good Afternoon,

Be sure you check to see which caps you have! There are two different caps commonly used on the late model Bonanzas. Each takes different sized O rings. Look at the cap, get the manufacturers name and tell Performance Aero which one you have. They will send you the proper size O rings. You can also get the AN or MS numbers and buy them somewhere else, but it may well be worth the extra cost to just get them from Performance Aero.

Happy Skies,

Old Bob

[ARTICLES/20010317_143231_msg06065.tex]

Fuel Cell Repair

Mon, 22 Jun 1998 15:31:53

Good Afternoon William S. Helfand,

In a message dated 98-06-22 14:53:13 EDT, you write:

I am interested in knowing if anyone has had good or bad experiences with any major repair/overhaul sources.

I strongly recommend Aircraft Fuel Cell Repair, 300 Airport Road, Eagle River, WI 54521. Phone: 800 437-8732 or 715 479-6149 or FAX 715 479-6344

This is the Hartwig family operation and they formerly operated an FBO at Eagle River. Mom, Dad and the kids. They do great work, reasonably priced and very nice people.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980622_153153.msg03239.tex]

Fuel Drains

Sat, 9 Aug 1997 13:32:08

Norm Colvin mentioned blowing air up through the fuel drain and I have done that with good results. BE SURE AND TAKE THE FUEL CAP OFF FIRST. It works best if the tank is NOT full. I usually wait till the tank is about half empty.

Bob

[ARTICLES/19970809_133208_msg01510.tex]

IO-470-C Injector Torque**Thu, 25 May 2000 10:42:51**

In a message dated 5/25/00 8:22:15 AM Central Daylight Time, flyinglo@msn.com writes:

I've looked thru all my Continental and Bonanza manuals but cannot find the torque for the fuel injectors on my IO-470-C. My mechanic says "about 20 inch pounds". Is this close enough, or does someone know the actual recommended value?

Good Morning Jerry,

My IO-470 Manual, P/N X30588A, Page 72-50-04, states:

Fuel Injector Nozzle (With Anti-Seize Compound), Thread size 5/16-24, Torque to 55-65 inch pounds or 4.6 to 5.4 foot pounds.

I usually go to the light side of that limit.

Happy Skies,

Old Bob

[ARTICLES/20000525.104251.msg08628.tex]

Leaking Quick Drain**Mon, 1 Nov 1999 22:30:33**

In a message dated 11/1/99 7:11:10 PM Central Standard Time, N1BZRich@aol.com writes:

I have heard that another trick is to blow low pressure air up through the valve to clean it, but the first procedure has always worked for me and I have never had to try the air. Good Luck.

Good Evening Buz,

Norm Colvin mentions that in his book.

I have used the air up the drain procedure and had it work just fine. BUT! Be sure the fuel cap on the appropriate tank has been removed. I have always done it when the tank was less than full to allow for a little fuel bubbling around.

I also recommend that it be done outdoors and in a position where the only hazard will be to the airplane on which the procedure is being performed.

I have done it by just hooking a rubber hose up over the drain fitting, holding the hose high enough that the end is above the fuel level and then opening the drain valve. By lowering the hose till you can see the fuel coming up and the blowing it back into the tank you can avoid any fuel spillage. I have done it by just blowing into the hose with my mouth. That doesn't usually work though and most often, line air pressure is required.

In bad cases, I have found it necessary to blow the air into the tank, let it drain over the air nozzle and then repeat that sequence four or five times before the drain clears and the valve seats adequately.

Fuel doesn't seem to scatter around as much as you might think, but it always scares me when I do it!!

Sure beats pulling the tank though!!

Incidentally, I heartily recommend Carl Hartwig and his family for all fuel cell work. Nice family and they do excellent work at competitive prices. There are a couple of other Hartwigs in the fuel cell business. No relation to Carl. He is the one located at Eagle River, Wisconsin.

Happy Skies,

Old Bob

[ARTICLES/19991101.223033.msg10007.tex]

Leaking Sump Drains**Thu, 5 Nov 1998 20:22:45**

Good Evening Mike Edwards,

In a message dated 11/5/98 6:51:30 PM Central Standard Time, medwards@octa4.net.au writes:

I have a wing sump drain valve that's leaking a little. I've tried everything I could think, but I can't get it to seal completely.

A mechanic told me once that it's risky to remove the valve, because you might damage the fuel cell. Is there a risk? Is there a "better" way to do it that minimizes the risk?

Norm Colvin addresses this in his book.

The suggestion is to wait till the tank is less than full, remove the fuel tank cap, then blow high pressure air through the valve and into the tank, let it drain a bit and then blow the air into the tank again. Hopefully, repetition of that procedure will remove whatever is causing the valve to not seat properly.

Fuel tends to fly about and I wonder about the safety of the procedure, but it has worked for me on occasion!

I agree with the mechanic who would rather not try to remove the fitting on anything but an almost new tank. The possibility of damage is quite high.

It can be done, and often is, but it would be valid to try other methods before trying to remove the drain valve assembly from the tank.

Carl Hartwig, of Aircraft Fuel Cell Repair, Eagle River, Wisconsin, has designed a fitting to replace the standard one which will allow easy removal and replacement of the Curtis valve. He was showing it at the ABS convention in STL. Looks good, but is not yet certificated.

His unit can be installed without removing the fuel cell.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981105_202245.msg06720.tex]

Osborne Tank Fuel Cap

Thu, 29 Mar 2001 15:07:22

In a message dated 3/29/01 1:53:41 PM Central Standard Time, guntalk@guntalk.com writes:

\$65 each, according to a message left on my phone machine!

For a 3-dollar stopper!

Pass the transmission fluid, please. grin

Good Afternoon All,

The Moeller Manufacturing Company of Greenville, Mississippi, manufactures a line of thermos type caps for use in large (non aviation) engine oil filler tubes. If the caps you have for the Bellanca or the Osborne tanks can be disassembled, you might be able to match a new rubber doughnut from Moeller to replace those 65 dollar ones.

Sorry, I don't have a contact, maybe some of you Internet experts can come up with one!

Happy Skies,

Old Bob

[ARTICLES/20010329_150722_msg06813.tex]

Quick Drain**Tue, 23 Mar 1999 13:01:04**

Good Afternoon Mike,

In a message dated 3/23/99 11:32:15 AM Central Standard Time, Mavitor@aol.com writes:

Now I have a leaking quick drain in my main tank. I understand that the manufacturer of the quick drains no longer supplies the "O" ring, and you have to buy a new unit (.05 vs \$15.00). Also it is very easy to damage the bladder when removing. Is there a fail/safe technique?

I also read on this forum that someone is working on an improved quick drain system that protects the bladder, but it is not approved yet.

The drain takes a special seal, not an O ring, though some have mistakenly used an O ring to stop a leak. That and the lawyers are the reason the Curtis people quit supplying the seal to we mere mortals. Someone nailed them with a liability suite when the O ring didn't do the job and they were sued because they had the deep pockets. At least, that is the way I heard it.

The drain is very hard to remove without damaging the bladder. The older the tank, the greater the problem.

Before I tackled that, I would try Norm Colvins suggestion. Remove the fuel cap, then open the drain and blow some air back up through the fuel. That will sometimes clear the debris away and allow the drain to seal.

I have on occasion done it by affixing an appropriately sized hose over the fitting, lifting the hose up above the level of the fuel, opening the quick drain valve and then blowing into the hose either by mouth or with high pressure air. I have also done it by just placing the air nozzle on the bottom of the fitting, opening the drain valve and then alternately blowing and letting fuel flow threw the valve. That seems rather dangerous to me and I don't think I would do it anymore, especially if the airplane is anywhere but outside and well away from other things that might burn!

The valve that the Hartwigs of Eagle Fuel Cells have invented looks like the answer. At the ABS convention last fall I got the impression that they were planning on making it so the unit could be installed while the tank is in place, I spoke to Karl a month ago at a mechanic seminar and he told me that I would have to pull the tank to affix the unit. I am not sure which is correct.

Best of luck.

Happy Skies,

Old Bob

[ARTICLES/19990323_130104_msg03203.tex]

Quick Drains**Thu, 20 Aug 1998 13:11:53**

Good Afternoon Scott Derrick

In a message dated 98-08-20 12:51:31 EDT, you write:

I have a 35 and the left quikdrain leaks alittle sometimes. I twist it back
anf forth to stop it.

Norm Colvin suggested that the fuel cap be removed and then high pressure air be blown
through the valve to dislodge whatever foriegn matter might be causing the fuel leak. I
have used that method to good advantage several times.

BE SURE TO REMOVE THE FUEL CAP FIRST!!!

Are there replacment quik drains available?? And are they easy to install??

First question - Yes

Second question - NO

It is necessary to remove the clamp and remove the fitting from the tank. That is not
easy to do on a new tank and gets progressively more difficult as the tank ages.

With older tanks it is not unusual for damage to occur during the attempted removal
which would necessitate pulling the tank and sending it in for repair. I would recommend
that it not be attempted unless you are prepared for that eventuality.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980820_131153_msg04598.tex]

Shadin Fuel Flow Indicator Problem**Wed, 19 Nov 1997 13:53:09**

Hi Bob Briggs,

I love my Shadin Miniflo dearly WHEN IT WORKS. I had quite a few teething problems after the initial installation.

If the thing stops and then restarts again, it is most likely in the Transducer. It is nothing more than a small turbine wheel spinning in the fuel delivery line. My first one failed after about three hundred hours of operation. The next one had about nine hundred hours when I took it out of service for another reason. Did you send the transducer back to Shadin when you sent the panel unit?

I have had excellent factory support from Shadin, no gripes, but I did come across a problem that they were unable to fix.

Every couple of weeks the unit would have it's program messed up when I turned it on and the whole thing would have to be removed and the initial programming redone.

I sent it in a couple of times and NO problems were found.

I noted that when I threw on my aircraft master switch, a red light would flash on the Shadin unit even though the avionics master switch was turned off. I reasoned that it was taking twelve or thirteen volts to energize the avionics master relay before it would be opened. (Mine is wired in the standard Beech way, there are better ways to do it.)

Since the Shadin unit will operate on either twelve or twenty four volt systems with no modification, I figured it was sampling the current for use and every now and then it just blew it's mind. I asked Shadin what they thought about it and the response I received was: Could be!

I then established the procedure of turning off my Shadin power control switch before shutdown and not turning it back on until after engine start and after turning on the Avionics master switch. Since I instituted that procedure I have had about a thousand hours of no problems.

Mine is a twenty four volt system and it is likely that the problem would not occur on a twelve volt system. I understand that some shops wire the Shadin in without a seperate switch. In that case I suppose the circuit breaker might be pulled, but I don't like to use CBs as a sytem control unless they are designed for that function.

I hope this may be of some help.

Yours,

Bob Siegfried

[ARTICLES/19971119.135309.msg02436.tex]

Water In Tank**Fri, 22 Sep 2000 12:10:32**

In a message dated 9/22/00 10:43:47 AM Central Daylight Time, ltemplet@slip.net writes:

We had a similar situation and decided it was dew on the wing leaking in through the filler cap. Now we're in a hangar and the problem has gone away. Larry Templeton '63 Deb

Good Morning Larry,

I would strongly suggest you invest in new "O" rings for your fuel caps. Be sure to get the right size for your caps. There have been various models used and they all use different rings. And don't forget the little one that goes in the middle. That is most likely where you got the dew into your tank. The moisture sits in the handle cavity and has plenty of time to seep through.

Happy Skies,

Old Bob

[ARTICLES/20000922.121032.msg13887.tex]

7.7 MAINT-LDGGEAR

Actuator Rod End**Thu, 27 Jan 2000 16:48:27**

In a message dated 1/27/00 1:57:37 PM Central Standard Time, hal.dee@juno.com writes:

My airplane was 45 years old when the rod end failed and on inspection it showed signs of having been stress cracked for some time. I recommend that owners of older Bonanzas, 1960's Models and older seriously consider replacing this fitting at the next annual. It's difficult if not impossible to inspect and determine its structural integrity in place. Cheap insurance for avoiding a landing with the nose gear still retracted and the result being a potential 25 thousand dollar repair bill.

Good Afternoon Hal,

In my case the rod ends and the rod itself were in excellent condition. Something had to give when the gear jammed against the door retract rod fitting and the rod was the weak link.

I do agree that a lot of the rod ends and such are in marginal condition. I replaced or rebuilt almost everything on an A35 that my second son owned a couple of years ago. I was having trouble rigging the gear properly and each component showed some wear but nothing was real bad. All put together though, it just wasn't possible to get the gear properly rigged. I see a lot of them on the flight line that look worse than my son's airplane did when we started!

It is a great landing gear, but it is highly stressed and needs to be maintained!

Happy Skies,

Old Bob

[ARTICLES/20000127_164827.msg01875.tex]

Gear Box and Motor**Wed, 5 Jan 2000 16:01:51**

In a message dated 1/5/00 2:14:15 PM Central Standard Time, MikeM86949@aol.com writes:

I do have a maintenance program for my airplane, but the gear & flap motors, I decided to do on condition. The gear motor on my 1965 Deb started acting up in 1998 and I replaced it. The flap motor is still in there.

Mike McNamara

Good Afternoon Mike,

Doing the overhaul of those motors on condition is not a bad idea, but I think you should add something to your standard operating procedure.

As Bill Hale mentioned, the time it takes for the gear to extend or retract changes as the motor nears a point where service is required. The length of time is dependent on the age of the aircraft and the voltage of the sysytem. If you will check the time on yours with a new motor installed and the generator putting out whatever it is supposed to, you will have a basis from which to note the change.

Another important factor is that as the brushes wear down, the gear motor will not stop as fast via the dynamic brake system as it does when everything is up to snuff.

If the motor coasts beyond the designated point, the sector gear and it's stops may be damaged. Not Good! To check for proper stopping, reach down and crank the gear handle every now and then, both in the up and the down direction. (That is of course, 'up' after retracting the gear and 'down' after extending it and with proper safety precautions of depowering the system.) There should be one quarter to one half turn on all but the latest actuators before the stops are felt. If it is any less, the upstop switches are out of rig, the dynamic brake is not working or the gear motor is going bad.

It will still run the gear up and down long after the point at which it needs service to avoid banging the stops.

Happy Skies,

Old Bob

[ARTICLES/20000105_160151_msg00261.tex]

Gear Case Oil Level**Tue, 4 Jan 2000 10:02:20**

In a message dated 1/4/00 7:39:41 AM Central Standard Time, wlohmeyer@ccms.net writes:

Anyway, the gear actuator worm gear plug has a small hole in it's top and small amounts of grease has been coming out. It looks like yellow oil. It doesn't look like it has been doing much, however over the years it has added up on the floor. What, if anything can be done to stop that?

Good Morning Wayne,

Don't over fill the actuator case!

The hole in the plug is a vent. Unless your airplane regularly sees deck angles in climb of some thirty or forty degrees, there should be no leakage if the actuator oil is kept at the proper level. The proper oil level is such that the oil will come half way up on the worm gear shaft. Anymore than that will cause the leakage you are experiencing. To check the level, remove the plug, look in the hole to spot the shaft, then while you are looking at the shaft, turn the gear crank one quarter turn. The gear case oil should be stiff enough to adhere to the shaft long enough for you to observe if it is at the proper level.

Happy Skies,

Old Bob

[ARTICLES/20000104_100220_msg00160.tex]

Gear Extention Handle**Sun, 19 Jul 1998 22:39:35**

Good Evening Christopher Raphael,

In a message dated 98-07-19 21:46:46 EDT, you write:

Actually the handle hits the edge of the indented metal cup on the floor.
At that point you close the handle and swivel it around, open it up and
get another half turn..

The handle should clear the little indented pan sufficiently to allow your fingers on the handle as you turn the crank (Provided that your fingers are not fatter than my fat stubby ones!) If it does not, I would check that the Hand Crank Shaft Housing, Part Number 35-810142-2 has not been installed incorrectly.

This unit is manufactured with an angle other than 90 degrees from the face of the bolting surface to the plane of the crankshaft and that angle should allow the crankshaft to be angled upward slightly from the floor boards. There are three screws holding this part to the gear housing and I suppose it could be installed rotated to the wrong position. It has been a couple of years since I had one apart and my memory is not good enough to recall whether it would or would not be easy to do. In any case the shaft should angle up from the case. If it does not, something is improperly assembled.

I would suggest that this be checked post haste!

Happy Skies,

Bob Siegfried
Ancient Aviator

[ARTICLES/19980719_223935.msg03768.tex]

Gear Up Landing and FAA**Sat, 11 Mar 2000 11:58:25**

In a message dated 3/11/00 10:06:16 AM Central Standard Time, flyinglo@msn.com writes:

Bob, or anyone, when your nose wheel refused to extend, causing the described landing, was this an "incident", as far as the FAA was concerned? or an "accident"? What is the difference in their opinion? Does the insurance co. always use the same word as the FAA to describe the occasion? Did your insurance co. pay for most of it? What was the total, and how much did they pay for? Did your rates go up because of it?

Good Morning Jerry,

I don't remember what they called it in their report!

Had the incident occurred somewhere that the FEDs were not watching, I would not have told them about it.

It is my opinion that even a gear up landing where someone forgot to extend the gear is not a reportable accident, but the FAA seems to disagree with that interpretation.

They will generally ask the pilot to voluntarily surrender their certificate and ask that the pilot take remedial training and a conformity check ride. It would be nice if one of our gutsier colleagues would tell them to go take a flying leap at the moon if it ever occurred to them, but I don't know if I would have the guts or not. I would NOT surrender my certificate without the advice of a knowledgeable aviation attorney.

In my case, I was about eighty miles from home when the nose gear failed to extend. I didn't take the airplane home, but to an airport near home where there is a large maintenance facility that does good quality work. That airport not only has a control tower, but the local FSDO is there. Both maintenance and flight inspectors were at the site of the landing along with the airport fire equipment.

Both FAA groups asked that I file a report and we had a combined interview as soon as the airplane was properly stowed in the hangar. They asked to be provided with photocopies of the my log books showing the last few months of flying and my required currency flights.

They were very pleasant and cooperative, but I still don't see why they had to be involved.

My insurance picked up the total tab. I had been with them long enough that I was a "preferred" customer and there was no deductible. The total was right at \$41,500.

The only structural damage to the airframe was to a couple of frames in the fuselage belly which had been ripped when the nose gear actuating rod bent and tore through the frames. In order to repair those frames, all of the cables in the belly had to be

removed and then reinstalled and rerigged. The actual damage was rather minor but the labor to get to it was extensive. The four blade prop that I had at the time kept the nose bowl high enough that it was not damaged. Sure messed up the four blade though!

The engine and landing gear actuator both had to be torn down to check for possible internal damage. This was at the insistence of the insurance company, not me. The nose gear actuator arm on the bottom of the actuator and both the failed and the non failed extension tubes were replaced. A new propellor and new nose gear doors finished up the parts required list. The insurance company was very easy to deal with. I have no complaints.

My rates did go up this year, but they claim that the incident had nothing to do with it. Who knows?

Happy Skies,

Old Bob

[ARTICLES/20000311.115825.msg04575.tex]

Gearbox Oil Level**Sun, 7 Feb 1999 01:01:29**

Good Morning Nick Stratford,

In a message dated 2/6/99 3:07:07 PM Central Standard Time, beech35@hotmail.com writes:

Can anyone tell me how to check the landing gear gearbox oil level? After removing the front bench seat, the only component I could see was the motor itself with the grounding plug on top.

The spot to check the oil is at the filler plug on the gear box. It is located between the electric motor and the manual handle on the top of the unit. It is closer to the manual handle than the motor. On the early airplanes it is a rather standard 1/8 inch pipe plug with a square head through which a vent hole has been drilled. On the newer airplanes that plug was replaced with a newer type that has a small screen over the vent hole. In either case, just remove the plug so that the worm shaft may be viewed. It should be free of oil. Turn the hand crank one half turn and observe how much of the shaft is covered with oil, the oil should cover no more than the bottom half of the worm gear. If any oil is on the worm gear, it is probably enough. If the oil covers more than one half of the diameter of the shaft, it will probably leak out.

Hope that helps!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990207_010129_msg02002.tex]

Greasing Main Gear Trunnion Bolts and Bushings

Sun, 2 Jan 2000 22:07:13

In a message dated 1/2/00 8:41:05 PM Central Standard Time, IFLYV35@aol.com writes:

There is no mention of any scheduled maintenance required for these points in the service manual. I believe the earlier Bonanzas had grease fittings here. Does anyone know why they were removed? Maybe an "unwritten maintenance tip" I should know about concerning this?

Good Evening IFLYV35,

I asked that question of Norm Colvin when they quit installing the fittings. His answer was that they really didn't need to be greased often, so the factory eliminated the fittings as a cost saving move.

The landing gear is supposed to be removed at two thousand hours. They should be greased at that time.

I pulled mine at two thousand hours and while there was no scoring or other defects noted, the fittings were drier than I liked. I would recommend pulling the bolts and bushings and hand greasing them about every one thousand hours. I suppose the number of cycles of the gear and the chronological age would be more important than the number of hours on the airframe! If your airplane is ever power washed in the wheel well area, I might suggest that they be pulled even more often!

The main trunnion bolts and bushings can be removed without actually taking the gear out of the airplane if one is at all careful. Be sure and slide in an appropriately sized drift as the bolts are removed and don't forget to take out the bushings as well as the bolts. The more often they are removed, the easier they will be to get out.

Happy Skies,

Old Coot Bob

[ARTICLES/20000102.220713.msg00067.tex]

Inner Gear Doors Holes**Tue, 7 Jul 1998 09:41:10**

Good Morning Ron Davis,

In a message dated 98-07-07 04:53:46 EDT, you write:

Also, Norm suggested taping over the holes in the inner gear doors to keep corrosive mud and water out of there, too.

These holes were covered at the factory with good old fashioned grade "A" cotton and nitrate dope (later on they used butyrate) just like the fabric on the ailerons.

That is still the method I would use, though I would use a more modern fabric and fill material.

I know nobody ever sees it except a mechanic doing a proper annual, but it looks a lot nicer than sticking tape over the holes. I will admit to having used the aluminum tape myself when I didn't want to spend the time to do a "proper" job, but I always felt guilty when I did!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980707.094110.msg03509.tex]

Inspection**Wed, 5 May 1999 10:08:04**

In a message dated 5/5/99 7:53:27 AM Central Daylight Time, burnside@erols.com writes:

What Howard said. I swung Debbie's gear last Saturday at a shop in MRB – took two of us less than five minutes to jack the plane, then maybe another five to cycle and check the mechanisms, and five more to lower the plane, remove the jacks and push it outside. And he didn't charge me a farthing.

Good Morning Jeb,

Why was the gear being swung?

What were you trying to check?

If the airplane is being inspected for an annual, at the very least the outboard gear doors need to be disconnected and I don't see how the required inspections can be properly performed without disconnecting the inboard gear doors as well, though I know a lot of people do it with only the outboards down.

The nose gear doors both need to be released and taped out of the way.

Side loads, both inboard and outboard, should be applied to the nose gear doors (while they are connected) to see that the nose gear door retract stud hits properly on the nose gear door retract arm fork.

The clearance between the "uplock" (it really isn't an uplock, but rather a stop to keep the gear from dropping excessively in a high G load situation) and its roller is critical and should be checked. The clearance of various components in relation to the structure needs to be evaluated in the full up position as well as during the retraction and extension cycle.

The play in the extension retraction rod ends can only be checked while the gear is in an "in transit" position.

The adjustment of those rod ends should be checked at several different positions of the retraction cycle to ascertain that they do not bind and put a load or twist on the mechanism anywhere.

The load on the springs when the gear legs are overcenter in the full down condition must be checked and adjusted if necessary.

The spring load on the nose gear in the up position is also required to be checked.

The main gear must be checked for deflection while the nose gear is "bumped." That checks the condition of the worm gear and its thrust washers.

These are only a few of the tests that must be made at every annual and if they aren't being done, you are not getting the inspection that was intended by the manufacturer.

Should any rigging adjustment, spring replacement or other required repairs be evident following a proper gear check, the six hour figure could easily be reasonable!

As has been said by others on this forum, it takes most mechanics at least twenty hours to perform the inspection that is spelled out in the Beechcraft maintenance manual.

I agree wholeheartedly, that changing mechanics along the way will drastically increase the hours required to get the job done.

One of the disadvantages of a small one man shop is that he often must be taken away to attend to other duties. At the bigger shops, daily assignments are often adjusted and changed as conditions change and that runs the hours up. A job that encounters delay for any reason will almost always have an inordinate increase in the time it takes to be completed.

The lowest labor cost is often on the high priority rush job that entails considerable overtime pay. The job gets done while the mechanics attention is full time on that project.

The highest labor costs are often on that job that was taken at a reduced hourly rate just to keep the guys busy when there is nothing else in the shop. The inherent delays and reeducation required add up to a lot of extra time being billed to the project!

I sense that Eric's job might well have been on a "maybe we will do this and maybe we won't" schedule. That can be an awfully inefficient way to do things. I apologize, Eric, if that was not the case.

Still pretty bad, but we are only hearing one side of the story.

Been there, done that, from BOTH sides!

Happy Skies,

Old Bob

[ARTICLES/19990505_100804_msg04342.tex]

Loose Cowl Flaps/Nose Gear Doors**Tue, 28 Nov 2000 16:30:50**

In a message dated 11/28/00 2:19:27 PM Central Standard Time, burnside@pressroom.com writes:

How does this happen, bad rigging? Could this result in the nosegear not coming down sometime?

Wear and tear, a little misalignment and things bend a little. Unfortunately, Beech has not allowed much in the way of adjustment. The only thing that I know to do is to get things back as close to original as possible. The bent shaft is very hard to spot without disassembly. Even then it takes a good eye. It is best to put it on V block and measure the displacement. It could jam the nose wheel. That is not what happened to mine, but it could have been contributory to the nose gear ball release which did cause mine to jam in the retract position. My cross shafts were both very bent and it was not noticed by the folks who rebuilt it. I had them removed and rechecked after the rebuild because the cowl flaps were hard to operate with the gear up. I do consider the shop I used to be a very good bonanza shop and the mechanics assigned were sharp and conscientious. This is just a very unusual occurrence and hard to spot. It is imperative that outward loading be placed on the gear doors during the retract check to simulate the airloads. The chief of piston maintenance, chief of turbine maintenance and I were all helping the two men assigned to the job for several hours before we finally located the problem. Once located it was easy to fix. The secret was the outward loading of the nose gear doors. Hard to explain without seeing it in action.

Adjusting the position of the pin can vary the pressure put on the cross shaft when the gear is retracted.

How late would the plane need to be to have this adjustment? Mine's a '66 C33A... (No, it's not convenient to go check it for a day or so.)

I do not have the answer to that. Mine is a late '78 and has the adjustable pin. I know Beech has a modification kit to add a roller instead of the pin and it can be put on the early airplanes as a replacement for the fixed pin. I think the adjustable pin was first used around 73 or 74. I will start looking around, but it may take a while.

Does removing them require jacking the plane?

Not at all. There is nothing involved that connects in any way to the nose gear when it is extended. The nose gear door retract pin on the lift leg link doesn't make contact with the fork to start closing the nose gear doors until quite far along in the retract cycle.

Is this something with which a shop not intimately familiar with Bonanzas could handle?

Since the problem is quite rare, most Beech mechanics are not familiar with the problem.

Any competent, open minded, mechanic should be able to do all of the removal and straightening or replacing of the components.

If the cross shaft is straightened, the nose gear doors must be rerigged and that will require that the airplane be put on jacks. Experience rerigging the gear will then be helpful, but it isn't difficult. Just be sure that you or they have the current manual and rigging instructions.

remainder snipped

I'm planning to get new tires (*and* tubes...) installed in a week or so during some scheduled downtime. This sounds like something worth tackling at that point.

Thanks!

Jeb

Your Welcome! It will be an interesting and educational experience.

Happy Skies,

Old Bob

[ARTICLES/20001128.163050.msg16859.tex]

Main Landing Gear Strut Removal and Rebuild?**Wed, 2 May 2001 09:37:51**

In a message dated 5/2/01 12:36:08 AM Central Daylight Time, flyinglo@msn.com writes:

It's the best way. After all, what's two more bolts? Do #3. Do it right.

Good Morning Jerry and Bob,

That would be my recommendation as well.

The biggest job required when removing the whole shebang is bleeding the brakes on reassembly!

The trunnions on which the assembly pivots were supplied with grease fittings on the early airplanes, but since the early sixties or so, those fittings have not been installed.

The steel bushings and the bolts which hold them in place should be removed, cleaned and greased every couple of thousand hours anyway. Might as well do that at the same time as the struts!

Incidentally, be sure to adhere to the proper torque specifications when reinstalling those bolts and bushings. Too little torque and the mechanism may turn on the bolt instead of the bushing, too much torque and the steel bushing can be crushed. There are also some specifications for clearance to be maintained along with spacer washers to aid in correct alignment. Not difficult, but not obvious either. Use the book!

Happy Skies,

Old Bob

[ARTICLES/20010502_093751_msg08708.tex]

Main Landing Gear Strut Removal and Rebuild?**Wed, 2 May 2001 11:46:02**

In a message dated 5/2/01 10:21:46 AM Central Daylight Time, flyinglo@msn.com writes:

Bob, no man! That's the beauty of it! The hydraulic system is not broken into. You just remove the brake disc/line as an assembly, and set it aside. No bleeding, etc. Jerry Osborne, PRC, Az, J35, N8323D, IO-470-C. From: BobsV35B@aol.com The biggest job required when removing the whole shebang is bleeding the brakes on reassembly!

Good Morning Jerry,

Interesting concept, but how do you remove the fittings that go through the landing gear components without disconnecting them?

On my V35B, I am sure it would be impossible! The line goes through the trunnion cross brace.

I don't have a J35 or the manuals available to me here, but I feel it is easier to just break the connection where the flexible brake fluid line attaches to the main gear trunnion cross brace or where the line attaches to the aluminum line in the wheel well than it would be to remove all of those pipes and fittings from the landing gear assembly. I always take off the brake unit at the axle as well, just to lighten the assembly.

I suppose it would be possible to break the fittings and cap immediately to get by without bleeding the brakes, but that seems rather haphazard to me!

Happy Skies,

Old Bob

[ARTICLES/20010502.114602.msg08721.tex]

Nose Gear Door

Fri, 16 Feb 2001 13:33:25

In a message dated 2/16/01 12:02:43 PM Central Standard Time, swo49@hotmail.com writes:

Bob: 1. I totally agree with that which you provided below. 2. "That pin is fixed on all but the latest airplanes and those older ones which have had the roller kit installed." – what is this roller kit? 3. One more thing to look at closely are the ball joints on the cowl flap and nose gear door "control" rods condition - mine were totally frozen. Steve

Good Afternoon Steve,

The ball joints should, of course, be checked as should the hinges etc.

I was attempting to explain how the shaft could be bent!

The roller kit was offered by Beech seven or eight years ago. I think it was described in a Service Bulletin, but am not sure. I don't know if it is still available or not.

It consists of a new arm with a roller mounted on it to replace the pin that is normally on the nose gear lift leg.

It is relatively easy to fasten the arm on the nose gear for those later airplanes which have the adjustable pins. For those airplanes on which the pin is welded, the arm is cut off about half way up and made into an adjustable unit.

The big problem comes with making the slot in the cross shaft assembly big enough to accommodate the roller instead of the pin. The kit claims it is possible to grind it out without removing the cross shaft assembly from the airplane, but I think that would take an unusually agile person!

I found it a demanding task even with the assembly on the bench. I tried to buy a new nose gear cross shaft with the large slot already in it, but Beech does not provide that part. If you want the roller, you need to grind out a stock fork.

The kit was fairly cheap, so I bought it and installed it on my airplane. Next time we are at the same flyin, take a look at mine.

I DO NOT recommend it being done.

I think the only reason Beech offered the kit was because of the wear that was being experienced on many of the lift pins

After the research that I have done on the nose gear door mechanism, I am now convinced that if the alignment can be made what it should be, the pressures will be light enough that the standard pin won't wear. If it does wear, there is something wrong with the alignment.

The problem is that there are no adjustments possible except on the pins of the later airplanes. I don't think the problem is with the pin anyway. I think the faulty adjustment is in the varying amounts that the factory has used for the overcenter condition.

I have some thoughts on how to fix that, but it might be difficult to get it approved.

Happy Skies,

Old Bob

[ARTICLES/20010216_133325_msg03997.tex]

Nose Gear Doors**Wed, 5 May 1999 19:14:24**

In a message dated 5/5/99 12:57:00 PM Central Daylight Time, flyboy_98@yahoo.com writes:

I guess what I am asking is if this were your Bonanza and you were doing the same, what items would you give a good inspection while you had it apart?

Thanks, Jason

Good Evening Jason,

I think that Arkie or whoever is doing your strut will take care of any problems that are known to me about the nose gear strut itself, but I think I would take this opportunity to remove the cowl flap cross shaft and nose gear door retract fork assembly. Check it for abnormal wear and make sure that the through shaft for the cowl flaps and the nose gear retract fork assembly are both perfectly straight.

There appears to be a slight variance in the angle that the stop has been welded on to various nose gear door cross shaft assemblies and if the little dog that hits the fork and closes the nose gear doors isn't rigged exactly right, it may go on the top of the fork and bend the shaft. It will also keep the nose gear from retracting all of the way and put a substantial strain on the retract mechanism.

To rig the mechanism properly, be sure and pull out (horizontally to the side) on the nose gear doors while checking to see that the pin fits in the fork. It may work just fine on the jacks, but ride on the top when the airloads are on the gear doors. Rig it so that it hits the slot in the fork both with pressure outboard on the doors and pressure inboard on the doors.

If you have ever experienced difficult to operate cowl flaps, that is likely to be the reason.

I don't have any idea why there is such a variance in how the stops are welded on. One would assume that they are all made in the same jig, but I have noted that some appear to allow the mechanism to go just an eighth of an inch or so over center while others go a full half inch. (measured at the lift arm) The more the arm goes overcenter, the more likely it is to be misrigged. When airloads pull the gear doors outboard, the fork moves down and lowers the position of the slot in the fork. Up comes the lift pin on the gear leg and if it hits high on the fork, it may go on the top and close the doors early. The extra strain will then bend the cross shaft and the cowl flap cross shaft which rides inside the nose gear retract shaft assembly. The problem exists on aircraft of all vintages, new and old.

Happy Skies,

Old Bob

[ARTICLES/19990505_191424_msg04362.tex]

Nose Strut Leaking**Mon, 20 Jul 1998 15:14:26**

Good Afternoon Timothy W. Freeze,

In a message dated 98-07-20 14:16:01 EDT, you write:

Looking at the exploded view it appears I can depressurize, losen the torque link, and change the main O-ring and felt.

I think that would probably work but why do it the hard way?

The nose gear is very easy to remove. Two upper trunnion bolts, one lift leg bolt and, if your airplane is equipped with nose wheel steering, one bolt attaching that. It shouldn't take five minutes and makes the whole job a lot easier. Just put it up on jacks, crack the gear to release the pressure on the gear leg and have at it.

Happy Skies

Bob Siegfried Old Lazy Mechanic

[ARTICLES/19980720.151426.msg03786.tex]

Three Light Gear Position Indicator System**Mon, 15 Nov 1999 13:24:31**

In a message dated 11/15/99 11:16:03 AM Central Standard Time, commwlthsls@msn.com writes:

Eric, BDS says it's not available for sale.

Good Afternoon John, Eric and All,

That is a pity, but I would imagine it would be relatively easy project on which to gain a local approval. The easiest way would be to purchase all of the appropriate components from Beech and install then in the same manner as the later airplanes, which are so equipped.

If that price came up excessively high, I would just make copies of the Beech stuff and submit it as self manufactured! Give complete information on the materials, brackets, methods, switches, wire sizes, diagrams and all. Write up the Instructions For Continued Airworthiness and it should be no problem. I would suggest writing it up as a proposal before any work is done on the aircraft. Once either final or tentative approval is obtained, go ahead and do the work. I have had excellent success with my local FSDO on simple projects such as that.

The labor involved in the installation would be no more than that required by the STC'ed unit and I would estimate ten or twelve hours of additional paperwork for the local approval. Probably less for those of you have, and are proficient with, cad/cam programs.

If you have a really gutsy A&P/IA, you might consider listing it as a minor alteration and the only requirement would be a log book entry by an "A" licensed mechanic or other entity authorized to return the aircraft to service following a minor alteration. I would go for the local approval, but there may be others who would buy the minor alteration approach. It is certainly, at least, debatable!

Happy Skies,

Old Bob

[ARTICLES/19991115.132431.msg10595.tex]

7.8 MAINT-MISC

Air Skeg/restoring the S-35**Thu, 20 Aug 1998 14:59:26**

Good Afternoon John,

In a message dated 98-08-20 13:43:05 EDT, you write:

The project aircraft came with a D'Shannon skeg on it but the paperwork got lost along the way. Can anyone help me out with a copy of the STC?

Take it off and throw it away! It is in the way when tying down the airplane. It impedes proper inspection of the tail and it adds weight where you don't need it.

The instructions say that you must keep your feet on the rudder pedals to gain maximum effectiveness of the skeg.

If you place your feet on the rudder pedals and resist the temptation to use aileron unnecessarily, your airplane will have less wiggle than any with the skeg installed. If you really want something that will help with the Beech wiggle, save your money until you can afford an electronic yaw damper. It does not do as good a job as a hard working and attentive human pilot, but it is right there all of the time.

Lose the Skeg!!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980820.145926.msg04606.tex]

Annual Duration**Thu, 2 Oct 1997 18:31:33**

Hi Curt,

Boy that does sound bad!! Obviously we really can't judge what is happening on your airplane without hearing the other side.

I can tell you though, about what it takes to get my airplane annualed.

It usually takes about a day to get it cleaned up and opened up. That includes the time spent noting small discrepancies that need to be looked at and cleaning all of the areas that are not accessible until the covers are pulled.

It generally takes another day to get things greased, oiled and such. If things go well, my inspection and the the retraction test etc. will be done and the airplane ready for the IA by the end of the second day.

The third day I will pick up any small items left and the IA will do his thing. Paper work may run the third day into a long one but that is about a normal shot.

Three good long days provided that there are no other things to do besides a good inspection of a clean and well maintained airplane. Quite often I will have a project which should be accomplished at the same time and that would necessitate a longer time in the shop.

I guess it would be a good idea to ascertain before you allow someone to open up your airplane if they will have the manpower to stay on the job until it is finished. If something is found that will require a wait for parts or such, well those things happen.

It has been my experience that a job that has men working on it sporadically ends up eating up a LOT more shop time than one on which people work steadily till it is done.

Talk to them and get it straightened out as soon as possible.

Yours,

Bob

[ARTICLES/19971002.183133.msg01907.tex]

Annual Inspection**Tue, 24 Mar 1998 17:40:28**

Good Evening Eric Poole,

In a message dated 98-03-24 17:21:14 EST, you write:

On average, what do you think an annual on a 38-year-old Bonanza should cost, with no major problems found?

I would think that an inspection with no problems found should entail approximately 20 hours of labor including cleaning, lubricating, adjusting things and doing the required paperwork, AD searches etc. Any work to be performed such as repairs or replacements would be extra.

The going labor rate in our area is about 55 dollars per hour so the \$1500 doesn't sound too bad. In a low labor area I understand some shop rates are as low as 30 to 35 bucks per hour and that would make a considerable difference.

When I hear about 3 or 4 hundred dollar annuals I just can't believe the airplane is being properly inspected. There are certain things that must be done and it takes a fair amount of time to perform those functions. I don't see how it could be done in less than twenty hours.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980324_174028.msg01335.tex]

Annual Inspections**Tue, 24 Mar 1998 19:02:27**

Good Evening Eric,

In a message dated 98-03-24 18:41:18 EST, you write:

Almost two weeks. But that's not my fault. They kept pulling themselves off of my airplane to work on "more important" stuff, which was OK by me up to a point (and I told them that anything up to a couple of weeks would probably be OK).

Even the finest and most conscientious cost conscious shop will find the cost creeping up on an airplane that is allowed to sit. Unfortunate but true. It is generally best to have a tight schedule to get the airplane out.

Happy Skies,

Bob

[ARTICLES/19980324_190227.msg01343.tex]

Annual Inspections**Wed, 25 Mar 1998 11:41:58**

Good Morning Bob Belovich,

In a message dated 98-03-25 10:57:37 EST, you write:

Could you publish your "self-annual checklist.

There is a checklist in the maintenance manual for your airplane. Even if you do not intend to do any of your own maintenance, you should invest in the manual with revision service for your airplane, it's engine, propeller and any of it's other accessories. many mechanics do not keep up to date copies of these required documents and as an owner you should see that they are available before any maintenance is performed. That IS required by the regulations!

Total cost should be a couple of hundred bucks to start with and revision service about a hundred per year. If there are others of a like mind with aircraft covered by the same manuals, they can easily be shared.

I share my manuals, AD service and other such stuff with several other mechanics and pilots. Works great and we are all legal!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980325_114158.msg01380.tex]

Brackett Air Filter**Mon, 17 Jan 2000 21:31:33**

In a message dated 1/17/00 7:03:13 PM Central Standard Time, flyinglo@email.msn.com writes:

Bob, that would be interesting to check. However, a Beech filter would probably not fit in the Brackett housing, right? This is a IO-470-C.

Good Evening Jerry,

No, the Beech unit won't fit in the Brackett housing, but most of the Brackett housings fit in the Beech mountings. I do believe some of them require a minor modification to be made to the airplane before the Brackett unit goes on, but as I recall, on most airplanes all that is required is to remove the Brackett, reinstall a Beech filter and file a 337 stating that the Brackett has been removed.

I agree that the paper work is stupid, but the FEDs claim that if you need a 337 to put it on, you need a 337 to take it off! You aren't using the 337 to approve the installation of the Beech filter, it is in the op specs for the airplane. The 337 is to show that the Brackett was removed.

The biggest disadvantage is the cost of the Beech filter. I don't have it right here but as I recall it is about ten times the price of the Brackett! I believe the Brackett filters a little better as well.

Happy Skies,

Old Bob

[ARTICLES/20000117.213133.msg00972.tex]

Carpet Installation

Wed, 24 Sep 1997 09:11:16

Hi Jim,

The newer airplanes have Velcro. Mine is 19 years old, has over 2000 hours use and the carpets are removed at least twice a year and sometimes more often. The Velcro is still serving just fine.

Yours,

Bob

[ARTICLES/19970924_091116_msg01809.tex]

Cowl Flap Rigging**Sat, 31 Mar 2001 10:21:05**

In a message dated 3/31/01 9:10:17 AM Central Standard Time, rick@boatservices.com writes:

Recently, the cowl flaps on my 36 have started creeping open on their own while straight & level. All of the linkage appears to be OK. Any tips?

Rick, E-3

Good Morning Rick,

The rigging has probably slipped.

Get the maintenance manual and follow the rigging instructions.

Basically, they are supposed to be rigged so that the bell crank is slightly over center in relation to the cowl flap door actuating rods. The most likely place for yours to have slipped is at the phenolic block on the firewall.

However, I really urge you to read the factory maintenance manual before you attempt any adjustments.

Happy Skies,

Old Bob

[ARTICLES/20010331_102105_msg06955.tex]

Cowl Flaps Hang**Wed, 5 May 1999 22:33:38**

In a message dated 5/5/99 8:43:01 PM Central Daylight Time, SOxman@oxko.com writes:

My cowl flaps are difficult to operate. Steve K-35 N12711

Good Evening Steve,

First, remove the cross-shaft assembly and check that both elements are straight. It is very hard to discern the bend with the unit installed.

Then, if you can round up the manpower, put the airplane on jacks and get two of your assistants to sit under the wing and push up on the main landing gear while you have another assistant crank it up. The gear will not be hurt provided that those two main gear pusher-uppers are doing their job!

Have another helper hold the right hand (or left or both!) nose gear door(s) out so that the lift arm fork is at it's lowest position. Then check to see that the lift pin fits smoothly into the fork. You can also look at the cowl flap fork and see if it shows signs of having been rubbed on the top of the fork.

The problem is often intermittent. Might only ride up on top one time out of fifty or so.

Rig the pin so that it rides on the top of the fork slot with the gear doors held out and the bottom of the slot with the gear doors held inboard.

Good luck and:

Happy Skies,

Bob

PS If you are short of helpers, the gear can be "bumped up" electrically as described in the maintenance manual. If you try to crank it up by the hand crank you may over stress and break off the ears into which the "screw diver blade" fitting on the hand crank rides. That is the weak point of the system. Pushing up on the mains unloads the system so that it won't be overstressed.

[ARTICLES/19990505.223338.msg04367.tex]

Cowl Flaps Hanging up

Tue, 28 Nov 2000 14:24:23

In a message dated 11/28/00 12:08:54 PM Central Standard Time, burnside@pressroom.com writes:

I'm interested in learning more about this procedure and what it will and will not remedy. Specifically, my cowl flaps are relatively easy to open and close when the gear is extended. When the gear is retracted in flight, however, the cowl flaps are easy to close, but rarely can they be opened, even partially, once they are fully closed.

Is it your impression that this disassembly, cleaning, lube and re-assembly will alleviate this stiffness in them when the gear is up?

Good Afternoon Jeb,

If your cowl flaps are hard to operate when the gear is up, there is definitely something wrong.

You may be even be one of those very few unlucky souls whose nose gear retract pin slides over the top of the fork and not into the mouth when the gear is retracted. That doesn't occur very often, but when it does, it puts a tremendous pressure on the cowl flap cross shaft.

Why the cowl flap cross shaft?

Because, when Beech designed the Bonanza one of the prime criteria was to make it as light as possible. To this end, a major effort was placed to have one component do many jobs. That is why they had the combination Wobble Pump, Fuel Selector Valve and Fuel Filter assembly. One unit doing multiple jobs.

The cowl flap shaft runs across the wheel well and provides a shaft on which the nose gear door retract cross shaft can ride. Double duty engineering at it's best!

When the nose gear is being retracted, the little pin on the lift leg link eventually slides into the fork on the cross shaft. That rotates and pulls up the doors.

On all of the early airplanes, there is no adjustment for the position of the pin. The later airplanes, have the pin adjustable so that it can be made to fit into the fork better. Adjusting the position of the pin can vary the pressure put on the cross shaft when the gear is retracted.

It is not at all unusual to find both of the cross shafts bent. When they are removed, they should be placed in V blocks and checked for straightness. Due to the various weldments that are on the shafts, a little misalignment is not always visible to a casual inspection.

If the shafts are bent, they should be straightened or replaced, but that isn't the end of the job. The next thing is to find out why they bent. That is more difficult to do and

there is little or no adjustment available to the erstwhile mechanic.

When the mechanism is being checked for proper operation, a pressure should be applied against the nose gear doors to the outside, or open, direction. That is the way the airloads act on the doors. They are blown out, not in. The mechanism may work just fine on the jacks when there are no airloads, but the pin can ride up over the top of the fork when the air loads are applied. That will result in a bent cross shaft and further deterioration of the mechanism.

It is easy to take apart. I prefer to release the nose gear door lift rods by taking them off at the hinge and/or at the lift arms on the cross shaft. That does not disturb the length and does not require a disassembly of the ball joint. If the balls are dirty and need cleaning anyway, there is nothing wrong with doing it Steve's way. The new ones cannot be disassembled in that manner and must be done either the way I described or by unscrewing them from the rods. If the number of turns is carefully recorded, they may be reinstalled without requiring rerigging, but they usually need a little tuning up every year anyway.

One common point of wear is on the right side where the bell crank is fastened to the cross shaft. If that is allowed to become loose, it will wear rapidly. It can be shimmed to provide a tight fit and reduce the wear.

The main thing, though, is to check both shafts for straightness!

Happy Skies,

Old Bob

[ARTICLES/20001128.142423.msg16849.tex]

Drag testing, was Assist step**Tue, 6 Jan 1998 12:58:20**

Tom Turner

In a message dated 98-01-06 10:03:24 EST, you write:

the maximum airspeed range does vary from plane to plane. When I was selling the things we claimed "at least" 195 KTAS; I never delivered a turbo'd Bonanza that did less than 197KTAS with just me, half tanks and at 75% power, 20,000 feet, and 100F rich of peak (best power).

Hi Tom,

When you were doing your speed tests, did you have a chance to calibrate your airspeed indicators? I agree that there is ten mph or more difference in brand new airplanes depending on the rigging, but I have also found ten mph difference in indicated speed when flying alongside other airplanes.

Many years ago I had the opportunity to do some flight tests using an FAA calibrated trailing bomb unit to calibrate our airspeed indicator but even that left difficult to analyze problems.

Getting a good calibrated airspeed is only part of the problem. Finding a stable air mass with no lifting or settling is extremely difficult.

I rather feel that the best way to really tell what a true airspeed is on any airplane is to make a series of upwind/downwind runs with a GPS unit over a period of several weeks and in lots of different weather conditions. Even then you are still only obtaining an average. Comparison tests against another aircraft are by far the easiest and fastest way to determine the effect of any small change to rigging or other aerodynamic improvements.

As an aside, one of the methods that Steve Wittman used to evaluate drag on his wings was to make the changes on only one side at a time and then go fly the airplane to see if he could detect the change by rudder trim change or change in stalling characteristics. Direct comparison wind tunnel!!

It ain't easy.

Bob

[ARTICLES/19980106_125820_msg00134.tex]

Dzus Fastener Tool**Sun, 31 Oct 1999 23:07:33**

In a message dated 10/31/99 7:33:14 PM Central Standard Time, sderrick@tnstaafl.net writes:

I can think of many other items that I could waste my money on! My \$5.00 gas drain with a flat head screwdriver attachment works pretty good for me..

No doubt that such a device will work, probably for a long time too!

However, any fastener will last longer if the device used to operate it fits the receptacle into which it inserted as tightly as possible. That is true for Phillips, Reed and Prince, Camlock, Torx, regular slotted screws and Dzus fasteners.

The design of the Dzus is for something with parallel faces and a curved blade end.

It is expected that the tool will be appropriately heat treated for wear resistance and strength. Anything else will wear the fitting out faster than the proper tool.

You could undoubtedly make one yourself. As I said earlier, we made our own in aircraft mechanics school. Most of ours didn't last too long as we didn't do that great of a job at heat treating.

As always, it depends on what you want and what you are willing to pay, either in dollars or effort.

Happy Skies,

Old Bob

[ARTICLES/19991031_230733_msg09965.tex]

Elevator Trim Indicator Dial Illumination**Wed, 15 Sep 1999 10:49:17**

In a message dated 9/15/99 9:18:08 AM Central Daylight Time, beech_35@yahoo.com writes:

Stephen_Kolacz@avid.com wrote:

Anyway, my question is in regards to the Elevator Trim indicator dial in a 1970 V35B. Does anyone know if that indicator dial is supposed to be lighted?

FWIW mine is illuminated. (V35)

Good Morning Stephen,

Welcome to Howard Page's Bonanza Forum! I hope you find it as helpful and interesting as have I.

Your trim indicator does have a bulb to provide backlighting, at least it did have when it left the factory!

It is located so as to shine on the trim dial from the front so as to shine through the dial. The bulb base is mounted on a small bracket just to the left of indicator. If there has been nothing mounted to the left of the control column mount and below the panel on that side, it is not too difficult for a young agile person to access. For me, it takes a bit of effort!

If the intensity is not what you think it should be, I would check that the dial is clean on both the inside, where the light shines, and on the outside, where we look at it.

The placement of the bulb and bracket is such that someone working behind the panel could easily bend it out of position if something less than TLC is used while working there, so the placement of the bulb should be checked as well. If my memory serves correctly, there is a light guide that is supposed to be slipped over the bulb, should that be missing, it might make the light less efficient. Finally, the bulb should be checked to see that it is of the proper rating.

Any help?

Happy Skies,

Old Bob

[ARTICLES/19990915_104917_msg08458.tex]

Emergency Static Vent**Tue, 6 Feb 2001 09:49:07**

In a message dated 2/6/01 8:22:38 AM Central Standard Time, lanius@firstworld.net writes:

I had one incident where the static system became blocked while flying IMC in a friend's 58 Baron around Pueblo, Colorado. I later found out the plane was washed by the owner's son the day before. When I detected the problem, I opened the emergency static vent on the side panel by my knee and I got my altimeter back. I suspect the ports froze because we didn't see any water in the drain lines after I landed. As part of pre-flight, I now look carefully at the static port buttons.....wpl

Good Morning Patrick,

I guess that is why Beech offers the heated static vent as an option!

That little emergency static vent did it's job for you, didn't it?

I wonder if those of our group who are making the valiant effort to gain easy access to their static system drain might not be well served by assuring that their airplane is equipped with the emergency static vent?

I don't remember when Beech started installing it and am not sure whether it was a standard or an optional item, but it is certainly a good idea to have one.

I also don't have any idea of what the cost is for the one that Beech uses, but I have seen some airplanes where the folks had installed a stock Curtiss drain valve in the static line for that purpose. I suppose some might consider that a major alteration, due to the fact that it is in a rather primary flight reference system, but I would buy it as a minor alteration and be happy with a log book entry by someone with at least an Airframe mechanics certificate.

Happy Skies,

Old Bob

[ARTICLES/20010206_094907_msg02917.tex]

Failed Alternators/Generators Away From Home**Wed, 20 Jan 1999 01:23:36**

In a message dated 1/19/99 9:59:48 PM Central Standard Time, epoole@auctionweb.com writes:

Is it actually legal to do that

ferrytheairplane

? Seems that an alternator is a fairly critical piece of equipment ... is it legal to take off with a known inoperative alternator?

If you want to do it and can find an A&P who will agree that it can be done safely, get a ferry permit, but be sure and let your insurance company know you are going to do so. I have been told that some insurance is no good if you operate on a ferry permit without their approval.

Happy Skies,

Old Bob

[ARTICLES/19990120_012336.msg00849.tex]

Fixed Step**Fri, 21 Jul 2000 16:20:46**

In a message dated 7/21/00 1:10:44 PM Central Daylight Time, k5hmd@worldnet.att.net writes:

Would you expect the same gain if you removed a fixed step from a later model?

Good Afternoon Joe,

No, I wouldn't. The later model fixed steps have the supporting tube lined up with the thin edge toward the airstream and they are slightly shorter. The P model and some of the Debonairs had a round tube to support the step. The retractable one uses a fairly wide streamlined tubing with the fat, flat surface facing the airstream. Very high drag.

I would imagine that one, maybe at the outside, two knots, could be saved by eliminating the step altogether on an S model or later, but such small amounts are very difficult to verify. I think the round one from the P would be higher drag than the newer ones, but have no data to prove it.

Happy Skies,

Old Bob

[ARTICLES/20000721_162046.msg11203.tex]

Flap Rigging**Mon, 6 Oct 1997 13:31:46**

Hi Bill Fleming,

The question – ” How did you know the flaps needed rigging?” is an interesting one.

For starters, that is one of the most common reasons for one model 33, 35 or 36 to be slower than another similar vintage, weight and condition airframe.

The Beech rigging procedure states that, unlike most other airplanes, bubble protractors are NOT to be used for checking the rigging of those airplanes. You will find that most ”speed demons” just rig the flaps as high as possible without bending anything.

The early airplanes had a U shaped rubber bumper that fit in the flap track to take out the rattle when the flaps were adjusted to the factory specified settings. (More on these later) When I had early airplanes, I took out that bumper which was about 3/16” thick and replaced it with old fashioned rubber electricians tape which may not even be available any more, but was about 1/16” thick thereby allowing me to bring my flaps up a little higher. I then rigged the ailerons up to line up with the flaps.

Very unscientific but I always thought I was picking up 3 or 4 mph. It is difficult to tell though without sophisticated test equipment and procedures.

The newer airplanes have little toilet seat style bumpers out near the outboard section of the flap mounted on the structure just forward of the flap.

The flaps are first adjusted to the desired setting and then the adjustable bumpers are screwed out far enough to hit the flap when retracted and eliminate rattle They are NOT designed as stops. They are there strictly to stop the rattling.and vibration.

Misadjusted flaps can start to tear up structure in the wing so caution should be used when messing around here.

Now the BIG problem.

I recently decided that I would like to obtain the equipment necessary to rig the Beech 33, 35 and 36 line as per factory directions.

I took the manual out and checked on what equipment they felt was required to do the job. After writing down all of the part numbers of the special equipment and tools required, I called RAPID (Raytheons parts division) and obtained the prices. The required travel boards and jigging devices that are necessary range in price from the cheapest at about \$700.00 to the priciest (a very small one used to rig the trim tabs) at over \$5000.00.

The stuff for my airplane (not enough to cover the whole fleet) was over \$30,000.00.

Now I know why most shops just line things up by eyeball and see how she flies!!

I gave up on the idea of purchasing the equipment from Raytheon and am currently looking into other avenues of obtaining the required stuff!

If anybody has some good ideas, let me know.

I have seen travel boards made from 3/4" plywood.. I don't know if those were factory ones or not. If a layout or template could be obtained that might be an answer.

Don't know if this answers any questions but I just thought I would put it out for comment.

Yours,

Bob

[ARTICLES/19971006.133146.msg01964.tex]

Fuel Sump Winged Fastener**Wed, 19 Nov 1997 10:23:35**

To Glenn and all,

In a message dated 97-11-19 05:32:38 EST, you write:

Performance Aero, Inc. advertises a "Bonanza Fuel Sump Door Winged Stud" for \$11.00. Look at their ad on page 4952L in the October 1997 ABS Magazine.

In many cases, I find small standard parts such as this to be relatively low priced at RAPID (the parts division of Raytheon), so I checked and this is what I found:

Part Number - WL98293-1-060 — Stud \$11.40 each Part Number - 99785-2 —————
—Cross Pin .80 (but with minimum order of 25)

I guess that means if you are paying list, it is still rather expensive for a small part.

Performance Aero has done the job of finding the source so it seems they deserve the profit!

If anyone wants to check prices directly with RAPID, their number is 1-800-428-3234.

You will need a Part Number, all you get is a person at a computer terminal, very pleasant and helpful, BUT! No product knowledge.

As always,

Bob

[ARTICLES/19971119_102335.msg02433.tex]

Getting Your A&P**Mon, 22 Nov 1999 00:10:36**

In a message dated 11/21/99 10:49:40 PM Central Standard Time, thender@ix.netcom.com writes:

As I expected, the experience requirement looks like a killer for any of us weekend mechanics.

Well Tom, it has been done! The FAA will generally accept a log book that shows the work performed and who supervised it. Thirty months of four weeks each at forty hours per week is 4800 hours. That is a lot of time! Remember though, that an apprentice mechanic is washing airplanes, sweeping out the hangar and cleaning parts for a lot of those hours. As he/she gains experience, time will be spent perusing catalogs and parts books to order things to be used in maintenance procedures. Later on, time will be spent seeing that the paperwork is all in order and ADs complied with. All of the time is not spend welding, riveting, gluing wing spars or bending wrenches! Doesn't that sound a lot like things that all of we owners do all of the time? Keep track of everything you do, find a friendly A&P you is willing to be your mentor/instructor and get started!

Another possibility is to attend a local college or other educational facility that provides a night school style of program. Some of those have programs approved where both licenses can be earned in as little as eighteen months or even less!

Happy Skies,

Old Bob

[ARTICLES/19991122.001036.msg10938.tex]

Go Fast Stuff**Thu, 9 Jul 1998 11:15:33**

Good Morning John,

In a message dated 98-07-08 17:45:54 EDT, you write:

Can you recommend some reading that would perhaps give me a few more knots on mine?

I wish I could, but I am not familiar with anything specifically referencing speed mods.

Over the years both the ABS magazine and the EAA publications have addressed specific drag reduction problems and it would probably be advantageous to look through the ABS CD and back issues of the EAA newsletters to see what might be found.

My personal recollections are a combination of hearsay, old wives tales, common knowledge (as perceived by me), personal prejudices and interpretations of statements made by others.

Along that vein, it is my perception that mods done by Alan Peterson (BDS) are strictly "cut and try" with retention of what does best. Roy LoPresti attacks problems from the vantage point of a well trained and experienced aeronautical design engineer.

It seems to me that Mike Smith is a little closer to the Alan Peterson mode but he used "book learning" to a little greater advantage than does Alan. I wish Roy LoPresti would go to work on our favorite machine.

The original Bonanza design was a text book study of how to use the knowledge of the day to reduce drag and gain maximum performance from a small engine.

Frontal area was reduced by eliminating every external protuberance possible and placing the function within the structure. All of the landing gear retracts completely and even the loop navigation antenna was placed within the structure. The door handles are flush as are the hinges. The entrance step retracted, and so forth.

Skin drag was to be reduced by using electric spot welding to eliminate the rivets. When that didn't work out too well, they were to be replaced with flush rivets.

The weight of the structure and it's accessories was given extreme attention. The combination fuel valve and wobble pump assembly is one example of ingenious weight saving design.

The combination of all this detail engineering was a very light weight, low drag machine.

Over the years "tons" of unnecessary weight have been added to achieve commonality of parts for increased manufacturing efficiency.

Protruding head rivets have replaced flush ones in many places where a little design effort would have allowed the retention of flush fastening devices.

So what can you do to make it go faster?

The principal drag producing device on the airplane is the wing and it is difficult to eliminate that.

The weight of the structure is difficult to address, but weight in general is one area over which we have some control. Keep it light.

It also goes fastest with an aft C.G. but that can lead to controlability issues. Be sure it is within approved limits.

Drag reduction that we can control appears to be along the lines of what Mike Smith has done.

Make sure that the airplane is in proper rig.

That is a lot easier said than done and is an area in which Mike Smith probably has the most expertise in the world. Rigging the wing angle of incidence is not easy but is very important. Mike always said it is a matter of adjusting and flying till you get it right. Don't forget rigging of the ruddervators.

Once the airplane is rigged to perfection, install gap seals

Make sure that all of the doors and windows close tightly and that all of the seals are doing their job. Every air leak is a little protuberance creating drag.

Eliminate the air intake on the top of the fuselage. Mike put an NACA type inlet in the left side aft inspection plate. I have no idea if it works or not but it looks like it would reduce the drag!

No antennas or lights on the top of the fuselage.

That one would be hard for me to live with, but if you want the least drag it is the way to go!

Mike put the ADF antenna AND the comm antenna in the tailcone on some airplanes.

I don't see how that can work properly but have talked to people who had that arrangement and said it seems to work!

He mounted the ELT antenna inside the airplane near the side windows. Does it work? I would hope no one ever finds out.

I am sure there are many other aspects we could discuss, but my wife is bugging me to get off the computer and go mow the lawn. Such is life!

Happy Skies,

Bob

[ARTICLES/19980709.111533.msg03557.tex]

Grimes Beacon**Fri, 12 Mar 1999 00:13:41**

In a message dated 3/11/99 5:56:44 PM Central Standard Time, aerome@onramp.net writes:

Thanks Cy; I really need to get out to the hangar and measure it, but from memory it probably is about 3.5" or bigger. I couldn't find anything about replacements in the Spruce catalog, so I'll maybe check the junkyards. Al

Good Evening Al,

Have you tried Leatherwood at Paso Robles?

He has purchased most of the loose stock of Grimes beacons from around the country. If that is what you have, there is a good possibility he has the parts.

Happy Skies,

Old Bob

[ARTICLES/19990312.001341.msg02788.tex]

Hartzell AD Problems**Sun, 1 Nov 1998 10:33:30**

Good Morning John Small,

In a message dated 11/1/98 8:53:55 AM Central Standard Time, jtsmall@onramp.net writes:

I suppose my question/comment has been discussed previously to some extent. I'm having a bit of a problem coming to terms with expensive AD's that amount to faulty engineering on the part of the manufacturer. It is one thing to pay top dollar for parts. Is it too much to also expect that they are air worthy too? Must we pay for the manufacturers' lack of expertise? After all it's not like we get the parts at a bargain price to begin with.

This is a tough one. I tend to feel that our friends who are manufacturing the parts contained in the assembly we use for aerial transportation are as competent and responsible as any human beings on the planet Earth.

Faulty engineering is a rather broad and unfair indictment of the industry. I am not following the Hartzell troubles closely, but am confident that all of their designs were at the state of the art when developed.

A very high percentage of the difficulties we have with our flying machines is caused by we operators not following the dictates of the maintenance and operational parameters established by the manufacturer.

But even with the best state of the art engineering and the most intense application of diligence in maintenance and operation of the machines, problems are bound to occur. The AD system is the response we have to get the word to the operators of the equipment.

Many times the initial corrective action is serious overkill and the problems are mitigated when other minds start to work on the situation. We are still a group of humans and nothing is perfect.

With all of the difficulty, I think that you will find that the accidents due to failure of equipment are few and becoming fewer. The system does work!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981101_103330_msg06551.tex]

Magnesium Ruddervators**Tue, 18 Apr 2000 14:18:34**

In a message dated 4/18/00 12:58:01 PM Central Daylight Time, MikeM86949@aol.com writes:

Would I then decide, no, I'd rather spend \$15,000 on plastic parts so some owner 25 years into the future won't have this problem? I think not. I would just replace with Magnesium.

Good Afternoon Mike,

I believe that shows that there are still differences of opinion as to how we evaluate purchases for our aircraft.

You are assuming that the new ones from Raytheon are suitable for your use. I, on the other hand, feel that surfaces that met the specifications delineated would be superior to the Raytheon product and less likely to encounter the difficulties of old age that have afflicted the 35, A35, B35 and 35R aircraft. To me, even at my advanced age, that is the better value.

You spend your money and you take your choice.

Happy Skies,

Old Bob

[ARTICLES/20000418.141834.msg06641.tex]

Magneto Timing Buzz Box/Down Lock Tension Measuring Device**Mon, 23 Aug 1999 11:55:56**

In a message dated 8/23/99 8:54:10 AM Central Daylight Time, flyboy_98@yahoo.com writes:

can anyone please recommend a good magneto timing indicator?

Good Morning Jason,

Are you referring to the timing light or a method of determining the engine rotation relative to top dead center?

I like the little buzz box devices to tell me when the points open and on the 520 and 550 you can use the timing mark on the generator drive gear to find 22 degrees before top dead center. If you want to check that mark's accuracy or if you have an engine that needs a timing indicator, I like to use a degree disk on the prop combined with a mechanical stop in the plug hole to locate top dead center.

I recently purchased a new buzz box, timing indicator and sparkplug pin for locating top dead center from Eastern Technology Corporation. They seem well made and were relatively economical. I am sure there are many others available and I did not research the market before I bought mine. They were just advertised in Trade A Plane and convenient to buy.

I formerly used a Time Rite. They are OK, but I like the timing disc better.

Also, where can I purchase a tension meter for checking down-lock tension on the landing gear?

Raytheon has them for sale and you are in luck!

When ABS worked hard a couple of years ago to get some of the prices reduced on Beech parts, the tension measuring device was one of those devices which enjoyed a massive price cut.

The price was reduced some 45%! They lowered it from around \$4500 to about \$2500. Such a deal!

The device consists of a quality fish scale that can measure from both ends, pull or push. Beech added a nice brass handle to one end and a small hard rubber knob to the push end. That added \$4200 bucks to the tool provided they paid full list for the scale as I did.

I purchased the same scale from a high priced supply house and it was less than \$300, still way over priced, but at least affordable. I would imagine cheaper ones are available and the only criteria would be that you should have some method of calibrating or checking the accuracy of any scale you use.

Have fun!

Happy Skies,

Old Bob

[ARTICLES/19990823.115556.msg07182.tex]

Main Gear Strut Rebuilding**Wed, 10 Nov 1999 13:15:32**

In a message dated 11/10/99 11:56:07 AM Central Standard Time, barryb@pon.net writes:

Carmine Pecoraro wrote:

Replace the "O" rings. Cheers Carmine Pecoraro

I have a similar problem. My AI tells me you have to take the gear off the Bonanza to rebuild. I'm gonna wait til I get my new engine paid for. G

Barry

Good Morning Barry,

I have seen the struts rebuilt in place but consider it stupid and false economy to do so!

None of the three are hard to pull. They merely need to be disconnected at the lift leg, appropriate wiring and plumbing disconnected and the hinge bolts/bushings removed.

If the hinge bolts or bushings are hard to get out, that means they need lubrication anyway!

Pulling all three struts should not take over an hour even for the most fastidious and careful mechanic.

Once removed, the rebuild is much easier than with the struts in place.

Happy Skies,

Old Bob

[ARTICLES/19991110.131532.msg10439.tex]

Measuring Airspeed**Thu, 24 Jul 1997 10:15:49**

To John Whitehead,

It appears that I am still not getting all of the mail on the circuit. I have not yet received your mail on the airspeed question but I did receive the answer to your message which recommended the four way run!

That certainly is a good method. I usually just pick a heading that is into the wind and don't worry about the visual ground track. I adjust the heading (I use the flux gate compass and have checked it's accuracy) until it and the ground track shown on my GPS are the same. Then make a series of runs upwind and downwind and average the ground speeds.

I have found that in high wind conditions the heading and wind speeds are variable enough that good consistency is hard to find. It seems to work best in very light winds and good stable air. If I can't get repeatable results on at least three or four runs I disregard the results and then try again another day. I make sure that the airplane has stabilized at the same indicated airspeed both ways and make the runs at least three minutes long before making the one-eighty.

When I first started doing this I had about a five knot error in my indicator. I took it to the instrument shop and had it recalibrated (He did find that it was about four knots off) I still find that I have a couple of knots error at both high and low indicated speeds and I believe that is an installation error in my airplane. (The static and pitot systems are OK).

It may not be a particularly fast airplane but I still like it!

Bob

[ARTICLES/19970724.101549.msg01355.tex]

Nose Weight**Fri, 28 Aug 1998 02:23:23**

Good Morning George Vasick

In a message dated 98-08-27 19:39:37 EDT, you write:

I already have a new Hartzell 3 blade, but I don't know the weight of the prop itself. We reweighed the plane after the new prop and IO-550 upgrade. I guess I could always add a turbo. :-)

There have been local approvals for weights added on the stringers just aft of the plus ten bulkhead.

Norm Colvin recommended putting shot bags of lead shot in the nose cowl alongside the weight installed on all of the non-stretched airplanes built from 1964 on.

He felt it did not need paper work but only a pilot notation on the weight and balance computations. I believe he considered it as discretionary located baggage!

While I normally feel Norm was pretty accurate with his recommendations, I do have a small problem with this particular procedure and would recommend a 337 local approval on solid weights installed securely as far forward as practical.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980828_022323.msg04913.tex]

Oil Filter Torque**Wed, 5 May 1999 00:10:00**

In a message dated 5/4/99 10:39:26 PM Central Daylight Time, jtsmall@onramp.net writes:

Oh yes. Sure of that. Two different Craftsman wrenches.

Good Evening John,

I think I agree with those that counsel you to put the filter on finger tight and then turn it down 3/4 of a turn.

Torque wrenches all have great differences and a wide scatter. That is why critical bolts are often torqued by measuring the bolt elongation. It is much more accurate than any torque wrench.

Turning the filter down 3/4 of a turn is rather like stretching the bolt, probably more accurate than torqueing.

I think I would take the one that you turned down two turns off of the engine as soon as possible and I would throw it away and start out with a new one.

Happy Skies,

Old Bob

[ARTICLES/19990505_001000_msg04333.tex]

Oil Filter Torque**Wed, 5 May 1999 23:35:42**

In a message dated 5/5/99 10:21:37 PM Central Daylight Time, jtsmall@onramp.net writes:

It's not leaking ... if too tight I would expect it to deform the gasket resulting in a leak, right?

Good Evening John,

No, over tightening will make it very hard to remove. The longer it is on, the harder it will be to get off. The use of heat as was advised earlier will likely help though I have never tried it. I still prefer the 3/4 turn method. Been using it forever and have never had a leak problem or undue difficulty with removal. I don't know where your A&P obtained the information concerning using more turns, but nothing that I have says anything other than the 3/4 turn technique.

When I was using the Ultimate filter, I torqued it with a very high quality recently calibrated torque wrench and found that it hit the proper torque at almost exactly the 3/4 turn position. The gasket seemed very similar to those used on the standard Champion filter.

Do what you think best, but I bet the thing will be a bear to get off at the next oil change!

Happy Skies,

Old Bob

[ARTICLES/19990505.233542.msg04376.tex]

Overweight Bonanza?**Mon, 31 Aug 1998 00:47:05**

Good Evening Joe,

In a message dated 8/30/98 11:06:22 PM Central Daylight Time, jgarner@elelink.xo.com writes:

I've been going over the old W&B sheets that I did— it was weighed just before I bought it – trying to find the extra weight. There are a few entries with 'no change' or 'negligible change' but nothing that would add up to the 109#.

It can be very difficult to reconcile actual weights with the factory weight. You may well find that the original weight figures for your airplane are calculated not actual weights. Look at the original papers and see what it says. I have also found incorrect weights for components used by Beech. I suppose there is always that conscious or unconscious effort to keep the numbers as favorable as possible. I have also found factory arms that were not correct. The components were usually farther aft than shown in the paperwork.

Is it reasonable that the windshield and panel mod added that much? Reweighing was the plan from the start of the project so I didnt weigh the parts going in or out. My feeling was that I took out more than I put in, there where a lot of parts in the old panel and the new one was much simpler.

I am not up to speed on the weight of the thicker windows but I have a recollection that there is some fifteen pounds additional for a 3/8s over a 1/4 and another fifteen pounds for a 1/2 inch windshield. Seems that it would be easy to add thirty or more pounds with thicker windows.

I have weighed the old panel components and the new when replacing the early style with a newer floating unit and it was about a draw.

Your numbers for the engine seem a little high. They can be checked quite easily if you will look in the aircraft specs for your engine and the one you replaced. I have found there is usually a bigger difference in the weights of the accessories than the engines. Have you included all of the wiring and such for new equipment?

I was present when the plane was weighed and the system the guy used looked pretty good, digital scales, one for each wheel. Even added the 3 numbers for a total. Didnt figure a balance though, did that with a calculator.

The plane was weighed with full fuel and that could be a source of error... When I get flying I'll empty the tanks and see how much they hold, that might help – or hurt!

I have never found a Bonanza tank that would not hold more fuel than the tank was placarded for. The forty gallon tanks without the anti slosh stuff will usually hold about 41 or 41 and 1/4 gallons. If they have the antislosh junk the capacity is usually 1/3 to 1/2 gallon less.

Similar numbers are true for the 20 or 25 gallon tanks.

There can be some problem with fuel dispensing equipment. It depends on how recently the weights and measure people have checked the equipment. Four percent errors are not uncommon.

If you want to get real technical, you can check on the specific gravity of the fuel. 100 LL usually runs between 5.85 and 5.95 pounds per gallon.

I have seen electronic automotive scales used that have a caution listed that they are only accurate within 2 percent. 2 percent of 2000 pounds is 40 pounds! Not insignificant! If there is considerable tare and full fuel the total weight might be 2600 or more and the 2 percent error would be 52 pounds. After subtracting the tare and fuel you would still have the full error!

Are the tires heavy duty? Lots of us use heavier tires than are required. Many of the airplanes of the 60s had tubeless. Adding a tube adds considerable weight.

Lots of chances for extra weight to sneak in on us!

Happy Skies,

Bob

[ARTICLES/19980831.004705_msg05034.tex]

Owner Maintenance**Sat, 20 Mar 1999 23:58:15**

Good Evening All,

It is getting a little difficult to follow who said what to who! If anyone is interested, my comments follow these messages

In a message dated 3/20/99 7:21:35 PM Central Standard Time, jtsmall@onramp.net writes:

On Sat, 20 Mar 1999 18:55:27 -0600, n5kxi@ionet.net wrote:

One way to keep the cost down is to learn how, and do a lot of your own work.

Yep ... I'm working on it. But it takes time and is only for the small stuff presently.

Thanks.

-jts

One can only save money by doing his own maintenance if his earning capabilities are less than the charge of those who maintain aircraft professionally.

In my area, the shops charge some 50 to 60 bucks an hour to work on general aviation style aircraft.

If you are a Doctor, a Lawyer or an Indian Chief who can earn more than that per hour for your labor, you are probably better off financially to hire the work done.

I have never earned those lofty sums per hour for my labors, so I do save money by working on my own airplane.

But that isn't the principal reason I like to do my own work. It is satisfying to have attained the knowledge to do so and I find the work interesting and fulfilling. If you also are so inclined, maintain your own bird.

If your reason for doing so is merely to save money, possibly you shouldn't attempt it.

You might well be better off to improve your performance in your principal field of endeavor so that you can do what you enjoy and make sufficient funds to pay a professional to maintain your aircraft.

Happy Skies,

Old Bob

[ARTICLES/19990320_235815.msg03079.tex]

Owner Maintenance**Tue, 21 Dec 1999 10:29:05**

In a message dated 12/21/99 1:13:44 AM Central Standard Time, doug@rds.com writes:

Here's a question for ya:

According to the FARs, a pilot can replace "bulbs, reflectors, and lenses of position and landing lights." 1. Does that include wingtip strobes? 2. If replacing the strobe lamps requires removing the wingtip, do the FARs permit the removal of the wingtip in order to do so?

[I can remember a discussion (not here) about the replacement of brake pads. The theory is that if you remove the wheel to change a tire, the pads fall out. Why not replace them with new ones? :-)]

What do *you* think?

...doug

Good Morning ...doug,

I am sure you have already read this, but for those who haven't:

"Part 43.3, (g)

The holder of a pilot certificate issued under Part 61 may perform preventive maintenance on any aircraft owned or operated by that pilot which is not used under Part 121, 127, 129, or 135.

Part 43, Appendix A, (c)

Preventive Maintenance. Preventive maintenance is limited to the following work, provided it does not involve complex assembly operations."

The FAA then goes on to describe thirty operations that are considered preventive maintenance items.

You will note that the descriptive paragraph titled "Preventive Maintenance" is a little disjointed. The reason for that odd wording is that it formerly said something like this:

Preventive maintenance includes, but is not limited to, the following work, provided it does not involve complex assembly operations.

Taking out those three little words "but is not" and replacing them with "is" makes a major change in how the paragraph may be interpreted.

Whether or not the functions that you describe are considered preventive maintenance depends on the viewpoint of the person making the evaluation!

I tend to think that they are, but the important thing is whether or not you would feel

comfortable defending that position at a hearing!

The change was made some time ago and seemed to elicit very little response from the aviation community.

I think that is a pity, the old way seemed reasonable to me!

In any case, no maintenance can be performed by anyone, A&P, IA, Repairman, Repair Station, or other entity if that entity has not performed that function before. The proper documentation must be used to assure compliance with all pertinent data and the performance of that maintenance must be properly entered in the aircraft records.

Not much help am I!

Happy Skies,

Old Bob

PS The next question is: What constitutes "having performed the function before"?

[ARTICLES/19991221_102905_msg12171.tex]

Painting the Gear**Tue, 18 Aug 1998 18:25:24**

Good Evening John,

In a message dated 98-08-18 17:32:05 EDT, you write:

I'd like your input as to whether or not I should have my landing gear painted with the powder-coat process vs. doing them with epoxy primer and enamel.

I don't know. I wanted to get my landing gear wheels powder coated and I called Beech to see what their thoughts were. They suggested that I call Cleveland and ask them.

Clevelands response was that they were looking into the process but were not sure what the required elevated temperatures would do to the wheels structural integrity.

I did not have my wheels powder coated.

I don't think I would have my struts powder coated without some assurance from a qualified and knowledgeable engineer that the process would not have a negative effect on the structural integrity of the unit.

I personally don't think the high temperature would hurt them at all, BUT I am not an engineer and would respect the engineering opinion.

Give Raytheon a call and see what they say!

Sorry for such a waffling answer,

Bob

[ARTICLES/19980818_182524_msg04510.tex]

Pitot Mast Screws**Tue, 10 Mar 1998 20:22:26**

Good Evening Greg,

In a message dated 98-03-10 18:37:36 EST, you write:

I'm having trouble finding the screws that are used to attach the heated pitot head to the "mast" that attaches it to the wing. These appear to be *something* like a #6 screw with a 40 thread... Definitely an odd size. I can't find any reference to them in the beech shop/parts manual.

Does anyone know what these fasteners are and where I might find them? The ones on my airplane are in really rough shape!

-Greg

My parts catalog shows these as MS24693S224 screws. I don't know if they are the same on all Bonanzas but I would imagine it is a good possibility.

I don't see them listed in my usual catalog sources so I would imagine you are correct in that they are number 6-40s which would be the National Fine thread.

Try Rapid (Raytheon Parts Company) They are usually not too far out of line on prices for AN hardware and the good thing is they tend to have the oddball stuff.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980310_202226_msg01174.tex]

Pulling up the assist step, was Annual from heaven.

Fri, 21 Jul 2000 08:19:06

In a message dated 7/20/00 11:25:21 PM Central Daylight Time, flyinglo@msn.com writes:

Actually, how are they tied together? I mean, if the cable is pulled by the nose gear, it pulls its own spring, but how does that pull the step down?

Good Morning Jerry,

Very simple answer.

It doesn't!

The step is pulled down by the cable that is attached to the nose gear.

The early airplanes had two shock cords. One was used to pull the step up and the other was used to pull the cable back when the nose gear came up. There is a little angle attached to the top of the step. It has a hole in it through which the cable slides. Above that hole is fitting on the step extension cable which is too big to go through the hole in the small piece of angle aluminum. When the nose gear goes down, it pulls the step out. The shock cord which is attached to the step and the one attached to the cable are both extended. If the step should hang up and not want to retract, the shock cord attached to the cable will still pull it up and out of the way so that the cable doesn't get fouled in the nose gear area.

A nice simple and very workable system.

The problem comes when the housing through which the cable extends becomes dirty or gets misaligned. That makes it difficult for the nose gear to pull on the cable. There is a weak link on the nose gear attachment of the cable which is supposed to break if the cable gets too hard to pull. That is sometimes replaced by a stronger link after it breaks a few times. Occasionally the strain becomes so great that the nose gear doesn't get all of the way extended and it collapses on landing.

Not good at all!

Another problem that can cause trouble, besides the dirty or misaligned cable housing, is the effort by some folks to add additional strength to the retraction mechanism via more shock cords or stronger springs.

The factory early on sent out a SB recommending the addition of a second shock cord to help raise the step. Anything that helps raise the step puts a bigger pull on the nose gear as it extends. Add a big enough load and it won't extend all of the way!

Since the shock cords spend most of their life in the stretched position, they don't last too long. They should be replaced every couple of years. The factory offered a spring kit to eliminate the problem of shock cords getting worn out and not being replaced.

The main reason the step does not retract is that it gets dirty. When it gets dirty, the chrome is worn off. That creates more friction and things get worse. Many misguided souls tend to lubricate the step leg. That is not recommended as the step then attracts more dirt.

It is meant to be left dry and not lubricated. The phenolic blocks in which the step slides should be cleaned a couple of times a year and the step will need to be rechromed every four or five years.

When it is properly maintained, the step will retract nicely with just the one shock cord pulling it up.

Another factor in the step retraction equation is the speed at which the airplane is flying when the gear is retracted. The lower the airspeed, the easier it will retract!

Get it off the ground, pick up five knots above the lift off speed and get rid of those draggy wheels. That will let the step retract easier as well as look a lot neater.

I found that the step needed cleaning about every six months to retain proper operation. That included removing it from the airplane and properly cleaning the phenolic blocks. NO lubrication! New chrome helps a lot. If you wait until the chrome is looking bad, the step will not be retracting as easily as it should.

Once again. It is an ingenious solution, but it does take some TLC.

Happy Skies,

Old Bob

[ARTICLES/20000721_081906_msg11180.tex]

Purchase**Tue, 6 Jan 1998 09:01:29**

Good Morning Eric and All,

In a message dated 98-01-06 07:12:58 EST, you write:

As for the logs, the plane is 36 years old. If the logs are complete for the last 31 of those years; if all applicable AD's and SB's have been complied with and logged as such; and if a thorough pre-buy yields no un-accounted-for damage, are logs for the years 1961 through 1966 REALLY that important?

I tend to agree with Eric as to the possibility that the airplane could still be a good buy at SOME price.

I think it is difficult to over pay for a jewel. Ten percent above book is probably still a good buy but there just aren't very many low time NDH 36 year old airplanes out there. The items listed by Larry as detriments aren't all that bad if the price is right. However new paint, new interior and a new major on the engine by a non name shop are all items that the "used car" type salesman will do to an airplane to make it move.

Much more important, as Eric points out, is the actual condition of the airframe. Is there any hail damage? How about internal corrosion especially inside the control surfaces? Can you see where the repairs were made? Have the struts been rebuilt and by whom? Was the landing gear rebuilt? What is the total airframe time? Does it fly straight, coordinated and fast? An airframe that has had five or six thousand hours of excellent maintenance with all service bulletins complied with and factory component rebuild times complied with, may still be a jewel where a two thousand hour airplane that has set outside by the sea shore and never flown could be almost impossible to repair.

It is not easy to evaluate the condition and impossible to evaluate the abuse an airframe has suffered in 36 years but that is the way it is in aviation today. As Larry knows, a fresh annual doesn't mean a thing. All that is required is the airplane meet the minimum airworthiness requirements the day it is annualled.

Since Larry is an A&P I would imagine his trained eye can make the evaluation, it would probably be a good idea though, to get a second opinion from an acknowledged Bonanza expert before determining the value of the airframe.

Tain't easy is it!

Happy Skies,

Bob Siegfried

[ARTICLES/19980106_090129_msg00119.tex]

Rear Bulkhead Inspection**Fri, 13 Jun 1997 14:40:13**

Hi Dennis

Concerning the required 100 hour inspection of the rear bulkhead on the Bonanza.

If you will look at paragraph (b) which starts out "For all airplane models, visually inspect the fuselage bulkheads" etc., you will note that the last sentence of that paragraph reads "Repeat this inspection at each 100-hour TIS interval thereafter."

This inspection is required of all model 35s except those that have been converted to that funny looking inverted "T" tail. It is one of the few things that are mandatory every 100 hours regardless of the type of flying the aircraft is subjected to. If you fly the airplane over 100 hours without having the inspection performed, you are illegal. That was the primary change between AD 87-20-02 R1 and AD 94-20-4.

Keep 'em legal!

Bob

[ARTICLES/19970613.144013.msg01143.tex]

Rear Seat Removal**Thu, 15 Jun 2000 17:42:43**

In a message dated 6/15/00 2:24:09 PM Central Daylight Time, epoule@scoot.netis.com writes:

Is it legal to fly the Bo with only the front seats in?

Good Afternoon Eric,

As Always!

It Depends.

On the straight model 35 aircraft, a portion of the rear seat back is a structural member that stiffens the sides of the fuselage and helps hold them in column. If the seat back is not installed, a suitable FAA approved brace must replace the seat back.

For all of the others, it would be my opinion that the aircraft could be flown without the rear seats.

The newer aircraft generally have the appropriate data in the POH.

For those aircraft without that data, I would make an appropriate entry in the aircraft records that the seats had been removed as a Minor Alteration. That, and a corrected weight and balance, along with a corrected equipment list, should make the operation legal for any of them. A licensed airframe mechanic can make such an entry.

Happy Skies,

Old Bob

[ARTICLES/20000615_174243.msg09744.tex]

Rear Window Latch**Wed, 17 Dec 1997 17:13:52**

Good Evening Peter,

In a message dated 97-12-17 15:40:26 EST, you write:

Same old story - Beech wants \$185 for a small bracket which attaches to the wall of the airplane. The rear window locks into this bracket with a pin. The part is simply worn and needs to be replaced. At \$50 it would still be robbery.

I have been looking at my parts book trying to figure out which piece you are referring to. My manual does not cover your airplane specifically but as I recall they have the same locking mechanism as my V35B.

The very early airplanes had the the mechanism go well over center and that was the primary thing that kept the windows closed. There was a small spring clip but with the over center unit properly adjusted, they would stay closed even if the clip was broken or missing. When the additional upholstery was added, the over center mechanism no longer did a very good job so a positive latch was added. If your airplane has that positive latch and it is not catching due to the slot or latch being worn, I think a repair could be made from flat stock under FAR 43 as normal repair or as a minor alteration depending on the thoughts of your IA.

Am I missing what is worn or not working?

Yours,

Bob Siegfried

[ARTICLES/19971217_171352.msg02786.tex]

Recurring Maintenance**Fri, 23 Oct 1998 08:23:00**

Good Morning Ron Koyich,

In a message dated 10/23/98 1:38:23 AM Central Daylight Time, rkhintak@mnl.sequel.net writes:

Only got one response to my 2000 hour questions the other day - do either of you have any comments?

I remember seeing your message but can't locate it now, the following is in response to what I 'think' you asked.

I haven't looked in my copy of Norm Colvins book to verify this, but it is my recollection that he felt that many of the 2000 hour items were somewhat of an overkill. As an example, I believe he recommended not pulling the landing gear and rebuilding it if it seemed to have been well greased and maintained.

I tend to agree on this particular item with one reservation. The early airplanes had more grease fittings than do the later ones. My 1978 V35B has no grease fitting on the aft main gear trunnion bolt. I am not sure at precisely what point in history that fitting disappeared. When I noted the missing fitting, I asked Norm about it and he didn't know either. It was his feeling at the time that if the gear is not pulled for inspection at 2000 hours, that bolt should be pulled, inspected and hand greased.

I guess what I am trying to say is: Doing the 2000 hour items sure can't hurt but maybe careful attention to those points and evaluation of the need for service would suffice.

My airplane is currently around the 2500 hour mark and I have been trying to pick at those things. It lives in a heated air-conditioned hangar and the only time it is on unimproved areas is at Oshkosh and Sun 'n Fun. Things stay pretty clean and I NEVER power wash anything. So far I have found very little wear in the areas concerned. An airplane that lives outdoors and is exposed to hard service in less than ideal conditions might well require much more often and thorough maintenance.

Happy Skies,

Bob

[ARTICLES/19981023_082300_msg06210.tex]

Removing the Wings

Tue, 14 Sep 1999 23:24:46

In a message dated 9/14/99 9:10:06 PM Central Daylight Time, jfseis@pilot.infi.net writes:

I made some wing stands that are adjustable and have a wooden form cut out the shape of the wing with some pipe insulation installed to protect the paint. This allows you to pull the wing away without any problem - there is no jerking or tugging if the wing is supported fully. We use the airframe jacks to raise the fuselage up and down in order to put full pressure on our wing supports.

Good Evening Ed,

That sounds like a good method to me! I particularly like the idea of using the airframe jack to provide a controlled method of taking the strain off the wings. Every time that I have been involved with removing a wing, it has been done with pure unadulterated man power and there were always many tense moments!

I saw the rig that the Lufthansa school at Goodyear Airport, Phoenix, Arizona used and I was very impressed. They had canvas slings to support both the inner portion and the outer portion of the wing. There were three screw jacks arranged with two at the inboard end and one at the tip. By adjusting them individually, any angle of dihedral and pitch could be accommodated. The whole thing was on wheels. It really was impressive!

It would, however, be a bear to store!

They had also modified their interiors to make the disconnection process simpler. We were told they could put the airplane in the shop at sundown, pull the wings, make a repair on a cracked center section spar and have the airplane back on the line for the next day's flying! They didn't say how much manpower was required.

Happy Skies,

Old Bob

[ARTICLES/19990914.232446.msg08437.tex]

Replacement Heim Bearings**Wed, 24 Jun 1998 16:04:17**

Good Afternoon John Foose,

In a message dated 98-06-24 14:20:53 EDT, you write:

Several of them have the same part no. Bob, I have no explanation as to why one of your differential control rods bearings was .015 wider than called for, with the same part No. yet. It's hard to imagine that .015 would make a difference,

Once again I have failed to make myself clear.

If you purchase the bearing from Beech/Raytheon/Rapid, it will have been ground down so as to fit in the mixer mechanism properly. If you use a stock Heim bearing it will be .015 over size and will not fit with out hammering it into position.

Definitely not good!

The standard dimension for the bearing face to face is .500 inches. It is ground down to .485. The grinding is done either by or at the behest of the Beech/Raytheon folks and the Heim number is still the same but the bearing dimension face to face is now smaller. Every unit that I have purchased from them has been so ground. It is obvious when they are inspected that the grinding was done after original manufacture.

Not all of the Heim end bearings in the airplane are so modified. The only ones that I have checked thoroughly are ones on the ruddervator tubes on "J" model and later airplanes.

Fifteen thousandths of an inch makes for a major mis-fit when forced between two machined aluminum protrusions.

Once again, if the part number in the current parts book is a Beech or Raytheon part number and not the product manufacturers number or an AN number, that part has undergone some modification or additional testing in order to be used in the Beech/Raytheon aircraft.

Purchasing such a part from Berry Bearing or any other source and using it on the airplane is not legal and may or may not be safe depending on the part and it's application.

If the part is listed in the Beech parts book by an unmodified AN number than it may be purchased at any traceable source and used legally on the airplane. If it is listed by the manufacturers part number, most people feel that it may be used freely but there are some who argue that it must have an approved traceability, whatever that is!

With apologies to Frank Kerner, I will jump in on your question to him as long as I have the computer going!

The standard "flat" or "thrust" washer is the AN960-XXX with the "X"s indicating the

size. The "flat washer, large area" or "wood" washer is an AN970-XXX.

The term wood washer comes from it's use on wood spars and such to distribute the load.

Those who are automotively inclined might liken it to a fender washer only it is built to an AN specification.

There was an AD or Service Bulletin (I forget which) several years ago requiring the use of an appropriate size AN 970 washer on the throttle linkage of at least one Piper product to preclude the throttle becoming disconnected if the rod end bearing failed. I tend to use them on the Bonanza for the same purpose.

Happy Skies,

Bob

[ARTICLES/19980624_160417_msg03307.tex]

Replacement Zerk Fittings

Thu, 5 Feb 1998 23:25:56

Good Evening Glenn and Ray,

In a message dated 98-02-05 19:49:25 EST, you write:

Glenn: I tried using threaded ones where this happened. a tap seems to work pretty good to get them in and then some loktite holds them forever.

I have been told that Beech does not approve of trying to put threaded zerk fittings in place of the drive-in type in the scissor assembly. It seems there is not sufficient metal to do so and retain design strength. The later units which have threaded zerk fittings have substantilly larger bosses formed for that purpose.

The Loctite would certainly be worth a try.

Happy Skies,

Bob Siegfried Worry Wart

[ARTICLES/19980205_232556.msg00797.tex]

Replacing The Step**Mon, 16 Jun 1997 10:54:03**

More for Peter,

One thing I forgot to mention.

These airplanes are built very much "one at a time" and parts for one airplane are not necessarily direct replacements for another aircraft. This is definitely the case for the non-retractable steps. I have found different bolt hole patterns on most every step that I have checked. Generally not a lot of difference, but it appears that they are drilled to fit at the time of installation. You certainly want to be sure and use the step that was originally installed and not try to buy a good used replacement, It may not fit!

Yours,

Bob

[ARTICLES/19970616_105403.msg01162.tex]

Replacing the Step**Mon, 16 Jun 1997 10:00:16**

Hi Peter,

You are on the right tack. The side panels should be removed in order to get out the bottom pan.

I have known people who have forced it out without doing so, but it usually causes collateral damage to the trim. The earlier airplanes had side stringers and wooden floorboards which were removable easily for maintenance. Some years ago Beech went to the metal floor pan which incorporated the side stringers in the pan. It was called an improvement! (It was cheaper and slightly lighter. A pound or less)

I had to replace the step on my airplane some time ago and it is a big job. While I had the pan out, I added captured floating nut plates to hold the step on and now it can be replaced without removing the floor. The ideal time to do the job would be during an interior refurbishment.

I have been told other people have added another inspection plate to the area in the pan above the step so that the nuts holding the step in place could be accessed. If your AI thinks that that would come under the guidance of the FARs as a minor alteration it would probably be OK, (be sure the modification is listed in your aircraft log) or it could be done as a local approval. Incidentally, I personally feel that the removal of the floor pan should be done under the supervision of a licensed mechanic. If you are not so rated I would suggest you confer with your friendly A+P before proceeding further.

Enjoy,

Bob

[ARTICLES/19970616.100016.msg01160.tex]

Replacing the Step**Tue, 17 Jun 1997 12:13:50**

Hi Peter,

Taking off the side panels isn't all that difficult but I think your decision to bring your engineer in the loop is a wise one.

May I assume you are in Canada? I'm not up to date on canadian maintenance and modification procedures but I'm sure your engineer will know how to handle the paper work.

As to why Beech (Raytheon) decided to eliminate the nut plates, the easy answer is cost. I imagine it was very difficult (considering the almost custom building of these airframes) to pre-attach the nut plates before assembly and still get nice tight alignment of the step to the fuselage. Stopping to install nut plates during the assembly of the step to the airframe would have taken an extra 15 minutes or so and it all adds up!

V-tail or straight tail they are FABULOUS airplanes.

Good luck,

Bob

[ARTICLES/19970617.121350.msg01180.tex]

Replacing the Step

Tue, 17 Jun 1997 12:24:14

P.S. for Peter

If you and your engineer do decide to put on nut plates, I would strongly recommend using floating nut plates. It makes it much easier to assure that the step is nice and snug to the side as well as to the bottom of the fuselage.

Yours,

Bob

[ARTICLES/19970617_122414.msg01181.tex]

Replacement Heim Bearings**Mon, 22 Jun 1998 10:26:18**

Good Morning John,

In a message dated 98-06-22 01:05:15 EDT, you write:

I heard of one fellow here in our area who paid \$250 for a rod end from Beech to replace one on the ruddervator push rods to comply with that latest AD note, and talked to another guy who got one with the same part number at a bearing house for \$11. Same part number; he put it on and it does fly ok.

Replacing Raytheon parts with generic parts can be a problem. The example you quote is potentially quite a serious one.

The rod ends on the ruddervator push rods that I have examined have all had a nominal distance across the bearing face of .485 inch. The Heim end of the same part number has a dimension of .500 across the same point. I discovered this when one of the units I was removing for the AD was very difficult to get out.

Evidently it had been replaced with the generic Heim end when the earlier service bulletin was complied with. (Wasn't in the log book though) The tabs on the ruddervator mixer arm were slightly bent and the sides showed evidence that the rod end had been forced in place. I cold straightened the tabs, dye checked the area for cracks and feel that no permanent harm was done. I still can't imagine a licensed mechanic forcing that bearing in place! It just goes to show that all are not as careful as they should be. I guess that is the definitive hammer mechanic.

I purchased several new rod ends direct from Rapid at the time of the latest control rod AD and they were all in the range of \$25 though I also heard war stories of much higher prices being paid.

I don't know whether the reduced dimension rod end is common to all Bonanzas but I would imagine it is. All of the airplanes I checked required them. It is evidently something that is done either by the Beech/Raytheon factory or at their behest after the rod ends come from Heim.

Why was the dimension reduced? I don't know. There is no problem with clearance around the area they are used and I would imagine the arms could easily have been machined to accept the larger dimension.

I do have an unsubstantiated theory though. Many of the parts on our beloved airplane were engineered to be able to use WWII surplus parts which were available by the ton. One example is the use of gun turret drive motors for the gear and flap retraction units. I would imagine that there was ton of rod ends that had been specially modified for some military use which did require the reduced dimension and Beech just designed the ruddervator arms to use them.

Anything in the Beech parts book which has a specified Beech part number rather than a generic manufacturers part number or an AN number, should be purchased from Rapid due to the possibility of modification or additional inspection being required.

An example? You will note that many of the AN bolts listed in the manual have an "M" after the AN number. That denotes a required magnetic inspection for the bolt before installation. If you purchase them from Rapid that will have been done and the bolt painted green or purple to denote the process used.

I have purchased wheel bearings and such from bearing supply houses for older airplanes where there was no other source and with careful inspection I would think there is no safety problem, but the rules still say otherwise.

Such is life!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980622_102618.msg03227.tex]

Restoration Practicality**Thu, 16 Sep 1999 16:38:49**

In a message dated 9/16/99 2:11:52 PM Central Daylight Time, bhenry@saber.net writes:

What do you think a plane like this is worth?

How much do you think that it would cost to bring it back to tip top shape?

Good Afternoon Brian,

There is nothing inanimate that can't be restored if you are willing to spend enough money.

Look at the rebuild which the Staggerwing Museum and others did on old serial number one Beechcraft. It was nothing but a few pieces dug up from a farmers field when they started on it!

The big question is whether or not such a program is a practical one for you. Should you decide to undertake it, remember that the cost to repair and rebuild a G model will be substantially the same as it would be to completely renovate a relatively new aircraft and it is unlikely that the market value of the G would reflect that cost.

Corrosion of the airframe is the biggest obstacle to restoration of an old aluminum airframe. They can be reskinned and even new frames may be available if those are damaged. The cost would be very high.

Unless the airframe is in exceptionally good condition, I doubt if the airplane would be financially practical to rebuild even if you received it as a gift!

Should you decide to do so, there would be a tremendous satisfaction in knowing that you had saved the old girl from a certain death!

I agree with Steve that your estimates of expenses are probably about fifty percent of what the likely costs would be and there are a number of small detail things which you list as miscellaneous which could equal the total expenditure of all of the rest of the items together. There is a reason besides the lawyer driven liability which runs the cost of a new Bonanza as high as it is. There is a lot of work to building one and that is what you are proposing to do with a rebuild as extensive as the one you describe.

I wish you the best and hope that the airframe is not in as bad a shape as it sounds, but I am afraid that my advice to you would be to proceed only with extreme caution.

Happy Skies,

Old Bob

[ARTICLES/19990916.163849.msg08526.tex]

Retractable Step**Fri, 3 Oct 1997 20:15:17**

Bill Fleming,

The early airplanes had a retractable step. It went up and down with the landing gear. (If it was working right)

The step is on a piece of streamline tubing but the tube is turned flat side to the airstream so as to gain the greatest strength. It's a very high drag configuration.

The retraction system is very temperamental. It must be kept scrupulously clean and well aligned for it to work properly. It is extended by a cable that hooks to the nose gear through a small aluminum weak link and retracted by shock cords (sometimes replaced with springs) behind the rear baggage compartment shear web

I always found that I could get it working at annual time but by the third or fourth month after, it was starting to not retract all of the way and by six months it either didn't retract at all or was at least still hanging part way out. Beech approved of adding some stronger shock cords and someone came out with an STC for springs.

Beech said DON'T lubricate it and keep the chrome in good shape and nice and clean and dry.

I never wanted to try anything stronger than the original strength shock cords. The weak link would break rather easily and I didn't want that to happen. A lot of people put in stronger weak links but then a fair number of airplanes had collapsed nose gears when the step mechanism would hang up and the weak link didn't break. It's kind of like towing the airplane with the the nose wheel axle instead of the towing pins. The weak link was there for a reason!!

I finally gave up and removed the step. If you do that be sure and have an A&P make a log book entry and adjust the weight and balance. I consider it a minor alteration but I have talked to some who consider it to be a major alteration requiring a 337 and local approval.

Also without the step you put yourself at risk for greater strain on the flaps. The step stool is a good idea but it obviously won't be available all of the time.

The newer airplanes with the fixed steps are much lower drag. Some of the early Debbies had one with a round tube and I assume that is rather draggy. The later style with the streamline tube in the minimum drag position doesn't seem too bad. Mine is off but I can't really tell any difference. There is no way that I know of to make the direct comparison such as my son and I were able to do in the old model 35 some 42 years ago. I have heard the figure of one or two mph drag reduction with the new style removed but I sure don't know.

More than you ever wanted to know, right!!!

Yours,

Bob

PS We missed you at Deerfield.

[ARTICLES/19971003.201517.msg01925.tex]

Retractable Step**Sun, 5 Oct 1997 01:50:08**

To Frank Woods

In a message dated 97-10-05 00:01:31 EDT, you write:

Even if I were to stand on the step while the gear were retracted (on jacks), the net result would be slack in the cable because the cable pulls the step down, the spring raises the step.

PS- If this is the way your step operates there is a spring or shock cord missing or they are improperly rigged. There is supposed to be one shock cord connected to the cable and another to the step. That is so that if the step sticks in the down position, the shock cord attached to the cable will pull it up and keep the slack out of the cable when the gear is retracted. There is a sliding fitting over the cable that extends the step but does not inhibit the cable from being properly retracted if the step refuses to retract.

Yours,

Bob

[ARTICLES/19971005_015008.msg01941.tex]

Retractable Step**Fri, 21 Jul 2000 11:50:15**

In a message dated 7/21/00 9:19:37 AM Central Daylight Time, flyinglo@msn.com writes:

Would you pls. see my further ?'s below? Thx.

From: BobsV35B@aol.com the step will need to be rechromed every four or five years. Is the step made of steel or aluminum? Can any place that does chroming do it or does it have to be an aviation place?

I found that the step needed cleaning about every six months to retain proper operation. Bob, would you say this only applies in those midwest grass strips? (As opposed to asphalt strips). Thx.

PS: I thought you were at Oshkosh?

Good Morning Jerry,

1. The step is made of steel.
2. Any good chrome shop is OK. I suppose there might be a purist out there who would argue the point, but I don't see why!
3. No, I think the things just get dirty everywhere. Dust from asphalt, concrete or just the atmosphere seems to accumulate on the phenolic blocks. Obviously, operation in water where things are splashing up from the wheels would be worse. It wouldn't hurt to wipe the step off often, especially after operations where it is obvious that things have been thrown on it.

I found that my step needed some TLC after about six months, regardless of where or how much I flew the airplane.

Incidentally, I made arrangements to extend and retract the step at will for a test flight. I found that with a straight model 35 powered by an E185-11 and indicating 140 mph, extending the step would slow me down five mph. When it was retracted, the aircraft would quickly regain about four MPH and within a minute or two, be back at the full 140 IAS.

Well worth the effort to keep it fully retracted.

4. We will meet the group at RFD on Sunday and leave for Oshkosh around 1400 Monday. Will we see you there?

Happy Skies,

Old Bob

[ARTICLES/20000721.115015.msg11189.tex]

Rigging**Mon, 6 Oct 1997 18:50:33**

Hi Ron Davis,

In a message dated 97-10-06 17:22:39 EDT, you write:

I believe that the stop-to-stop travel jigs you describe are the ones listed in the back of the original "Model Thirty Five Maintenance Manual" book.

That's true, the only problem is that my copy of the original model 35 maintenance manual is 47 years old and I have been told that those drawings are not applicable to the new airplanes. There are some other jigs and fixtures for which I have not yet been able find drawings or descriptions either. I figure that somewhere somebody ought to have a current set that we might be able to copy.

The BDS stuff is basically the old Mike Smith information and is very good.

All rigging of the Bonanza starts with getting the wings at the proper angle.

That is another problem because of the high price of the wrenches and torque wrench adapters necessary to loosen and tighten the wing bolts. A full set from Raytheon runs about \$10,000.00 but there are other people selling usable ones for less.

I sure would like to find a set of the factory tools that could be looked at. I wonder if anybody has spent that kind of money for the jigs and travel boards?

Thanks for the input.

Anybody else have any ideas?

Bob

[ARTICLES/19971006_185033_msg01971.tex]

Rigging**Wed, 18 Feb 1998 18:31:47**

Good Evening David,

In a message dated 98-02-18 16:31:12 EST, you write:

Some of my reading supports your thoughts on rigging being a strong approach to speed improvement. I wonder if it's not something of an art which few shops are really capable of excellence and results??? I'd like to find a shop known to have this talent on board and would be willing to travel for such quality of workmanship if it's known to anyone.

The neat thing that Mike Smith had going for him was that he did so many. He could fly the airplane and then know pretty well "how much to move what". Most any shop with the tools can make adjustments and then fly to check it out and eventually arrive at a very good rig.

Several years ago we had a WBS convention in Mesa where we went over to the Lufthansa operation at Goodyear Arizona. They probably have the best maintenance facility in the country for 33s, 35s, 36s and Barons. At that time they weren't interested in doing outside work, but said they might consider some specialized work which required pulling wing bolts and adjusting wings etc. for which they have extraordinary capability. They told us that they didn't make any effort to make the airplanes fast, but they were very competent in doing the mechanical portion of the work. What is needed is a shop with that capability and some individual who really wants to get in to being a rigging expert. Isn't there one among us who would like to take on that challenge? There seems to be considerable interest.

Happy Skies,

Bob

[ARTICLES/19980218.183147.msg00996.tex]

Rigging**Mon, 23 Feb 1998 13:40:13**

Good Afternoon John Whitehead, John Foose and All,

In a message dated 98-02-23 13:21:08 EST, you write:

I stayed for 2 1/2 days. They would rig, then I'd go fly with a mechanic and we would take notes. Then, the rigging was tweaked and another test flight. I felt sorry for the mechanic that had to destroy his hands when he adjusted the turnbuckles several times over (just inside the left aft inspection plate ... forward of the ruddervators).

The folks at the former United Beechcraft were the ones recommended by Norm.

The advantage of someone like Mike Smith, who did so many airplanes, was that he tended to not have to make as many adjustments.

There is no doubt that any competent shop with the proper equipment can get the job done. Unfortunately the travel boards and wrenches are VERY expensive. They were on the list of things the ABS submitted to Raytheon for possible adjustment but I don't believe any was made. I seem to recall that equipping oneself with all of the factory equipment suggested for rigging would run over thirty thousand dollars. I know that some shops have spent the time to make their own and several have things left over from the days when the stuff was more reasonably priced.

I would think the travel boards could be made rather reasonably if Raytheon would release the drawings or dimensions at a workable price. Quite a few people are making substitute wrenches at a much more affordable amount.

I still hope someone will decide to specialize again as did Mike.

Happy Skies,

Bob

[ARTICLES/19980223_134013_msg01105.tex]

Rigging**Fri, 6 Aug 1999 13:01:24**

In a message dated 8/6/99 11:35:50 AM Central Daylight Time, Txgroup@home.com writes:

Before I re-rig the plane, I would like to check that the T&B is in the panel level.

Good Morning Txgroup,

Set a level on the center section spar (seats out) and level the airplane via the jack points. Adjust the ball bank so it reads level. The stock Beech panel holes are drilled oversize in the later airplanes to allow a fair amount of adjustment twist. If that is not enough, you may have to do some filing.

One problem is that if the ball bank (inclinometer) is mounted on the floating panel, it's position may vary with panel movement due to aging shock mounts and other factors. It can change day to day and even during a flight!

Most airliners have a separate inclinometer mounted on a solid non-shock mounted area of the structure that is used for checking the in-flight rigging. Not a bad idea for us as well.

One caveat, just properly rigging the rudder may not be enough. If lateral adjustment is required, the only options are adjusting the trim tabs or flaps, which adds drag, or moving the wing which is expensive!

Happy Skies,

Old Bob

[ARTICLES/19990806_130124_msg06709.tex]

Rigging**Fri, 13 Aug 1999 07:44:43**

In a message dated 8/13/99 12:28:00 AM Central Daylight Time, doug@rds.com writes:

The most interesting thing was that it turned out the rigging wasn't so bad after all. The turn coordinator was just not level with the airplane. The only adjustments we made were (a) about 1/4" on the right flap, and (b) straightened the turn coordinator. It wasn't terribly sophisticated or accurate, but it did work.

Good Morning Doug,

I note that the out of trim situation was corrected by adjusting the flap. Was a rigging board used to check the flap alignment to the wing?

If the flap is not at the proper relationship to the wing, it will definitely cause unnecessary drag!

Should the airplane be wing heavy with the flaps in proper alignment, the wing should be rotated, it is NOT proper to correct for such an out of rig situation by dropping a flap.

Small lateral deviations can be corrected by judicious bending of the fixed tabs on the aileron, but even that should be used sparingly. The proper fix is to move the wing.

It is one thing to make the airplane fly hands off with the ball in the middle. It is something quite different to have it fly that way and create minimum drag.

Happy Skies,

Old Bob

[ARTICLES/19990813.074443.msg06900.tex]

Rigging**Fri, 13 Aug 1999 14:32:58**

In a message dated 8/13/99 11:34:01 AM Central Daylight Time, mruthven@impact-consult.com writes:

Do you know of anyone/anyplace that really does Bonanza rigging *right*.

Mick Ruthven

Good Afternoon Mick,

Unfortunately, I do not. However, any shop which has the requisite jacks, wing cradles, wing wrenches, travel boards and other rigging jigs should be able to do the job.

My knowledge of the various shops around the country is very limited. I know some good shops locally, but none that specialize in rigging as did Mike Smith.

No one that I know of has stepped up to replace him as the current guru of rigging.

The place to start is with a good level. As was discussed last week, that is best done by laterally leveling the airplane on the ground and affixing a good inclinometer to a non shock mounted portion of the structure. Adjust it to read level with a good level placed on the front spar carry through structure.

There should be no bend at all in the aileron tabs. The airplane surfaces should be checked with rigging boards and jigs to ascertain that they are all in the specified positions. That is easier said than done as Beech specifies that their rigging tools are to be used for this purpose and a full set from Raytheon would run about thirty-thousand bucks! Suffice it to say that most folks do a lot of eyeballing and exercise some judgment with the use of bubble protractors. Travel boards can be made for a relatively low cost. Plans for them were published in the early maintenance manuals and I suppose they would either be the same for, or easily adapted, to the newer machines.

Fly the airplane and utilize the rudder and aileron to place the inclinometer ball in the middle with the airplane flying straight ahead. Absolutely NO turning moment!

Rig the ruddervators by adjusting the trim tab cables per the manual (also mentioned by Howard Page a couple of days ago) to eliminate any rudder pressure at the speed for which you are trimming.

If it is necessary to hold aileron or use any aileron trim after all of this, then one wing or the other needs to be moved. Remember that the aileron trim that is installed on some Bonanzas is just a spring that holds the pressure for you. Make sure it is not holding any pressure when you are doing your flight checks.

Chances are the right wing is already rigged with the trailing edge as high as it will go. That is the way most are installed. That means the left wing trailing edge would need to be moved up or down as appropriate to eliminate the roll. There is about one-eighth inch adjustment available on the later airplanes. I don't remember how much the earlier

airplanes can be moved, but it seems to me it was a little more than that.

That is not a bad job IF you have the tools and cradles required. It is strictly a trial and error procedure and that is where the expertise of Mike Smith came in. He did enough of them that he could make a pretty good educated guess as to how much the wing needed to be moved.

If the bolts are more than eight or ten years old, it would be reasonable to replace the wing bolts and of course, the soft washers need to be replaced every time the wing is adjusted.

Your best bet for a shop to do this work would be one who pulls and replaces a lot of wings. You should probably educate yourself so that you are the person who makes the decision as to which wing to move and how much to move it.

WBS had a fly-in a few years ago where we visited the maintenance facility at Goodyear airport, Phoenix, that was doing the maintenance on all of the Lufthansa Debase.

They had the best equipment for pulling and replacing wings that I have ever seen. We asked about their doing some outside work and they said they would consider it. I don't know if they do or not.

I have observed some pretty wild forays where barrels were set under the wings and such which didn't look very safe to me. Equipment which would allow good control of the wing without a bunch of people assisting would seem to be a good idea, but most of the time I have been involved with taking a wing on or off the airplane, it was done with a whole lot of folks tugging and pulling. Not a very comforting sight!

Happy Skies,

Old Bob

[ARTICLES/19990813_143258_msg06910.tex]

Rigging**Tue, 23 Jan 2001 21:35:35**

In a message dated 1/23/01 7:58:07 PM Central Standard Time, swo49@hotmail.com writes:

Okay Guys:

How many ways can we level the Bo wings? My Bo is still flying right wing down - significantly.

The ways I know are:

1. Adjust the ailerons
2. Adjust the ruddervators
3. Drop the right flap a bit
4. Insure that the left flap is not dropped
5. Insure even gas when testing the plane

Please note, I have no fixed tabs on my ailerons, I have an electric trim on the left aileron - and yes, if I trim the aileron trim all the way, the plane will fly level - but the yaw dampener then is super sensitive and thereby ineffective.

Any ideas appreciated

Steve

Good Evening Steve,

I hate to say this, but the way Beech designed the airplane, the plan was to move the wing if it needed trimming for a wing low!

The flaps and the ailerons are supposed to be aligned with the wing via travel boards.

The tail feathers are to be adjusted so that no rudder pressure is required to keep the ball in the middle with the wings level.

And, of course, the ball has to be adjusted so that it reads level when the aircraft is leveled on the ground as described in the Maintenance Manual.

When the mighty Bonanza was first built, it did not have any trim tabs on the aileron at all. No little spring knob on the control column either. If the test pilot returned from a flight and reported that the airplane needed a little tweaking on the roll axis, the wing bolts were loosened, new soft washers were inserted, the wing angle of incidence was adjusted and the bolts retightened.

As the months rolled by, Beech realized that was costing a lot of money so they added the fixed tab on the aileron.

If the improper roll trim could be taken out with the tabs by minor bending, that is the way the airplane left Wichita. Too much bending of the tabs and the wing was moved as before. During the worst quality control days of Beechcraft, they started to drop a

flap instead of moving the wing when a reasonable amount of bending of the aileron tab wasn't enough. Once the flaps are drooped, the airplane becomes a dog. That is one of the reasons some airplanes are so much slower than others.

I have never done the wing adjustment myself. Folks who do it all of the time say it really isn't all that bad, PROVIDED you have all of the proper equipment such as wing support cradles, jacks and wrenches.

Mike Smith said that the airplanes built during the seventies seemed to be the worst and were the most likely to have factory drooped flaps to counter a wing low problem.

But, if your wings have ever been off the airplane, they are suspect if the airplane was not flight tested and the wings adjusted as necessary following wing reinstallation.

Mike also said that getting the wings on right was the basis from which he worked when rigging for speed.

Happy Skies,

Old Bob

[ARTICLES/20010123_213535.msg01605.tex]

Rigging

Fri, 26 Jan 2001 15:48:26

In a message dated 1/26/01 11:51:37 AM Central Standard Time, raylock@radiks.net writes:

How do you determine if the wings are properly rotated? Can that be objectively measured or do you just have to do trial and error testing? If you (or an A&P) undertake this project, how is it done? Just loosen the wing bolts and rotate then go test fly? Does the wing have to be completely disconnected? Is this a major effort? Just wondering how big a deal this is.

Thanks Ray

Good Afternoon Ray,

Since this is thoroughly covered in the maintenance manual, I will only skim the surface.

The idea is to make sure that the ailerons, flaps and ruddervators are all faired to the wing and stabilizer surfaces. That takes travel boards. The aircraft is then test flown to see if the surfaces have to be displaced from those neutral positions to make it fly straight and level. If they do have to be displaced, the wings should be adjusted.

In general, the wings should have the leading edges as low as possible and the trailing edges as high as they can be. Once the wing heaviness is determined. The trailing edge of the wing that wants to drop is lowered. The amount it needs to be lowered is where the experience of a Mike Smith comes in!

Most often, the right wing is twisted so that the leading edge is as low as it will go and the trailing edge is placed as high as it will go. The left wing is done the same and the trailing edge is then dropped a sixteenth of an inch or so as a place to start.

From then on, it should only require adjustment of the left wing, but who knows for sure!

If you are equipped with all of the jacks, wing stands and wrenches required, it is not a bad job, but without that stuff it can be a bear!

The airplane is set on jacks and the wing stands are arranged so as to support the wings once they are loosened.

The bolts are loosened, the top ones are removed and the soft washers taken out and discarded. New washers are installed, the wing is moved to the new guesstimated position. The bolts are reinstalled and torqued. After that comes a test flight and the whole process is repeated as required.

Each wing is held to the carrythrough structure by four bolts in tension, two uppers and two lowers. The holes are big enough such that the fit is sloppy. That allows the wing to be rotated or twisted to increase or decrease the angle of incidence. There is

a series of annular ring grooves around the upper holes. A soft aluminum washer is placed between the wing and the carrythrough structure before tightening. The annular grooves in the carry through and the wing fitting bite into the soft aluminum and carry the shear loads. Relatively simple, but it takes experience to know how much to move the wing and a lot of equipment to do the job properly.

I have seen folks do the job with nothing more than wrenches and a lot of people lifting and tugging. I wouldn't try that myself and don't recommend it to anyone else!

Happy Skies,

Old Bob

[ARTICLES/20010126_154826_msg01907.tex]

Saunders Spar Strap'**Fri, 4 Aug 2000 23:19:33**

In a message dated 8/4/00 9:48:10 PM Central Daylight Time, raven@tminet.com writes:

My comments about the strap design seem a bit snider than I had intended, but my basic question remains- what, if any, advantage does this modification provide a 35 operator not engaging in routine aerobatics?

Good Evening Bill,

I rather liked your comments!

The various spar strap modifications that have been added to the early V-tails and the Twin Beech are all rather unnecessary if the aircraft is operated within it's design limits and inspected regularly. The last time I checked, there had been some sixteen or so tubular Bonanza spars that had been found to be cracked all of the way through, but only one V-tail that came apart in flight due to the failure of the center section spar. There is considerable evidence that the subject airplane had not been inspected in accordance with an active AD and the airplane was overloaded and buzzing on a hot summer day. Following a high speed pass, the aircraft was pulled up sharply and the wing failed.

The Twin Beeches never had a problem as long as they were properly maintained and flown at their design weights. After they were allowed to be turned into freighters, the spars that were not properly maintained incurred internal rust and corrosion. Added to that were operations that were conducted at weights as high as fifteen thousand pounds. The poor thing was only designed to be flown at around 9700 pounds and even the highest aftermarket gross that I am aware of was only for ten thousand, two hundred pounds.

Any piece of machinery can be destroyed if one is determined to destroy it!

The spar straps for the Bonanza series are a device looking for suckers to buy them!

I appreciate the comments of you and George as it is nice to know what engineers think of the problem, but I am convinced that there is no smoking gun that needs to be silenced. I just hope that the FAA doesn't try to do something stupid just because it can be done!

Happy Skies,

Old Bob

[ARTICLES/20000804_231933_msg11761.tex]

Sound Dampening**Fri, 18 Sep 1998 19:13:37**

In a message dated 9/18/98 5:09:14 PM Central Daylight Time, mmantei@mainline.com writes:

Is it specifically sold by aircraft supply companies or is it a common insulation material that can be found at Home Depot type places? Also, this may be dumb but I need to ask, do you stick it directly to the skins or to the underside of the floorboards? If it's stuck to the skin do I need to worry about moisture trapped between the aluminum and the sticky stuff leading to corrosion?

Good Evening Mark Mantei,

I don't know what was used by the others, but I installed some stuff on my airplane during an extensive rework in 1991.

I don't remember exactly where I got it, but I believe it was at one of the local supply houses such as Grainger or McMaster Carr.

The product was made by 3M and on the box it says:

Sound Damper Tape
Foil/Foam Laminate
Y-370

It came in a box containing fifteen sheets eighteen inches wide, four feet long and one quarter inch thick with a paper backing over the sticky side.

It weighs one pound fourteen ounces with the paper on and one pound twelve ounces worth the paper removed.

My recollection was that it was rather expensive. Could have been as much as twenty bucks a sheet but I can't locate the invoice.

I was worried about the trapping of moisture and never found anyone who had an authoritative answer to the question. So far I have noted no problem but my airplane lives in a heated air-conditioned hangar. Who knows?

I was advised by one of the sound gurus to only place the material on the center portion of each bay. I kept it back about an inch from the stringers and bulkheads so it is unlikely that there will be any spots that can collect and hold moisture (I hope).

On the firewall, I put it everywhere I could get it in. No gaps at all. Horrible job!

Incidentally, if you found any paint on the belly skins or any where else in the interior, it was paint that was applied after the aircraft left the factory. The interiors were unpainted till the 1979 models came out in the fall of 1978. Some components were painted starting

about a year before, but the complete interior did not receive the priming coat of paint till D-10179.

I placed the 3M material on all of the skin panels beneath the floorboards and on the bottom of the floorboards where practical. Don't have any idea whether it was a good idea or not.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980918_191337_msg05500.tex]

Spar Crack Inspection

Wed, 21 May 1997 09:14:59

Hi Ralph, I'm sure some one who is much more familiar than I with the origination of the spar crack problem will come up with the information, but meanwhile—

I believe the first cracks were found in the model 33's, 36's and Barons used to train Lufthansa pilots out at Goodyear Arizona. Those airplanes lead a very rough life but are given absolutely fabulous maintenance. I'm sure they were found long before the rest of us would have spotted them. After that, quite a few Barons, some used in training but others that were not, were found with cracks. It seemed that we who lead rather benign lives with our V-tails didn't have too much to worry about.

Unfortunately, a friend of mine found a crack in his very clean and not abused M model a couple of months ago. His is just a "stop drill" problem at this time.

The degree of difficulty of the inspection is very subjective. The first one that I did took quite a while. I found it necessary to remove several components to adequately observe the affected areas. Also the airplane bled red dye for several months after the inspection. I have learned to be a little stingier with the dye penetrant since then. I recently did a J model and felt that it was necessary to remove the heat duct forward and to the right of the spar to get a proper look at it. Other mechanics may feel that they can get a proper look without doing that. I did have the opportunity to observe the mechanics at Goodyear Arizona doing the inspection about a year after the first AD came out and they were very thorough. They opened the airplane up more than I did.

I don't feel that this is a serious safety problem. I think the cracks would have to develop to a point where they would be glaring at you with even a casual inspection before they became dangerous.

It is the same with the spar inspection of the straight 35's. To my knowledge, of the some seventeen cracks that were found where the bottom tubing was cracked completely through, only one resulted in wing seperation and that one was doing a buzz job on a hot turbulent summer day, was over gross with four people on board and did a sharp pull up at the end when the wing finally let go.

All Bonanzas are safe when PROPERLY MAINTAINED and adequately inspected.

The problem with an older airplane is the difficulty of knowing what has happened to it in the last fifty years. I'm not sure the bad ones could be brought up to standard regardless of the time and money spent.

'nough rambling

Bob

[ARTICLES/19970521_091459_msg00916.tex]

Speed Mods**Wed, 18 Feb 1998 10:13:00**

Good Morning All,

In a message dated 98-02-18 09:27:17 EST, Tom Turner wrote:

I agree with Chris, that turbocharging provides the greatest opportunity for airspeed improvement with a normally aspirated airplane.

May I add my agreement with the proviso that the aircraft be properly rigged first.

The thing that has surprised me by it's absence from this discussion is reference to Mike Smiths very successful speed enhancement program.

He found that with most any Bonanza he would pick up between 10 and 20 mph with his modifications. The single most effective move and the one that gained the most dramatic improvement was careful rerigging of the airplane. He told me once that it was not uncommon to find one straight from the factory on which he could pick up 12 mph by rigging alone!

The next move was to take everything off the top of the airplane. No scoops, antennas, rotating beacons or anything else allowed. He even stuck the comm antenna inside his plastic tailcone on some airplanes. In that position it had horizontal orientation and a lousy ground plane and as we all know should not work well at all. I have spoken to several owners and been told that it seems to work OK whether it should or not.

He went to strobes instead of rotating beacons, put the ELT antenna inside the airplane by the rear windows, used blades on the tail for the nav units, built an airscoop into the left rear fuselage inspection plate and other such mods to eliminate drag.

There were also changes to the tail cone, gap strips and later on, modifications to the cowl inlets.

The biggest move though, was simply proper rigging.

Someone else has said, and I agree, that one experiment is worth a thousand theories, but having said that, I still think there is at least five mph and probably ten available inside the engine cowl by rebaffling and modification to the cowl flaps, inlets and eliminating the side gills.

I would think that in the long run, turbocharging and improvements in the baffling would be the most productive. I, for one, am anxious to see George's results on the baffling.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980218.101300.msg00983.tex]

Speed Mods**Wed, 18 Feb 1998 12:25:32**

Good Morning Skip,

In a message dated 98-02-18 11:07:47 EST, you write:

Do you know of anybody that has direct knowledge or experience in Smith's work that could do the rigging?

Unfortunately I do not. The last time I spoke to Mike Smith was about a year after the Reno ABS convention. I was trying to talk him into working on my airplane which is badly out of rig. He told me that he had sold the rights to his rigging expertise to Allen Peterson (A.K.A. BDS) with an agreement that Mike would go down to Texas for three to six months and teach Allen's people how to do what he had been doing. At the time of that conversation, Allen had never called him to Texas!

Harry Bennet has done a fair amount of messing around with the rigging on his airplane and has been rather successful but I don't know of anyone who is really into it like Mike was.

The wrenches are very expensive and it is best if cradles are available for moving and supporting the wings while adjustments are being made.

Unfortunately I have to run right now. Maybe we can continue this later?

Happy Skies,

Bob

[ARTICLES/19980218.122532.msg00988.tex]

Speed Mods**Thu, 19 Feb 1998 10:28:38**

Good Morning All,

Just a couple of more old thoughts on speed. First the disclaimer! I don't know if the following is correct or not, just something that I read or heard along the way.

I have been told that an air leak in the door or a window is roughly equivalent to sticking a solid rod or plate out into the airstream six inches perpendicular to a leak. That is, a one quarter inch diameter leak would have the same effect as one quarter inch diameter steel rod protruding six inches from the side of your airplane.

Any protuberance ahead of or at the point of maximum thickness supposedly causes a lot more drag than one further down stream. This would seem to indicate that a poorly sealed door on our favorite airplane could be a major drag producer.

I was at Sun n' Fun the year that Wayne Collins dusted the field with his IO-550 powered V35B in the stock airplane races and one of the things he did was tape over every hole in the airplane that didn't absolutely have to be open, air vents and all. He even had his crew tape the main cabin door seams after he was in.

He proudly showed to all his \$1.95 speed mod, a roll of packing tape!

Some people feel that our big baggage doors on the later airplanes are drag producers for the same reason. A lot of them don't seal all that well but at least they are behind the area of maximum drag. (Wayne had that taped up)

Gotta run!

Happy Skies,

Bob

[ARTICLES/19980219_102838.msg01013.tex]

Speed Mods**Thu, 9 Jul 1998 21:30:25**

Good Evening Paul Bruce,

In a message dated 98-07-09 19:25:21 EDT, you write:

Is it me or does Roy seem to be REAL PROUD of his stuff?

The stuff is a little pricey, isn't it?

When Roy sent his letter to Beech owners concerning the cowl mods, I gave him a call to see what area he was working on. As I understood his proposal, it would have included a prop shaft extension and a new fiberglass cowling which would have radically changed the looks of our favorite machine. I inquired as to what changes he planned inside the cowling and was told that plans for that area had not yet been developed.

It is my feeling that most of us don't want drastic cosmetic changes on the Bonanza. The speed increase would have to be quite dramatic to get me to accept a new fiberglass nose on my airplane.

I feel that there is somewhere in the vicinity of ten mph to be gained inside the cowling by redirection and smoothing of the airflow. I would hope that could be done by minor modification of the existing Beech air inlets and some modification of the cowl flaps.

The majority of the changes would be inside where we couldn't see them.

It is probably wishful thinking and a dreamers hope on my part but I am looking forward to George Bralys modifications with great expectations.

I have been told by many cooling airflow experts over the years that the standard baffling is among the worst in the industry and wasn't even very good by 1946 standards. It did the job adequately with the 165 HP engine but hasn't been substantially modified since.

Brand "C" did a cooling cleanup on the 172 many years ago where they picked up 7 mph with no external changes at all!

Surely a well trained engineer could find 10 mph on the Bonanza.

Our cowl flaps are very inefficient. If they could be made to have a greater control from full open to full closed, we could eliminate the gill louvers and still be able to keep the engine warm at low power settings.

It has been done on other airplanes.

The present cooling arrangement was put together just 42 years after the Wright brothers got theirs going. I would think the ensuing 53 years should have provided considerable knowledge which might be applied to the Bonanza.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980709.213025.msg03565.tex]

Speed Mods**Fri, 10 Jul 1998 08:12:35**

Good Morning John,

In a message dated 98-07-10 07:01:42 EDT, you write:

I must assume that Roy doesn't have the funds to pilot new projects so he relies on those who are interested in his work to do the funding for him. My question would be " what do I get after I do the testing for you? Roy still owns the STC.

I would imagine that is a large part of the reason, but I would also assume that the "interested party" investor serves as a means to determine the extent of the market.

I have been bugging him for several years to turn his magic talents loose on the Bonanza and I am sure he has had that request from many others. From what I have been able to find out, he had a very small response from we Beech owners to the letter he sent out.

Sort of a "put your money where your mouth is" situation and evidently we didn't respond too well!

I don't have any inside information and the only contact that I have had since shortly after the original query went out, was the young lad with whom I spoke at Sun 'n Fun. Possibly there is some activity that he either didn't know about or didn't feel free to discuss.

I have been checking the LoPresti web site periodically and nothing has shown up there either.

Do any of you know of anyone who took Roy up on his development offer?

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980710.081235.msg03574.tex]

Speed Mods**Sat, 3 Apr 1999 12:16:02**

In a message dated 4/3/99 10:25:52 AM Central Standard Time, mruthven@impact-consult.com writes:

Does anyone know what happened to the supposedly-very-effective Mike Smith Bonanza speed mods. I know he's been out of business for quite a while, but if the mods were so effective I would think they would be available from some source. ???

Mick Ruthven

Good Morning Mick,

Mike sold all of the rights and data to BDS. Part of the agreement was for Mike to come down to Texas for a few months to train some of Al Peterson's (BDS) folks on how to go about making the Bonanza faster. The last time I spoke to Mike about it was shortly after the ABS convention that was held in Reno, NV, I have forgotten the year.

I don't believe the trip to Texas ever occurred and am reasonably confident the Al still owns all of the stuff.

Most of what Mike did involved rigging and flight testing.

He also made a point of cleaning everything possible off the top of the airplane. He felt that was the high drag area.

I have been gone for a couple of weeks and when I started to read the 307 messages that were waiting for me on my return, I noted that there were several comments concerning the removal of the rams horn antenna.

Since I have written on that subject often, it appears that there must be an awful lot of folks who just automatically delete anything I send, but I will repeat again that which I have sent many times.

One of the changes that Mike Smith used was to remove the factory style rams horn and replace it with a set of blades on the tail. He stated that he had done a lot of flight testing and determined that the lowest drag position was between the last and the next to the last bulkheads with the antenna oriented NOT in level flight position but with the blades parallel to the bottom of the fuselage and approximately three and one half inches above the bottom.

The blades are used for both VHF Nav and Glide Slope.

Mike used a comm antenna mounted horizontally in a plastic tail cone of his design.

While I think any electronics person will tell you that is a lousy installation, insufficient ground plane and improper polarization, I have spoken to several pilots who have the installation and report no communication difficulties.

I did put the blades on my airplane in the position he recommended, but have never had the guts to try the horizontal tail mounted comm antenna.

He also removed the new style cabin air inlet from the top and relocated it in the inspection plate that is located on the aft left side of the fuselage using an NACA style inlet.

There was a new nose bowl also but that was just before he gave up the business and not too many are around.

I think most of Mike's successes were do to careful attention to detail and eliminating protuberances from the airframe.

For what it's worth!

Happy Skies,

Old Bob

[ARTICLES/19990403_121602.msg03542.tex]

Stiff Cowl Flaps**Tue, 11 May 1999 08:51:36**

In a message dated 5/10/99 4:01:44 PM Central Daylight Time, SOxman@oxko.com writes:

I bet there are a lot of Bonanzas with difficult to operate cowl flaps - I have this problem too. Steve.

Good Morning Steve,

I suppose the determination as to whether the cowl flaps are difficult to operate or not is a very subjective thing.

They will always be somewhat stiffer with the gear up than with the gear down. Since the door actuator shaft rides on the cowl flap cross shaft, the tighter the nose gear doors are rigged, the more pressure will be on the cowl flap shaft.

If the units are properly lubricated and the shafts are not bent, the cowl flaps are generally no more than a little stiff (once again, a subjective evaluation). Bob Briggs mentions that his are difficult to open above 140 knots indicated. To tell you the truth, I can't remember ever trying to open them when I was going that fast!

The main problem appears to be that the shafts are often bent and that is difficult to check without pulling the assembly. In addition, they are often in need of lubrication.

If the cowl flaps are VERY hard to operate (subjective again), it is likely that the nose gear door actuator pin has ridden up on the top of the actuator fork.

Happy Skies,

Old Bob

[ARTICLES/19990511_085136_msg04514.tex]

Strut Inflation**Tue, 22 Aug 2000 10:07:12**

In a message dated 8/21/00 11:45:31 PM Central Daylight Time, mrudy1@juno.com writes:

Of course, right above that statement it says to inflate the strut to approximately 100 psi air pressure. That's when i got oil in my air tank. So I guess you pay your money and take your pick.

Good Morning Rudy,

This is just a comment, not a recommendation! Back in the olden days when I was operating and maintaining my straight 35s, I always inflated the struts as the manual then suggested. That is, service the strut as described before with fluid, let it set overnight with no pressure, recheck for proper fluid quantity, then extend the strut fully and inflate with shop air to one hundred pounds. After a couple of days of operation they would generally need a little adjustment of the air to get just the right strut extension, but the one hundred pounds on the extended strut came pretty close. I have tried that on the later airplanes and one hundred pounds is not enough. Not only that, it is now politically incorrect to use air! All the big boys say to use nitrogen. Seemed to work OK with the air, but who knows??

Happy Skies,

Old Bob

PS I have your "Bonanzas to Oshkosh" name tag. Should I send it to you or wait till we get together? Sorry you didn't make Telemark, it was one of our best flyins ever!

[ARTICLES/20000822_100712.msg12410.tex]

Test Flights**Thu, 2 Mar 2000 16:32:41**

In a message dated 3/2/00 2:01:56 PM Central Standard Time, whprim@pdq.net writes:

The guy that owns the flight school on the field related that they had a Bonanza painted at Murmer and when he took it up for a flight test, the elevator trim was hooked up backwards. He about broke his arm trying to hold back pressure (or forward pressure, I don't remember which) in order to get around the pattern and back on the ground.

Good Afternoon WHP,

I do not in any way intend to excuse any faulty maintenance performance on the part of any mechanic, but I am a little disappointed that the pilot who performed the test flight following the maintenance procedure did not check the proper movement of any control surface that had been disconnected.

I think we are all aware that the most likely time to have a problem is immediately following maintenance. That is why test hops are performed.

On the airline for whom I flew, there was a mandatory test hop any time any control surface was disconnected for any reason. While I had great confidence in the quality of maintenance provided, I still made it a practice to have another crew member observe the proper movement of the affected control surface before I made those test hops.

I don't know how familiar your friend was with the Bonanza, but if my airplane was so far out of trim during the takeoff roll that it would be difficult to control in flight, I think I would have recognized it long before attaining a speed too fast to abort. Every time I forget to set the trim properly before takeoff, the old Bonanza tells me about it by the time I have the throttle open! Beyond that, if an effort to trim the airplane made things worse, I don't think it would take a rocket scientist to try trimming it the other way, especially on a flight that was being conducted to test the functions of the aircraft following maintenance of the control surfaces!

In any case, I would think that if any blame is to be placed, the pilot performing the test hop was at least a weak link in the chain.

Happy Skies,

Old Bob

[ARTICLES/20000302.163241.msg04073.tex]

Tires - Balancing**Mon, 4 May 1998 19:54:50**

Good Evening Glenn Humann,

In a message dated 98-05-04 13:25:58 EDT, you write:

Were your tubes and tires properly mounted before taking them to a motorcycle shop for further balancing (or corrective balancing)?

Many people feel that the only way to properly balance a small aircraft tire assembly is to put the weights inside the tire between the tire and the tube. This entails balancing the unit with the weights taped to the exterior of the tread and then breaking down the wheel and putting the weights inside. Quite a tedious process. Weights applied to the small hubs we tend to use are not very satisfactory. I agree that if the tube and tire are positioned properly, further balancing should rarely be necessary on the Bonanza assembly.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980504_195450.msg02257.tex]

Torque Wrenches Types**Wed, 5 May 1999 09:22:19**

In a message dated 5/5/99 7:13:21 AM Central Daylight Time, epweaver@erols.com writes:

But I admit, most of us (non-A&Ps) don't have access to a torque wrench calibration device, and probably have no idea just how off (if any) our torque wrenches are—especially the micrometer "click" types. If I remember correctly, that 3/8" Craftsman wrench was off only by a foot pound or so in just a part of the operating range.

Good Morning Earl,

How true!

Some where in my horribly unorganized files, I have a copy of a report on the scatter of various types of torque wrenches.

The absolute worst of the bunch are the micrometer adjustment "click" wrenches! They not only have the worst consistency, they also go off calibration the fastest.

The ones with dial indicators are the next worst, the better ones are the round beam or bar types such as most Craftsman wrenches and the ones with the least scatter are the pure flat ground beam types.

The report, that I can't find, stated that the most consistent numbers were those developed by a mechanic doing repetitive tightening on the same assembly day after day and using the feel developed with no torque wrench at all!

We must remember that the torque numbers we use are those that are developed by the engineers which will give the required preload to the device we are fastening within very specific conditions of application.

The condition, size and fit of the threads, the lubrication or lack thereof, the squareness of the pieces to be joined, the material from which they are made and, I am sure, a multitude of other factors must be added to the equation to determine how much twist we need to apply to gain the desired preload of the fastener. It is that preload that is important and thus the requirement to measure elongation in those fasteners where staying together is critical.

The conditions must be identical to those under which the torque numbers were developed to attain the same results.

Remember, the torque numbers are only given to aid we who do not have the capability of checking the preload directly!

Happy Skies,

Old Bob

PS Many of us who are not (non-A&Ps) don't have good calibration capability available either!

[ARTICLES/19990505_092219_msg04339.tex]

Upgrade Practacality**Wed, 3 Nov 1999 21:03:05**

In a message dated 11/3/99 7:47:01 PM Central Standard Time, jtsmall@onramp.net writes:

It seems to me many mods fall into this catagory. Large baggage door, panel upgrade (nonetheless justifiable popular) and moving the rear bulkhead back come to mind easily. However, after going through a lot of hassle catching up the maintenance on my P35 I can understand why one would choose such a course of action from the heart.

Good Evening John,

Well put!

I don't fly my airplane because it is economically practical. I fly it for the pleasure I receive from operating it. I don't fly places because I want to get there. I fly because of the enjoyment of the flight.

If rational thought was involved, I would ride an airliner and let others do the flying. I could save money which would go to my children. My preference is to spend my children's inheritance.

We are fortunate that we have the capability to make our decisions with the freedom we do!

Life Is Good!

Happy Skies,

Old Bob

[ARTICLES/19991103_210305_msg10109.tex]

Verneer Control Tension Adjustment**Fri, 11 Feb 2000 12:38:00**

In a message dated 2/11/00 11:24:06 AM Central Standard Time, beech_35@yahoo.com writes:

Bill, are you saying that there's no knurled nut at the front of the panel to tighten? I thought they all have some type of friction adjustment. I had the same problem with a prop control but it was an easy adjustment to make.

— Bill McCune raven@tminet.com wrote: I have a vernier mixture control that walks from any lean setting to 10.5 psi in cruise.

No gland nut at the base to tighten..

Good Morning John and Bill,

Most of the verniers used on the Bonanza series have a leather washer for tension adjustment. You loosen the nut behind the instrument panel (toward the front of the airplane that is!), then tighten the knurled nut on your side of the panel. Usually works just fine. I suppose it is possible that one of the washers may wear out, but I have never found one that wouldn't tighten.

Happy Skies,

Old Bob

[ARTICLES/20000211_123800.msg02764.tex]

Vibration**Thu, 2 Apr 1998 22:53:41**

Good Evening All,

In a message dated 98-04-02 22:43:39 EST, George Braly wrote:

BUT, I have paid a lot of attention to making sure that there was nothing that was coupling up the airframe to the engine. This can be as simple as an a flexible hose that is too short or an exhaust pipe that is touching something or even baffling that is not flexible enough and is coupling engine vibration into the airframe.

One similar problem is some well meaning mechanics will gather together numerous Ahrends controls, tubes and hoses etc. and tie-wrap them all together thus providing a solid connection which will transmit vibration to the airframe. There needs to be a much freedom as practical of the engine from the airframe.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980402.225341.msg01801.tex]

Water in Static System**Tue, 6 Feb 2001 08:21:27**

In a message dated 2/6/01 6:43:31 AM Central Standard Time, esoteric5121@earthlink.net writes:

Ernie: I would imagine it could happen at cruise speeds with the pressure differential involved, and simply, ram air....just a thought...

Good Morning Paul,

It just doesn't happen that way. I doubt if any airplane flies a higher percentage of it's flight time in heavy rain than does mine. I have never had a problem with water in the static system.

On top of that, if the vents are properly located, there should be no differential pressure, that is why we have the static system!

If you aim a water hose at the vent while washing the airplane and hold it there for a while, I suppose some could get in, but even that doesn't seem to happen. I have always covered mine with tape when I use a high pressure hose for washing, but a little care should do just as well.

I have flown airplanes where the static vents iced over. That can be a problem, but it has never happened to me in a Bonanza and I have had a lot of experience with a Bonanza in ice. The Beech supplied system is a good one.

The static system should be checked and drained at the recommended inspection times, but I don't think it needs to be an everyday item. Flame away all of you who feel otherwise!

Happy Skies,

Old Bob

[ARTICLES/20010206_082127_msg02902.tex]

Weighing Accuracy/Tip Tanks**Wed, 6 Dec 2000 10:40:39**

In a message dated 12/6/00 8:19:15 AM Central Standard Time, guntalk@guntalk.com writes:

Jeb:

Osborne tips will give you an increase to 3500# gross, not to mention adding 2.5 hours of range. You could do that at the same time you have the turbonormalizer installed. g

– Tom

Good Morning Jeb and Tom,

The BDS tip tanks might be better, depending on the use made of the aircraft. Osbornes will carry more fuel, but the BDS tip tank approval may allow a higher gross.

I have not monitored the approval status for the Debonair series as close as I have for the Bonanzas, but the S model, which normally has a gross of 3300 pounds, gains 250 pounds when the BDS tanks are installed, provided it has the wheels and tires that are specified.

That would mean you could have a 3550 gross, but would only pick up thirty gallons of extra fuel instead of forty.

While we are on the subject of weight, I would be highly suspect of that 1888 Empty Weight.

We had a 1968 V35A on which we installed Brittain (predecessor of Osborne) tip tanks. That combination allowed a gross of 3600 pounds, but the empty weight was around 2124 for a useful of 1476 or thereabouts.

That was a calculated weight, not one derived from an accurate weighing.

The airplane had dual NavComs, ADF, etc., but had only a wingleveler, not a full autopilot.

While all factory weights are of a minimally equipped aircraft, (i.e., one NavCom, no long range tanks, autopilot, rotating beacon or other options) even those weights tend to be suspect. I have never found one that was not at least a few pounds heavier than the factory weights.

Now, having said that, I also feel that most of the weighing of light aircraft are done in a manner that leads to very inaccurate weights.

The last time I weighed one, I borrowed a set of electronic truck scales. The directions with those scales stated that the accuracy was approximately plus or minus two percent. That means that regardless of how diligently I worked to find an accurate weight, the

range of that weight could easily be almost one hundred pounds. Two percent of 2300 equals 46 pounds. The weight would be between 2254 and 2346.

I have been shopping for something more accurate. Devices with greater accuracy have been quoted to me at 5 to 6 thousand dollars. One of the salesmen I contacted tried to convince me that it was a good investment, as he knew of many shops which were charging \$750 to do a weighing of a light aircraft. Too rich for me, but I can understand why the charge would be that high if it is necessary to pay that much money for a scale accurate to one-tenth of one percent.

One-tenth of one percent would allow an error of 2.3 pounds on that 2300 pound airframe for a range of 4.6 pounds between 2297.7 and 2302.3. That is an accuracy I could live with. 2254 to 2346 is not acceptable to me.

Many shops fill the fuel tanks for the weighing and then subtract the weight of the fuel. That adds error due to the variable weight of the fuel, the need to use a different CG for the fuel and the different amount of fuel held by different airplanes.

The weighing of aircraft is not often done to the same degree of precision with which we use the resulting weights!

But, I have once again rambled far beyond the subject at hand. I would expect the Debbie in question to have an empty weight around 2100 pounds if equipped with a full electronic package and three axis autopilot. If it has been repainted and/or has an aftermarket interior, it could be a lot heavier!

Happy Skies,

Old Bob

[ARTICLES/20001206.104039.msg17245.tex]

Wood Flooring**Fri, 14 May 1999 09:47:48**

In a message dated 5/14/99 7:38:57 AM Central Daylight Time, flyboy_98@yahoo.com writes:

Does anyone know what kind of wood Beech used for the floorboards on the mid-fifties 35 series? I want to replace mine as they are cracked and peeling. Any other info, like thicknesses, varnishes, etc. would also be appreciated.

Good Morning Jason,

The stuff Beech used was a relatively low grade fir plywood. Definitely not what we have come to call "aircraft grade" plywood though that term generally refers to wood to be used for structural purposes. I always felt that the floorboards used by Beech were of a slightly lower quality than that used by Piper which surprised me at the time. Remember, that is a very subjective opinion and I did not check the specifications of either!

Remember also that Beech was making an extreme effort to make the airplane as light as possible and it could be that the wood was a better grade than I give them credit for, but met the light weight criteria at the minimum strength they required for the installation.

I have used "aircraft grade" birch faced 1/4 inch plywood to build replacement floor boards with aircraft grade clear spruce used for the re-enforcement strips where required.

They are a lot stiffer and stronger than the originals but a full replacement of all of the boards will add two or more pounds to the weight of the aircraft. It should be listed in the paperwork.

I like to finish them with a good grade of marine spar varnish. There are probably more modern finishes available, but I like the way spar varnish works and looks.

Some folks have used the new space age composite materials as replacement floor boards. That should help with the soundproofing and might well be lighter.

Happy Skies,

Old Bob

[ARTICLES/19990514.094748.msg04649.tex]

Working with the Shop**Sun, 18 Mar 2001 08:14:48**

In a message dated 3/17/01 3:24:17 PM Central Standard Time, esoteric5121@earthlink.net writes:

Also, I have seen the cases where the customer brings the plane in, says he wants only the XXX replaced, cuz it's "bad", and we find it is a completely different or substantially more complex problem. That's what I'm basing my opinion on, I guess....

Ole Bob, I value your opinion greatly... what are your feelings on this subject, am I over-reacting?

Good Morning Paul,

There has been considerable discussion on this thread since I last checked my E-mail!

The subject was well covered, but since you asked, I will comment.

I don't think you over-reacted. You obviously feel responsible for the general safety of our industry and have a strong consideration concerning the costs involved in maintaining an aircraft in airworthy condition.

I believe the best comment was the one from Howard, It Depends!

If the person doing the maintenance and the operator of the aircraft have a broad knowledge of each others capabilities, it makes the trouble shooting much easier, but it could also lead to the situation such as occurred when the gauge was replaced without trouble shooting on the part of the maintenance personnel.

If a friend, who I know to be an excellent mechanic, pulls up to my shop and tells me the right generator needs to be replaced and he doesn't have time to do it, I would probably replace the generator without question.

In most cases, I would hope we can at least have a discussion as to why he thinks the generator should be replaced, but I wouldn't argue if he insisted.

The better method for both is to take advantage of the other person's area of expertise.

In the days when I was gainfully employed, it was considered best if the pilot would write up all of the symptoms he/she observed and allow the maintenance personnel to do the trouble shooting.

In general, the pilot didn't know the mechanic and the mechanic didn't know the pilot. Both had to do their job and allow the other to do theirs.

On rare occasions, the maintenance personnel would contact the pilot for further data.

We, in general aviation, often have a much closer relationship with those for whom we do maintenance. It allows us to do a much better job for both, IF we take the time to

communicate and respect each others area of responsibility.

Great topic for our forum!

Thanks,

Old Bob

[ARTICLES/20010318.081448.msg06114.tex]

Yoke Orientation**Fri, 13 Jun 1997 21:37:31**

To Dennis Wolf

The earlier airplanes had two positions for the single column and no adjustment for the seat. The rudder pedal adjustments and the up or down position was all of the accommodation available to short leg or long leggers etc. If you felt most comfortable with the single unit in the up position the dual column was installed with the wheels high. If you liked the single unit in the bottom position, it was installed with the "v" upside down. I don't recall the factory specifying a position in the "good old days" but they may have more recently.

Whatever works!!

Bob

[ARTICLES/19970613_213731_msg01144.tex]

Magnesium Ruddervators**Tue, 18 Apr 2000 12:40:04**

In a message dated 4/18/00 10:46:09 AM Central Daylight Time, raven@tminet.com writes:

How much trouble would I get into if I offered stronger, lighter, carbon fiber ruddervators to the fleet? At, say, 3 x the current cost- with a lifetime warranty against corrosion and cracks?

Cheers!

Bill

Good Morning Bill,

A couple of years ago, when the current difficulties with the tail surfaces on the early airplanes became apparent, I suggested that thought be given to using aluminum framed, fabric covered surfaces such as had been used by Beech on the preproduction aircraft.

I was informed by Willis Hawkins that the magnesium units provide greater stiffness and strength at a lighter weight than the ones that I envisioned.

If you could provide a surface with greater stiffness, lighter weight, the ability to be balanced using the same or less weight than the original Beech specifications, FAA certificated and at a price no more than three times the factory units, I believe you would find a ready and eager market!

Unfortunately, most folks seem to have a hard time getting anything certificated by the FAA, let alone a new set of tailfeathers for our beloved "forked tail doctor killers."

But! I am an old man and tend to become discouraged easily. Hey, I never thought I would see a set of balanced fuel injectors approved!

Go for it!!

Happy Skies,

Old Bob

[ARTICLES/20000418_124004_msg06630.tex]

Main Gear Strut Rebuilding**Wed, 10 Nov 1999 13:40:14**

From: Jason Beall flyboy_98@yahoo.com

Evening all,

My right main gear strut keeps leaking nitrogen. It slowly loses air over a period of a few days. It loses it more rapidly when I land on it. I have replaced the valve core and added fluid as per the service manual. Still, no luck. No visible fluid leakage. Any ideas? Do I need to rebuild it, or just replace the entire valve assembly up top?

Anyone have a source to get a complete strut rebuild kit?

Thanks,

Jason

Good Afternoon Jason,

There is something that might be worth a try.

I normally try to avoid "mouse milk" remedies but there is one that I have used and found worthwhile!

Granville Strut Seal has done the job for me on occasion. I was first introduced to it while on a trip a long way from home with a leaking strut problem. It was suggested by a local mechanic and I figured if it could get me home it would be worth a try.

Well, just like in the ad, the strut was leak free for a couple of thousand hours!

Might work for you too!

Happy Skies,

Old Bob

[ARTICLES/19991110_134014.msg10441.tex]

weight and balance**Sun, 22 Nov 1998 21:04:03**

Good Evening Russ,

In a message dated 11/22/98 6:41:57 PM Central Standard Time, russg@vnet.net writes:

My problem is that in our V35B, I'm 150# and my copilot (also a pilot) is 105#. Cannot put two standard 175# ea. people in the rear seats without maintaining lots of fuel.

Russ Gunnard

It is unfortunate that a lot of V-tails have a CG much further aft than is necessary. There definitely is a problem, but the problem is often made worse by the effort of many shops to take the easiest way to install electronics instead of the best way. An effort should be made to locate the equipment to greatest advantage for the loading of the airplane.

As an example, when I purchased my present V35B, the compass for the HSI, the 12/24 volt converter for the transponder and the Stormscope amplifier were all mounted aft of the rear shear web.

I moved them all up to the equipment shelf next to the firewall and that made a substantial improvement in CG location. As new equipment was added, everything that could possibly be mounted forward, was mounted forward.

Check your airplane and see if its CG can't be improved by some relocation of equipment.

I have also found some gross errors in math on weight and balance forms. It isn't that difficult to dig out the original factory WT and Balance forms and run a current one based on current equipment. You may find that things are not as bad as you thought!

The worst case situation is with the installation of autopilot and yaw damper servos. They pretty well have to go toward the rear and in some cases, compensating weights should be installed forward.

A V35B with four standard FAA type 170 pound people in the forward and middle rows of seats should be about a half inch within the envelope even with empty tanks. If yours won't fit that description, either the math is wrong or someone has done a lousy job of installing optional equipment.

Check it out!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981122.210403.msg07130.tex]

7.9 MAINT-PARTS

Aileron Bearing Rod Ends**Thu, 2 Mar 2000 19:14:05**

In a message dated 3/2/00 5:43:04 PM Central Standard Time, stutzman@stutzman.com writes:

Could somebody peek in their parts book and tell me what the part number is? Especially appreciated if you can cross reference the Beech part number to a AN or MS number. Want to buy new, but would prefer not to pay Raytheons prices.

Good Evening Frank,

I don't have the parts book for the A35 readily available, but if you don't get an answer in a day or so, let me know and I will get the manual back from my son and look it up!!

I would like to issue a caution though. Some of the rod ends used on the various Beechcraft components may have standard Heim end, MS or AN numbers visible and yet not be the same as production off the shelf units. Beech sometimes modifies them for specific purposes and puts their own part number on the modified part. An effort to force the unmodified rod end into a spot machined to accept the Beech modified fitting could cause considerable damage to the component.

Unfortunately, it really isn't legal to use the generic part unless Beech calls it out that way. If it has a Beech part number, that is what should be used to be legit. Should you decide to use the generic part, and I am not suggesting that you do, be sure to check it carefully to assure that all dimensions are the same as the one you remove.

Let me know if you need me to get that early parts book!

Happy Skies,

Old Bob

[ARTICLES/20000302.191405.msg04080.tex]

Aileron Bearing Rod Ends**Thu, 2 Mar 2000 20:29:42**

In a message dated 3/2/00 6:37:43 PM Central Standard Time, stutzman@stutzman.com writes:

So if I understand correctly, if it has an Beech number stamped on it in addition to an AN or MS number, then it is a Beech specific

Hi Frank,

Not always, but it may be! In some cases, Beech just does a magnetic inspection or other procedure which they feel is required to assure the quality they desire. I wouldn't be surprised if little or nothing is done but increase the price, but it is hard to be sure when that is the case.

The Clevis bolts which attach the trim cables to the trim tabs were supposed to be purchased from Beech or be magnetically checked by an aviation qualified shop such as a prop shop, but I think that has recently been changed to allow generic AN parts.

Even wheel bearings are supposed to be purchased from Beech, but I wonder how many are?

I have found some of the modified rod ends though, so you must be careful!

Happy Skies,

Old Bob

[ARTICLES/20000302_202942.msg04093.tex]

Aileron Bearing Rod Ends**Thu, 2 Mar 2000 20:38:07**

In a message dated 3/2/00 6:58:55 PM Central Standard Time, hgp@madaket.netwizards.net writes:

If I recall correctly (and please correct me if I am wrong) the rod end for the recent ruddervator actuator rod AD is an example of a Beech modified one where the standard part could not be used.

Howard

Good Evening Howard,

That is true! The face of the ball was ground down .015 of an inch. Unfortunately some full size generic ones were driven into place which bent the machined arms. Not good at all!!

Happy Skies,

Old Bob

[ARTICLES/20000302_203807_msg04095.tex]

Ruddervator Rod Ends**Thu, 2 Mar 2000 22:12:23**

In a message dated 3/2/00 8:18:37 PM Central Standard Time, jensco@wireweb.net writes:

You can still use the Heim MD46-15 provided you seal the passage and reidentify the unit.

Good Evening Jim,

I am not sure we are talking about the same thing. I also don't have the AD handy so I am not sure if the rod ends are the same for all of the airplanes or not, though I think they are all of the same dimension across the face of the ball. The unmodified generic Heim end has a dimension across the faces of the ball of .498 or .499. After Beech grinds them down, they will measure .484 or so. I don't know what the precise tolerance is. The position in the fork into which the rod end fits measures around .485 to .486. In order to put the unmodified generic Heim end into the fork, it must be forced or driven hard enough to make up at least .012 of an inch. The fork would have to be bent a considerable amount to make it fit.

I just went out to the shop to check on the dimensions and found a stock unmodified generic Heim end identical to the spare one I obtained from Beech and it measures .4985. The one from Raytheon measures .484 and shows the tell tale grind marks

The modification of the Heim end by either sealing the end or not having the shank drilled as directed by the AD is a different operation than the one required to face off the sides of the ball to allow them to fit in the fork.

Since both sides of the Beech supplied rod ends show evidence of having been ground and the stock Heim ends do not, I am assuming that about .0075 inches are taken off of each side to attain the required dimension of .485 or a little less.

Why Beech decided to build them that way is beyond me. I would guess that they were able to buy a large number of the modified Heim ends surplus and made the fork components to fit the modified Heim ends, but that is pure speculation.

In any case, purchasing a generic Heim end and filling the shaft end will not allow it to be used for the ruddervator. It must be ground down to the .485 dimension to fit in the ruddervator forks. The rod ends that were in the airplane can be filled with the sealant and reused if they are in satisfactory condition.

Happy Skies,

Old Bob

[ARTICLES/20000302_221223_msg04104.tex]

Ruddervator Rod Ends**Thu, 2 Mar 2000 23:09:06**

In a message dated 3/2/00 8:18:37 PM Central Standard Time, jensco@wireweb.net writes:

You can still use the Heim MD46-15 provided you seal the passage and reidentify the unit.

Good Evening Jim,

I think I owe you an apology. I just got out a magnifying glass and checked the number of the Heim end that I measured and found to be .498 across the faces. It is a Heim MD46-16. Could it be that the MD46-15 comes from the factory with a dimension of .484?

I don't have a Heim catalog to check. The ones that I received from Beech/Raytheon do not say the name of the manufacturer and have no numbers similar to the Heim numbers. Do you know if the -15 measures .484 or close to that?

Could be I jumped to a conclusion without adequate preflight!

Old Bob

[ARTICLES/20000302.230906.msg04110.tex]

Ruddervator Rod Ends**Thu, 2 Mar 2000 23:24:48**

In a message dated 3/2/00 10:02:16 PM Central Standard Time, jensco@wireweb.net writes:

Copy all the info. But the units that were in the a/c were the standard Heim MD46-15 and by simply filling them and reidentifying them, you may reinstall them. If the deminsion was too great, the SB or SI or AD should address the reduction, but they do not. When I modify the Rod End by the SB, I reidentify it with the same p/n that is available form RAC, so it follows that my modified MD46-15 becomes p/n 35-524106-9, the same p/n that RAC sells. The parts manual shows the same Rod End(MD46-15) for all models through V, but the rod p/n changes at K and subs. Jim N.

Good Evening Once Again Jim,

I think our notes crossed in the ether. I know that when I was doing the mods on the pushrods, I either reused the existing ones or obtained new ones from Raytheon, then filled and remarked them as did you. All of the Heim ends that I had in stock measured at or close to .500 so I just bought replacements from Beech via their part number. Tonight was the first time I got out a magnifying glass and managed to read the numbers on the generic ones I had in stock. I'll bet those -15s measure .484 the same as the ones purchased from Raytheon.

Well, a day in which we learn nothing is a day wasted!

Thanks for the information.

Happy Skies,

Old Bob

[ARTICLES/20000302.232448.msg04111.tex]

Ruddervator Rod Ends**Fri, 3 Mar 2000 09:45:47**

In a message dated 3/3/00 7:58:03 AM Central Standard Time, cgalley@qcbc.org writes:

looking at my Aircraft Spruce Cat. the MD46-15 has Ball width of .484
while the MD46-16 has a ball width of .5 and the price almost doubles!

Good Morning Cy,

I never even thought to look in the Aircraft Spruce catalog! My industrial catalogs show nothing between a .375 and a .500 ball width.

Thanks. The secret is knowing what is available and, as always, you know where to look!

Happy Skies,

Old Bob

[ARTICLES/20000303.094547.msg04125.tex]

Ruddervator Rod Ends**Sat, 4 Mar 2000 21:39:17**

In a message dated 3/4/00 7:38:07 PM Central Standard Time, jensco@wireweb.net writes:

My parts manuals show no application for the MD46-16. By P/N this should have a 3/8-24 shaft instead of the 5/16-24 of the MD45-X Jim N.

Good Evening Jim,

Things are getting more and more confusing!

Both the MD46-16 that I have in stock and the one that I have left from my Raytheon order have 3/8-24 shafts. The only differences I can find are the measurements across the ball and about a quarter of an inch difference in the length of the shaft. The Beech one is longer. The picking tag is still attached to the Raytheon part and it lists the part number as 131765-3M. My parts manual shows that the part number should be MD46-15. I suppose that was superseded by 131765-3M. I find no listing for the MD45-X.

Happy Skies,

Old Bob

[ARTICLES/20000304_213917.msg04189.tex]

7.10 MAINT-PROP

Painting Propeller Tips**Sat, 24 Mar 2001 19:07:24**

In a message dated 3/24/01 5:14:30 PM Central Standard Time, inyomono@telis.org writes:

So: other than tradition, can you paint your prop tips (or the whole prop) any way that you want to? Could you paint your entire prop day-glow orange? chartreuse?

This is for fun, but let's see what we have for opinions.

Pete Tracy Bishop, California

You can paint it any way you want, just so long as it maintains it's balance.

There was a Cessna 140 that took Grand Champion at Oshkosh a few years ago that had the prop painted the same soft beige trimmed in red as was the rest of the airplane. Looked very nice.

I know that a lot of folks do polish their propellers, but it really shouldn't be done. I don't know anything at all about metallurgy, but the really knowledgeable prop guys tell me that even the best cared for polished prop is more prone to get microscopic corrosion pits which can lead to a prop losing some portion of a blade and ruining your whole day.

Our local FSDO tells we IAs that we should not accept a polished prop as being airworthy. Some are still doing it, but not all.

Happy Skies,

Old Bob

[ARTICLES/20010324_190724_msg06500.tex]

7.11 MAINT-REGS

Adlog**Tue, 10 Aug 1999 13:26:45**

In a message dated 8/10/99 11:44:44 AM Central Daylight Time, jtsmall@onramp.net writes:

Can any one speak about the adlogrecord keeping system for a Bonanza?
Is it worth \$100 plus about \$20/yr subscription?

Good Afternoon John,

Our youngest son has used their system with his Beech E18 for several years and has been pleased with the service.

I used it before I subscribed to a full CD-ROM maintenance service and I think it is a good reminder for the individual owner. Even if one is not directly involved in the maintenance, the owner is the one who is responsible to see that it is done in a proper and timely manner.

ADLOG helps with awareness of ADs, but doesn't cover service bulletins or items that need repetitive inspections, so maintenance of other records is required in addition to the mailings from ADLOG. They do, however, provide a convenient method of keeping those records. If you use their system completely, it becomes the log book for the aircraft. It could save some time for your mechanic if you have maintained the records faithfully and that should lead to a monetary saving at annual time.

Happy Skies,

Old Bob

[ARTICLES/19990810.132645.msg06846.tex]

Adlog**Thu, 12 Aug 1999 08:22:44**

In a message dated 8/11/99 10:53:44 PM Central Daylight Time, jtsmall@onramp.net writes:

Thanks ... could you compare this to adlog, both in terms of cost and coverage?

Good Morning John,

I will try!

For Adlog, you supply them a list of your individual airplane, engine and components.

They will then send any ADs which may be, or become, applicable to your aircraft, etc., and at annual time, a summary of all that are due.

They also supply a large loose leaf book which, if used, will become your logbook.

It is primarily a record keeping system, somewhat like an office organizer that many people use, combined with notification of any ADs that are issued for your aircraft and any of it's listed components.

You are probably already receiving all of the ADs that apply to your airplane and engine. The advantage of the Adlog system is they will supply ADs that apply to oddball little aftermarket components such as the inflatable door seal or pulselite type stuff, provided you tell them they are on your airplane!

The CD-ROM systems contain all pertinent FARs, OpSpecs and sundry other items in addition to ALL ADs that are, or ever have been, issued by the FAA. It complies with the library requirement that applies to all persons exercising the privilege of Inspection Authorization and a new disc is supplied each fourteen days. The one we have, has a website where information may be obtained concerning things that come up between publication dates. I imagine the other suppliers do the same.

There is a search capability, and provision for keeping records for individual aircraft as well as a means of printing out all of the records and forms (such as 337s) required for maintenance.

The CD-ROM systems are all around four to five hundred bucks a year. The Adlog is just a few bucks a year, plus the single one time charge for the organizer material and setting it up.

They are quite different animals designed for different purposes.

Does that help?

Happy Skies,

Old Bob

[ARTICLES/19990812.082244.msg06880.tex]

Airworthiness and IA's**Wed, 24 Mar 1999 09:23:20**

In a message dated 3/24/99 5:25:12 AM Central Standard Time, epoule@scoot.netis.com writes:

So, the question remains, do I have the original shop sign off everything but the tail and then have the "second opinion" shop sign off the tail? I can't picture how that would work and can't imagine either of them going for it.

Good Morning Eric,

No, I think in this case you are pretty well stuck! Not necessarily by regulation, but by circumstance.

Once the surgeon has made the cut, it is a little late to take advantage of a second and contrary opinion.

There is a distinct hesitation among IAs to accept something on an annual inspection that has already been listed as unairworthy by a fellow IA. The IA is required by regulation to make a report of what he has found and, if it is his opinion that an item is not airworthy, that information must be posted in the aircraft records for all the world to see.

Even casual questioning, by you the owner, concerning the IA's possible thought on the airworthiness of a particular item on a particular airplane can lead to problems for the IA if he tells you that an item is not airworthy without putting that information in the aircraft records (thank the lawyers, read congressmen, for that)!

If you want to form an opinion of how the IA feels about a certain subject, it is possible that the best approach is the one usually started by the phrase: "I have a friend who —."

I have seen an IA take the responsibility of approving something that had been written up as unairworthy when he felt the first IA was in a total "rip off" mode. Remember though, that such action puts him in a position ripe for potential litigation.

I have also seen cases where the owner has taken the questionable item to the FAA and received an opinion that the item was airworthy.

I once knew a gentleman who had his airplane declared unairworthy by an FAA inspector. He obtained a ferry permit and flew it to the factory in Wichita where the factory signed it off as airworthy. That was around 1960.

I doubt if either of those last two scenarios would play out today!

Get that second opinion early!

Happy Skies,

Old Bob

[ARTICLES/19990324.092320.msg03268.tex]

CD-ROM Maintenance Documentaion**Tue, 10 Aug 1999 19:07:09**

In a message dated 8/10/99 4:29:43 PM Central Daylight Time, koyich1@koyich.com writes:

Would you care to elaborate on where you obtained your CD-ROM and how it's organised?

Thanks - Ron Koyich

Good Evening Ron,

I rather rushed through my earlier answer to you and didn't list a lot of the things for which I do use the disc. One of the handiest things is a full listing of the specs for all light aircraft and engines.

There is also a fairly large list of STCs available, It is not complete, as I don't think even the FEDs have a complete handle on all of the STCs available and of course, there are a lot listed that are no longer available. As I am sure you are aware, The FAA has no way of knowing when someone goes out of business or just decides to quit messing with the stuff!

Happy Skies,

Old Bob

[ARTICLES/19990810.190709.msg06855.tex]

CD-ROM Maintenance Documentation**Tue, 10 Aug 1999 18:54:53**

In a message dated 8/10/99 4:29:43 PM Central Daylight Time, koyich1@koyich.com writes:

Would you care to elaborate on where you obtained your CD-ROM and how it's organised?

Good Afternoon Ron,

I share Avantext, Inc. with another mechanic and it is in his name. They advertise in Trade A Plane and Aviation Maintenance Technology. I think they also advertise directly by mail to mechanics because we subscribed following an ad and trial disc that I received via snail mail.

It is pitched as a complete FAA regulatory library and they send out a revision every 14 days the same as the AD schedule.

It qualifies as my required library for purposes of maintaining my Inspection Authorization for everything except the manuals for the aircraft or component being maintained.

It does have all of the ADs and the service bulletins that are required to do the AD along with all of the FARs and such. Lots and lots of stuff!

I have not learned to use all of it's capabilities. I am a basic computer illiterate and I am sure someone with a better knowledge than I could put it to much better use, but it does make me legal. It is around \$500 per year, cheaper if you pay two or three years ahead.

Not cheap, but it takes up a lot less space than the old stuff did.

There are other competitive products available, but I haven't researched any of them. I tend to be creature of habit and don't make many changes, just lazy I guess!

Address: Avantext, Inc. Green Hills Corporate Center 2675 Morgantown Road Suite 3300, Reading, PA 19607 USA

Website: www.avantext.com (I've never tried that, but it is listed on their CD)

Telephone: (800) 998-8857

Hope that helps!

Happy Skies,

Old Bob

[ARTICLES/19990810_185453_msg06854.tex]

Ferry Permit**Thu, 11 May 2000 00:00:41**

In a message dated 5/10/00 8:36:42 PM Central Daylight Time, johnmills@sprynet.com writes:

Is it legal to get a hand-held portable tach and fly the airplane on a ferry permit? Any problem with insurance? jm

Good Evening John,

If the airplane is being flown on a ferry permit, it is up to the mechanic who signs the ferry permit to decide what is required for the flight. No tachometer or any other instrument is required if the mechanic thinks it isn't.

As to the insurance coverage, I would suggest that you contact the insurance company to assure that the aircraft is properly covered. I have never been refused coverage or charged anything for the ferry flight.

Happy Skies,

Old Bob

[ARTICLES/20000511.000041.msg07987.tex]

Field Approval**Tue, 30 Jan 2001 07:39:08**

In a message dated 1/29/01 9:55:26 PM Central Standard Time, N54CE@aol.com writes:

I am hoping that only a logbook entry by an A&P is required, but I am afraid I will need a 337 and field approval for the new 2 1/4" needle and ball. I am getting conflicting opinions from 2 IA friends. I suppose I could call the FAA, but ..

Good Morning Jim,

Welcome to the list!

The following is my opinion only, given freely and probably worth about what anyone is likely to pay for it!

The need for a 337 is determined by the decision as to whether the change is a minor alteration or a major alteration.

Since moving instruments around is not one of the things specifically listed as a major alteration, the determination is left to the person doing the job.

If your "A" licensed mechanic decides that it is a minor alteration, he/she can make a logbook entry, put the airplane back in service and all is well.

But, if at annual time, the IA who inspects the airplane, decides that the change was a major alteration, he/she will list it as a discrepancy and the airplane will not be considered airworthy.

What if the IA agrees with the installing mechanic? He/she will sign it off and the airplane is legal to go!

Now, let's say that some FED sticks his/her nose in the airplane, somehow notes the change, and asks about a 337. You and/or the affected maintenance folks explain that it was considered a minor alteration. If the FED agrees, all is well, if he/she decides that the change is major alteration, he/she has to decide whether or not a federal case should be made and if he/she thinks that, their view will prevail, pending litigation.

If it goes to that stage, it is a Federal Case and, as we all know, no one can be certain what the outcome will be.

The airplane will have been perfectly legal up until the time that the FAA person decided that it wasn't. The "A" licensed mechanic had the authority, in fact the obligation, to make the original decision. The same goes for the IA at annual time.

All of this potential hassle is the reason that most FAA personnel will tell you that if there is any doubt at all as to whether a 337 should be filed, you should submit the 337. If it is completely obvious to the inspector that receives the file that a 337 is not required, he/she will advise the submitter of that fact.

If it were me making the change that you plan, I would leave the standby horizon where it is, remove the Turn Coordinator, replace it with a full size Turn and Bank, put the Davtron clock in the control wheel, replace the clock in the panel with the 2 1/4 inch T&B, as you suggest, and make a log book entry.

Without rereading the functions allowed to be done by an owner/operator I am not at all sure that the functions described could not be performed under the provisions of allowable preventive maintenance on a part 91 airplane, but I would sign it off as an Airframe licensed mechanic.

If the airplane was submitted to me for an annual, I would be happy with the installation and the logbook entry.

Since you are new to the list. I guess I should mention that I do hold an A&P certificate with IA.

There is one more consideration. Is the Turn Coordinator you intend to move (or discard if you take my advice) used as a stabilization device for an autopilot or wing leveler? If it is, you would need to place it elsewhere in the aircraft. I do have some opinions as to how to handle that, if it is required, but I will let that go until another time!

Happy Skies,

Old Bob AKA Bob Siegfried Ancient Aviator

[ARTICLES/20010130_073908.msg02188.tex]

Field Approval**Sat, 3 Feb 2001 18:44:55**

In a message dated 2/3/01 12:44:47 PM Central Standard Time, Mavitor@aol.com writes:

Could this work like the rule of law regarding precedence? If a FSDO in Walla Walla approves an installation would other FSDO's be obligated to accept it? If you showed evidence of an acceptance of an installation to a FSDO in DC you wanted to do, would he have to accept it? If he did not accept it would that make the original installation (accepted in Walla Walla) illegal?

Good Evening Mike,

Boy, I just don't know!

I know that there are installations around done in a manner that passes one place and not another.

My feeling is that it would not automatically be approved just because it has been done before.

However, if you have a 337 from one office that will generally help when applying for the same thing at another.

I am sure that it would not make the first installation illegal if another office refused to certify the same thing.

There is always the possibility that some inspector could make it his crusade and convince the rest of officialdom that the first approval should be decertified, but that would really be a Federal Case!

In any case, the first installation would be legal until it was rescinded. (I Think!)

Happy Skies,

Old Wishy Washy Bob

[ARTICLES/20010203_184455.msg02652.tex]

Field Approvals and Approved Data**Wed, 25 Apr 2001 01:52:31**

In a message dated 4/25/01 12:41:45 AM Central Daylight Time, KenV35A@cs.com writes:

George, Thank you for your detailed explanation. I realize FSDO's vary in their interpretation of FAR's, etc. But, I was not aware of a congressional law, "Act of Congress", on this matter. I am now and will take heed, before I get into trouble. Thanks. Ken

Good Morning Ken and George,

As you both know, I have no knowledge of the law and little about the regulatory environment, but I did attend an IA seminar this last evening at which this subject was discussed.

The perception with which I came away from the meeting was that the FEDs have been given guidance that it is NOT their responsibility to determine whether or not a submitter of data had permission to use that data.

That may be a totally erroneous perception on my part, but it does appear that the FEDs have recently been given new guidance which differs from that they were given a year or so ago.

Happy Skies,

Old 'On The Fence' Bob

[ARTICLES/20010425_015231.msg08256.tex]

Legal Parts

Sun, 27 Jul 1997 08:52:47

To William Webb,

My point precisely, but it is the AI who has to sign the book and it is his interpretation that counts. If there is no direct data to the specific part he (or she) makes the determination.

There are some Feds who claim that any part put on the aircraft must come from Raytheon or have an STC or PMA approval. Other Feds and most AIs have a more conventional and, I feel, more practical view but it is still the AI who makes the decision.

Bob

[ARTICLES/19970727_085247.msg01383.tex]

Owner/Operator Sign Off**Tue, 31 Mar 1998 09:33:41**

Good Morning Nick Dudley,

In a message dated 98-03-31 02:41:43 EST, you write:

When signing-off the log (i.e. an oil change), does the owner/operator sign his name only or name, title (i.e. owner, etc), pilot license number or in some other manner?

This involves FAR 43.5 APPROVAL FOR RETURN TO SERVICE etc. and FAR 43.7 PERSONS AUTHORIZED TO APPROVE etc.

"Paragraph 43.7 (f) A person holding at least a private pilot certificate may approve an aircraft for return to service after performing preventive maintenance under the provisions of (para) 43.3(g)."

The wording to be used is spelled out in FAR Part 43.9. It is a rather long section so I won't try to include it all but paragraph (a) (4) states:

"If the work performed on the aircraft, airframe, aircraft engine, propeller, appliance, or component part has been performed satisfactorily, the signature, certificate number, and kind of certificate held by the person approving the work. The signature constitutes the approval for return to service only for the work performed."

Incidentally the spelling of the words "preventive" and "propeller" are as used by the FAA as is the use of commas. The spelling "preventative" and "propellor" are shown in my dictionary as alternative spellings.

At maintenance seminars which I have attended recently the FAA has been hitting us hard on not putting enough information in the aircraft records following maintenance. Some people say that the less, the better in case of lawsuits. I like to include part numbers, brands of components and other such information that I would be curious about if I were looking at an airplane that someone else had maintained.

Your "pilot" entry should look just like those from an A&P except for the type of certificate held.

Look over different log books and see what looks the best to you.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980331_093341_msg01678.tex]

Owner Maintenance**Wed, 25 Mar 1998 11:19:56**

Good Morning David Pyle,

In a message dated 98-03-25 09:22:56 EST, you write:

Lee Allen wrote that he is an *ex* mechanic and does his own oil changes. I believe that oil changes are not an FAA approved owner (non-A&P) maintenance item.

May I quote: FAR 43.3 paragraph (g), "The holder of a pilot certificate issued under Part 61 may perform preventive maintenance on any aircraft owned or operated by that pilot which is not used under Part 121, 127, 129 or 135"

The functions allowed as preventive maintenance are covered under FAR Part 43, Appendix A , paragraph (c). There is no specific reference to "changing the oil", however there is a paragraph, (c) (6), which specifically allows "Lubrication not requiring disassembly other than removal of non structural items such as cover plates, cowlings, and fairings." There is a further reference, (c) (23), allowing "Cleaning or replacing fuel and oil strainers or filter elements."

There are other references in this section that might impact on the operation of changing the oil, but none that I know of which would prohibit that being done by the qualified pilot.

There is one additional caveat that applies to all maintenance done on any aircraft by anyone, including A&Ps and IAs. FAR Part 65.91, paragraph (a), which describes the "General Privileges and Limitations" applicable to aircraft mechanics, includes the language - "However, he may not supervise the maintenance, preventive maintenance or alteration of, or approve and return to service, any aircraft or appliance, or part thereof, for which he is rated unless he has satisfactorily performed the work concerned at an earlier date."

So, all that needs to be done is to perform the function under the supervision of a person who is qualified to do the work and from then, on you are qualified!!

Be sure and make the required entries in the log and sign with your name and pilot certificate type and number.

Happy Skies,

Bob Siegfried Ancient Mechanic

[ARTICLES/19980325_111956_msg01378.tex]

Owner Maintenance**Wed, 25 Mar 1998 11:30:19**

Good Morning Lee Allen,

In a message dated 98-03-25 11:13:14 EST, you write:

You can do " ANY" work on your plane if an A&P inspects it and signs it off...

Not precisely true but utilized on a practical basis. The FAA holds that for work to be done "under supervision" the supervising individual must be physically available on the property and available for consultation. As a practical matter, most A&Ps feel comfortable signing off work performed when they were not on the property if they feel that adequate inspection of the work is possible. Open to lots of interpretation isn't it?

Happy Skies,

Bob

[ARTICLES/19980325_113019.msg01379.tex]

Owner Maintenance

Sat, 28 Mar 1998 01:16:52

Good Morning Ralph Requa,

In a message dated 98-03-27 23:58:43 EST, you write:

In regards to Part 43, owner maintenance. How is that part interpreted when you are a partner in a multi-partner ownership agreement? Can all the partners perform the listed maintenance?

May I quote: FAR Part 43.3 paragraph (g) "The holder of a pilot certificate issued under Part 61 may perform preventive maintenance on any aircraft owned or operated by that pilot which is not used under Part 121, 127, 129, or 135."

Note that the reference is to "owned OR operated" therefore any number of licensed pilots may perform that maintenance provided they EITHER own or operate the aircraft. No problem as long as the airplane is operated under Part 91 only. They wouldn't need to own any portion as long as they operate the aircraft. They wouldn't have to operate it as long as they owned a piece of it.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980328.011652.msg01523.tex]

Owner Maintenance**Sun, 29 Mar 1998 12:12:49**

Good Morning Dwaine Moore,

In a message dated 98-03-29 02:47:37 EST, you write:

Regardless of what one wants to believe, a partnership in an airplane is not owning an airplane. (Oh, I know I am going to catch hell on this one.)

Very interesting! I certainly do not have an opinion on this statement but would be very interested in what any lawyers or other specialists in the fine points of our language have to say.

I did look in my dictionary to see what it said and I could be convinced that Dwaine is correct! I also tried for co-ownership and could find no such word even though there were other hyphenated words listed.

I have attended local FSDO sponsored sessions on what was and was not legal for a rated pilot to perform as preventive maintenance and who might perform that maintenance. The question of the large flying club was specifically covered and the answer as I recall was that they considered any member of the club to be an owner. I am sure that was primarily the opinion of the person giving the seminar and he may well have misinterpreted the situation. The specific question was whether a member of the club who had not yet checked out in the club equipment could legally perform preventive maintenance and sign for it. The answer was that as long as the individual was a licensed pilot and held an equity position in the airplane he could do so.

I am anxious to hear a definitive answer!

Happy Skies,

Bob Siegfried

[ARTICLES/19980329_121249.msg01566.tex]

Placard REquired by AD**Wed, 17 Mar 1999 12:32:47**

In a message dated 3/17/99 10:57:38 AM Central Standard Time, stutzman@mate.kjssl.com writes:

This AD was previously a Beech service bulletin. As I was redoing the other myriad placards in my plane, I went ahead and made up one for this service bulletin. Am I now in compliance with this AD with my homemade placard, or do I have to buy part number 36-920059-1?

Good Morning Frank,

The following is a free opinion and is undoubtedly worth exactly what you are paying for it.

It would seem to me that making your own placard should be considered a minor alteration. A minor alteration can be approved and returned to service by an A&P with a log book entry. Since the AD states that this particular AD can be complied with by an owner with a Private pilot certificate or greater, it does not seem to be too great a stretch to figure that a minor alteration of this placard would be approvable by that Private pilot with the requisite entry in the aircraft record. The key would be if whoever performs the next annual agrees. If the IA who does that inspection agrees that the minor alteration is acceptable, you are OK. If not, the factory placards would have to be applied or further approval of the home made placards from the FEDs obtained.

Incidentally if your A&P thinks it is a minor alteration but at the next annual, the IA does not, that does not mean that the airplane has been illegal during the interim. Tricky, huh?

Did I waffle sufficiently with that one?

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990317.123247.msg02946.tex]

Re-Weighing**Wed, 28 Mar 2001 13:03:34**

In a message dated 3/28/01 10:29:43 AM Central Standard Time, swo49@hotmail.com writes:

Pete: We did the re-weighing and then did a simple logbook entry as a part of the annual (weighing occurred during a weighing). Did not do an equipment list - since that which was in the plane is that which was weighed. Then, for each alteration thereafter, a 337 was used and the 337 has a W&B recalculation sheet attached. The 337 is not required for the weighing. What was done is what my A&P believes is correct and I took his word on that. Makes sense to me. Steve

Good Morning Steve,

I wouldn't say that what your A&P did is wrong, but it isn't the way I like to do it! I do believe in an easier way.

There is a lot of latitude allowed in determining the form in which the Weight, Balance and Equipment List records are kept. Putting them on the 337 was once required. While that is no longer true, it does provide a safe repository for the data that can always be recovered by contacting the FAA and getting copies of all 337s ever filed on your aircraft. Your mechanic's system utilizes that factor.

Now that computers are available that can be operated by a misfit like me, I prefer to combine the Weight and Balance with the Equipment List. If it is all placed on a spread sheet program, the changes can be made and a new form printed with ease.

I know of no reason to retain the old data any longer than is required of any other maintenance records. Without looking it up, I believe that is only one year.

Old data is nice to have and will often aid in maintenance or in a sale, but it isn't really required.

As to what data is required, check AC 43.13-1B, Chapter 10.

The Equipment List requirement is covered by paragraph 10-19.

The main point is that there must be an accurate weight, accurate balance and an accurate list of the equipment aboard available to the operator. The form of that data is up to the owner and operator.

I haven't checked this out myself, but there is a recommended form for a combined Weight, Balance and Equipment List available through AOPA.

Check it out, it may help.

Happy Skies,

Old Bob

[ARTICLES/20010328.130334.msg06753.tex]

Re-Weighing and Equipment List

Thu, 29 Mar 2001 00:08:19

In a message dated 3/28/01 9:38:44 PM Central Standard Time, inyomono@telis.org writes:

Well, I understand that there has to be an equipment list. The recent article in AOPA Pilot says that the list must include the equipment installed plus the weight and arm of each piece.

I have the original equipment list from the factory, and I have the W&B revisions over the years showing what has been added and subtracted. (Although a few things seem to have been missed.) Now I have had my plane weighed and I have a new weight and balance for the empty plane as equipped when it was weighed. So I have an effective zero start point.

I have no real problem creating a new list of equipment that was on the plane when it was re-weighed. But if I try to do the weights and balances for each piece, there is no way that it will come out the same as the re-weighing numbers.

So: Having re-weighed and having obtained from the re-weighing a new empty weight and a new balance (arm and moment) what do I do about the equipment list? Do I list only what was on the plane, or do I somehow have to get the combined weights and balance information for all the pieces to come out to the same numbers as the re-weighing numbers?

Pete

Good Evening Pete,

You make out the Equipment List showing the weight and arm of each piece of equipment you found on the airplane at the time of weighing. There is no need to make the old numbers reconcile with the new.

If and when you make any changes, you make the removals based on the numbers you have listed on the Equipment List and make the additions as appropriate.

As I mentioned earlier, I would suggest that you seriously consider combining the lists

There is no requirement that they be maintained separately and with modern computer capability, the easiest thing is to just combine the two. All that is required is that any old data be marked as "superseded" and the date of the change be listed along with the name of the authorized person making the change. If you want to keep the old data for historical purposes, that is fine, but they don't have to be in the airplane.

All that is required to be on board is the data required by the operator to properly operate the aircraft. That can be in the form of weights and moments data or placards, as appropriate.

Happy Skies,

Old Bob

[ARTICLES/20010329_000819_msg06794.tex]

Re-Weighing and Equipment List**Thu, 29 Mar 2001 01:22:42**

In a message dated 3/28/01 11:34:13 PM Central Standard Time, inyomono@telis.org writes:

So even if I am careful, the weight and arm at the end of the new equipment list will not be the same as the weight and arm given by the re-weighing company.

And this, of course, creates the quandry.

Pete (who actually worries about this stuff)

Good Evening Pete,

I think you are on the correct path! Just forget about the previously established weight and all of the changes between the time the airplane was built and the time of the most recent weighing. Start with that new weight and the CG located as per the directions in AC 43.13-1B Chapter 10.

You should list everything for which you have the data. If you don't have the weight, you can't list it.

If you don't have the CG of the component, you can't list the arm either!

As an example, you might have an instrument in the panel which is six inches long and has a weight shown on the data plate of three pounds. However, you have no way of knowing where within the instrument is the CG of that instrument. The data is available for some equipment, but not for all.

As a practical matter, you could probably estimate the CG of the instrument and use that in relation to a known point as the arm, but it really isn't necessary. I have a Piper Pacer which came from the factory with very little data concerning the weights or arms of factory installed equipment. No big deal until you decide to remove it!

The primary reason you want to list equipment you have is so that you can make adjustments to the weight and balance data if you decide to remove that component.

In the absence of weight and arm data in the equipment list, it is acceptable to weigh the equipment when it is removed, determine the CG of the component and measure where it was when mounted in the aircraft. You then compute the weight and CG by subtracting that weight from the weight determined at the most recent weighing and adjusting the CG based on the moments determined at the time of removal.

The official numbers are those determined by your recent weighing. The Equipment List is just so you know what was on board when it was weighed. If the data as to weight and moment is not available, don't post it!

The important thing is that the pilot have accurate data concerning the current weight

and the current CG of the empty airplane so that he/she can accurately adjust that figure for the condition in which the aircraft will be flown.

Having the Equipment List is important so that one will know what was aboard at the weighing.

Having the weight and arm of the equipment listed is primarily a convenience for anyone who might remove a device or component which was on the airplane when weighed.

Many weights that are found in our paper work are atrocious. For the last few years, Beech has used a figure they refer to as the Basic operating weight which includes the "unusable" fuel and the oil weight in the empty weight. That is not the correct way to determine the "Empty Weight." Empty Weight is supposed to represent the weight that the aircraft will have when all of the fuel has been drained from the fuel tanks with the airplane in the level flight position designated in the specifications. Any fuel left in the aircraft after the tanks have been drained to the level of the fuel line to the engine is known as residual fuel, not unusable fuel. Whether or not the weight of the oil is included depends on whether the airplane was certificated as a Part 3 aircraft or under the auspices of Part 23. Beech uses the FAA empty weight plus the lawyer derived unusable fuel figure plus the weight of the oil as the Basic Operating Weight. That figure is then used to enter the Beech supplied tables and determine the operating weight and balance. You can do that, or you can do all of the calculations based on the actual empty weight and adjust as required for the actual consumables on board.

Weighing procedures commonly used throughout our industry are poor and rarely give accurate results!

I have seen scales used in high priced shops which have an allowable error listed as high as two percent. Two percent of 2500 pounds is 50 pounds. That is a larger error than I would like to see in my weight data.

I guess I am running on here and going far beyond your question.

Just use the data you have, list as much as you can and be sure that any changes are properly calculated and documented.

Happy Skies,

Old Bob

[ARTICLES/20010329_012242_msg06797.tex]

Rear Seats - Legal to Remove?**Wed, 19 Aug 1998 14:55:32**

Good Afternoon Tom,

In a message dated 98-08-19 14:22:03 EDT, you write:

Ah, another controversy!

I don't know about pre- roughly 1965 models, which may have "bench" seats, but the understanding I developed working at the Beech factory is that the seats are considered part of the "installed equipment" of the airplane, and as such they're part of the "aircraft empty weight" on the weight-and-balance paperwork.

According to Beech, removing a seat, then, would require that new weight and balance paperwork be generated, to show the adjusted aircraft empty weight, moment and c.g. location. You can't simply "mentally adjust" the empty condition numbers--such amended paperwork would have to be signed by a licensed mechanic to be "legal".

You may, however, generate more than one equipment list/weight and balance sheet, clearly labeled "Four seats installed, five seats installed, etc.", and maintain them both in the airplane. That would allow you to calculate aircraft weight and balance (and demonstrate those calculations if need be) for different aircraft empty conditions.

Another option might be to have a weight and balance done with two seats only installed, and then make a weight and balance form that leaves a place for adding the weight and moment of each seat as necessary, just as you'd add or not for baggage, etc.

All that you say is true with the possible exception of who has to sign the weight and balance forms. I am not sure that one must be a "licensed mechanic" to do so.

I have tried to find a reference in the FARs and have thus far seen none.

The closest I have come is to some references of an "authorized individual". As we all are aware, the pilot can in many cases be the "authorized individual" who returns an aircraft to service.

I do sign my aircraft record changes with my A&P number but I am not convinced it is necessary.

Happy Controversial Skies,

Old Bob

[ARTICLES/19980819_145532.msg04549.tex]

Regulation**Sat, 4 Mar 2000 23:55:00**

In a message dated 3/4/00 10:36:00 PM Central Standard Time, Ernie_Ganas@email.msn.com writes:

It is amazing how we survived without all their guidance. Ever since the FAA became the experts GA has not done anything significant with out someone being able to spend a ton of money. Oh Well, don't worry if Al Gore gets elected we probably won't be able to fly anyway since we use leaded fuel

Good Evening Ernie,

It is fun to read about the ease with which the folks back in the thirties stuck different engines, props and all on their airplanes with no government interference at all.

One of the current examples of how the system hamstring progress is to note the way GPS is going like gangbusters in all of the non-regulated fields and yet the snails pace that it is being assimilated into one the most intense navigation fields, aviation. Just think what we could have if approval of the systems used were not required!

Happy Skies,

Old Bob

PS I don't know about Al Gore or Young Bush, but if we get stuck with McCain, no one but the airlines and the military will be allowed anywhere in the nations skies. He has stated that none of the little airplanes are necessary to the nations health and welfare. Pity!

[ARTICLES/20000304.235500.msg04196.tex]

STC's and Field Approvals**Thu, 24 Aug 2000 18:25:12**

In a message dated 8/24/00 3:52:58 PM Central Daylight Time, jsalyer@columbus.rr.com writes:

I do not know, however I was wondering if a statute of limitations might exist and an STC might become "public domain" after so many years. The three light gear STC is over 25 years old. Does anyone know? Joe Salyer

Good Afternoon Joe,

I, too, don't have any absolute knowledge on this subject, but I would like to add a couple of thoughts.

To issue a local approval via the 337 route is a privilege given by the FAA to their maintenance inspectors. They have no obligation to issue a local approval regardless of the strength of the data submitted.

If they do issue the local approval, and any litigation ensues, it is the inspector who signed the approval who is responsible and not the FAA.

There was a directive given a couple of years ago telling the inspectors to be sure that any proprietary issue was considered before using data that may have such an issue associated with it.

The intent was to protect the interest of the folks who had paid the money to develop the data in the first place. I personally have no argument with that.

The problem comes when the person or persons who developed the data are not readily available. I heard a rumor, no verification, at Oshkosh this year, that further guidance had been issued telling the inspectors that if, in their judgment, the owners of the data were no longer readily available to the industry, they could use the data as justification for another local approval.

It comes back to that individual local maintenance inspector. If he/she is willing to take the responsibility, the approval may be issued.

I guess it pays to be on good terms with your local FED!

Happy Skies,

Old Bob

[ARTICLES/20000824.182512.msg12529.tex]

Weight and Balance Update**Wed, 15 Nov 2000 10:20:27**

In a message dated 11/15/00 8:37:46 AM Central Standard Time, cgalley@qcbc.org writes:

Bob, you really aren't serious. It might be ok not to weigh legally, in fact many airplanes come from the factory that way. A major change like a different engine plus all those mods installed just by calculation over the year just might be a serious change. Have there been any repairs, or repainting?

Good Morning Cy,

Yes, I am quite serious! I read the comment as meaning that a weighing was required as a part of the approval and, for the approvals with which I am familiar, that is NOT required.

As to whether a weighing of the aircraft is good idea or not, that is more a question of how long it has been since the airplane has been weighed and how diligently the weight and balance computations have been recorded.

I often see log book entries of changes that I know to have been several pounds, or more, where the weight calculations were pencil whipped with a notation that the weight change was "negligible." Many layers of upholstery are often found with absolutely no record of those layers in the ships papers.

Such poor and incomplete records do, in my mind indicate the desirability of a weighing of the aircraft.

On the other hand, replacement of an IO-520 with an IO-550 is a very simple computation using well known weights and CGs. The same is true of the lighter weight starters, alternators, magnetos and propellers.

If the airplane has a good weight history, why do it again?

If the airplane has a dubious weight history, it should be weighed whether the engine is changed or not.

Do we agree?

Happy Skies,

Old Bob

[ARTICLES/20001115_102027.msg16253.tex]

Annual Inspection Discrepancy**Tue, 27 Apr 1999 08:41:39**

Good Morning Eric,

In a message dated 4/27/99 7:28:59 AM Central Daylight Time, you wrote:

A hypothetical question for you IA's out there...

You are an IA doing an annual inspection on a customer's airplane, and you find something that, while not creating an immediate danger to flight, is likely to become less-than-100-percent-safe sometime within the next several months (i.e. sometime before the next annual inspection). The needed parts to fix the problem won't be available for a month or two. You decide to sign off the airplane as being airworthy but only for the next two months ... after two months, the aircraft is out-of-license, out-of-annual, whatever you want to call it, and must be grounded until the repair is completed.

Can you do this?

Given the proviso that you understand that this answer is given free and advice is often worth what you pay for it, here goes!

Simple answer, no.

There is no provision to extend or limit the times between the required inspections.

If the component meets the required airworthiness standards at the time of the annual, it should be accepted, if not, it must be repaired or listed as a discrepancy and the aircraft cannot be returned to service until such time as the discrepancy is corrected by a person authorized to do so.

You may find other opinions, but that is the way I see it!

Did I waffle sufficiently?

Happy Skies,

Old Bob

[ARTICLES/19990427.084139_msg04053.tex]

7.12 MAINT-VACPUMP

Intrument Air Induction Hose "S" Curve**Sun, 19 Nov 2000 19:56:48**

In a message dated 11/19/00 11:43:00 AM Central Standard Time, inyomono@telis.org writes:

I cannot figure out what the "S" curve is all about. It seems easier just to run a short piece of straight line from above the inline filter to the firewall. What am I missing? What is the purpose of the "S"? Can the "S" be removed and a straight short line put in?

Pete Tracy Bishop, California

Good Evening Peter,

I am sure that at least part of the reason for all of the bending around is to aid in providing adequate flexibility to handle the vibration and twisting of the engine, but I have also been told that the aluminum tubing is used to provide a modicum of cooling to the pressure air of the instrument pneumatic system.

That is why the aluminum tubing should not be replaced with a similar or shorter piece of flexible hose.

Once again, that is not my call and it may be an Old Wives Tale!

The easiest way to eliminate the bothersome tubing would be to go all electric. I would like to do that, but haven't yet persuaded myself to go that route!

Happy Skies.

Old Bob

[ARTICLES/20001119_195648_msg16470.tex]

Vacuum Pump Installation and Maintenance**Tue, 4 Jan 2000 16:53:33**

In a message dated 1/4/00 3:18:43 PM Central Standard Time, beech_35@yahoo.com writes:

Does anyone else have this problem? Logbook entries say the lines were cleaned and new gasket and filters installed each time. What am I doing wrong (other than not budgeting \$2 per hour for the vacuum pump)? By the way, these were all Sigma-Tek pumps. Does Airborne make a better pump in spite of its old-fashioned carbon vane design?

Good Afternoon John,

I definitely am not an expert on vacuum pumps but I will state my experience. I have never used the Sigma-Tek but I have installed Rapco pumps on peoples airplanes when they wanted to save a few bucks. I have never had any complaints. For my own ship, I use Airborne and replace it when it starts to show signs of stress. That is generally around eight hundred hours. The first indication is an increase in the amount of carbon dust that is generated. It will also start to show a lower pressure when the engine is idling. I highly recommend the use of a direct cooling sleeve such as the Rapco rather than just the blast tube Beech installs. Even though the hoses and tubes were supposedly cleaned, I wonder just how good a job was done. I have observed mechanics who did a rather cursory puff or two through the lines and signed it off as lines cleaned.

I like to blow them out thoroughly with air, thread a piece of safety wire through, pull a swab through gun barrel style and then blow it out again. For the vacuum style, it might be worthwhile having the gyros disassembled sufficiently to be sure that no particles have migrated to them. For the pressure systems, the pressure relief valve should be disassembled and cleaned. If it doesn't look like it will seal well, maybe it should be replaced.

Airborne offers a test kit which they will loan you free of charge. I have never used one, but if you are having that much trouble with your system, maybe you should give them a try. I am not sure if this is the latest number, but the one I have used in the past for Airborne is 440 284-6300. They have been very helpful. Incidentally, I just installed their new 216 pump and am hopeful that it may make it to 1000 hours. That is their suggested useful life for the new pump.

Happy Skies,

Old Coot Bob

[ARTICLES/20000104_165333.msg00181.tex]

Vacuum Pump Replacement**Fri, 19 Nov 1999 22:53:42**

In a message dated 11/19/99 9:39:13 PM Central Standard Time, N1BZRich@aol.com writes:

Dennis, I put a new vacuum pump on our M-35 (IO-470C) in July 1998. Did the work myself in less than an hour. New Airborne pump (model 216CW I think) cost approx \$370 after sending core back. If they charge for much over an hour, they are working pretty slow. Blue Skies, Buz Rich

Good Evening Buzz and Dennis,

The one hour should be plenty of time for just changing the pump, however going across the airport, towing the aircraft to the shop, taking off the filter, lines and regulator, blowing out the system (necessary if the pump has failed, good idea even if it hasn't) reinstalling all of the components, checking the operation and checking for leaks, then returning the aircraft and filling out the log books could easily kill a half day! I know we all figure that the mechanic can just start working on our aircraft and complete any task with no preparation, but that isn't the way it works in real life. There is a degree of staging costs that have to be accounted for even by the most efficient mechanics. Once he or she is on the job, things can be done quite rapidly, but getting ready does take time. Paperwork can be daunting, especially if it is an airplane with which the mechanic is not familiar.

Happy Skies,

Old Bob

[ARTICLES/19991119_225342.msg10836.tex]

Wet vs. Dry Vacuum Pump**Sat, 3 Feb 2001 11:07:30**

In a message dated 2/3/01 9:34:14 AM Central Standard Time, FlyV35B@aol.com writes:

Actually, replacing something as critical as a vac pump every 10 years is not such a bad thing....Most people wait until it fails to replace it....not a good idea.

If you use the plane for hard IFR, I'd say more like 600-800 hrs and then buy another one.

Cliff A&P/IA

Good Morning Cliff,

Aren't you both correct?

If we are discussing a wet pump, it would probably be a good idea to have it overhauled at the ten year mark just to make sure that the seals are still in good shape and properly lubricated. However they are very reliable and long lived.

There are lot of airplanes that don't fly six hundred or more hours in ten years. They might even need it done more often than one that flies more!

If we are discussing the dry pump, it is somewhat dependent on the service it is seeing. If the pump is being used to drive a lot of old AN instruments, an autopilot and maybe even wing boots, it won't last as long as one which is only powering one modern small attitude gyro.

I lean toward replacing the dry pumps somewhere around six to eight hundred hours, but I temper that by observing the amount of graphite that is being produced by the pump and the chronological age of the unit.

Along that line, I really like the clear plastic cased inline filters which allow direct observation of the crud being collected.

I also make it a point to really inspect the entire system any time the pump is replaced. The regulators do get old and dirty and it is relatively economical to replace all of the hoses at least every third or fourth pump change. For sure if it has been spitting out hunks of graphite.

On top of that, I am working toward my goal of going all electric and eliminating the pneumatic junk entirely!

Happy Skies,

Old Bob

[ARTICLES/20010203_110730_msg02632.tex]

Chapter 8

MISC

Accidents and Risk

Thu, 25 May 2000 22:19:58

In a message dated 5/25/00 7:27:00 PM Central Daylight Time, grady@mailzone.com writes:

Following this logic, everyone who gets into a GA aircraft is granting permission for the pilot to injure or kill them. By extension, everyone who rides as a passenger in someone else's car assumes the risk of injury or death, and everyone who goes to another's home or place of business assumes the risk of being injured while there. If you go to the zoo and a trainer inadvertently lets a lion out and you get mauled, then you are to blame because you assumed the risk of being around the animals. If you walk down the sidewalk and a building falls on you, that is your problem because you assumed the risk of being near an old building.

Good Evening Wes,

I guess I am about to step into another of those arenas where my knowledge is totally lacking, but in each of the cases you mention, I think the party who takes the action you specify does assume a portion of the risk.

Why should we try to protect everyone from everything? Why does there always have to be someone who is found at fault?

Don't we all accept some risk just for being alive?

No one has to ride in a small plane (or any plane for that matter), the ride in someone else's automobile is not mandatory, you don't have to go in a neighbors house or even inside a place of business. Should you decide to frequent a place that has a wild animal around, isn't there a greater chance of being mauled by that animal? I would think that if you are around old buildings there is more likelihood of a stone falling on your head than if you are out in an open field.

I think that before anyone is compensated for having had a bad experience in the situations you describe it should be shown that the individual from whom one is trying to collect was grossly negligent or otherwise operating far from the norm of how others would operate in similar circumstances.

The mere existence of an unpleasant result does not seem to me to indicate a compensable situation.

For what it's worth!

Happy Skies,

Old Bob

[ARTICLES/20000525_221958_msg08678.tex]

Affording an Airplane

Wed, 8 Apr 1998 16:10:18

Good Afternoon Jerry,

In a message dated 98-04-08 15:11:38 EDT, you write:

Thank for letting me get that off my chest. You can now press Delete.Jerry
Frank

I know exactly how you feel!! I bought my first model 35 in 1953 and it was almost a full years wages. If I hadn't been able to do most all of the work myself and had a lot of help from good friends and casual acquaintances it wouldn't have worked! Thanks to an understanding wife who likes to travel things have worked out well and I have managed to trade along to a 1978 V35B.

In some ways I wish I would have stayed with the last straight 35 I had, but the V35B is nice.

Stick with it and enjoy!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980408.161018.msg01885.tex]

Aileron Roll

Wed, 1 Mar 2000 19:07:45

In a message dated 3/1/00 3:52:28 PM Central Standard Time, cmkerner@postoffice.worldnet.att.net writes:

Anybody remember for sure?

Good Evening Frank,

I don't remember "for sure," but I believe it was Bevo Howard that did the airshow in a straight 35 many years before Marion did his thing in the F33C.

I know it is of no interest to anyone but me, but I am going to tell you anyway!

My absolutely first ride in an airplane was with Marion Cole when he was a line boy at the old Mount Hawley Airport in Peoria, Illinois. He later went off to teach Navy pilots how to fly in the N3N. Great guy and marvelous aviator from a unique family.

Happy Skies.

Old Bob

[ARTICLES/20000301_190745_msg04024.tex]

Air Parks

Sun, 31 Oct 1999 10:40:22

In a message dated 10/31/99 7:45:45 AM Central Standard Time, epoole@scoot.netis.com writes:

At 08:27 PM 10/31/99 +1100, Ron Koyich wrote:

Hi, Eric - one of the reasons I'd move to an air park would be that it would be a community populated with people that have a love for, and a tolerance of, airplane sounds. Yes/no?

Yes. But perhaps not at 5 AM, or even 6 AM. Also, it's a small airpark, with people living all around it that aren't part of the airpark and aren't pilots.

Good Morning Ron, Eric And All,

For what it's worth!

We live on an Air Park with some 80 homes and about 100 airplanes. It is completely built out and has been in existence for some 50 years. When first constructed it was out in the country and is now completely surrounded by normal urban housing. Regular city style half acre lots.

There have been some problems over the years and a few efforts to get the airport closed. About thirty years ago, long before I moved here, the Air Park had around thirty homes. Things were pretty bad. The group got together with the complaining neighbors and started a PR campaign to make things work.

One of the compromises made is a policy that no takeoffs will be conducted between 11 PM and 6 AM. Landings are allowed any time.

The most important outcome of those meetings was the realization that the airport folks needed to get involved in local community activities. They began to join the local bowling leagues, church groups, homeowners association, Boy Scouts, Girl Scouts and anything else that would allow the flyers to get to know the non flyers and vice versa.

There is one day a year when, in association with a community wide family picnic, free airplane rides are given to any resident of the community and all of the grandchildren and other guests they care to bring. The rides are volunteered by, and all expenses paid by, the individual pilots. No direct association with any of the community groups at all.

When we do Young Eagle rides, we invite the parents to attend and after all of the children have been cared for, we encourage the parents to go up as well. We sometimes spend longer with the parents than the Young Eagles. Whatever seems appropriate to make them enjoy the experience.

Any and all who live in our community are told we would be happy to have any of their friends who own or fly small private planes visit and use the strip any time. We ask

only that the incoming pilot contact one of the airport board members by phone or in person to get a briefing as to our local operational restrictions and as to where they should park. No charge is made for this accommodation.

For those aircraft owners who live nearby, but not on the strip, we have a limited number of tiedowns available that can be rented and the field is available for their use at the same rates as a resident. That courtesy is only available to local folks, not to just anyone who wants a tiedown.

We now find that local residents refer to the strip as "their" airport. It is even listed as a plus when they are selling their homes.

We still have a few complainers, but overall, the neighbors are happy and friendly. It does require a conscious effort to get along.

My neighbor immediately to the east has an AT-6. He always makes reduced power takeoffs, both RPM and MP. My neighbor to the west has a Cessna 185. With the original engine, it was by far the noisiest airplane on the field. He also uses the reduced power technique when it is practical to do so. When he has the floats on and heads to Canada. All of the power available is needed and it makes a lot of noise, but he doesn't make 6 AM departures in that mode.

He recently installed an IO-550 and has a three blade prop. The original 520 turned 2850 and the 550 only turns 2700. It is a LOT quieter now.

The combination of a little consideration and a lot of getting to know your neighbors will make a tremendous difference in how the field and it's operations are accepted.

Happy Skies,

Old Bob

[ARTICLES/19991031_104022_msg09926.tex]

B777 Flight Time

Tue, 21 Dec 1999 22:48:32

In a message dated 12/21/99 9:27:03 PM Central Standard Time, girders@attglobal.net writes:

Are you sayin' that there is someone out there that might just let me do a few touch-n-go's in one [B747] ?

All it takes is money! I think I heard 777 flight time was available at around ten grand per hour!

Happy Skies,

Old Bob

PS I just had to change the spelling in the subject line, sorry if that confuses anything!

[ARTICLES/19991221_224832.msg12222.tex]

Cost of Flying

Wed, 3 Jan 2001 13:43:50

In a message dated 1/3/01 11:09:55 AM Central Standard Time, HHammond@lgc.com writes:

It's not just a matter of money either. Flying is expensive but not so expensive that it can't be done if you manage your priorities.

Good Afternoon Hal and All,

I tend to agree with Hal.

There are lot's of ways to fly that don't require a lot of money. Many of the members of our glider club have relatively low paying jobs. They are able to come to the field, play with gliders, talk about flying and just plain have a good time without spending any large sums of money. Many only fly the gliders a few hours every year, but they get to fly the towplane every flyable weekend if they want.

Getting in a four place high speed cross-country machine is going to cost a few bucks, but you don't have to do that to enjoy the pleasures of flight.

I remember that in my days of sailing, not all of the folks who belonged to our yacht club could afford a cruising sail boat, but they still enjoyed sailing by crewing for others and enjoying the camaraderie of the group.

I feel that lack of money is an excuse, not a reason, to stay out of aviation.

I have always driven older cars and lived in a simple home so that I could indulge in my passion for flight.

The problem is, we are not doing a very good job of developing that passion in the younger folks!

It is cheaper to take flying lessons from a CFI than it is to take tennis lessons from an unlicensed tennis pro.

We all do what we want to do with our funds.

Just as there are low cost ways to go sailing, there are low cost ways to go flying.

You only need the true desire.

Any venture in life takes an expenditure of time or money. As many have said, it depends on your priorities.

Happy Skies,

Old Bob

[ARTICLES/20010103_134350.msg00209.tex]

Eclipse Jet

Mon, 19 Jun 2000 11:36:57

In a message dated 6/19/00 6:59:48 AM Central Daylight Time, tturner@vol.com writes:

The Eclipse, the Safire, and the Century Jet are all possibilities for our construction company airplane (to replace the 58TC) some time in the future.

Good Morning Tom,

They are all out of my price class, but right now the Eclipse looks the best. It is planned to be an all aluminum airframe and appears to have the wealthiest people involved in it's development.

If they managed to build it for the price quoted, it would be competitive in price with a model 36.

Great things are on the horizon!

Happy Skies,

Old Bob

[ARTICLES/20000619.113657.msg09872.tex]

Eclipse Jet

Mon, 19 Jun 2000 18:43:30

In a message dated 6/19/00 4:48:04 PM Central Daylight Time, 72311.556@compuserve.com writes:

We were delivering 20 Aerostars each month in 1969. Total employee count was about 1400. About 600 on one shift and 400 on each of two more shifts.

Good Evening George,

I guess that means that 2000 folks should shove out 30 airplanes per month or about one and one half per working day!

There have been so many wonderful things proposed over the years that never happened, it is easy to be skeptical.

Beech started out with the thought of building the Bonanza primarily with electric spot welding. If it would have worked, and if they could have sold the ten thousand a year that they originally envisioned, the airplane would have been cheap transportation.

There have been many things done with electronics that I never imagined could be done. Maybe those same minds can bring some magic to the building of aircraft.

Would have, could have, should have!

Wouldn't be miraculous if they could pull it off?

Who knows, someday, old retired airline pilots may all be boring holes with jets instead of Bonanzas.

It is fun to dream!

Happy Skies,

Old Bob

[ARTICLES/20000619_184330_msg09902.tex]

Flying

Fri, 19 Jan 2001 18:44:29

Good Evening Cy,

"I decided that if I could fly for ten years before I was killed in a crash, it would be a worthwhile trade for an ordinary lifetime. Charles Lindbergh"

Your Lindbergh quote is one that I have used to guide my life in more areas than aviation. What good is living if there is no enjoyment?

I first read it a few years after I soloed. So far so good!

Thanks for bringing it up.

Happy Skies,

Old Bob

[ARTICLES/20010119_184429_msg01266.tex]

Flying Clubs

Mon, 22 Mar 1999 17:52:11

Good Afternoon All,

I have very little direct experience with flying clubs, but it has always seemed to me that there might be a place for a flying club which consisted of members who would invest almost the same amount of money that they would have in an individual airplane but wherein greater utility and availability was provided.

How about some of you mathematically inclined folks doing your thing with the numbers that could help one determine the availability of one airplane owned and flown by one owner as against two or more airplanes owned and flown by various numbers of multiple owners.

If one individual owns one airplane, he still does not have one hundred percent availability. There will be times when the airplane is unavailable due to scheduled or non-scheduled maintenance.

Two airplanes owned by two individuals would quite likely provide better availability numbers for both owners than individual ownership.

How about five airplanes owned by ten people? Or fifty people!

Has anyone worked out the probabilities of such "club" style ownership?

I would envision the group owning as nearly identical airplanes as possible so that the availability would be consistent as to utility of operation.

I know there are a lot of fine large flying clubs around. Do any of them provide better availability of aircraft than individual ownership?

Just curious!

Happy Skies,

Old Bob

[ARTICLES/19990322.175211.msg03152.tex]

Flying Films

Fri, 18 Feb 2000 14:18:34

In a message dated 2/18/00 1:09:43 PM Central Standard Time, phaedra@aerobat.com writes:

Can you guys suggest some good aviation films?

Good Afternoon Phaedra,

How about JayJay the Jet Plane? My grandchildren love it!

Happy Skies,

Old Bob

[ARTICLES/20000218_141834_msg03108.tex]

Flying Films

Fri, 18 Feb 2000 18:45:01

In a message dated 2/18/00 5:30:52 PM Central Standard Time, YAKpilot@aol.com writes:

Not exactly a movie, but don't forget the Sky King series. From a year or two ago.

For What It's Worth,

The star of that series is operating an airport near Terre Haute, Indiana.

It is called, appropriately enough, Sky King!!

The identifier is 3I3. That is an "I" as in Indiana between the 3s, not a one.

The airport has IFR approaches and there are all sorts of memorabilia around the place.

Happy Skies,

Old Bob

[ARTICLES/20000218.184501_msg03131.tex]

Flying the Airliners

Mon, 12 Jan 1998 12:40:55

Good Morning Tom,

In a message dated 98-01-07 09:36:36 EST, you write:

my dad told me the UAL pilots loved to slip the DC-6s.

Yes, It did slip nicely and the slip was used by some when the situation demanded.

It wasn't till the jets came on the property that the company said to quit using the slip as an altitude losing maneuver. Most of us still used the slip as a crosswind landing technique. The jets generally had relatively high flap extension speeds and the drag rise was very high at the higher speeds which enabled us to develop some extremely high sink rates when needed. So much so, that a couple of airplanes were lost before the industry learned how to handle it.

Happy Skies,

Bob

P.S. The Stearman flies when the sun is out, the temperature above forty and the winds are light.

[ARTICLES/19980112.124055.msg00258.tex]

Hauling the Family

Sat, 14 Nov 1998 07:26:53

Good Morning Jeb, Skip and All,

In a message dated 11/13/98 11:29:05 PM Central Standard Time, burnside@erols.com writes:

those kids get older and heavier (we won't discuss the pilot...) faster than I can say BFR.

How true!

Having agreed to that premise, I would like to expand the thought a bit. I went through that "kids getting heavier" stage some forty years ago. At first it was adequately handled by a reduction in the fuel loads which added a few stops along the way to grandmas house.

Those stops were actually rather appreciated by the occupants and the only problems were the days when extensive low ceilings called for far away alternates.

I did enter into a partnership which provided me with a Twin Beech to haul the family around and that worked very well.

The funny thing was, I rarely had the whole family to haul around!

It seemed that as the children became fifteen to sixteen years old, they found other things to do rather than accompany the old folks on trips around the country. I could have flown almost all of my model 18 trips using the old Bonanza just as well. It was a lot of fun arriving with my mini-airliner, but it was not necessary most of the time.

The second factor was that the kids were getting to the stage of needing cross-country experience on their own and they often flew another airplane to grandmas house and met the old folks there. See – That is another excuse to get the kids to learn to fly!

We did try a Baron for a while, but found that the Bonanza seemed to do the job most of the time and was a better fit for my financial capabilities.

There are a lot of options available. The dreaded C210 has an excellent load carrying ability and a much better CG envelope than we enjoy. While I never cared for the handling characteristics of the 210, the numbers are pretty good. We had a C195 for a while. That was a joy to fly, but no better at hauling the family than the Bonanza.

We bought a nice new V35A with factory installed tip tanks in the late sixties for a FBO operation in which I was involved at the time and it had a great useful load. Around 1472 pounds as I recall. The CG was still a problem though and the fifth and sixth seats rarely carried other than small children.

The kids not only get big fast, they also disappear from family outings fast. Buy an airplane to fit your needs, but don't forget that your needs will likely change rapidly

throughout your life.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981114.072653.msg06938.tex]

Jepp Charts

Fri, 19 Mar 1999 13:37:48

In a message dated 3/19/99 10:31:44 AM Central Standard Time, jtsmall@onramp.net writes:

Assuming the updates are some trouble and that you've used NOAA charts can you tell me briefly why you prefer Jeppesen? And in particular is are the Jeppesen GPS charts superior?

Good Afternoon John,

Asking me why I use Jepp charts instead of NOAA is rather like asking me why I fly a Bonanza instead of a Cessna 210!

Everybody has their preferences. Both get the job done.

I have been using Jepps for the last fifty years and they grow on you!

I find them much easier to read. They tend to have more pilot oriented extra information available and, besides that, Jepp was a United Air Lines pilot and we old guys have to stick together. He was the first to issue such plates. The approaches were originally written out in a narrative form and took some visualization to use properly.

There is no doubt that my long use of the product makes me very prejudiced toward them.

Putting in the revisions is a pain!

It takes me from two to four hours every other week to insert the revision. It must be remembered, though, that I am involved in a project where I look for certain changes and trends in the approaches. I therefore may spend two or three minutes on a single page while I record and analyze the data.

I would say that if you just stuck in the pages without looking at the changes, the full lower forty-eight coverage would still take an hour to an hour and a half to do.

Jepp does have a quick change option where the pages are just thrown away the same as the NOAA charts.

It is a little out of my price class and it doesn't fit in well with my evaluation project.

I have recently added the JeppView to my coverage and that seems to have tremendous potential if you can find a computer that you are willing to trust well enough to eliminate the paper charts. It works wonderfully. I don't like the idea of trying to pick out the charts before a trip though, I wouldn't use it unless I had the confidence to just carry the CD and the computer and call up the charts as they are needed. I am not at that stage yet!

I have used the government charts a fair amount. When I was actively instructing, I

always recommended that my students start out with the NOAA system since that is what they would be using on the written. I don't know if that is valid reasoning anymore or not. I never did get as comfortable with them as I am with the Jepps.

I guess it's the same old story, "you pays your money and you takes your choice."

Not much help was I?

Happy Skies,

Old Bob

[ARTICLES/19990319_133748.msg03025.tex]

Life Rafts

Mon, 22 Mar 1999 08:40:42

In a message dated 3/22/99 3:38:25 AM Central Standard Time, rkhintak@ibm.net writes:

So before someone mails a raft they might check on who is responsible for declaring it HAZMAT.

Good Morning All,

Shipping the life raft does seem to be quite a problem.

As I understand it, the entity that ships the raft must be certified as having had all of the special training and record keeping capability that the US government has seen fit to impose.

I have mine checked, packed and recertified by the manufacturer who is located in Florida.

About four or five years ago, when I tried to ship mine back for service, UPS refused the shipment. I called the company who does the repacking and they told me that these shipping regulations had been imposed. They knew of no way around them.

I was fortunate in that I had a friend heading for Fort Lauderdale and he agreed to drop my raft off at the repacker in Hollywood. Since that time, I have been dropping it off there following my overwater trips.

They are qualified to ship it to me via UPS and it is at some reasonable price. I don't recall the exact amount, but it is something like twenty bucks.

If I want to ship it back to them. I have to locate a shipping company who have personnel that have gone through the training program and can do the HAZMAT inspection, pack and then ship the thing to Florida. That can run from 150 to 200 bucks!

It's as bad as dealing with the FAA!

I have spoken to some of my friends who fly overwater more often than I and was told that some of them have shipped the unit as aircraft parts and didn't say what it really was. That would be exposing yourself to the potential of some rather heavy fines if the true nature of the shipment were discovered.

While the raft must be inspected every year if it is to be used as a required flotation device, we GA types are not required to have flotation equipment on board so I have only been having mine repacked and certified if am planning an overwater trip. Even then, if it is less than a year overdue, I haven't had it certified.

I think the best answer is to find a source as close to your base of operation as possible that can do the repacking and certifying.

Happy Skies,

Old Bob

[ARTICLES/19990322.084042.msg03114.tex]

Life Rafts

Mon, 22 Mar 1999 11:38:17

Good Morning Skip,

In a message dated 3/22/99 8:00:11 AM Central Standard Time, you wrote:

Bob, if you are happy with the emergency raft you have and the manufatures service would you be kind enough to share that info. with us? I hope to fly to Eleuthera a lot this year. Thanks! Skip Weld, near Orlando

Be happy to!

Mine is a 4 man raft made and serviced by Survival Products, Inc., 5614 S.W. 25th Street, Hollywood, FL 33023. Telephone: 954 966-7329.

I have the one that is attached to a survival pack and they are both in one package which measures 12" by 13" by 7". I also purchased two life vests from them. Whenever I have the raft serviced, I also have the life vests serviced.

I did no research of the market before the purchase, a friend recommended them, so I bought!

Most experts recommend that you take it apart and familiarize yourself with the contents before you head out on an overwater trip. I have never done that, but it is undoubtedly a good idea.

I don't figure to be in the water long enough to need the food, but I do take a couple of gallons of water along. I also secure a small waterproof bag containing a handheld 760 comm unit, a handheld GPS and lots of AA batteries to the raft and the water jugs by a small nylon cord.

I have been pleased with their service. However, I have been told there is an outfit in Rockford, IL which MAY be able to service my raft. The person that told me about it has his life jackets recertified there but wasn't sure about rafts. If true, that would be much more convenient for me. I last had my raft serviced in November of 1998 for a trip we made to Venezuela, so I am at least a year and a half from having it done again.

Happy Skies,

Old Bob

[ARTICLES/19990322.113817.msg03127.tex]

Logging time - Tach or Hobbs?

Mon, 17 Aug 1998 13:01:21

Good Afternoon Robert Lightfoot,

In a message dated 98-08-17 12:38:29 EDT, you write:

Thanks, Is there a FAR to back this up? I have been looking, but have not found it.

Unfortunately, there is considerable discussion within the agency as to the proper interpretation of the rules of logging time on an engine or other component.

This has come to the fore due to the emergence of electronic recording tachometers.

There are many Feds who argue that the regulations require that engine time be logged based on the actual number of hours the engine is operated regardless of the RPM or whether or not it is in flight. Others feel that the actual number of flight hours is the proper parameter and that is supported by historical data in that most all airlines have always recorded their engine time in that manner.

The other side of the coin is that we have a very long history of using tach time in evaluating engine time and use. That brings up the question of what RPM the tach should be recording? It is my understanding that there has never been a regulation stating what it should be but there have been some recommendations.

I am currently told that one of the manufacturers of electronic tachs has an approval for limiting the time at which the tach will log time to those times it is operating above something like 1300 RPM, thus it would for all practical purposes, record flight time.

Another of the popular electronic tach manufacturers has been told that is not legal and that the first approval should never have been issued.

What am I saying? Just that the procedures currently used for certification of any device are so confusing and contradictory that I am surprised anything gets done!

That is NOT to knock the FEDs who work there. I find most all of them to be well meaning, conscientious, aviation oriented people.

The system is broke and we need to get on our elected representatives to get it fixed but, unfortunately, most of them are lawyers and have very little interest in any improvement.

That doesn't help answer your question at all, does it? Sorry!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980817_130121_msg04418.tex]

McCain

Sun, 5 Mar 2000 18:34:23

In a message dated 3/5/00 5:13:46 PM Central Standard Time, markjenn@halcyon.com writes:

Bottom line: McCain is a pilot. Do you think that will make him more or less sympathetic to pilot's issues?

-Mark

Does he hold a current medical? Has he ever held a civilian certificate?

He may be a former military aviator, but that doesn't make him a pilot. Some of the worst enemies General Aviation has ever had were current or ex military pilots. The same is true of many airline pilots. The ex military pilots that most of us know are the ones who are good friends and enthusiastic aviators. The same goes for those of our airline friends who are active GA pilots. Unfortunately, merely flying for a living or risking ones life for their country does not equate to having a love of aviation or a comprehension of aviation's place in the scheme of things. On the contrary, they often have the attitude that they know all about those flying machines and those idiots who fly around in small single engine or single pilot airplanes without a parachute are stark raving mad and need to be protected from themselves and separated from the public by massive regulation and restriction. Unfortunately, the unknowing public is likely to listen to them. That makes someone with an aviation background more dangerous and likely less sympathetic to our needs than a person with absolutely no knowledge of aviation.

Still hoping for and wishing all,

Happy Skies,

Old Bob

[ARTICLES/20000305_183423.msg04266.tex]

Metric Compass

Fri, 29 Oct 1999 02:17:57

Good Morning All,

Last night I responded to a post concerning the use of a Metric Compass. I want to assure all that I have never heard of such a thing!

I trust that the possibility of the development of such a device is as much of a spoof as I think it to be!

Actually, I rather like the old mariners notation of Nor' by Nor' east and such! Wouldn't that be cool? "Bonanza 20318 this is Chicago center, turn to starboard, new heading South by East, traffic showing up two points off the port bow, should past well abeam on your new course."

Happy Skies,

Old Bob Would be Ancient Mariner

[ARTICLES/19991029_021757_msg09805.tex]

Metric Compass

Thu, 28 Oct 1999 22:52:02

In a message dated 10/27/99 11:05:59 PM Central Daylight Time, N1BZRich@aol.com writes:

Blue Skies, Buz

PS - By the way, what is the latest on the new Metric Compass? When will the prototype be out and when will the FAA require it in our airplanes?

Good Evening Buz,

Great hearing from you again. I haven't seen the prototype Metric Compass yet, but I understand that some of the European States want it to be 0 to 250 in each direction rather than 500 degrees for the full circle. Kind of like some of the old European compasses had East and West bearings of 0 to 180.

I think it should go all of the way around similar to the way our current 360 degree compasses work. It's going to take enough time to learn to turn to 125 degrees for East rather than 90 without having to introduce the problem of East and West bearings as well!

I guess they don't care much about what I think though! We found that out when they forced the METAR stuff on us didn't we?

Happy Skies,

Old Bob

[ARTICLES/19991028.225202.msg09799.tex]

Misc

Mon, 17 Aug 1998 12:19:20

Good Afternoon All,

1.) Just to jump into the fray, I am an unemployed airline pilot. If any of you have a 747 you would like to be checked out in, or if you want it ferried somewhere, give me a call!

2.) I agree strongly with Tom Turner's message that we need to get our children and grandchildren involved early in the game. My wife and I have five children who all soloed gliders on their fourteenth birthdays and airplanes on their sixteenth. I won't say there was any pressure, BUT!

3.) I have a 1978 V35B and dearly love it.

4.) In case you haven't noticed, I am enamored of the Magic of the GPS.

Happy Skies,

Bob Siegfried
Ancient Aviator

[ARTICLES/19980817.121920.msg04410.tex]

Now They Are Shooting At Us!

Mon, 8 Nov 1999 12:55:09

In a message dated 11/8/99 11:24:08 AM Central Standard Time, hale@lucy.fc.hp.com writes:

At one of our BPPPs, one of the airplanes got shot ... we think down by San Marcos.

Looked like a 30-06 up thru the wing just outside of the fuel tank.

The pilot was unaware anything had happened.

Bill Hale

Many, many years ago, a friend was flying his Bonanza on final to Runway 25 at Rockford, Illinois, when he heard a slight thump which seemed to be to his right. Upon landing, the right gear collapsed. The landing gear lift leg had been damaged by what appeared to be a 30.06 slug.

I believe it was at Dayton, but it might have been Columbus, Ohio, there was a rash of bullet holes found in DC-6 and Constellation aircraft that were landing on a certain runway. The local authorities finally caught the culprit. He just didn't like the airplanes flying over his house at night and that was when he was shooting them!

In 1949, I was washing a Navion following a charter trip to Springfield, Missouri. As I moved the airplane, I heard something rattle in the fuselage. Further investigation revealed a hole in the right rear wing fairing, a corresponding hole in the fuselage and a bump on the top of the fuselage lined up with the other two holes. When I retrieved the slug from the rear fuselage, it appeared to be a twenty two. I had flown to Springfield IFR, but the return had been scud running beneath a four to five hundred foot ceiling. I rather imagine some moonshiner thought I was looking for his still!!

I guess folks have been shooting at us for a long time!

In the context of our recent conversation about flight at minimum legal altitudes, I suppose this would be one more vote for the "keeping it high" side!

Happy Skies,

Old Bob

[ARTICLES/19991108.125509.msg10321.tex]

Portable Oxygen Systems

Sun, 11 Feb 2001 22:08:14

In a message dated 2/11/01 8:09:05 PM Central Standard Time, Michael.Lott@ssc.nasa.gov writes:

Among other things:

All OX is the same. I'm using welders OX in my airplane.

Good Evening All,

This statement is true, today, but it wasn't always that way.

The specifications for Welders Oxygen, Medical Oxygen and Aviators Breathing Oxygen are all different.

Nowadays, all Oxygen that is supplied to all users comes from the same source and is identical.

However If you have oxygen which only meets the minimum specification for Medical use, or the minimum specification for Aviators Breathing Oxygen, you cannot use it for welding.

The specifications for welding are the most severe.

Welding Oxygen can be used for medical purposes and for Aviators Breathing Oxygen, but not the other way around!

Years ago, when the purification equipment slipped a little, they would stop filling welding tanks and just fill medical and ABO tanks until the quality got back up to welding standards.

Fortunately, it is all the same today. Even the hospitals and we aviators get as good oxygen as the welders have always had!

Happy Skies,

Old Bob

[ARTICLES/20010211_220814.msg03562.tex]

Roger vs. Wilco

Sat, 3 Mar 2001 11:52:44

In a message dated 3/3/01 10:28:46 AM Central Standard Time, flyinglo@email.msn.com writes:

What's the difference between Roger and Wilco?

Roger was the phonetic word used for an R during WWII.

The R was used to let the transmitting party know you had received and understood his message.

When using Morse code, only the "R" would be transmitted. When voice became common, the phonetic version of "R" was used.

It's meaning and recommended usage changed a few times during the war depending on the whims of the various commanding officers, but is currently most commonly accepted as meaning about the same as the original use.

Wilco is short for Will Comply. In the days of code, it was generally sent as "WC." Some of the early radio operators would send it in voice as Whiskey Charlie, but it became more commonly used as wilco. That use was discouraged by some authorities and it was considered very bad practice to say: Roger, Wilco, Over and Out.

Most authorities felt that the simple "Roger" conveyed the entire meaning of the rest of the statement.

As in so many things, It Depends!

Happy Skies,

Old Bob

[ARTICLES/20010303.115244.msg05093.tex]

Single Pilot Operation

Wed, 7 Jun 2000 10:29:19

In a message dated 6/7/00 7:43:26 AM Central Daylight Time, MikeM86949@aol.com writes:

BTW, most jet drivers think very little of single pilot ops. After flying the Lear, I can see why. Its doable, but only if you're very very good, and if the aircraft systems are simple.

Good Morning Mike,

I am sure you enjoyed the Lear, it is quite a hot rod!

I wonder, though, about your statement concerning what most jet drivers would say.

I agree that most of them would probably affirm your statement, but is that really pertinent to the operation we are discussing?

During the time that I was a gainfully employed aviator, at least eighty percent of my compatriots would tell me that they thought anybody who flew IFR single pilot in any airplane without a parachute strapped to their tail was stark raving mad!

I did find that many of those same pilots would later buy a small airplane. They almost always said it would be flown only in good, day, VFR conditions. Over a few years, most of them flew at night and IFR just like the rest of us "stark raving mad" GA enthusiasts.

I had several friends who started out with a twin because they didn't trust one engine even in the daytime.

Many of those eventually ended up with a Bonanza or similar high performance single engine machine.

I don't know whether we rationalize our decision due to the rapture of the GA scene or find that the benefits to be derived are truly worthy of the risk involved, but somehow there are still a bunch of us who get in those little single pilot machines and go punch holes.

So what is the point I am trying to make?

Just because a lady or gentleman is making a living flying a jet airplane doesn't make he or she an expert on operating single pilot in anything!

I am not type rated in the Lear, but I did fly a couple of segments once in a Model 24. It was without a doubt, one of the busiest airplanes I ever flew, WHEN ON THE GROUND!

The pre-takeoff checklist was as comprehensive as any machine I ever flew. All of the stick pushers and stuff that had to be added to that little Swiss fighter by Bill Lear before it became a successful piece of corporate transportation make it a very complicated unit.

It was, however, the first of it's kind. Many advancements have been made in the last forty years since Bill tried to make that little bugger a single pilot machine.

Once the Lear is airborne, it, like most jets, is a baby carriage to fly. The newer machines are even easier. Whether an airplane has a jet engine or a piston engine is not the issue. The Jet Engine just makes a sophisticated airplane easier and simpler to operate than the same sophistication piston engine aircraft.

In my own experience, I find that the Late D model and early E model Twin Beech machines are the busiest single pilot airplanes that I have ever flown. But look at all of the kids who managed to haul the night freight in a bunch of old poorly maintained dogs while they were building time to move on to something better.

After a reasonable amount of training, most Twin Beech owners seem to be able to do a pretty good job of getting their comfortable machines where they want to go.

I also have a fair amount of time in a 58P Baron. That is as busy as the Twin Beech, but much easier to land! The engines are easier to operate, but it has pressurization which adds to the workload.

The King Air is a MUCH easier airplane to fly single pilot than the 58P, yet I'll bet that most professional pilots flying a King Air will tell you that it really needs a two man crew.

Would you listen to those who are being paid to fly that two man machine or to the many wealthy owners who regularly do fly their King Airs single pilot?

The King Air, with all of it's automatic systems, modern engineering and those very reliable easy to operate turbo prop engines, is one of the easiest airplanes to fly that I have ever flown.

Anyone who has even reasonable competency in a Bonanza would find it easy to transition to a King Air. The engine is easier to operate and the airplane is even easier to fly than the mighty Bonanza.

The only thing that I could think of to make a King Air easier to fly would be to eliminate the problems associated with a propeller. That is what happens with a jet!

Pressurization is the single thing that the Eclipse or similar airplanes will present as a complication to the single pilot operation. Even then, the modern pressurization units are much more reliable and simpler to operate than were early systems.

I would hazard a guess that the Eclipse and Safire will be MUCH easier to operate than a Malibu or a Baron 58P.

It is hard to believe that such a machine could be built and sold for 775 or 800 thousand bucks, but if it is, it should be an easy to fly single pilot machine.

Jet engines do nothing but make any airplane easier to operate. Tricycle gear is always easy to handle. Wing loading determines runway length. It takes just as much skill to put a J-3 Cub in a 600 foot strip as it does to plant a 747 on a 6500 foot one.

If the little jets are built and certified for balanced field lengths of 2500 feet or so, that makes them easier and safer than any of the 400 series Cessnas and most of the Barons.

All twin engine aircraft introduce a different set of options than are available in a single engine machine.

The almost center line thrust of the Little Jets should make the decision easier and they will undoubtedly be certified to operate only under balanced field length conditions. They will therefore be intrinsically safer to operate than any of our current light twins, including the King Air.

Don't let the professional jet "drivers" influence you unduly, talk to a jet "aviator" instead.

Happy Skies,

Old Bob (Bob Siegfried Ancient Aviator)

[ARTICLES/20000607_102919_msg09234.tex]

Solo

Tue, 2 Jan 2001 12:41:44

In a message dated 1/2/01 10:55:14 AM Central Standard Time, barryb@pon.net writes:

So what are the parameters here? PIC or just riding in an airplane?
Thanks, this is more fun than lawsuits. Barry

Well, I didn't solo until May of 1946, but pumped gas, washed airplanes and such for rides for a couple of years before that.

Happy Skies,

Old Bob

[ARTICLES/20010102.124144.msg00111.tex]

Twin Beech Society

Wed, 3 Sep 1997 09:12:53

Hi Jeff,

I am not currently an 18 owner but my youngest son has one. It is really a lot of fun and a great airplane.

If you are not yet a member of the Twin Beech Society division of the Staggerwing Museum Foundation, you should sign up soon.

There is another model 18 group called the Twin Beech Association.

Both groups are dedicated to keeping the 18s flying and preserving the information available. My son and I belong to both.

Twin Beech Society
P.O. Box 550
Tullahoma, TN 37388
Phone: 615 455-1974
Fax: 615 455-2577

Twin Beech Association
P.O. Box 8186
Fountain Valley, CA 92728
Phone: 714 964-4864
FAX: 714 964-5834

Bob Siegfried

[ARTICLES/19970903.091253.msg01634.tex]

Use of Broker

Fri, 8 Aug 1997 02:54:29

To the Saunders,

Have you considered using a broker to find the airplane that is just right for you?

They usually charge about five percent of the purchase price and if you are not an expert yourself it might be money well spent. Just like getting a real estate agent to help you buy a house.

I don't know any to recommend right now but surely someone must have a contact.

Happy hunting,

Bob

[ARTICLES/19970808.025429.msg01496.tex]

Use of Broker

Mon, 8 Sep 1997 15:57:07

Hi once again,

I strongly agree with Rays suggestion to tie up with a GOOD broker. They can save you a lot of grief.

Lee Larsen has an excellent background and reputation.

I'm sure there are others, ask around your area.

Yours,

Bob

[ARTICLES/19970908.155707.msg01697.tex]

Use of Broker

Sun, 16 Nov 1997 10:52:13

In a message dated 97-11-16 10:06:10 EST, you write:

As a first time buyer, what are the pros and cons of using a broker for purchase?

I think that ESPECIALLY for the first time buyer a broker is a good idea. I haven't used one for several years and am not familiar with current rates, but it used to be around 5 % of purchase price. I would think costs of title search, prepurchase etc. would be additional costs. I would highly recommend Lee.

Yours,

Bob Siegfried

[ARTICLES/19971116.105213.msg02395.tex]

Wisdom

Sun, 16 Nov 1997 07:33:45

Hi Larry of Tulsa,

In a message dated 97-11-16 07:21:26 EST, you write:

Am really looking forward to purchasing my dream plane, a V-tail.

My what an intelligent person you are!!

Bob

[ARTICLES/19971116_073345_msg02390.tex]

Young Pilots

Wed, 3 Jan 2001 10:30:41

In a message dated 1/2/01 11:27:36 PM Central Standard Time, gwbraly@gami.com writes:

Do not allow your kids to touch the yoke. UNDER ANY CIRCUMSTANCES. Treat it like it is a forbidden fruit. "No! Not until you are old enough!" "How old is that?" "At least 16 before you can touch the controls.... "

Good Morning George and All,

I don't know what it takes to instill a friendly feeling for aviation in our youngsters, but I can tell you how we handled our progeny.

Thelma Jean and I have five children. In order of delivery, boy, boy, girl, boy and another girl.

All five soloed a glider on their fourteenth birthday and all five soloed an airplane on their sixteenth birthday.

The boys all obtained their instrument tickets during their seventeenth year.

The oldest boy was seventeen when he got his instructor rating, number two was sixteen and the youngest got his instructor rating, along with his private glider certificate, on his sixteenth birthday. He added the airplane instructor rating on his seventeenth.

Unfortunately, the FAA then changed the rules. You now must be eighteen to be a flight instructor.

As an aside, when I obtained my instructor rating, the minimum age was also eighteen, but in a rewrite of the regulations in the early fifties, they eliminated the age requirement for an instructor rating. You either had to have a Commercial or hold a Private Pilot Certificate and meet the skill, knowledge and experience requirements of a Commercial Pilot to gain the instructor rating. That was the provision under which our boys obtained their instructor certificates.

The boys are all still active pilots. All have instructor and instrument ratings and own airplanes.

Neither of the girls are active pilots. They both still evidence a strong interest and often state that they wish they had stayed with it. Somehow, we failed to instill the same drive toward flying in the girls as the boys.

The oldest daughter had a Private and was doing well on her quest for the instrument ticket when she met the boy she later married. She would take him for rides in the airplane and he seemed to accept aviation OK, but our daughter slowly stopped flying, married and started a family.

The youngest girl had some physical problems which caused her to stop flying

So I guess we had a sixty percent success rate!

I still don't have any idea why people fly, but I THINK the important thing is that they have fun doing it.

Some folks can do a good job of rationalizing the expense by using the airplane for business or as a great transportation tool for the family, but if it isn't fun, very few will keep on flying regardless of the utility.

I felt that the early indoctrination helped with our children. I let them fly when they were sitting on my lap. I would have them place their feet in my hands and when they needed rudder, they would press on my hand and I would apply a commensurate amount of rudder.

I think that waiting till a child is sixteen is too late. Cars and girls/boys have, by then, gained the upper hand.

Glider flying is the answer that we chose. The involvement at the glider field was fun, even when not flying. They got to drive the vehicles that towed the gliders around the glider field, run the wing for takeoff and, in many other ways, be involved in the operation. By the time they were sixteen, they could bring their friends to the airport and take them for a ride in a flying machine with NO engine. What a thrill for a sixteen year old! They weren't student pilots. They were truly Pilot In Command exercising their privilege of being entrusted to carry another human being aloft.

Unfortunately, of our ten grandchildren only two have soloed, one has earned the Private Certificate. There are some younger ones who are currently showing a strong interest and a couple of the older ones are realizing that they missed something along the way, so there is still hope!

Well, there I go with another long story with no conclusion. I wish I knew the answer, but I don't.

Having fun helps.

I guess it all depends.

Happy Skies,

Old Bob

[ARTICLES/20010103_103041.msg00186.tex]

Portable Oxygen Systems

Thu, 18 Jun 1998 16:55:11

Good Evening Eric Poole,

In a message dated 98-06-15 04:32:42 EDT, you write:

Actually, welding oxygen isn't required to be tested for the same impurities that breathing oxygen is. So while welding oxygen is probably perfectly safe and just as good as medical or aviator's oxygen, and may be the exact same thing, it isn't required to be, so there's always the chance that a harmful impurity might be present

I guess this has been beaten to death already and things may be different in different areas and jurisdictions, however, my local oxygen purveyor tells me that he starts up his machinery on Monday morning and as the equipment is pumping along he tests for the required purity. When the output gets relatively clean, he can start filling bottles for aviator breathing purposes, after a short time the output meets the medical standards and medical bottles may be filled. Some considerable time later things get good enough for welding and after that time he fills whatever bottles are there to be filled.

At least at his operation, the cleanest oxygen you can get is the welding stuff!

Most of the time, it will all be at the same standard but if you get your Aviator Breathing bottle filled early on Monday morning it will be only as pure as required for breathing and not good enough for welding.

There may well be downline sanitation requirements for the handling of Aviator Breathing Oxygen and Medical Oxygen but it seems as though the quality of the material itself should be highest with the stuff for welding.

This may be an old wives tale, but it came from the old oxygen purveyor at the place I purchase my welding and breathing oxygen.

Old Bob

[ARTICLES/19980618.165511.msg03191.tex]

Chapter 9

NAV

9.1 NAV-APPROACH

Approach Design

Thu, 31 Aug 2000 10:20:49

In a message dated 8/31/00 8:27:56 AM Central Daylight Time, MikeM86949@aol.com writes:

NJ is pretty flat country except in the NW portion where there are few airports anyway. Higher mins on a localizer might be due to terrain on the miss. GPS is an advantage there because they have more flexibility in where they can draw the missed approach. With localizer, the only miss might be to a VOR on a nearby mountain, which affects MDA.

Mike

Good Morning Mike,

You are definitely in the proper ball park, but there are other complications.

As you are obviously aware, the minima are often affected by the miss. The other thing which may not be so obvious if you are not a student of the TERPS (which I am Not), is that there are different requirements for a miss from a localizer approach than from other non precision approaches!

I have not dug this out myself, but was told by someone who is conversant with such things that the localizer approaches require a straight ahead segment that is not a requirement of the other non precision approaches. I asked why this was so and was informed that it is because the requirements were drawn up by different persons and the one who wrote the book for localizer approaches did not like immediate turns during the miss!

Once again, it helps to realize that the basis for the TERPS was a codification of what the pioneer IFR pilots had found was workable before the FEDs started regulating things. The later stuff is a result of what a bunch of desk bound pilots and engineers hammered out at a conference table.

That is one of the reasons that I am totally opposed to the implementation of the ICAO PAN-OPS in the US National Airspace System. It seems like a good idea to standardize procedures world wide, but if we do so, the USA will lose a lot of the operational capability and flexibility that we now enjoy.

Happy Skies,

Old Bob

[ARTICLES/20000831_102049_msg12873.tex]

Approach Design**Thu, 31 Aug 2000 12:45:05**

In a message dated 8/31/00 10:21:58 AM Central Daylight Time, burnside@pressroom.com writes:

Can you expand on this a bit?

Thanks...

Jeb

Good Morning Jeb,

I will be happy to try!

There is pressure, not only from the European community, but also from some of our US airline brethren to adopt PAN-OPS world wide. Obviously, it is easier for international travelers and operators to only have one set of rules with which they are required to be familiar.

PAN-OPS is the ICAO version of TERPS.

In almost all cases, it requires greater distance from the field for the obstacle clear zones and has more adjacent secondary areas and required transition slopes. The biggest problems are with the non precision approaches.

Very few of the major carriers of the world operate to small unimproved fields that are so typical of our General Aviation aircraft. The vast majority no longer circle in less than VFR conditions and most have adopted some sort CANPA (Constant Angle Non Precision Approach), where the constant angle refers to a steady rate of descent instead of a series of level flight segments.

We in general aviation are operating in conditions that are a lot closer to what the airmail pilots were flying in the early thirties. While we have vastly superior navigation capability and much more reliable equipment, the obstacles are as bad or worse than they were back then.

Our approach and maneuvering speeds are very close to those used by the DC-3 and that is the airplane around which the original TERPS were developed. The required obstacle clear zones are similar to the limits that the working pilots of the thirties had developed as personal limits, not the limits that some lawyer driven committee felt was necessary.

If we get stuck with PAN-OPS the minima at airports located in obstacle rich environments will rise dramatically.

The ones out in the middle of nowhere with no obstacles in sight won't be affected at all.

Neither will the vast majority of the major airports as they have been cleared of obstacles that will interfere with low minima precision approach capability or had special procedures developed to allow operations such as the Canarsie lights at Idlewild or the checkerboard approach at the old Hong Kong airport.

I think that the current TERPS clearance criteria should be maintained and we should be allowed to tighten up on the slop allowed for poor navigational signals. If we would take advantage of the greater accuracy of the GPS, now that selective availability has been deactivated, we should be able to fly as close to an obstacle with a GPS derived course as with a localizer guided one at least up to, and maybe a little way inside, the FAF. Once WAAS is accepted, the GPS approach should provide better guidance and allow flight closer to any obstacle than does any localizer.

I think all of us would prefer the constant angle of descent approach if one is available. The problem is that such an approach doesn't work well for minima much above 400 feet, yet many of our smaller airports, and a few pretty big ones, are located in an environment where six to eight hundred foot MDAs are inevitable.

For a constant angle descent to be viable with the angle at the standard three degrees of glide slope you would have to have a visibility of around two and a half miles upon reaching the MDA. If you can't see the threshold (or high intensity approach lights, if installed), you must execute the miss. The good old boys of the thirties managed to handle minima of 800 and one quite well in the DC-3s and we can do it too, if adequately trained. I would hate to see us lose that flexibility just because such operations are no longer required for viable airline operations.

Let's not forget, all of the new approach procedures are airline and automatic flight driven. I have no doubt that the high tech glass cockpits and flight management computer equipment will filter down into the GA fleet. That is great and I hope I live long enough to see the stuff available to folks at my income level, but, I think it will be a long time before that happens and I don't want to lose the capabilities that we now have.

Even if the FAA had not shot itself in the foot by stupidly declaring that the integrity of the WAAS would be at the ten to the seventh level, the satellite guidance would not have given us the capability of having a 200 and a half approach to every runway.

The flight guidance to a point in the sky is only one part of what it takes to make a low approach.

In addition to getting there safely, we must have clear zones applicable to the category of aircraft being flown and lighting or other conspicuity devices to aid the pilot in positioning the aircraft for landing or making the decision to go around. The PAN-OPS require greater distances for obstacle clearance. We not only don't need that, but should be pushing for reduced clearance based on the greater accuracy of the current GPS signal.

Well, Thanks for letting me start on this convoluted essay. I know I should modify, organize and refine it, but I just don't have time. I gotta put my mags back on the Bonanza and go flying!

Happy Skies,

Old Bob

[ARTICLES/20000831_124505_msg12888.tex]

Approach Design

Mon, 2 Oct 2000 15:11:05

In a message dated 10/2/00 1:11:07 PM Central Daylight Time, tturner@vol.com writes:

The NDB approach at the "home 'drome" (KHDI) is down because (1) the NDB died and they aren't going to fix it, and (2) the Feds have not flightchecked the approach for over a year. We have authority to fly the approach as a GPS approach using the NDB 3 approach plate information, but it is not marked as a GPS approach in any way (it's on that "long list" you've talked about). Chattanooga Approach continues to assign the approach, and I've asked the controllers (face to face) about the issues of (2) above—they shrug their shoulders and say they know, but they're allowed to assign the approach to "/G" airplanes.

Good Afternoon Tom,

As you say, the approach plate is not marked as an overlay, but it is listed as one of the approved Phase Three approaches by Jeppesen on Terminal Page US-3 dated 1 SEP 00. It is still in the current database of my IFR approach approved set.

I would say that it is a perfectly usable and legal approach.

I will comment later on the safety of the approach.

As to the lack of a flight check in the last year, I am not sure what the flight check requirements are these days. I do know that they are using a more flexible schedule now than the old 'once a year' criteria, but I don't know what that schedule is. I think it depends! Some are checked much more often and others way less. I think ours is being done every eighteen to twenty months, but I understand they will pick C24 up when they are in the area for some work at ORD. If they have time left over after doing the stuff at ORD, they swing down and get ours. They seem to be given a fairly flexible time window in which they can get it done.

I believe they will check your approach within the allocated time frame since it is a current Phase Three approach, however, that is an assumption, not a known fact!

I have noted that the flight inspection teams are picking up a lot of pretty serious construction which results in substantially higher minima at many places.

That means that there is a lot of construction going on that the FEDs never find out about until long after it has been completed and becomes an obstacle for us to hit!

Sooo! It seems that we all should be keeping an eye out for obstacles that are being built that may impinge upon our minima. Whether or not a tower, tree or building gets up into our obstacle clear zone is not something the FEDs automatically know about. At all but the largest fields, the only control on construction is via local building codes. While there are some requirements as to when the FAA should be advised of potential hazards, that notification is often not proffered.

The AOPA has an excellent program that encourages local folks to be aware of something that may lead to encroachment on our use of, or the closure of a runway or an airport. That ombudsmen approach should be expanded to have someone check to see that the entire obstacle clear zone for the instrument approach is protected.

At C24, we have managed to stop some tower construction that would have affected our minima by nipping it in the bud! Nobody is going to do it for us, we have to do it ourselves.

I would not hesitate to use the GPS approach to your airport, but it would be prudent to keep an eye out for construction or tree growth which might affect the minima.

Any help?

Happy Skies,

Old Bob

[ARTICLES/20001002_151105_msg14336.tex]

Approach Minima**Wed, 16 Feb 2000 20:01:21**

In a message dated 2/16/00 5:40:25 PM Central Standard Time, MikeM86949@aol.com writes:

He said that in recent years, the FAA gave up the charting of obstacles less than 250 feet. They just assume they will be there.

Good Evening Mike,

I think there may have been some misunderstanding between you and the FED as to what was being discussed.

The FAA does make some assumptions about the height of various obstacles based on the length of time it has been since the area was surveyed, but it is a variable amount with lots of ands, ifs and buts.

The basic minima for the MDA on all non-precision approaches is 250 feet above the touchdown zone. That is increased by the height of the obstacles in the approach zone to which are added any fudge factors due to out of date surveys and the result is moved up to the next highest twenty foot increment. That becomes the MDA.

The lowest MDA for any non-precision approach in the USA that I am aware of is 263 feet above the touchdown zone. If there was to be 250 feet added to all approaches as a fudge factor, there would be no approaches with a minimum MDA below 500 feet above the touchdown zone.

For any non-precision approach, whether the MDA is listed as 2000 feet above the TDZ or 280 feet above the touch down zone, there is likely to be an obstacle within 250 feet of your aircraft somewhere during the approach.

I would suggest that it is inadvisable for anyone to ever assume that there is a fudge factor built in to any approach procedure. That is why they are called Minimum Descent Altitudes.

Happy Skies,

Old Bob

[ARTICLES/20000216_200121_msg03057.tex]

Approach Trivia**Sun, 23 Nov 1997 15:12:28**

Hi All,

This is just a little effort to fill Sunday afternoon.

Over the last four years I have been involved with getting an instrument approach approved for our little flying field. This brought me into a closer contact with the TERPS manual than I had ever had before.

Some things which I probably should have known but didn't.

Note: This is based on my copy of the TERPS which has a publication date of 1993.

The lowest possible minima for ANY Non-precision approach is a 250 foot ceiling with 1/2 mile visibility.

If it is an NDB incorporating a Final Approach Fix, the lowest possible minima is a 300 foot ceiling with 3/4 mile visibility. If the approach contains no FAF, then the lowest possible NDB approach minima is 350 feet and 3/4 mile vis.

The lowest possible circling minima is 300 feet.

That knowledge has set me on a quest for what ARE the lowest minima approved in the US for various non-precision approaches.

I've looked through a couple of my Jepp manuals but certainly not the entire set. I wonder if any of you have come across any lower ones than I have found.

This is what I have so far:

Rock Springs Wyoming, VOR/DME Rwy 9 (Jepp 13-1), 263' & 3/4 mi.

Rock Springs Wyoming, VOR/DME Rwy 27 (Jepp 13-2), 280' & 1/2 mi.

Rapid City South Dakota, NDB Rwy 32 (Jepp 16-1) 342' & 3/4 mi. This one incorporates a FAF.

Rapid City also has a VOR or GPS approach to Rwy 32 with minima of 282' & 1/2 mile but Rock Springs beats that handily.

The lowest circling minima I have found is at Rock Springs. 360 feet with 1 mile visibility on three of the approaches for we who operate below 90 knots.

I would appreciate anyone sending me information on any non-precision approaches lower than these and am especially anxious to find out what the lowest NDB without a FAF is. I've yet to find one below 400 feet.

Thank you,

Bob Siegfried

[ARTICLES/19971123.151228.msg02473.tex]

Approaches Minima**Wed, 16 Feb 2000 15:14:13**

In a message dated 2/16/00 1:37:05 PM Central Standard Time, beech_35@yahoo.com writes:

I noticed many years ago that it's not unusual for an RNAV approach to have higher minima than a VOR approach to the same runway. I always thought this is somehow part of the TERPS criteria, and never questioned it.

Good Afternoon John,

That was true with the old style VOR DME based RNAV approaches. They had to consider all of the reception problems from the base VOR DME units used for the approach as well as the basic TERPS obstacle clearance criteria.

The new style RNAV approach is a different breed of cat. You will notice that they are not approved for the old KNS-80 style of unit. You must have a Flight Management Computer style device with the waypoints loaded. For we low end GA types, the only thing currently available which meets the criteria for the new approaches is the TSO C129 (a) (1) GPS category of equipment.

The GPS meets or exceeds the Required Performance Standards for almost all of the approaches currently conducted under the non-precision design criteria of TERPS. It is therefore reasonable to expect that a GPS approach drawn to those same criteria and considering the same obstacle clearance requirements will have the same or lower minima.

Unfortunately, for the last year or so the FAA has been drawing approaches that were designed to accommodate a constant angle of descent procedure. Sort of a pseudo glide path sort of thing.

Now I like an ILS as much as anyone and if one is available, that would be my choice. The fly in the ointment is that there are many airports around the country that are located in obstacle environments where a properly drawn non precision approach with judiciously placed step down altitudes can provide a lower approach minima than can an ILS!

Unfortunately when that ILS style criteria is applied to the obstacle plane at those airports, we end up with an approach with an artificially high minima. For the Air Carriers, it is probably a good idea. 747s don't really circle all that well and the crews don't get much practice at it anyway.

We GA types can utilize the level flight segment with step down style approaches quite handily and to good advantage. It bothers me to see all of the new approaches being drawn that don't utilize the well proven tools of TERPS to best advantage. They are effectively raising the minima at which we will be required to abandon an approach

without out any public hearings or input from the users.

Bad Scene!!

Thanks for the comment, I was beginning to think that no one had read the message!

Happy Skies,

Old Bob

[ARTICLES/20000216_151413.msg03040.tex]

Approaches under a MOA**Tue, 3 Oct 2000 08:14:36**

In a message dated 10/2/00 11:49:44 PM Central Daylight Time, raven@tminet.com writes:

We are under a MOA! To my dismay, airports under a MOA cannot have instrument approaches. The single exception is Inyo-Kern, which has a unique corridor and approach through the MOA.

Until we get enough political clout to cause our USAF brethren to redraw the western edge of the MOA, we are VFR only.

Good Morning Bill,

You know, I had never thought about the problems involved getting an approach at an airport within the boundaries of a MOA.

At our last Edwards briefing, we were told about the Inyokern corridor, but I note that Inyokern has no approach listed by Jeppesen and they don't show the corridor on the enroute chart. I wonder if Jepp is just late getting the data out or if it is some sort of a private deal?

Of course, Mojave does have an approach and there is no corridor going to it!

Yoakum, Texas, is located within the confines of Randolph One which has a floor of 9000 feet. De Ridder, Louisiana, is inside Warrior Three Low which has a floor of 100 AGL. I am sure there are many other examples around the country where the locals have been able to convince the powers that be that they needed IFR access.

I think you have hit the nail right on the head. The most important thing is the political muscle available to get the approach drawn by the Feds and accepted by the military. From my very little military association, I note that they seem to fight a lot harder to gain or retain airspace than we do to be allowed to fly in that airspace.

Tehachapi's location right on the west edge of Isabella and next to Bakersfield (MOA that is) seems to be one where justification for IFR access through the MOAs would be relatively easy to develop. Plus, there are airports in much more hostile obstacle fields than yours that have IFR approaches.

Looks like getting that approach would be a good project for you to spearhead. I was the point man for our group when we obtained our instrument approach. It isn't all that hard, but it does take time!

Happy Skies,

Old Bob

[ARTICLES/20001003_081436.msg14381.tex]

DH vs. MDA**Wed, 21 Feb 2001 23:35:18**

In a message dated 2/21/01 9:54:44 PM Central Standard Time, swo49@hotmail.com writes:

To Pete and all - I thought that you should never go below MDA. I know DH is lower than MDA, but I thought that the decision occurred at DH. If that is true - (with a bit of caution do I say this) - is it not true that we will always bust DH on the go around? (How's that for being a trouble maker?)

Steve

Good Evening Steve,

Since the aircraft is in a descent at the DA(H) and that is the point at which the decision to continue or start the missed approach, it is physically impossible for the aircraft to not go below the listed altitude. I am not sure exactly what amount of sink through is currently allowed.

You will find many FAA inspectors at the local FSDOs who will tell you that no allowance is made and that the missed approach should be started soon enough that the aircraft will not descend below the DA(H).

That is definitely in error, but I personally don't want to argue with them!

Where it really counts, at a hearing following an incident, the folks that really know will confirm that such a sink through is expected.

As I said before, I don't know what the current limits are, but in the early sixties, when we were qualifying for Category II (one hundred foot DA(H) with a visibility minima of one quarter mile), it was not disqualifying if the aircraft actually touched the runway during the go around.

I have seen figures published recently which indicate that the average sink through for an aircraft such as the 757 or 767 is around twenty-five to thirty-five feet. I would imagine that Ralph Requa and John Deakin will have more current data than do I.

Modern jet aircraft have a much better spoolup time than did the equipment we were flying when CAT II was first introduced.

The side slope and vertical slope clearances are all such that proper clearance will still be maintained even though the aircraft does go through the DA(H). After all, if the airplane were to continue on course and on glideslope it wouldn't hit anything before touchdown. That is what happens on a CAT III approach when the guidance is good enough for such an approach. If the missed approach is started at the DA(H) and flown as per the published miss, the aircraft will be OK on the side clearances and above the required glide path zone even if it does contact the runway during the miss.

I have never flown an approach, nor been on an airplane, when it contacted the runway during a go around, but I have heard of it happening during training in the Caravelle. It had a very slow spool up time. If the throttles were closed and the engines spooled down, it took fourteen seconds to get the engine up to full power. There was almost no thrust until about eight seconds, about fifty percent power at ten to eleven seconds and seventy-five percent at twelve to thirteen seconds.

Incidentally you state "I know DH is lower than MDA."

The two are not directly comparable.

On all non precision approaches, the required obstacle clearance is 250 feet. The height of the MDA above the TDZ or the airport is a function of the obstacles in the approach zone.

The minima on an ILS, or other precision approach with a glideslope, is a function of the distance to the runway and the height of the touchdown zone modified by the sloping obstacle clear zone. When the airplane is at a 200 foot height above the TDZ it may be as close as 100 feet to an obstacle. Most approaches nowadays have better clearance than that, but the older approaches could still be using that criteria.

As always, It Depends!!

Happy Skies,

Old Bob

[ARTICLES/20010221_233518.msg04351.tex]

GPS/ADF Approaches**Mon, 22 Jan 2001 18:27:49**

In a message dated 1/22/01 5:13:50 PM Central Standard Time, YAKpilot@aol.com writes:

Given the above information and the original question, would the fact that a portion of the ground based equipment is not functional make the approach unusable? Would ATC not issue clearance for that approach due to that problem. I understand the functionality of the GPS replacing DME and ADF in the aircraft, however this does not deal with the component out issue. Obviously non GPS equipped aircraft would not be able to comply due to no NDB for this particular approach.

Possibly I should attach a copy of the approach I am asking about.

Good Evening Carter,

Thanks, but I do have a copy of the approach and did look at it before I wrote the previous answer.

The FAA strongly states that the ground equipment does NOT have to be operable for the GPS to be used in lieu thereof.

It would be possible that some controller might tell you that the approach was unavailable due to the ground equipment being inoperative. I believe, in fact I am sure, that you could tell him/her politely that you do have equipment on board which can be legally substituted for the ADF requirement factor of the approach and, if clearance was obtained, you would be legal to shoot the approach and execute the miss via the GPS if a miss became necessary.

Unfortunately, not all of the FAA folks, including some of the FSDO Inspectors are aware of that fact.

Any help?

Happy Skies.

Old Bob

[ARTICLES/20010122_182749_msg01483.tex]

LNAV Approach**Wed, 16 Feb 2000 15:33:02**

In a message dated 2/16/00 1:37:05 PM Central Standard Time, beech_35@yahoo.com writes:

Something about "LNAV". What's LNAV?

Hi John,

Sorry I skipped over this question, I am so bent out of shape about what they are doing to our approaches that I just passed it by!

Jeppesen's Briefing Bulletin DEN 00-A covers it completely. That came with revision 02-00. I will try to hit the high spots. The new RNAV approaches are designed to supersede the current GPS approaches as well as provide criteria and guidance for glass cockpit generated approaches.

There are three basic minima associated with each approach.

The first is similar to an ILS and is called the GLS PA. That will require all of the ILS style ground equipment and an augmented satellite based navigation system.

The next is a constant angle of descent approach which has slightly higher minima and may or may not require extraordinary lighting systems but which will require some sort of baro augmented or other wise modified signal in addition to those provided via satellite. That is called the VNAV approach.

The lowest rung of the ladder (highest minima) is for all of we unwashed masses.

That is similar to our current GPS approach. It is called LNAV for Lateral Navigation. There is no vertical guidance provided other than altimetry and that is based on what we see on the panel, not fed to the navigation box.

Does that help?

Happy Skies,

Old Bob

[ARTICLES/20000216_153302_msg03041.tex]

NDB Approach Design**Tue, 7 Mar 2000 06:49:20**

In a message dated 3/6/00 6:16:13 PM Central Standard Time, whall@draper.com writes:

Does anyone out there know how NDB approaches are designed? How much off-course can one be to be assured obstacle clearance? How much error off-course would drive you to abandon the approach? Recognizing of course that it can be a little tricky with separate ADF and DG to figure out exactly how far off course the instruments say you are, even if the ADF were an accurate instrument, where do you set your personal decision points (those of you who opt to fly these approaches at all, that is!)

Bill Hall

Good Morning Bill,

First the disclaimer!

I am no expert, just an interested observer!

The TERPS, Terminal Instrument Procedures is the document that spells out the requirements for obstacle clearance for all approaches in the U. S. National Airspace System, NAS. Most of the rest of the world use criteria established by ICAO which they refer to as PANOPS. There are differences between it and the US standard. In many cases, lower minima and thus less clearance from obstacles is required by the TERPS.

On top of that, there is considerable interpretation possible in the application of TERPS to any approach. As in so many other situations involving government activity, there is an interpretations manual which the FAA folks responsible for drawing the approaches use, that is not easily available to we mere mortals. There is also a provision in the TERPS which allows a waiver of the guidance rules if it can be shown to provide adequate safety and provide substantial benefit.

My copy of the TERPS is seven years old. The latest information is available on the web, but I am a computer illiterate and not capable of retrieving that information.

I am told it can be found at <http://terps.faa.gov/> know how to find such things!

According to my seven year old copy, VOR and ADF procedures are drawn using the same obstacle clearance criteria, then additional restrictions are placed on the ADF approach.

A trapezoid is constructed with a center line based on the course to be flown and with bases determined by the type of approach and the segments thereof. That establishes a primary zone. Another zone, the secondary, is established to the side and it's width varies according to it's distance from the guidance source. The obstacle clearance in the secondary varies with the distance from the primary zone.

The size of the trapezoids is a variable that depends on the source of the navigational signal, the course, the distance to or from the navigational source and the segment of the approach being flown.

You ask: "How much off-course can one be to be assured obstacle clearance? How much error off-course would drive you to abandon the approach?"

As you can see, the answer depends on many factors. The approach category of the aircraft being flown has to be considered. Even the turbulence and wind conditions prevalent would enter into the decision.

The closest that you could ever be to an obstacle to one side or the other is one mile. That would be a very rare case.

The obstacles that are likely to be to the side and your distance from them is dependent on the size of those trapezoids.

One constant factor pertinent to all of the approaches is the possibility that somewhere under that primary obstacle clear zone for the approach segment is an obstacle which is two hundred and fifty feet below the MDA. That is true whether you are flying a 747 or a Piper Super Cub on a Localizer approach, an ADF approach or any other nonprecision approach.

You further ask: "Recognizing of course that it can be a little tricky with separate ADF and DG to figure out exactly how far off course the instruments say you are, even if the ADF were an accurate instrument, where do you set your personal decision points (those of you who opt to fly these approaches at all, that is!)"

The ADF and the magnetic compass can be very accurate instruments, if they are properly mounted and properly compensated.

Whether or not I would fly an ADF approach would depend on my knowledge of the accuracy of my compass, the accuracy of my ADF and the style of ADF approach.

If all of the components are within the desired specifications, I would fly the approach to the minima published. Those approaches have served very well for over sixty years. I figure they will still do the job for a while yet.

Incidentally, In Europe and in times past here in the USA, ADF approaches have been designed which were meant to be used with dual ADF equipment. By having two ADFs pointing to two different NDBs, the requirement for an accurate compass and even some of the installation error of the ADF can be eliminated. If both needles are on the same instrument, the approach can be flown so that one needle is always lined up with the other and a straight course ensues. It is/was called marrying the needles. Worked like a charm when we had both inner and outer locators on an approach!

In summary, if your equipment is in good operating order and properly calibrated, flying an ADF approach to the minima published has an equivalent safety level to any other approach.

Happy Skies,

Old Bob

[ARTICLES/20000307_064920_msg04359.tex]

NDB Approach Design**Tue, 7 Mar 2000 08:05:42**

In a message dated 3/7/00 5:53:49 AM Central Standard Time, BobsV35B@aol.com writes:

One constant factor pertinent to all of the approaches is the possibility that somewhere under that primary obstacle clear zone for the approach segment is an obstacle which is two hundred and fifty feet below the MDA. That is true whether you are flying a 747 or a Piper Super Cub on a Localizer approach, an ADF approach or any other nonprecision approach.

Good Morning Bill,

When I wrote this paragraph in my answer to your ADF questions, I neglected to insert the differences pertaining only to the ADF approach which are applied to the approach after all other considerations for a nonprecision approach are considered.

For an approach where the NDB is located on the airfield, an additional 100 feet is added to the minimum obstacle height found by application of the TERPS criteria before determining the MDA. For an NDB approach where the facility is off the field, the addition is only fifty feet. I have no idea why or how this adjustment was determined to be required. In any case, you should never be closer to an obstacle than three hundred feet on any ADF approach.

Happy Skies,

Old Bob

[ARTICLES/20000307_080542.msg04367.tex]

NDB Approach Design**Tue, 7 Mar 2000 15:04:14**

In a message dated 3/7/00 11:25:54 AM Central Standard Time, Rich@Dr-Amy.com writes:

Anyone have an idea? If not, I guess I should write Wally Roberts.

– Rich

Good Afternoon Rich,

Writing Wally Roberts is absolutely the right thing to do! Let us all know what he says.

But in the meantime!

As I said earlier I don't really know, but I have a suspicion that it might be associated with the history of shooting approaches.

In the late twenties and early thirties, there was no minima established. The pilots and/or their companies decided whether or not they would fly IFR and if they did so, how it would be done.

When regulations and procedure were drawn, they tried to make them fit what the operators had been doing. As the years went by, things got ever more technical and precise. By the time the fellows in DCA were designing the criteria currently known as TERPS, they had decided that all of the nonprecision approaches should be built to the same standards. When that criteria was developed they found that the ADF just didn't fit into the overall program. The integrity and verification capabilities were just not up to the standards they wanted to apply, but the darn thing had an excellent safety record. The answer was to apply the newly developed TERPS nonprecision criteria to the obstacle plane for all nonprecision approaches and arbitrarily add some extra qualifications for the NDB. The minimum visibility requirement was placed at three-quarters of a mile regardless of the lighting available and an adjustment was made to the MDA. I suspect that the addition of one hundred feet was what was originally proposed for all ADF approaches, but I bet the airlines screamed that such an addition was not appropriate for those approaches which were based on an outer locator associated with an ILS. Most of the approaches with the NDB at the field were at airports with less sophisticated approaches and relatively low traffic counts. The compromise was what we have now. Fifty feet addition for those approaches where the facility is off the field and one hundred extra feet for the ones with the facility on the field.

All of the above is wild speculation but based on similar things that I have observed happen in the last fifty-four years of aviation activity.

Happy Skies,

Old Bob

[ARTICLES/20000307_150414_msg04390.tex]

New Approaches and FAA**Thu, 18 May 2000 07:26:04**

In a message dated 5/17/00 3:48:16 PM Central Daylight Time, farrarwd@tca.net writes:

Old Bob and George,

If you have a "procedure" for getting this done, let the list know and maybe we can get folks here to take on an airport each. Thanks for your efforts!

Will

Good Morning Will,

The most important thing of all is for someone to show the interest that you have.

I don't know if it would qualify as a procedure, but I got involved the same way George did.

We wanted an IFR approach to our little private airport and I was designated as the person to look into the matter.

The first step I took was to buy a copy of the TERPS. That document can be rather daunting, but a few hours spent perusing and cross checking can pull out the meat of the situation that affects your individual operation.

The TERPS information is now available on the web at <http://terps.faa.gov/>

I then contacted the local FSDO who put me in contact with the appropriate folks at the FAA Regional office. It took about three years to get everything accomplished. There were environmental impact statements, obstacle survey procedures, runway environment, evaluation of the need and all sorts of details to be covered. Not difficult, but time consuming.

However, all of that effort is not required if there is an existing approach!

The problem that we see occurring today is one concerning the application of TERPS to airports that are already in the IFR system. There is an effort to reduce the number of approach plates that have to be produced, so the FAA has come up with a new consolidation technique which will allow more than one type of approach to be presented on one piece of paper. To accommodate that criteria, they try to establish a FAF and runway alignment that will serve all approaches built to any individual runway. Unfortunately, that will not always provide the optimum minima for all classes of operators. Since the system is heavily oriented toward the desires of the aircarrier community, some approaches that could be very beneficial to we GA types are either not drawn at all or are compromised drastically to fit the desires of the VNAV and high precision approach techniques.

There has also been instituted a policy that there will not be more than one GPS approach drawn to any individual runway and that there will not be step downs between

the FAF and the MAP on the LNAV portion of the combo RNAV approach.

If sufficient need and benefit can be shown, multiple GPS approaches can be developed.

Since all of these changes are more associated with policy than with the substance of the TERPS, contact with the poor souls who are tasked with following the policy is not as productive as contacting the folks who develop the policy.

That is why I would suggest that AOPA be contacted if you note an increase in minima that does not appear to be associated with a new obstacle in your airport environment. This is especially true if a new RNAV approach has a higher minima than an existing approach.

If you just want a new approach to your airport, I would suggest contacting whatever entity is controlling the field in question. It helps to have whatever political muscle is available on your side. After you have all interested parties focused on the same goal, make the contact with the FAA folks and things should work. As George said, work with them, but have knowledge of what they can do and how you want things to go before you start the quest. Almost all of the FAA personnel that I have dealt with are interested in aviation and are trying to do a good job. However, they are all human and don't like to be put in a position where they are shown to be lacking in knowledge in an area they administer. Give them fair warning of what you want and how you expect it can be accomplished within the existing regulations. When you present them with documentation that shows your request is within their guidelines, things generally work reasonably well!

Happy Skies,

Old Bob

[ARTICLES/20000518.072604_msg08314.tex]

New Approachs and FAA**Fri, 16 Jun 2000 09:52:32**

Good Morning All,

The FAA has recently begun to build the next generation of approaches under the name RNAV.

This is an umbrella criteria that will allow the same checkpoints and course for a non precision, a semi precision and a very precision approach to the same runway.

They call them the LNAV, LNAV/VNAV and GLS PA respectively.

Sounds like a good idea, doesn't it?

The problem is that the criteria for the new approach has limits that are wider and more restrictive than those that we now use.

Not only will the new approaches built at places that don't currently have approaches be likely to have higher minima, but approaches that replace an existing device may have higher MDAs as well.

An example of the problem was published in the last round of approaches which became effective on June 15, 2000.

There is a Localizer approach to Runway 31 at The Ardmore Municipal Airport, Ardmore, Oklahoma. It has a visibility requirement of 3/4 of a mile (used to be 1/2, but more about that later), and a MDA of 348 feet above ground level.

They drew a new RNAV approach using the same inbound course and the same FAF as the Localizer approach. It has a MDA of 528 feet! That is one hundred and eighty feet higher than the localizer approach. How did this happen? The trapezoid used to locate obstacles for the RNAV approach is larger than the figure used for the localizer approach!

A localizer WILL be more accurate than a non differential GPS at the missed approach point, due to the convergence of the signal towards the transmitter site, but the GPS will be more accurate for the vast majority of the approach path.

The localizer protected area is 1.78 miles wide at the FAF, the RNAV is two miles wide at the same point. Somewhere in that wider area used for the RNAV approach is an obstacle which raises the LNAV minima 180 feet above the localizer minima. It is over one hundred and fifty per cent of the localizer MDA!

We need to get busy and see that the FAA revises the criteria used for the new RNAV approaches to be at least as permissive as the older, less accurate, guidance that we have been using in the past. If nothing is done, even the new WAAS corrected signals will be of no avail as the approaches using that signal are planned to be built using the wider, and in my opinion unnecessarily wider, more restrictive obstacle criteria.

Oh, I mentioned the 3/4 mile visibility requirement at Ardmore. It was 1/2 mile for the ILS and the localizer approach, but something was allowed to be built, or to grow, into the required 1/34 slope in the visual portion of the approach. That raised the minima to 3/4 of a mile. It is a shame that no one at Ardmore was monitoring the situation to prevent that incursion into the approach slope. The FAA doesn't. They don't have the manpower, let alone any directive, to do so. If we users don't look for such things at our local airports, no one is going to do it for us.

I hope that all of you will contact your aviation organizations and urge that we get together and encourage the FAA to adjust the criteria for the new RNAV approaches to criteria that are more consistent with the safety and operational capability of the new equipment when compared to the old.

Happy Skies,

Old Bob

Bob Siegfried Concerned Ancient Aviator

[ARTICLES/20000616_095232.msg09764.tex]

Non Precision vs. Constant Descent Rate Approaches**Thu, 18 Jan 2001 12:26:28**

In a message dated 1/18/01 6:00:00 AM Central Standard Time, cgalley@qcbc.org writes:

PRECISION APPROACHES FOR SMALL AIRPORTS... UPS Aviation Technologies is working on a GPS-based precision approach system that it expects to be certified later this year, the company announced last week. The UPS equipment uses signals from the FAA's Wide Area Augmentation System (WAAS) in conjunction with GPS technology to provide pilots with vertical and horizontal guidance to the runway without the need for extensive ground-based infrastructure. The system includes a mechanism for ensuring the integrity of the signal, UPS said, which should satisfy the FAA's concerns about the safety of such approaches. If approved, the equipment could make hundreds of smaller airports accessible in instrument conditions.

Good Morning Cy,

This announcement from UPSAT is very welcome. Hopefully it will help the FAA extract itself from the dilemma they created when they announced the 10 to the 7th fiasco.

However, all is not what it seems!

First, Phil Boyer states something along the line that the airlines have shown that the precision approach is safer than the non precision.

I would think that most of us would accept that on an intuitive basis, but believe it or not, general aviation has shown a very small statistical advantage in safety on nonprecision over precision approaches. It may be an anomaly, but we don't seem to splatter aircraft more often on the NPAs than we do on the precision ones.

The airlines, however, have a dismal record over the last twenty years or so when attempting traditional non precision approaches. My thoughts as to the reason for this would take considerable time to develop, so I will leave it alone except to state that when the airlines were using NPAs regularly, the safety record was excellent.

There is a bigger problem that I see on the horizon with the rush toward electronic glide path approaches.

The classic ILS approach consists of not only the electronic guidance system, but a few items which are, at the very least, expensive and which could be almost impossible to provide.

1. In order to operate to the Category I basic minima of "200 and a half", a very expensive approach lighting system must also be installed.
2. There must be a very flat approach zone devoid of obstacles combined with a similar

clear path for the missed approach procedure.

3. The width of the airport landing area clear zone is much greater than that which is required for non precision approaches

These realities mean that to attain the advantage of a constant rate descent approach to a two or three hundred foot ceiling it will be required that the airport is located in a place where there are few (if any) obstacles, the airport will have to spend a lot of money to provide the lighting required and that it must be located and developed in a manner that provides a very wide approach area.

The vast majority of small airports to which we GA types particularly like to fly our personal magic carpets will not support those low minima approaches.

OK you say, we will just continue along with the minima we now have, but will fly a computer generated glide path down to the NPA MDA instead of descending to the MDA and flying along looking for the runway.

I think we will all agree that an ILS approach is much easier and more comfortable to execute than are most NPAs.

The problem is that there are lot's of times when a classic non precision approach, which includes a level flight segment, will result in a safe and comfortable landing when a stabilized descent style approach to those same weather conditions would result in a missed approach requiring a diversion to an alternate.

Think of it this way.

In a descent to an MDA, action must be taken at some altitude above that minima to arrest the rate of descent so as to avoid descending below the MDA. The amount of altitude above the MDA that the round out must be initiated is dependent on a number of factors, but one common method is to start the maneuver at an altitude above the MDA equal to ten percent of the rate of descent. For a five hundred foot per minute rate of descent, the round out would be initiated fifty feet above the minima.

If the constant rate of descent approach is to be treated the same as an ILS, this would be the start of the missed approach, so you have just added fifty feet to the published minima!

Now let's say that the published MDA is 500 feet AG.

Applying a constant rate of descent procedure to that approach environment means that we now have a DA(H) of 550 AG.

To complete a landing legally from a DA(H) of 550 feet we must have an in-flight visibility of somewhere around two statute miles depending on the type of, or lack of, lighting available.

I think we all know of approaches with a minima of 600 and one or so that we find very comfortable to use.

The glideslope style approach has an advantage where the obstacles are a considerable distance from the field, but the smaller tunnel where the approach actually is located will require a lower obstacle field than a nonprecision approach built over the same area that utilizes maximum angles of descent and step down fixes.

If the obstacles in the area are such that 400 feet is going to be the lowest descent minima associated with the glide slope style approach, the accompanying visibility minima will be around a mile and a quarter. The visibility requirement is determined by the distance to the threshold when the airplane is at the MDA on a glide path of around three degrees. Not only that, but there will only be a second or two to locate the threshold or other approved runway environment cues that are required on an approach that uses a DH or DA. Unless there is some sort of approach lighting, spotting the required cues in that small amount of time with the actual weather right at the limits will be unlikely.

A light wing loaded, maneuverable airplane, such as a Cessna 182, Bonanza or DC-3, does very well at the older style of non precision approach. Rates of descent exceeding 400 feet per mile are not difficult, if properly planned for, which makes the minima of one mile visibility practical for a nonprecision approach with MDAs of five or six hundred feet, even higher for part 91 operators, depending on the runway length and markings.

When a circling approach is considered, minima of one mile visibility and MDAs of eight hundred to a thousand feet become very practical. All three of the airplanes listed above can comfortably fly a downwind at way less than a mile from the field. A descent can legally be started on the downwind leg for a normal approach and landing, if obstacles permit, without straying outside of the minimum visibility zone of one mile.

Small and/or remote airfields which are unlikely to qualify for extensive obstacle removal programs, sophisticated approach lighting and expensive runway markings are not likely to benefit at all from the glide slope style of approach and may even suffer a significant loss of IFR capability.

I think all of us would prefer a two hundred and a half glideslope style approach with full approach lighting at our destination, but if that is not financially practical, I would prefer that the well proven nonprecision approach minima originally designed around the capability of the Douglas DC-3 be retained for the benefit of those aircraft which are capable of making good use of the provisions!

This has been a long one and I wonder if anyone is at all interested.

Any comments, pro or con, would be appreciated so that I might judge whether the subject is of any interest to anyone but me!

Happy Skies,

Old Bob

AKA Bob Siegfried Ancient Aviator

[ARTICLES/20010118_122628_msg01160.tex]

Non Precision vs. Constant Descent Rate Approaches**Thu, 18 Jan 2001 14:55:15**

In a message dated 1/18/01 1:22:07 PM Central Standard Time, cgalley@qcbc.org writes:

If this comes about, a good safe GPS approach should be available for even a farmers airstrip.

Good Afternoon Cy,

The farmer could have a very low approach, provided he has control of the obstacle environment and can afford the approach lighting, runway lighting and runway marking required.

He could have a GPS approach to an unlighted sod field with a MDA 250 feet above the ground and one mile visibility RIGHT NOW.

Add WAAS, a couple of million dollars worth of improvements such as lights and runway markings and his approach minima would drop another fifty feet and the visibility minima could be lowered another one half mile.

The airborne guidance to the decision point is only one small portion of the package required.

Don't get me wrong! I am very pleased with what UPS is doing and I strongly support the WAAS program. It has the potential of supplying us with much greater accuracy for all of our navigational needs. That could lead to lower minima IF the FAA narrows the approach zones accordingly. So far, that is not being done nor is it presently contemplated. There are a few of us who are urging that such a change be made.

I am just fearful that folks are expecting more than what can be delivered by just the airborne guidance system.

As an example, if there are no obstacles at all in the approach zone and no obstacles at the landing area, a nonprecision approach to that field can have a MDA as low as 250 feet with the current minima. With no lighting or runway markings, the visibility minima can be as low as one mile. If sophisticated lighting and markings are provided, the visibility for a nonprecision approach can be as low as one half mile.

What we currently have has tremendous capability. What pushes the minima up so high is not the lack of glide path information, it is the proliferation of obstacles in the approach zone.

The glide path style of approach helps a lot when the obstacles are at some distance from the landing area, but if the obstacles are in the final approach zone or in the circling area of the airport, the glide path is of no help at all!

Happy Skies,

Old Bob

[ARTICLES/20010118.145515.msg01176.tex]

Chapter 10

OPERATE

10.1 OPERATE-ELECTRICAL

Hung Starter**Mon, 28 Aug 2000 12:36:18**

In a message dated 8/28/00 10:32:48 AM Central Daylight Time, hgp@madaket.netwizards.net writes:

When the engine starts, one may examine the alternator gauge to verify that the battery is not discharging (i.e. starter hung).

Good Afternoon Howard,

Check the wiring diagram for your airplane. Most will not show a discharge as the cranking current is not normally sent through the ammeter shunt.

Happy Skies,

Old Bob

PS I am with you on the desirability of not switching on the alternator or generator until the engine is started. Modern electronic controls are much better and spikes and such are not as likely as they were years ago, but it is still nice to check for a nice stable condition before throwing on the power source. I also like to check for proper voltage from the power source before I fire up the Avionics Buss.

[ARTICLES/20000828_123618.msg12710.tex]

10.2 OPERATE-ENGINE

Approach ROM - Prop Speed on Approach**Wed, 1 Sep 1999 10:15:05**

In a message dated 9/1/99 2:31:11 AM Central Daylight Time, Heavy707@aol.com writes:

It has been said and it is true that at less than 15 inches of manifold pressure the rpm is not going to change until you have to add power for the go around (even with the electric prop), so why not have it ready [high RPM] if you need it. When you have a deer run out on to runway in front of you it is nice to power up and over him as quick as possible. Yup it has happened. I go to hi rpm after final power reduction for landing config.

Good Morning,

Your prop is a fixed pitch prop until you decide to press the switch up or down. If you have the low pitch prop stops set properly, it should not exceed 2300, the allowable rated RPM for that engine when installed in your straight 35, with full throttle any time you are at or below 100 mph. If you add that full throttle above 100 mph, you will have to toggle it down to prevent an overspeed, correct so far?

Now just suppose your aircraft were equipped with one of those new fangled doodads which attempt to control the RPM for you. I think some folks refer to them as a governor?

The stops could then be set so that rated RPM could be attained at sixty to seventy mph with full throttle. If you open the throttle while you are above that speed the engine will spin up to 2300 and then (not before it reaches 2300) the governor will kick in and attempt to control the engine RPM to 2300. Since the electric motor makes the RPM change at the rate of about 80 to 100 RPM per second, There can be a substantial overspeed before the RPM is brought under control. Been there, done that!

If someone has set the stops on your prop in the manner specified for the governor equipped aircraft (I can't imagine anyone doing that, can you?) you would have to get your thumb on that propellor control switch pretty fast and add the throttle quite slowly to avoid an overspeed. Now, since I believe you have an E185-11 or -8 installed in your airframe, an overspeed up to 2550 or so shouldn't hurt the engine as that RPM is allowed when it is installed in some airframes. Whether or not there would be a problem with the propellor would be dependent on which propeller you have. Some of the early ones were not approved for that much RPM.

The same thing can occur with those odd ball propellers which use oil to change the pitch instead of electricity like the props on real airplanes do.

If the governor is set for rated RPM while on the approach with reduced manifold pressure and then a sudden need for full power arises, there will be an overspeed unless the throttle is advanced rather slowly. The governor only watches the RPM and it will not take an additional bite of air until it senses that the RPM of the engine has exceeded

the rated RPM.

Now we all know that we should move that throttle deliberately and slowly, but do we always do it?

How about when that deer ran out in front of your airplane?

What would happen if you had the prop governor set for twenty-one or twenty-two hundred RPM and you shoved in the throttle a little faster than you should?

On most light general aviation aircraft, you would get some overspeed above the RPM set, but not above the RPM for which the engine is approved. Let's say that you forgot completely about the propeller and just climbed out with full throttle and twenty-two hundred RPM.

Would that harm the engine?

Not likely, though with a moderately lean mixture and the cowl flaps closed it could heat up to the point where a problem could occur. Remember, we are discussing a normally aspirated engine not a supercharged one, they are a different animal. Depending on the type of supercharging system the engine has, full throttle with a lower RPM could lead to problems.

I like to leave my governor set to cruise RPM for the approach. If I should elect to go around, I advance the throttle to twenty-five inches or so, move the governor control to full forward, add the rest of any throttle that might be available, adjust the mixture as required for the altitude and then open the cowl flaps.

That is what works for me. Like anything else, you should do what you find comfortable. I know it sounds like the sequence could be a little rushed, but I do not find it to be so and there is really no big hurry to do any of the steps other than the initial push on the throttle. Once that is done, the airplane is on it's way out of town! The rest are just cleanup items and if practiced regularly, fall to hand comfortably.

They are items that should be checked anytime the power is adjusted.

If you are experiment oriented, set it up with the prop control full forward and shove the throttle in hard, then try it my way. Either method is acceptable, so use what you like! Just be careful not to overspeed the engine when you try it with the prop full flat!

Happy Skies,

Old Bob

[ARTICLES/19990901.101505.msg07708.tex]

Approach RPM**Sat, 10 Feb 2001 10:56:57**

In a message dated 2/10/01 9:07:18 AM Central Standard Time, swo49@hotmail.com writes:

I thought for go around safety this is the thing to do (and it was taught to me that way a long time ago) - but am I hurting my engine? If yes, what is the higher priority - being ready for the go around or being careful with my engine?

Good Morning Steve,

The procedure you are using is acceptable and is consistent with what many authorities recommend.

We beat this subject up quite a bit a year or two ago, but I will try to throw in my two cents worth in as few words as possible. (for me, that is)!

If your propellor governor is set to the full flat position and you push the throttle in rapidly, the engine is likely to overspeed.

How slow you must apply the throttle to avoid overspeed is a function of the size of the governor in relation to the propellor requirements and the difference between the RPM when the power is applied and the RPM to which the governor is set.

There will be little or no thrust applied to the airframe until such time as the RPM reaches that RPM which the governor is trying to maintain.

There is, in fact, a potential of some drag being produced during the time that the engine is winding up to the selected RPM.

If the throttle is advanced rapidly while the governor is set to some lower RPM than red line, thrust will be produced as soon as the RPM reaches the RPM for which the governor is set.

I like to have the RPM set fairly low, 2000 to 2100 most of the time on my airplane, and then add throttle to around 24 or 25 inches when I want to go around. That gives me thrust sooner than I would get it if the governor was set for 2700 and reduces the possibility of an overspeed if I should happen to screw up and shove the throttle in too rapidly. I then put the governor control to the desired RPM and add the rest of the available MP. (Actually, I find that I can do both at the same time)

On engines that have a relatively small governor supplying a propellor which requires quite a bit of oil to actuate, it is relatively easy to advance the throttle at a rate which will create just enough overspeed so that the RPM goes up to the redline even though the governor is set to cruise RPM. A smooth advance on the governor control will then hold that RPM perfectly.

It worked great on the R-1830 in the DC-3!

I have tried it on Bonanzas and felt that it could be done on the early 470s, but the timing is more critical. The newer props and governors seem to react so fast that it is more difficult, or maybe with my advancing age, my timing just isn't as good. In any case, I don't recommend the procedure for most of us on most of our airplanes

So to answer your question, it depends!

You can baby your engine and still be in a position to make a panic go around with very little risk on a normally aspirated engine even if the RPM setting is left at cruise, so why not do it? For the non supercharged engine, full throttle at 2100 RPM is unlikely to do any damage and, if it is a panic go around, the RPM will likely overspeed a little anyhow. WOT followed as soon as possible with shoving the prop up will get power on quickly with no harm to the engine. But, if that makes you uncomfortable, the overspeed that you might get, in that panic situation, with the method you have been taught probably won't hurt your engine much either!

Any help?

Happy Skies,

Old Bob

[ARTICLES/20010210_105657.msg03378.tex]

Best Power**Thu, 13 Jan 2000 23:47:24**

In a message dated 1/13/00 10:34:56 PM Central Standard Time, swo49@hotmail.com writes:

Bob: So in my K-35 with the IO-520, when I have max speed, I am at my best power? Steve

Good Evening Steve,

That is a true statement! Remember though, that individual cylinders may not be. Some may be quite a way from best power. One of the advantages of our modern engine instrumentation is that we can determine how each one is doing. If the EGTs all peak at the same fuel flow, it is a pretty good bet that all cylinders will be providing pretty close to best power when sufficiently richened. Richen too much and the speed will fall off. Lean to peak EGT and the speed will fall off. Pretty simple eh?

Happy Skies,

Old Bob

[ARTICLES/20000113.234724.msg00793.tex]

Carb Heat/Carb Temp Indicator**Tue, 21 Sep 1999 21:00:02**

In a message dated 9/21/99 2:41:24 PM Central Daylight Time, tturner@vol.com writes:

Does anyone out there know of anyone who currently sells carburetor temperature indicators (to detect the potential for carb ice)? Anyone have any experience with one?

Thanks.

Good Evening Tom,

I don't have any direct knowledge of currently available carburetor air temperature gauges, but they were standard equipment on almost all of the Beech model 18s as well as most of the round engines used by air carriers for so many years. There must be lots of them around somewhere!

It's funny, I have several thousand hours flying time in aircraft equipped with those gauges and very little memory of what we used them for! I do recall that there were limits on how high we were allowed to carry the temperatures for continuous operation, but don't recall what those limits were. I believe they were required to be installed in aircraft used for IFR air taxi work in the late forties and early fifties, but that memory is hazy also.

I do remember that some of the Beech 18 operators flew with carb heat on all of the time except for takeoff. I never could figure the rationale for that procedure, but it wasn't uncommon.

On the airline for which I flew, we didn't use the heat unless we felt we were getting some ice and we would then set it at a temperature that would eliminate the ice and monitor that temperature to keep it as low as possible while still preventing the ice from forming.

There were a few pilots who would apply the heat as a precaution against getting ice any time we were in cloud, but those were the exception, not the rule.

The precise temperature at which ice would form seemed to vary a lot. I would imagine it is like anything else in aviation. It depends! The placement of the probe in the airstream would certainly make a difference and I suppose there are variables introduced by the moisture content of the air, the volume or rate of air flow and lots of other things of which I have no knowledge.

The use of the instrument seemed to decline as the years passed by and I guess it was because we didn't think it did much! It was helpful in keeping the heat as low as possible when carburetor heat was required.

Personally, I think there is little useful knowledge to be gained from the information the instrument would provide, but if you have an empty instrument hole, give it a try!

Happy Skies,

Old Bob

[ARTICLES/19990921_210002_msg08696.tex]

Climb Opeartion**Tue, 29 Feb 2000 16:44:47**

In a message dated 2/29/00 2:30:45 PM Central Standard Time, skolacz@nh.ultranet.com writes:

All this talk of Cylinder head temps scared the crap out of me this morning, as these are the temps I noted: OAT 32 degrees F WOT, 2500 RPM, Full Rich, Cowl Flaps open, 96 KIAS

Good Afternoon Steve,

Hopefully you will get a more complete comment from someone more knowledgeable than I, but in the meantime!

I would suggest that you avoid climbing at such a low airspeed. The airplane likes 120 knots or more and it cools a lot better.

I never use the winter baffles unless the temperature outside is down below zero Fahrenheit and even then, I don't think they are a very good idea. The airflow is atrociously uneven.

While I have been advocating full throttle and 2500 RPM for many years, the information that George Braly has supplied recently concerning the cylinder pressures developed by that technique have me backing off from that recommendation. I think that if we could use 20 degrees BTDC for takeoff, that would work fine, but the engine is not certificated that way and until we get an adjustable spark, I am either leaving the RPM up a little longer or reducing the manifold pressure to 25 inches or so before I reduce the RPM. Since I really HATE to do the latter, I generally just roll my RPM back more slowly than I have the last thirty years or so. By the time I am back to 2500 or 2550, I am up to two thousand feet MSL or more and I feel the cylinder pressures will not be too high, but I don't know for sure.

I don't like using spark plug gasket cylinder head temperature sensors at all, especially not on all six cylinders! Why not use the wells in the cylinders that were designed for that purpose? If those holes are filled with an engine heating system, I would change the engine heating system. There are many good alternatives available.

Those temperatures aren't all that bad, considering the airspeeds and the baffles, but they could be a lot better. I can't imagine operating any of the Continental 520 or 550 fuel injected engines without a set of balanced fuel injector nozzles regardless of what leaning philosophy is used.

Just one guys opinion.

Happy Skies,

Old Bob

[ARTICLES/20000229_164447_msg03936.tex]

Climb Power**Thu, 23 Nov 2000 12:07:34**

In a message dated 11/22/00 6:33:26 PM Central Standard Time, flyinglo@email.msn.com writes:

Bob, I think where I got that was when I was taught to fly the plane, my instructor, apparantly using the "cruise climb" table, told me to reduce the rpm to 2500. I therefore translated this to mean 2600 was only to be used during takeoff. Are we saying then, that the plane could be kept at 2600 rpm in climb all the way to 16k'? Or, in cruise?

Good Morning Jerry,

Most instructors will suggest a power reduction of some sort after takeoff in many high performance airplanes.

Part of that is a carry over from the days when some Bonanzas had engines that did have a takeoff power that was higher than the Maximum Continuous power, but sometimes it is just an effort, misguided or true, that a power reduction means that you are babying the engine.

I advocate using full power for takeoff, but reducing the RPM as soon as practical when flying over noise sensitive areas. Whether or not a manifold pressure reduction should accompany that RPM reduction is subject to more conditions than I care to discuss with this thread.

Suffice it to say that you can legally operate your engine at 2600 RPM anytime your heart desires!

Most engines and propellers are more efficient at something below maximum rated RPM, but that too can lead to a long discussion.

Happy Skies,

Old Bob

[ARTICLES/20001123_120734_msg16604.tex]

Cruise Power Setting**Thu, 2 Sep 1999 21:43:32**

In a message dated 9/2/99 6:23:01 PM Central Daylight Time, johnmills@sprynet.com writes:

It is not my conscious intent to always have the same cruise power. In part it's because it allows me to set power without having to refer to the charts, and if I use the same at all times, it's easier to remember. I'm a recreational flyer, and do not use the airplane for business, so my use is a bit irregular, and reducing the number of things to remember or look up just puts less of a strain on aging neurons. Time is not always a major consideration, so I'm not looking for maximum speed. It has always seemed to be a contradiction that we spend our training and early flying trying to get as much flight time as possible, and then once the ratings are earned there's a transition to trying to go fast, which reduces the time logged.

Good Evening John,

Your entire post was most interesting but the above quoted portion parallels my thoughts precisely!

I rarely use any special power setting. Most of the time I am at an altitude which calls for full throttle so I just set the RPM to give me an airspeed that meets the mission demands of the day and that is how she goes.

I enjoy trying different things with the machine to see what it will do and sometimes I go for long range, other times we just see how fast it will go.

What a neat toy to play with!

Your earlier post gave me a chance to talk about the need to look at the power charts IF one is interested in operating at some certain power. Thanks for the opportunity!

Happy Skies,

Old Bob

[ARTICLES/19990902_214332_msg07810.tex]

Cruise Power Setting**Thu, 2 Sep 1999 08:45:13**

In a message dated 9/2/99 12:54:07 AM Central Daylight Time, johnmills@sprynet.com writes:

I usually use 2300 RPM and 20 inches for cruise. Most times I'm high enough that this is full or nearly full throttle.

Good Morning John,

Just a small comment. It seems to be fairly common for many aviators to use a set of numbers such as "23 squared" or as you said, "2300 RPM and 20 inches."

There is certainly nothing wrong with operating the engine in that manner, but that procedure will not provide a consistent amount of power at different altitudes.

With a normally aspirated engine, 20 inches at 10 thousand feet and 2300 RPM will not provide the same horsepower as would 20 inches and 2300 RPM at 2 thousand feet.

The back pressure in the exhaust system is less at higher altitudes which allows more air into the cylinders than would the same manifold pressure at lower altitudes.

When I was first taught such things over fifty years ago, the word was that the difference was roughly equivalent to one-third of an inch of manifold pressure per thousand feet. I happily used that figure and taught the same to my students for many years. Then one day I actually looked at the power charts and it seems to me that the difference is closer to one-fourth of an inch per thousand feet.

I don't know which is correct, but the important thing is to remember that IF you want to use the same power at cruise while flying at different altitudes, you should consult your power charts to choose the numbers to set on the gauges.

Obviously there will be other factors affecting the power output than just the MP and RPM, a major one being the way the engine is leaned, but using fixed MP and RPM numbers does not provide a stable base from which to start.

Once again, there is no reason you have to operate at the same power at different altitudes, but if that is your desire, it won't happen using fixed numbers.

Happy Skies,

Old Bob

[ARTICLES/19990902.084513.msg07756.tex]

Cruise Setting and Ignition Timing

Thu, 13 Jan 2000 16:31:39

In a message dated 1/13/00 2:44:50 PM Central Standard Time, guntalk@guntalk.com writes:

It does, however, require a willingness to accept that what many people say about engine operation is just flat wrong. That's an uncomfortable position for many pilots.

– Tom Gresham

How very true your statements are!

The funny thing is that the information has been readily available since at least the 1920s.

Another factor in the equation is consideration of the ignition timing of the engine.

When we ran the Turbo Compound R3350s well on the lean side of best power (we didn't have EGT gauges, so we worked from best power) we switched the timing to an advanced position. Takeoff and climb was at twenty degree BTDC and cruise was at twenty-five degrees BTDC. At any certain cylinder pressure and mixture, the speed of the flame propagation is fixed. Richen the mixture from best power and the burn rate slows a little. Lean the mixture and the burn rate slows a lot! On the 3350, if we had leaned as aggressively with the spark set at twenty BTDC as we did with the spark at twenty-five BTDC the flame front would have still been burning as it went out through the exhaust valve. Not only would that be a disadvantage to valve longevity, It wasted a lot of the power available due to the peak pressure point being too late on the stroke.

Since the speed of the flame propagation is a function of the mixture and the pressure, changing the RPM effectively changes the timing of the position of the peak power pulse. Reduce the RPM and the timing is effectively advanced. Increase the RPM and the timing is effectively retarded.

What am I saying? We must remember that timing and the RPM at which the engine is being operated need to be considered when deciding how lean we should be operating the engine.

To take maximum advantage of the pleasures of lean side operation, we need an adjustable spark advance, just like the Model T Ford!

Hopefully, George Braly and/or Continental will soon have an electronic ignition available to solve that problem!

Happy Skies,

Old Bob

[ARTICLES/20000113.163139.msg00757.tex]

EGT**Thu, 26 Mar 1998 19:32:28**

Good Evening BeechG35

In a message dated 98-03-25 15:32:25 EST, you write:

I have and E-225-8 in a "G" model bonanza and wondered if anyone can tell me what range the actual EGT in degrees F should be when properly leaned at 75% power and say 6000 feet. I find lots of items regarding "rich of" and "lean of" but "what of"? Thanks.

I really wouldn't try to tell you what the actual temperatures should be. There are too many variables as to how far the probes are located from the cylinders etc. The function of the EGT is to help you analyze the reaction of the engine to the leaning process, but you must have a decent knowledge of what is happening before they make any sense.

Some basic considerations:

The peak combustion temperature in the cylinder will occur at or near the best power mixture. That is when all of the air and all of the fuel are consumed. The peak exhaust gas temperature at the probe will occur somewhat later, once again dependent on how far downstream the probe is located. On the Continentals with the probe located a couple of inches from the cylinder flange, the peak exhaust gas temperature will occur somewhere after the best power or the time the peak temperature is developed in the cylinder. When Alcor did their tests, I believe the numbers that were developed showed that peak power and peak EGT in the cylinder occurred when the EGT was approximately 50 degrees F richer than peak. In other words if you lean the engine till the indicated EGT is at peak you will be operating on the lean side of best power. Richen 50 degrees F and you will be at or near best power. Richen 25 degrees F and you will still be slightly on the lean side. Remember that you would have to be operating at the same power settings and have your probes at the same locations that Al Hundere had when he ran the tests in order to use the exact same numbers. This all presumes that the mixture is equal at all cylinders. We know that this rarely occurs though it is much better on the PS5C carbureted engines than on the later fuel injected engines.

Continental does not recommend running at or lean of best power mixture if the power is above 65%. You can cool the engine by adding extra fuel or extra air but using air to cool only works if the mixtures are the same in all cylinders.

At or above 75% power I would suggest 100 to 150 degrees F richer than peak EGT.

At 65% power or less, you can lean it any way you want. Between 75% and 65% things are a little controversial!

One way to check to see what best power is on your airplane is to set up 65% power cruise on a day with smooth stable air. Put your prop in manual (provided you are still lucky enough to have the Beech electric prop) then lean till you see an increase in the

RPM followed by a drop in RPM. The peak RPM will be best power. If you note the EGT at that time and then lean to peak EGT you will have some idea of the difference from peak power for the next time you lean in less than smooth air.

It is a lot easier than it sounds!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980326_193228.msg01451.tex]

EGT**Fri, 27 Mar 1998 10:04:01**

Good Morning George,

In a message dated 98-03-26 23:19:02 EST, you write:

If Bonanza owner participating in this forum can show me any intellectually honest engineering data that supports the proposition that operating an engine at any given specific horsepower (65%... 75% ... or even 90%) at 75F rich of peak is "better" for the engine than running it at the same horsepower at 75F lean of peak, then I'll buy them and all of their pax in their Bonanza a free BBQ lunch here at Ada and fill up both wing tanks before they leave.

Well put and it brings up an interesting (to me anyhow) point. Many years ago in a far distant past I had the pleasure of operating the R3350 on the DC-7 for several years. As you well know, these were very highly developed piston engines. Some versions provided over one horsepower per cubic inch displacement.

They were designed to be very light weight, provide high power for a short time for takeoff and yet have extreme economy to allow long range. Cruise SFC was .42, very low for the time.

The engine had direct fuel injection to the cylinder and that system had an injector distribution plate for each row or bank of cylinders. Twin row engine, two distributor plates. One of the problems we had was that the plates would occasionally slip on the shaft which tied them together and controlled the mixture delivered to the engine. When that occurred, and we leaned in the normal manner using the torquemeter, one row would get a much leaner mixture and one row would get a much richer mixture than desired. The total power output was what we wanted, but one row was doing almost all of the work. This led to very expensive engine damage. Pistons sometimes froze in the cylinders and broke connecting rods etc. Pretty messy!

The interesting point is that it was the overly RICH row that came apart!

The overly lean row of cylinders were clean as a whistle and had no sign of distress whatsoever.

The overly rich condition put the cylinder in a power range not designed to be used in cruise and they couldn't take it. The fix was to put a cylinder temperature gauge on each row instead of just one and if we noted a significant difference in temperature (I believe it was around 25 degrees Centigrade) between the front row and the rear, we would feather the engine.

It seems that any time the cylinder, valves and other components are operating in a temperature and pressure environment which does not exceed the stresses the unit was designed for, there is no problem! Whether the temperatures are controlled by

adding extra fuel or extra air make little difference. There is a potential, as you know, for oxygenation of certain components but that has been quite well accounted for by modern metallurgy.

It is fortunate that you can now instrument an aircraft engine and find out directly what is happening instead of relying on evaluation of symptoms as we had to do in those years long past!

KEEP UP THE GOOD WORK!!!

Bob Siegfried Ancient Aviator

[ARTICLES/19980327_100401_msg01474.tex]

EGT**Sat, 28 Mar 1998 02:06:30**

Good morning Ralph,

In a message dated 98-03-27 23:59:22 EST, you write:

I've been reading your stuff for a while now, and have yet to find an error.
Good stuff, but I got to ask you, How do you feather and engine?

Excellent point, obviously the engine was shut down and the propeller feathered. So much for technical accuracy.

Seriously, why didn't you just enrichen it until the crossover in CHT went back to normal. I always liked all four motors running on the DC-7 if it was at all possible. Even if it meant a little more fuel flow.

That too is a good point! I suppose it was because we were so paranoid about the possibility of setting that magnesium case on fire that we tended to shut it down if it hiccuped or even seemed close to doing so. When we were first trained on the airplane they showed us a training film that had been made for the military concerning the operation and care of the R3350. One of the comments in the film was to carefully observe the engine after receiving a fire warning and if a white flame was visible, to abandon the aircraft as there was no way to put out the fire and the wing would soon burn off. Since we were not provided with the means for abandoning the aircraft, we were not at all hesitant to shut one down. The engines were very expensive and the airplane flew extremely well on three and didn't do bad on two. We even had an airplane get successfully on an airport once after having feathered – oops! I mean shut down three engines. (The Captain did unfeather the propeller and restart one that he had shut down due to a double shorted secondary but it was still a commendable performance.) We tended to shut them down if there was any indication of a problem. I don't think I would have continued operating the engine even with a richened mixture as I don't think there was any way of knowing when the mixture and therefore the power was within limits. The engine would at least had to have been operated at reduced power to avoid the problem of the overly rich row still carrying too much of the load. I don't think equalizing the temperatures would have assured a safe operation and for sure, the spark advance would have to be put back to retard. I am not certain, but I really think the range of the airplane would be improved by shutting the engine down and feathering the propeller and I would then be sure I wouldn't break it. If you will recall, the leaning procedure was quite a process and rather high power was carried at a very lean mixture which relied on excess combustion air to the cylinders for proper cooling. Richening might have worked, but I would have wanted assurance from the engine designer before I tried it.

Pretty long dissertation for a simple comment but you have made me think about it!!

Lest I leave the impression that the airplane was less safe than others. I must comment

that I flew the airplane as long as my airline operated it. The first four years as a copilot and another seven years as captain. We flew the DC-6 and the DC-7 as a common fleet and I probably flew each about the same amount of time. The irregular removal rate on the seven was about twice what it was on the six but we tended to try to keep the aluminum cased R2800 running in cases where we shut down the seven due to the possibility of uncontrollable engine fire. If you are old enough to remember there were a few cases of people who tried to keep the engine running after they should have shut it down and there were at least two who were lucky enough to get it on the ground with an uncontrollable engine fire before the wing burned off. Both of those were within fifteen minutes of a suitable airport. It was a great airplane and did a wonderful job at what it was designed to do but it did need careful tender loving care.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980328_020630_msg01525.tex]

EGT**Sat, 30 Jan 1999 00:22:44**

Good Evening Mike Plecenik,

In a message dated 1/29/99 9:58:25 PM Central Standard Time, nanchang@earthlink.net writes:

I have a '51 C model with an E225-8/Hartzell hyd. and have seen posts referring to speed restrictions other than what is in the POH but no mention of what these restrictions are. .

I wonder if you aren't noting the references to the AD which applies to the 35, A35, B35 and 35R airplanes which lowers the allowed operating speed. Your C35 is not affected by that AD. Could that be it or are there other restrictions that you are asking about?

Also, there is mention of max. EGT but not what that max. is (my EGT at full rich is 1400 and peaks at 1550 then stays there until just before the eng.starts to stumble or quits then it might drop a few degrees - single probe in #2). All donations are appreciated.

I know of no maximum allowable EGT limit for the normally aspirated airplanes. Generally all references are plus or minus to the point at which the temperature peaks. The number of degrees that the engine is operated from that base number is the key.

The turboed engines do have a limit so that the turbine wheel will not be exposed to damaging temperatures.

The limit set for the individual engine is a function of the placement of the probe and the material of which the turbine wheel is manufactured. It is generally around 1600 or 1650 degrees.

You mention that the probe is mounted in #2. The distance from the cylinder can make a large difference in the actual reading. If you are getting no drop before the onset of roughness, it is likely that there is some problem with your fuel distribution.

Hopefully George Braly will have more to say as he is the expert on such things!

Probably not much help but at least the comments are free!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990130.002244_msg01483.tex]

Engine Cooling After Shutdown**Thu, 15 Jul 1999 23:44:47**

In a message dated 7/15/99 9:58:50 PM Central Daylight Time, gwbraly@gami.com writes:

Having made some actual measurements in this area, for the purpose of gathering some certification data on the necessary operating temperature of some under cowl electronic components, it is my conclusion that putting in the bird plugs after shutdown is one of the worst things one can do for the accessories.

Good Evening George,

Thanks for the information! I guess I can keep on cooling my engine down after shut down without feeling foolish!

It seems that many of the old procedures still have merit.

Happy Skies,

Old Bob

[ARTICLES/19990715_234447_msg06066.tex]

Engine Cooling After Shutdown**Fri, 16 Jul 1999 14:33:19**

In a message dated 7/16/99 12:22:28 PM Central Daylight Time, 72311.556@compuserve.com writes:

Candidly, I NEVER plug my cowl, except when I am in "bird country" in the spring time.

Good Afternoon George and All,

Everything George has stated sounds reasonable to me!

I have been trying to cool my engine before buttoning it up for at least the last forty years and for quite a few of those years, my procedure was similar to George's. I only used bird covers when I thought there might be a bird problem. Having been surprised by the little buggers several times, I now work at cooling things down so I can install the bird covers every time.

This discussion has brought a thought to mind. May be we should be designing a Bird Plug that consists primarily of a coarse screen of some type. Three quarters or one inch mesh ought to do the job. It would still be nice if it had soft edges so that it was as easy as the current crop to install.

Happy Skies,

Old Bob

[ARTICLES/19990716_143319_msg06108.tex]

Engine Cooling After Shutdown (was leaning)**Thu, 15 Jul 1999 12:40:34**

In a message dated 7/15/99 10:46:06 AM Central Daylight Time, jts-mall@onramp.net writes:

Here's a hypothetical: I arrive at my destination at an FBO and I immediately plug the nose, close the cowl flaps and generally button up the aircraft. The OAT is 90-100o and sunny. I'm in a hurry and will not return for several hours. Is this generally a 'bad' thing? If it is, then is there something significantly better?

For example, is it better when you arrive at your hanger that after pulling in you open both cowl doors? Is just opening the oil access door better than nothing?

Or is this much ado about nothing?

Good Morning John,

I am not about to recommend to anyone how they handle such a situation because there is a distinct possibility that it really is "Much Ado About Nothing."

Having said that, many years ago in a far distant past, I flew an airplane called the Convair 340. It was a twin engine airplane powered by a couple of very nice round Pratt & Whitney R-2800 engines. The airplane was one of the first to use augments tubes for cooling and that provision theoretically eliminated the need for cowl flaps. (It really didn't work too well, but that is another story!) Since there were no cowl flaps available to help dissipate all of the accumulated heat while on the ground, the airplane was equipped with a couple of roughly foot square doors on the top of the nacelle called "Heat Dissipation Doors." These were opened on the ground to help let the heat out. We were informed that this was necessary to keep the accessories from being heated to a temperature above that at which they were designed to operate.

Do to that training, I have made a practice of attempting to open my cowlings for a few minutes after shut down any time it is practical to do so. I delay putting in the bird plugs as well. I also take out the dip stick and place a porous paper towel or cloth over the oil tube. I find that if I do this right after shut down, the engine has generally cooled down quite a bit by the time I have arranged for transportation, fueling, parking and all of the other sundry activities associated with an airport arrival.

Does it make any difference?

Probably not, but it gives me something to do!

Happy Skies,

Old Bob

[ARTICLES/19990715_124034_msg06042.tex]

Engine Longevity**Sun, 27 Aug 2000 10:58:38**

In a message dated 8/27/00 8:53:15 AM Central Daylight Time, jtsmall@onramp.net writes:

Is it, in fact, true that running an engine easier will increase its life? What about the axiom of 'run it like you hate it'?

Good Morning John,

The longest lived engines are those which are stressed the least, BUT they must be set up with temperature control devices, ignition and valve timing to optimize the engine for the operation expected.

We in aviation tend to operate engines that we want to get a lot of power out of, but which we want to weigh very little. If you are going to pull a lot of power out of an engine on any occasion, I think it is important that the engine be operated at those high powers on a regular basis to make certain that it is capable of doing so with reliability.

If we wish to gain the maximum durability from the engine, operations at lower stress levels will do that and there MAY be fuel consumption advantages as well.

Putting the bigger engines in the lighter airframes allows us to operate that engine at it's very high power often enough to meet the goal of letting it do it's thing, but at speeds that allow excellent cooling capability.

It can take that airframe up to an altitude where we can operate it at a level of power which we consider low, but which is still a very high power rating compared to stationary or automotive applications, and provide very good performance while allowing flexible fuel management techniques.

Personally, I have never agreed with the axiom you state. I don't mind getting the greatest power out of an engine that can be done without reducing the reliability and I would prefer that such operation not decrease it's durability to any great extent.

However, I want to assure myself that I am treating that old horse in a manner which will allow it to get the exercise it needs without causing unhealthy strain in it's muscle and tissue.

Happy Skies,

Old Bob

[ARTICLES/20000827_105838_msg12645.tex]

Engine Longevity**Sat, 10 Feb 2001 13:36:32**

In a message dated 2/10/01 9:16:34 AM Central Standard Time, RSwaffer@1Canada.com writes:

This is interesting reading that Ernie sent: <http://www.avweb.com/articles/bigbore.html>
<http://www.avweb.com/articles/oversq.html>

Good Afternoon Richard,

I think it is important to remember that there is a big difference in how various operators manage their engines.

That difference can make a very big difference in the longevity of the engine.

There are a lot of differences between the big old round engines and our modern little flat ones, but there are many more similarities than variances.

When I first checked out as a copilot on the DC-6, we were overhauling the R-2800 Pratts every six hundred hours.

By the time they were retired from service by my employer, the overhaul times were approaching 4000 hours.

That was done by careful evaluation of the failures and instituting operating procedures throughout the company to ameliorate those problems. Little things like keeping the engine pulling seemed to help a lot. Others were strict limits on cold weather starting and some things as simple as waiting a full sixty seconds following the engine start before adding power to start taxiing even when the engines were already up to required temperatures.

I have never been certain which policies and procedures were the ones that allowed the continuous improvement in TBO, but I have always tried to adopt similar procedures for operation of my own engines until I found good data which would suggest another method.

Four thousand hours between majors sounds good to me!

Happy Skies,

Old Bob

[ARTICLES/20010210_133632_msg03397.tex]

Fuel Distribution Efficiency and GAMInjectors**Fri, 7 Aug 1998 13:58:50**

Good Afternoon Eric Poole,

In a message dated 98-08-07 13:22:40 EDT, you write:

The GAMIs sure do get a lot of good press but I guess I'm not sure about spending \$800 to fix what doesn't appear to be broke...

One method of checking the distribution efficiency of your engine is to set it up at cruise altitude and cruise power and then start leaning.

If you can get a drop in airspeed of 8 to 10 mph with no roughness developing, the distribution is not too bad.

Continue leaning until you lose the first cylinder.

If there is very little difference between the point at which the first cylinder drops out while leaning and the point at which the engine is no longer firing any cylinder, the distribution at that power setting is very good.

If one cylinder starts to drop out before you get any airspeed loss, but the engine continues to run (though roughly) for quite some time as you continue to lean before the engine quits completely, the distribution at that power setting is lousy.

Now that you have modern engine analysis capability I would suggest that you contact George Braly and go through the procedure he recommends to find out precisely what is happening to your engine.

The 470s don't seem to need balancing as much as the 520 and 550, but I think you will find that considerable improvement is possible with the balanced injectors.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980807_135850_msg04099.tex]

Fuel Flow**Sat, 17 Jan 1998 23:23:47**

Good Evening Joe Gerardi,

In a message dated 98-01-17 21:23:47 EST, you copy this message from George:

Having the mixture 10% too rich might cost you 3 to 7 hp on takeoff. having it 10% to low can crater your jugs in a 150 hours or so.

I for one agree wholeheartedly with George Braly. If the mixture is a little rich, you can always lean it out a little. If the error is on the lean side there is nothing that you can do about it from the cockpit.

I prefer to set them at the maximum and then add about another gallon per hour at least until I am able to calibrate the fuel flow gauges to be absolutely certain that they are rich enough.

Once the instrumentation has been calibrated, the flow can be dropped a little if desired.

It is not unusual to see new electronic fuel flow units that are four percent off. That is a gallon per hour in our airplanes. Enough to bother me!!

Happy Skies,

Bob

[ARTICLES/19980117_232347_msg00349.tex]

Fuel Flow**Wed, 23 Feb 2000 20:58:19**

In a message dated 2/23/00 7:48:42 PM Central Standard Time, Billearls2@aol.com writes:

Just wanted some more experienced input on the power setting/fuel burns since I hear so much about 12-13 gph fuel burn rates on this list.

Good Evening Bill,

It is my pleasure!!

Incidentally my everyday burns range from 16.6 GPH to 10 GPH depending on what I am trying to accomplish. The fantastic flexibility of the series is one of the things that make it so great! I just wish they had added that ten inch extension to the V-tail as well as the Debbie!

Happy Skies,

Old Bob

[ARTICLES/20000223_205819_msg03457.tex]

HP/Speed/Fuel Flow**Fri, 16 Feb 2001 11:22:54**

In a message dated 2/16/01 8:36:43 AM Central Standard Time, flyguy@nobleknights.com writes:

I took off with full fuel[80gal]just me and a small suitcase.....For fuel flow, all I have is the IO-550 OEM fuel flow gauge...It read between 13.2-14.0 gal/hr... With the old IO-520 no Gamis I would generally get 168-172k/tas. with fuel flow of 14.5-15.0 John 73 V35B

Good Morning John,

All in all, that doesn't sound too bad.

Faster on less fuel seems pretty good.

Let's try some wild guesses as to what might be the amount of improvement one should expect via the bigger engine and the GAMIs.

First off, the airplane should have exactly the same speed at the same horsepower as before.

Why? Well, consider the following.

The drag of the airplane should not change measurably.

The weight of the 520 and the 550 are virtually identical. Continental lists the 550 as a couple of pounds lighter on their TCDS. You may have lighter, more modern, starter and alternators installed or yours may be the same as before. The propellor should be considered as well, both for weight and performance.

You likely had the BDS baffling system installed. That could affect the drag, but I doubt if any difference would be measurable on the airspeed indicator.

If the horsepower, prop, weight and drag are the same, the speed should be the same.

Next let's consider just the GAMIs. The addition of these balanced injectors alone will have an effect on your pounds of fuel burned per horsepower developed.

Depending on how well matched your stock injectors were, you should be able to get the same horsepower now on one

half to as much a one and one half gallons per hour less fuel.

The IO-550 has the reputation of being slightly more efficient when it comes to developing horsepower. I doubt if it is as much as one percent more efficient, but let's assume that it is.

That would mean that if you were burning 14 GPH at some certain speed before the switch to a 550, the 550 would save .14 GPH resulting in a fuel flow of 13.86 GPH. Add in a WAG for the amount of fuel saved by installation of the GAMI's (let's use one GPH) and the burn to get the same horsepower should now be 12.86 GPH.

You should be going the same speed with the GAMI equipped IO-550 on 12.86 GPH that you were previously getting on 14 GPH with the non GAMI IO-520.

A fuel burn of 12.86 on an engine operated some twenty-five degrees F lean of peak EGT would be developing approximately 192 HP.

Increase the power to where you were burning 14 GPH with the same conditions and you would be developing 207 HP, fifteen more horsepower than before.

Fifteen more horsepower should yield something less than a four knot increase in speed.

As a practical matter, I find that I now experience average cruise speeds about ten knots faster than before, but I think that is due to the better rate of climb which encourages me to fly higher. I also find that my fuel burn per hour is higher which means that I am now cruising at a higher horsepower than I did with the 520.

My overall trip burns seem about the same as before. I believe that is also due to the higher altitudes flown.

Your experience appears to be right in line with expectations, but to check for sure, you need to develop some very precise before and after data. Obviously that would be difficult to do at this late date!

Hope this helps.

Happy Skies,

Old Bob

[ARTICLES/20010216_112254_msg03983.tex]

Idle Speed**Thu, 24 Feb 2000 12:54:03**

In a message dated 2/24/00 11:07:41 AM Central Standard Time, jtsmall@onramp.net writes:

Then I'd still run 1200 rpm after starting while the parts warm up.

Anyone have conflicting information?

Good Morning John,

Once again, it depends on what we are talking about. I like to keep the RPM as low as possible on a start for a few seconds. Right there, I guess I agree with your old mechanic friend! As the oil pressure rises and gives me confidence that oil is being thrown around the engine, I let the RPM come up a little. After thirty seconds or so, it is generally around 800 RPM. By the time a minute has gone by, it will generally have risen to 1000 or more. If it goes above that, I will usually throttle it down to a thousand and keep it between 1000 and 1100 for the rest of the warm up.

Having said that, back in my helicopter days, we regularly set the engines to idle at 1100 to 1200 RPM. Due to the lack of the flywheel effect, those engines needed to idle fast to run at all! The flywheel provided was small and light!

The engine regularly spun up almost immediately to 1200 RPM and we observed no undue wear or vastly shortened life. I do believe we were overhauling them at a TBO of around 1200 hours though.

Happy Skies,

Old Bob

[ARTICLES/20000224_125403_msg03521.tex]

Lead in Fuel as Lubricant**Fri, 14 Jan 2000 14:01:20**

In a message dated 1/14/00 11:48:18 AM Central Standard Time, 72311.556@compuserve.com writes:

This is not all first hand information for me, but I am sourcing it back to engineers in the refining business that are currently still making 100LL, that have first hand knowledge of these issues. I believe it to be accurate information, and it is consistent with my personal recollection of the history of these matters which goes back to the 1960s.

Good Afternoon All,

I would like to make a "me too" comment on this one. I have heard the story about valve seats requiring lead for lubrication ever since I started in the business well over fifty years ago.

Every now and then I would read an article by various fuel engineers that heavily disputed the necessity of providing lead as a lubricant.

The most convincing of those articles was one written by an engineer who was instrumental in developing the use of lead as an anti-detonation additive in the early days of combustion engines. He was employed by and had retired from the Ethyl corporation. If anybody should be familiar with such things, I think he would.

The article was in one of the boating magazines that I read some twenty or thirty years ago and he pointed out that there were many very high compression racing boats that had been run on totally lead free fuel. I am no engineer and I no longer have the article, but it was very convincing and he did comment on the use of lead in aviation fuel. He totally discounted any requirement for lead as a lubricant for the valves or anything else in the engine. As I recall, it was just the cheapest way to gain octane in the fuel!

For What It's Worth!

Happy Skies,

Old Bob

[ARTICLES/20000114_140120_msg00825.tex]

Lean to Best Power**Wed, 12 Jan 2000 22:50:23**

In a message dated 1/12/00 9:21:49 PM Central Standard Time, swo49@hotmail.com writes:

Bob: Please help this novice. When flying, how are you determining best power - by the book or by (what?) the gauges? Thanks for your help, Steve

Good Evening Steve,

As always, it depends! With a fixed pitch prop it is easy, just lean for peak rpm. For the early Bonanza with an electric prop, I would put the prop in manual and lean for peak RPM.

In a twin the aircraft is leaned roughly till the engines are smooth, but on the rich side. The aircraft is then trimmed for that power. One engine is leaned till a yaw develops and then adjusted until the max power is developed on that side. If the yaw develops toward the engine which is being leaned, it is richened. If it yaws toward the other side, the mixture is adjusted to maintain the maximum yaw. The other engine is then leaned in a similar manner.

That is normally referred to as power leaning.

On a single engine airplane with a constant speed prop, the airspeed is the primary indicator. In smooth air, it is a breeze. In turbulence, it takes some experience to note the best power position. It gets easier with practice.

Does that help?

Happy Skies,

Old Bob

[ARTICLES/20000112.225023_msg00708.tex]

Leaning**Fri, 30 Jan 1998 08:15:13**

Good Morning George Harrison,

In a message dated 98-01-30 07:14:15 EST, you write:

so what I'm trying to do is understand the best way to get adequate or reasonable performance and avoid doing bad things to the engine.

Ah, THAT is a commendable goal!

The problem with the log manifold Continentals is the lousy fuel/air distribution of the stock system. The E series and the early carbureted versions often (but not always) had much better distribution and could operate quite comfortably at the more optimum (leaner) mixture settings.

The key is that we should be striving for even distribution of air and fuel to all cylinders to obtain "adequate or reasonable performance and avoid doing bad things to the engine."

The fuel saved between overhauls will easily pay for the GAMIs and the instrumentation to see what is happening.

The extra fuel is not doing the engine any good! It puts all sorts of junk in the engine and can wash lubrication off the cylinder walls, contribute to stuck rings, provide debris to hold a valve open (causing warping and burning), provide an ignition source for preignition and all sorts of other bad things!

This is not a new problem. If you are familiar with the Jacobs and the Lycoming round engines of the forties, you might be interested to know that the Jakes were normally aspirated and the fuel was fed to the cylinders via a set of distribution vanes which were centered on the aft side of the engine. The Lycoming was set up similarly but their distribution vanes spun with the crankshaft. No boost, it just helped spread the fuel equally to all of the cylinders. With the Jakes, the top cylinders ran lean and the bottom ones ran way rich. Thus the appellation "Shaky Jakes".

The Lycomings were known as a smooth running engine.

I flew for an outfit that had both Lycoming and Jacobs powered Cessna Bobcats (UC78s or T-50s). At the same air-speeds, the Lycoming powered airplanes burned 28 gals per

hour for the two engines and the Jacobs powered burned 36 GPH. The Jacobs were constantly suffering from stuck valves and hard starting due to fouled plugs. The Lycomings just ticked away smoothly and quietly doing their job.

The first order of business is to attain an even fuel air mixture to all cylinders. It has always been so!

Once that is accomplished then we can start talking of which side of "best power" to operate at.

Notice that I didn't say which side of peak? The peak exhaust temperature which we read on our probes is dependent on the probes location on the individual engine. How far it is from the peak combustion temperature is a function of many variables.

The 25 degrees C or 36 F and other numbers are just averages that occur for the engines on which they experimented.

A small difference in the mag timing will make a substantial difference in the relationship of peak indicated EGT to actual peak combustion temperature.

Enough rambling from an old man!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980130_081513_msg00653.tex]

Leaning**Mon, 27 Nov 2000 11:30:44**

In a message dated 11/27/00 9:24:36 AM Central Standard Time, thender@ix.netcom.com writes:

George - Would you care to comment on the appropriate way to lean a carbureted, normally-aspirated engine that does not have either GAMI's, an engine analyzer or an EGT? At present, many of us are flying such airplanes and would greatly appreciate your insight.

Good Morning Tom,

I, too, would like to hear George's comments on this subject. While we are waiting, I hope you don't mind if I stick my two cents in.

I was operating straight 35s, and other aircraft, in the fifties before EGTs and the rest of the wonderful information we now have on our panels became available.

There are several interconnecting considerations to leaning with little or no modern instrumentation.

Let's start with a plain old carburetor, float or injection.

It may or may not have good fuel distribution.

The way that I use to determine fuel distribution quality is to lean the engine slowly and carefully until it becomes rough, or quits entirely, while watching the airspeed and/or the RPM closely.

If the aircraft is equipped with a fixed pitch prop, you can watch the RPM. That is easier than watching the airspeed, especially in less smooth air. If you are operating an airplane with an electric prop, put it in manual position.

If the air fuel mix is perfect, the speed and or RPM will initially rise and then start to fall. If it keeps on running smooth until the engine is no longer putting out any power at all, conditions are ideal and you can just choose how far on the lean side you want to operate.

Cessna recommended that the Cessna 170, with the Continental E-145, be leaned until you had a two MPH drop in airspeed.

For the twins, we would set up the desired cruise with a rich mixture and then trim the airplane very carefully. We leaned one engine at a time. If the engine increased power, as evidenced by developing an out of trim condition, we stopped at the peak power condition and leaned the other one the same way. Once both engines were developing peak power, we would retrim the airplane. Then we would lean the first engine until a noticeable amount of rudder was required to keep the turn needle stationary and the ball in the middle. The second engine was leaned until the aircraft was back in trim. If the total speed lost was more than 3 to 5 mph, we would richen both engines till the speed was somewhere in the range of a 3 to 5 mph drop and the aircraft was still in trim.

I still use that procedure when flying my son's Beech 18.

In flying my Bonanzas of that bygone era, I found that some of them would drop as much as 12 to 15 mph before I lost a cylinder, others would start getting rough with as little as 3 or 4 mph decrease. I had one that was so good that all of the cylinders would quit firing at almost precisely the same point. When I carefully added fuel to get it running again, all six would just smoothly come back ticking away.

I tried to find some reason, or difference, between various airplanes that made one work so well and another so poorly. I never did find anything that worked on all of them, but some efforts did result in various degrees of improvement.

The first thing was to look for induction leaks. (Nothing Changes, does it!)

I found that most, but not all, PS5Cs would work best if I throttled back from full throttle just enough so that a small drop in the manifold pressure was noted on the gauge. One quarter inch of MP, or less, was enough. I assumed that the reason that helped was because I was taking the unit out of the enrichment mode, but the slight turbulence added by the slightly cocked throttle plate may have made a difference as well. I did remove the carburetor and tried cleaning and smoothing the tubes where the fuel is injected into the carburetor airstream. That procedure had inconclusive results. Sometimes it made a difference and other times, nothing.

I found that most of my Bonanzas did very well with an air-speed drop of five mph.

I made a point of inspecting the plugs with an eye toward de-

termining how even the mixture was by observing the evenness of the color of the plugs.

I currently lean my Continental W-670 fixed pitch prop equipped Stearman by leaning for a fifty RPM drop.

If the engine has good distribution, some sort of "power leaning" works well. If it starts to get rough early in the leaning cycle, careful attention to the parameters will generally lead to the discovery of a procedure that works. However, it is cheaper and easier to install something that will provide six cylinder CHTs and EGTs than it is to spend all that time developing the information from those oblique methods.

Happy Skies,

Old Bob

[ARTICLES/20001127_113044_msg16789.tex]

Low Static RPM/Poor Performance**Tue, 21 Nov 2000 18:14:38**

In a message dated 11/20/00 7:38:50 AM Central Standard Time, flyinglo@email.msn.com writes:

Low static RPM is caused either by too much pitch in the prop or not enough power in the engine. Bob, I checked my maximum static yesterday; it was 2370 rpm. The red line is 2600 rpm, and it gets 2650 on take off. Since it gets over redline on take off, should I not worry about the static? Is the max static rpm a function of the mixture?

Good Evening Jerry,

The mixture could affect the power. Too rich or too lean can both cause power loss, though the mixture can be quite a bit too rich before power loss is noted while the power drops off quite rapidly with the mixture on the lean side.

If the propellor is not in the governing range when the aircraft is static and the engine is at full throttle, and it appears that yours is not, the static RPM is a very good check of the power available. The fact that it accelerates up to the redline RPM during or after takeoff has nothing to do with it. If yours is turning over redline after takeoff, the governor is already set too high.

My number two son has an excellently performing J35. He will be out of the country until after Turkey Day, but when he returns, I will ask him what his setup is currently turning static.

PS, Bob, assuming you read my other email on my 300'/m climb rate with the IO-470-C in a J35, would you care to comment regarding what differences in this figure one might see with an IO-470-N [260 HP]? IO-520-BB? IO-550-B? Ceiling?

First, get that engine you have up to the power it is supposed to develop!

If your airplane is not holding a few hundred pounds of extra lead weight in the belly, it should perform much better than the numbers you have presented. That engine needs to be

looked at very carefully. I am sure that your static RPM is way to low. If the problem was in the position of the prop stops, that could cause too low a static RPM, but once the combination got up into the governing range, the prop stops would not affect it. Since the engine seems to govern OK after you are airborne, there is little possibility that anything else is wrong other than your engine is not developing the power that it should.

Putting an IO-550B in that airplane would make it into a veritable rocket, provided that you are not carrying around an extra thousand pounds of lead or so.

The things that affect the performance are drag, power and weight. The airframes are all the same size so the drag of any of them at the same weight is pretty close to all the others. Put in the same engine and make sure they are at the same weight and the performance will be close on any of them.

Since your basic airplane came from the factory some four-hundred pounds lighter than my V35B, it should run the pants off my old clunker!

Just keep it light and add as much power as you can stuff under the cowling!

Happy Skies,

Old Bob

[ARTICLES/20001121_181438_msg16536.tex]

Maximum MP**Mon, 17 Jan 2000 18:19:30**

In a message dated 1/17/00 3:37:36 PM Central Standard Time, swo49@hotmail.com writes:

Bob: Should I be getting 29.6 inches on my 520?
Steve

Good Afternoon Steve,

That is the limit. I doubt if you would see it on the gauge unless the atmospheric pressure was on the high side and you were at sea level. On a cold high pressure day at sea level, most of us are likely to overboost the engine a little. If it does go over 29.6, we are supposed to back off the throttle, but I doubt if anybody does! Obviously, in a normally aspirated engine, the only way the indicated manifold pressure can be above the ambient pressure is if there is a ram air effect. For several years, Mooney used an air filter bypass method and claimed one inch of boost due to the ram air. I never flew one and have no knowledge of how well it worked.

The type of engine installed really makes no difference on how much manifold pressure shows on the gauge. In addition, the amount of manifold pressure has no direct bearing on the amount of power produced! If there is no fuel flowing to the engine, it will still show the same manifold pressure as when operating normally.

All the gauge tells you is how close the atmosphere where the gauge is measuring it compares to the ambient.

Some folks, Norm Colvin included, have felt that the Brackett air filter creates enough resistance to airflow that some power is lost. I have seen claims of a loss of as much as an inch or more. I use the Beech filter because Norm said it had the least loss of any he knew about. I have never measured it myself. I do know that it is important to squeeze as much oil out of the Brackett unit as you can before it is installed!

Take note of the indicated manifold pressure before you start the engine. If the indicated manifold pressure on takeoff roll is not within an inch of the ambient noted before engine start, I would look for some problem in the intake system. There should be less than an inch loss even considering the pressure drop across the air filter at the high air flow of the T/O condition. It has been a while since I checked, but I believe mine

has less than a half inch drop.

Happy Skies,

Old Bob

[ARTICLES/20000117_181930_msg00959.tex]

Mixture Position After Shutdown**Wed, 24 Jan 2001 18:20:28**

In a message dated 1/24/01 5:00:11 PM Central Standard Time, inyomono@telis.org writes:

Is this something to be concerned with on IO-520/IO-550 engines also??

Pete Tracy Bishop, California A36 N54DG

Good Evening Pete.

Not at all. There are no diaphragms in the Fuel Injection system used in the later Continental engines. The PS5C that was used on all of the E series engine and the Bendix fuel injection system does use a fuel controller that has a series of diaphragms to balance and evaluate the various pressures involved to arrive at the amount of fuel that is shoved into the engine.

The early version of both had diaphragms that were made of a rubber substance that would take a set if left in idle cutoff. They also were very sensitive to loosing their elasticity and required that they either be treated with oil or supplied with fresh fuel every week or so to maintain a proper working condition. Newer synthetic versions no longer have the problem, but it was a good idea to park the E-series powered Bonanzas with the mixture in full rich and most folks still do that.

On engines equipped with the Continental mechanical fuel injection system, the mixture can be left anywhere that you desire and it won't affect the system in any way. However, many folks feel that there is some safety in leaving the mixture in idle cutoff and the throttle full closed so that the engine will not run should it somehow end up with a hot mag and the propellor be turned. If the mixture is left full rich and the throttle left open, there is an outside possibility that moving a prop with a hot mag could lead to a disaster.

I park my IO-550 with the controls in idle cutoff and throttle closed. Some folks like to park with both in the forward position because it makes it a little easier to get out of the airplane.

I don't suppose it makes much difference either way.

Happy Skies,

Old Bob

[ARTICLES/20010124_182028_msg01681.tex]

Mixture and Mountain Flying**Wed, 8 Apr 1998 15:52:34**

Good Afternoon Charlie Gibbs,

In a message dated 98-04-08 13:52:44 EDT, you write:

I have a question to ask those of you who routinely fly in the mountains. Any comments would be appreciated.

Charlie Gibbs

Well, here goes! If you have a good six cylinder EGT such as the GEM or JPI, I would suggest leaning till you get the same EGT readings that you have on a sea level T/O.

If you have a high tech fuel flow gauge and you have great confidence in it's accuracy, lean to the fuel flow that your power chart says you should have for the T/O power developed. That can be a tough figure to locate, but will work if you have the numbers.

If you are lacking sophisticated instrumentation, leaning to smoothness and then richening to a little roughness and then back till it just smooths out will work on most any nonsuper-charged engine.

At the altitude you are asking about you could probably lean for best power (peak RPM, NOT peak EGT!!) on the ground and still be OK, but I would probably go a little richer anyhow.

Ok guys and gals, cut me to ribbons!!

Bob Siegfried Ancient Aviator

[ARTICLES/19980408_155234_msg01884.tex]

Oversquare**Wed, 8 Sep 1999 13:08:18**

In a message dated 9/8/99 11:22:57 AM Central Daylight Time, rcb@appsig.com writes:

I noticed the Sept 99 Light Plane Maintenance magazine is reviving that old maxim that running lower RPM than MP is bad for your engine. For example running 2200 RPM, 25" will wear out your cylinders faster than 2500 RPM, 22 ". Their argument seems to be based on a lot of graphs and theory, without any practical evidence, so I don't place much credence in it.

It would be nice to have some data, like running a twin with one engine at high RPM, the other at low RPM, at the same HP, to TBO.

Comments anyone?

Bob Briggs F33A

Good Afternoon Bob,

The article was quite interesting and may be factual. There may be an increase in cylinder wear under the conditions they discuss, but that doesn't mean that the best overall operation of the engine will occur using high RPM and low manifold pressure.

Once again, it depends!

The DC-7 had engines that were not noted for their longevity but which had a very high power to weight ratio and produced excellent specific fuel consumption figures. The DC-6 engines were considered more reliable and lower cost to operate. However, the DC-7 could fly much longer legs than could the DC-6 and it was therefore the preferred airplane for such operations even though the engines cost more to maintain.

Any engine operation has to be discussed based on the specific application to which the engine is being applied.

What is best for the long ranger may not be the best for the local service operator and neither one of those may operate the engine in the same manner that would be the best for someone involved in training.

Happy Skies,

Old Bob

[ARTICLES/19990908_130818_msg08104.tex]

Oversquare**Wed, 8 Sep 1999 14:54:48**

In a message dated 9/8/99 1:33:24 PM Central Daylight Time, 72311.556@compuserve.com writes:

Bob,

After the crews learned to actually operate the DC-7 engines ... always on the lean side at cruise, the service time on those engines ended up going to well over 3000 hour TBOs.

John Miller has some 20,000 hours in Connies, or 80,000 hours. Only had one 3350 barf on him the whole time, and that was a bearing failure on a main.

I can show you data that argues strongly that, for example, 27" x 2200 RPM and 100F ROP is NOT good for the engine.... but 30" x 2200 RPM at 50 LOP *IS VERY GOOD* for the engine, in terms of the internal cylinder pressure and where the peak cylinder pressure occurs.

Regards, George

Good Afternoon George,

I have no argument with anything you have stated above. Our 3350s on the DC-7s went to well over 3000 hours TBO as well. The P&Ws on the DC-6s went even better I believe they were at 3600 when we parked them.

Incidentally, we who were the early operators of the 3350 compound engine tended to run them very much as they were designed to be operated. We went to extensive classroom programs on the engine and were quite well prepared.

The problem with them came later after they had been relegated to second class status. Crews were checked out in them without the extensive extra training that we early troops had enjoyed and the irregular engine removal rate went right through the roof. My airline retired the 7s and continued to operate the 6s because it was cheaper than training the troops on the proper operation of the engine.

Even when the engine was operated to it's greatest advantage, it was never as reliable or as long lived as the P&W. However, the performance available was well worth the extra cost of operation for the way they were designed to be used. I flew the DC-7 for the entire eleven years it was in service with our airline, the first four years as copilot and the last seven years as captain. It was by far my favorite piston engined airplane, but the Pratts were more reliable.

Happy Skies,

Old Bob

[ARTICLES/19990908_145448_msg08114.tex]

Oversquare Operation**Sun, 1 Feb 1998 00:07:00**

Good Evening Doug Steen,

In a message dated 98-01-31 20:04:51 EST, you write:

Oversquare is approved for this engine; I presume the low compression helps tolerate high oversquare operation.

There has never been an "oversquare" limitation on any engine that I know of in any Bonanza.

There are suggested limits of cruise operation and for most of the "O" series it is something like a maximum of 24 inches MP at 2000 RPM or thereabouts!

I can't for the life of me figure out where these old wives tails come from. I have heard it said that they have a history from the big round engines but that is certainly not the way I was taught to operate those engines fifty years ago.

This stupidity came upon the scene in the late fifties and early sixties and we have been stuck with it ever since.

Thank goodness more and more people are beginning to understand their engines better and hopefully some of these falsehoods will be put to rest!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980201_000700_msg00689.tex]

Oversquare Operation**Sun, 1 Feb 1998 09:12:19**

Good Morning Doug Steen,

In a message dated 98-02-01 08:02:49 EST, you write:

The POH for my plane shows power settings way over square, much more over square than your O engine. It is in the plane so not available for exact verification here. My estimate is 25.5 inches at 1850 rpm.

How True!! In fact the very earliest manuals had cruise RPMs shown as low as 1300!

Notice also that those are not listed as limits, merely suggested power settings. The only restrictive statement on the E-185-1 was to not exceed 2050 RPM in cruise.

The more important factor is to be sensitive to your airplanes individual sweet spots.

There is generally a combination of MP and RPM where vibration is the least. High RPM will often aid in avoiding or at least masking a vibration problem, but if the engine has good distribution, even compression and is properly balanced it may well operate very smoothly at many different selections of MP and RPM.

Some of the hogwash about leaning procedures and "oversquare" operation did creep into some of the later manuals but that I believe was due to the pervasiveness of the rumor! I never saw an authoritative text or engineering paper that supported either contention.

Remember too that 23 inches of MP at sea level is not the same power that 23 inches is at seven thousand feet. At the higher altitudes, more air goes into the cylinder for any given MP due to the reduced backpressure on the exhaust. Consequently it is necessary to use less MP at the higher altitudes than down low to get the same percentage of power.

Nothing is easy is it!

Happy Skies,

Bob Siegfried

[ARTICLES/19980201_091219_msg00693.tex]

Oversquare Operation**Sun, 1 Feb 1998 09:32:31**

Good Morning Once Again Doug Steen,

A small addendum to my previous post, The early airplanes with wooden prop blades operated much nicer at the low RPMs. Metal blades are much more vibration sensitive. That is another reason for the large differences in operating characteristics between individual airplanes. The resonance characteristics of the individual airframe, engine and propeller combination get very specific.

Happy Skies,

Bob

[ARTICLES/19980201_093231_msg00694.tex]

Oversquare Operation**Sun, 1 Feb 1998 19:09:49**

Good Evening Reinhard,

In a message dated 98-02-01 11:59:29 EST, you write:

has always been and is even now taught in every ground school class on the subject of C/S prop operation: that you shall avoid high MP with low RPM, and that you therefore make power adjustments in the poper sequence

Even this widely taught procedure has very little application to our UNSUPERCHARGED engines.

It has not always been the hard and fast rule that is taught today. This old wives tale owes it's existence the turbo super-charged engines of WW II.

The thought was that the sequence of throttle and RPM adjustments that were necessary for those turbo-supercharged engines should be taught to all pilots because they didn't know what anyone might be flying. Not a bad idea for a high pressure training program. Unfortunately it has led to the situation we have today where people are afraid to make adjustments to their power plants such as reducing the RPM after T/O without reducing the throttle.

Many of the big round engines comfortably accepted RPM reductions with no adjustment of the throttle. It's a little involved to explain here but it has to do with gear driven superchargers as opposed to turbo driven ones. For maximum efficiency of operation one should know how to properly operate the engine he is operating and not be stuck with broad-based training expedients long after the need has gone by.

This is not the only training expedient that has been promoted falsely by our industry but it is one of the most widely believed.

Have you ever been told by a multiengine instructor to never make a turn into a dead engine?

That was another one that took a long time to overcome. There are lots of others.

Keep an open mind and question all of the "hard and fast" rules. That's when education occurs.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980201_190949_msg00708.tex]

Power Setting

Fri, 28 Aug 1998 02:11:36

Good Morning Chris Shaker,

In a message dated 98-08-27 14:22:05 EDT, you write:

I seem to recall someone saying that leaving the RPM up and the MP low (resulting in using the engine for braking) during descents is *bad*, and could result in taking the choke out of the cylinders?

I don't know about taking out the choke but it does tend to make the rings chatter and has been implicated in problems with ring land failure.

Happy Skies,

Bob

[ARTICLES/19980828_021136_msg04912.tex]

Power Setting**Tue, 8 Sep 1998 14:32:26**

Good Afternoon Scott Derrick,

In a message dated 9/8/98 12:38:28 PM Central Daylight Time, sderrick@yahoo- eng.com writes:

Of interest to me was the idea of reducing RPM after gear up without reducing MP. I pull back the RPM to 2300 and MP to 23" after climbing through 500+ agl.

A couple of days ago I tried pulling the RPM back first, the MP only rose 1/2" when I reduced RPM, then I pulled the MP back to 23". Doing it the other way around always require pulling the MP back, pulling the RPM back, then readjusting the MP. Thus saving a step.

Is this truly safe??

I don't remember what type engine you have but I would suggest that on any normally aspirated Bonanza, the procedure should be to leave the throttle wide open until you either start a descent for landing or set up cruise at such a low altitude that wide open throttle would result in a manifold pressure above that which you desire to use for cruise.

All of the unsupercharged Continentals used in the various Bonanzas and it's derivatives have rather wide spreads of allowable RPM and MP. Full throttle is an efficient way to get the power out of the engine and there is little reason to reduce from that setting if you are trying to gain altitude rapidly.

The only time I would consider using less than full throttle for climb would be when I desired to gain the absolute maximum range from the fuel on board. I would then establish a low enough power to meet my comfort zone for operating on the lean side of best power and climb at that lean power setting.

Generally speaking, I find that a full throttle climb puts me to altitude so much faster that the small penalty of operating rich for the time required is insignificant to the overall trip efficiency.

There are no unsupercharged Bonanzas that need to have the MP reduced before the RPM is pulled back.

How much the RPM is reduced is a variable depending on which engine you have. In any case, it is best if the RPM reduction is done smoothly and deliberately.

Which engine do you have and in what airframe?

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980908-143226-msg05314.tex]

Power Setting**Fri, 14 Jan 2000 13:23:05**

In a message dated 1/14/00 11:19:39 AM Central Standard Time, jtsmall@onramp.net writes:

When we go LOP then it follows to extract the most power from the burn we should be running a lower rpm? If so, as a practical matter how much lower? 2300, 2200, 2100?

Good Morning John,

I don't have any data available to me that would let me know what the optimum RPM, high or low, would be at any particular mixture and manifold pressure combination.

I would imagine Continental has the information and I am sure that George has developed that data on his new dyno setup.

It would be nice if we all had torquemeters on our airplanes. While Texas Instrument messed around with a torque meter mounted on the engine mount of an R985 a few years ago, I don't know any that have been developed for our class of aircraft.

In a perfect world, we would be able to choose the horsepower we wanted to use for cruise. We would then select an RPM and manifold pressure combination that the book told us was in the ball park considering our altitude and temperature. Next we would adjust the timing as the engine was leaned to assure that the peak power pulse occurred at the optimum time. Too many variables there for me to comfortably handle!

The "one lever controls all" engine control systems that are being developed should be able to juggle all of those factors and give us a reasonable compromise.

Meanwhile, if you wish to utilize lean of peak EGT operation, monitor the EGT for a rise in EGT toward the very lean side. If that occurs, the fire is burning a little too late in the cycle and either advancing the spark or otherwise changing the timing of the peak power pulse would be in order. Since the only control we generally have over the timing while flying is to adjust the rate of burning by varying the mixture or the point of peak combustion by changing the RPM, one of those would be required. I have assumed here that the manifold

pressure available is fixed. If the cylinder pressure can be increased, the fire will burn faster, giving us one more way of adjusting the timing.

I don't have any idea how great a change would be necessary in any particular situation! Sure would be nice to see what is happening on that dynamometer!

If your normal leaning does give you a rise in EGT as you get to the lean side, I would suggest that you check the timing to ascertain that it is right on spec. If the timing is OK and you still get the rise, you could try operating at a lower RPM or a higher manifold pressure, but I don't know if it would help or not. Theoretically, it should.

As an aside, when I was gainfully employed operating the big round engines, we were given maximum RPM limits above which we were not allowed to lean aggressively.

I tend to avoid aggressively leaning the mixture on my IO-550B when operating at low manifold pressures and high RPMs such as above ten or twelve thousand feet. Nothing scientific, just the way I do it!

For What It's Worth!

Happy Skies,

Old Bob

[ARTICLES/20000114.132305_msg00818.tex]

Power Setting**Mon, 17 Jan 2000 18:39:03**

In a message dated 1/17/00 3:09:52 PM Central Standard Time, Dave@VanHorn.com writes:

I'm new at this, but the procedure I've been working with has been to stay WOT from brake release until descent. Initial climbout at full throttle & V_y , then reduce rpm to 2500 or lower and transition to cruise climb, LOP and cowl flaps closed, CHT permitting (which they have been, I don't think I've seen over 350, but it is winter). Check mixture periodically during the climb to stay well LOP, but other than that I pretty much leave it alone. I try to cruise climb at about 500 fpm, which means a fast airspeed down low where I need the cooling and slower at altitude where I don't. Once at altitude I reduce RPM further to 2100-2300 and adjust the mixture again. What I'd really like to do is skip the 2500 RPM for the climb segment and make the initial power reduction all the way back to my cruise RPM & LOP setting, but I haven't been comfortable doing that.

Good Evening Dave,

Sounds to me as if you are currently operating your airplane more aggressively than I am operating mine! It is my very uneducated guess that what you are doing is likely to be OK.

I also like to leave the throttle wide open as long as practical and I do make an RPM reduction soon after takeoff. I normally go to 2550 or 2500 but I would be hesitant to pull it back any further as the RPM reduction has the same effect as advancing the timing and I believe the engine in takeoff condition is firing a little earlier than would be optimum anyway! You mention that you go immediately to a lean of peak climb power. That should have a result equivalent to retarding the spark somewhat and might compensate for the reduced RPM. I just haven't had the guts to try it!

Let us know how things work out.

Happy Skies,

Old Bob

[ARTICLES/20000117_183903_msg00962.tex]

Power Settings

Wed, 27 May 1998 17:20:56

Good Afternoon Bob Layne,

In a message dated 98-05-27 15:34:02 EDT, you write:

I can live with the additional gallon/hr or so of fuel; are there other reasons why it's clearly better to operate at 65% (or less) power settings? In the long run, will it make a difference in engine life?

Well here is one uneducated comment: It always seems to me that the Continental likes to run at high power. The temperatures can be kept up so that the water is boiled out of the oil and the heads stay hot enough to reduce the amount of lead that is precipitated. She works hard and enjoys it. I would think that an engine run that way and flown the factory recommended 40 hours per month should easily make it to normal TBO.

Having said that, I perceive a few difficulties adapting that type operation to the way I like to fly my airplane. I don't like to operate with high RPM and low manifold pressure. I don't have my power charts here with me, but from memory I believe it would take around 2700 RPM to get 75 % power at eight thousand feet and I rarely like to fly below that altitude. At eight thousand feet my MP is usually somewhere between 21 and 22 inches depending on temp, pressure etc. For that low a manifold pressure the engine doesn't seem to like an RPM higher than 2300 and even feels a little better at 2200 and that equates to something under 65 %!

Every engine text I have ever read says that I should try to operate at the highest MP and the lowest RPM allowed for any certain percent of power. I believe 75 % at six thousand feet is around 24 inches at 2450 or so on an average day and that seems to be a nice power setting if you don't mind flying that low. I personally do that every now and then. As you say, it feels good to have it zip along like that.

The problem that I have is the tremendous loss in efficiency that occurs from flying at those speeds. The greatest efficiency will come if you fly the airplane at the best lift over drag speed. It is hard to do that except during climb or descent so most experts recommend using a speed between 105 and 110 % of

best L/D for maximum range and economy. Increasing that speed to 130 or 140 % of best L/D doesn't seem to hurt too much but there is a point where economy and range really suffer.

If I fly my airplane at 6000 feet and 75 % power, the nautical miles per gallon are around 10.5 to 10.7, if I go to a little higher altitude and bring it back to 65 %, I can lean to the lean side of best power and usually even to the lean side of peak EGT. The miles per gallon will rise to 12.7 to 12.9 while the speed only drops about twelve to fourteen knots. If maximum range is desirable, the mpg can be raised as high as 14 at reasonable altitudes and airspeeds.

For me, cost of operation is a factor. When time is the most costly, I will operate at the highest power legal and go as fast as I can, but on most flights, operation at eight to ten thousand feet and 60 to 65 percent power settings save a considerable amount of money and cost me very little in time spent in the air and besides that, I like to fly!

If your trips are all relatively short, you don't have the need for high altitudes and cost is no factor, push it as hard as you want. The engine likes it. Just be sure that the temps and pressure are all kept within limits and there is adequate fuel (or air if you like to operate on the lean side of peak EGT) available for the necessary cooling at the high power settings. Be sure that your instruments are all well calibrated. Even new gauges (including new digital electronic stuff) are often out of calibration and if you are operating toward the edge, you want accurate information.

More than you wanted wasn't it!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980527_172056_msg02861.tex]

RPM During Climb**Wed, 23 Feb 2000 09:51:19**

In a message dated 2/23/00 6:32:30 AM Central Standard Time, Billearls2@aol.com writes:

Jeff,

Interesting comment on the 2300 vs. 2400rpm setting. You are right about the book only listing 2500 and 2300 tables. I guess that I was trying to compromise between going as fast as possible and being gentle with the engine by running 2400. I am going to rethink that unless someone can show me that 2400rpm is o.k. "by the book."

Good Morning Earl,

You are reading way too much into the idea of "By The Book"!

Any RPM within the allowable operating range of the engine is OK as long as it seems smooth to you. There is nothing magic about 2300 or 2500. Those are just convenient points which someone used to present numbers to use while you learn how to operate the engine.

Fact is that you may well be operating at 2250 or 2340 when you think you are at 2300! There is often an error of 50 RPM or more in the mechanical tachometers and it is not consistent day to day.

Set it where it runs well and lean by whatever method you prefer until the engine is performing to your satisfaction and you will be within the approved parameters.

Incidentally, there has been considerable discussion recently concerning the accuracy of the fuel pressure gauges which are calibrated in fuel flow and used on the majority of the fuel injected Bonanzas and derivatives.

Those gauges are often rather inaccurate, but they tend to be consistent. If you will calibrate them occasionally, they seem to maintain a more consistent reading than do the mechanical tachs.

There are a plethora of good, economical and accurate electronic fuel flow gauges and tachometers available on the market and if you are desirous of operating your engine at numbers that are so precise as 2300 or 2400 or 2500, then you should

invest in those electronic instruments.

But if you are going to climb at full throttle and full rich, cruise at low powers and lean till you feel comfortable, lean or rich, that precision is not required and you can do just about anything you want with the levers on the engine. The gauges are almost superfluous.

Along that line, for those of you who are religiously following the rich of peak philosophy that has snuck into engine operation in the last thirty years or so, you can continue to operate the engine with whatever magic method you have been using and still safely install the balanced fuel injectors.

They will save enough fuel to increase your range around eight percent if you don't change any of your engine operating procedures.

I realize that money is no object to the folks on this list, but the balanced injectors will pay for themselves in 400 hours or so even in engines that are operated with the EGT at 150 degrees rich of peak.

Well, I wandered quite a bit away from the subject of operating the engine by the numbers, but the point I am trying to make is that there is no way that the manual for the aircraft can be made thick enough to contain all of the approved and proper operating parameters that are applicable to the operation of the engine!

Secondary point is that the gauges just aren't all that accurate or consistent in readings.

Happy Skies,

Old Bob

[ARTICLES/20000223_095119_msg03410.tex]

RPM for Takeoff**Wed, 26 Jan 2000 18:52:34**

In a message dated 1/26/00 4:57:36 PM Central Standard Time, swo49@hotmail.com writes:

Bob: Do you actually use 2500 for takeoff from the ground? Would you on a 2500' strip? Steve

Good Evening Steve,

No, I use 2700 for takeoff, though one of my neighbors does use 2500 if he is not too heavy. I wait till I am airborne, suck up the gear and when I am satisfied that I will clear all obstacles, I suck up the flaps and bring the RPM down to 2500 or 2550.

Our strip is 2339 feet between displaced thresholds and the thresholds are based on twenty to one slopes from obstacles on both ends. Each end is displaced a hundred and fifty to two hundred feet, so that equates to about a 2500 foot strip from the beginning of the take off roll to crossing the far threshold. At medium weights and average temperatures I will generally have the RPM down to whatever I am going to use some time before crossing the far threshold. That allows me to be as high as possible and operating as quietly as practical when I cross over the homes off the end of the runway.

Happy Skies,

Old Bob

[ARTICLES/20000126_185234_msg01797.tex]

RPM vs. MP**Mon, 6 Sep 1999 09:25:50**

In a message dated 9/6/99 2:39:15 AM Central Daylight Time, requa@ibm.net writes:

In my distant past training on supercharged engines it was important to reduce MAP first as you will overboost the engine if you reduce RPM first. Seems strange that the T-Bone procedures have you reducing RPM first.

Good Morning Once Again Ralph,

Even as long ago as I was trained on the big round supercharged engines, we were taught to the same as you. However, when I got out on the line, some of the old prewar types made the point that the procedure was not really applicable to gear driven superchargers.

They claimed that it was one of those decisions made to "standardize" training during the war so as to get the most number of aircraft over the target with the least amount of teaching.

It was demonstrated to me that on the 1830 powered DC-3, you could bring the RPM back first and the boost would decrease. Were the RPM to be increased without touching the throttle, the manifold pressure would go up. The effect was not always the same, and varied with different power settings even on the same engine model, but it was repeatable using certain specified power settings.

I was told that on the turbo supercharged engines, this was not the case. Reducing the RPM first would increase the exhaust pressure which would then lead to more boost and result in blowing the heads off! I don't know if that is wholly true, but it was given as the reason to train with the procedure that is now standard.

Most of the old-timers would make the first power reduction from T/O to climb power by reducing the MP followed by a reduction of the RPM, but from then on, all of the changes were made RPM first and MP afterward, both when increasing and when decreasing power.

When those fellows went on to the larger airplanes and I started to fly with the WW II trained types, they would go absolutely through the roof if I were to even think about doing

it that way!

When the Twin Bonanza was introduced, I was rather surprised at the recommended operation procedures given, but as I thought back to the advice given by those prewar aviators, it began to make sense and it really worked great on the T-Bone for all of the time I flew them.

One of these days I will pontificate about another reason to use a high drag approach which is associated with this same phenomena. But I gotta get to work now!

Happy Skies,

Old Bob

Happy Skies,

Old Bob

[ARTICLES/19990906_092550_msg07950.tex]

RPM vs. MP**Fri, 9 Feb 2001 13:03:50**

In a message dated 2/9/01 11:12:24 AM Central Standard Time, RSwaffer@1Canada.com writes:

I have a question...all of the instructors I have ever talked to have said Props ahead of engines...i.e. always have the RPMs ahead of the manifold pressure. To do otherwise...I was taught, is hard on the engines and prop shafts. I was told not to put engines ahead of props unless otherwise approved in the POH as a recommended setting...(a la B58 2300rpm 24")

Is this incorrect? _____

Good Morning Richard,

Not incorrect.

It is incomplete.

There is a lot more to engine management than can be explained in a paragraph or two.

During W.W.II, there was an effort to simplify the training as much as possible. Rather than teaching all of the ifs, ands and buts, they tried to come up with procedures that were easy to teach and not likely to be harmful, but were not necessarily the most efficient or the best for the operation to be conducted.

That was were a lot of the Old Wives Tales we are currently saddled with came from.

When the war was over, the majority of the professionals involved with expanding the aviation industry were those pilots who had been trained via those war time training expediences.

Stupid things such as the admonition to never turn into the dead engine permeated the environment.

The most ignominious, such as the prohibition against turning into the dead engine, have been expunged from most training programs, but ones which have little negative effect and are handy to teach to new pilots, such as the RPM first, manifold pressure next are still firmly entrenched.

Once one looks at the situation with open eyes and gains a

little more knowledge of the ways of engine operation, it is obvious that there are many exceptions to the general rule that are a little easier on, and more efficient for, the engine.

Any help?

Happy Skies,

Old Bob

[ARTICLES/20010209_130350_msg03268.tex]

Shock Cooling**Wed, 8 Sep 1999 10:00:16**

In a message dated 9/7/99 11:39:46 PM Central Daylight Time, jtsmall@onramp.net writes:

I'm at 145 and 108 kias. It doesn't take long to get it down to 145 knots (chop power and pull up the nose). With the gear down I'm at 108 soon and down go the flaps. I came in a couple weeks ago at cruise descent of 178 knots and pulled it right down within a few miles of the airport after a descent from 9,000 to 1500 feet, coming down right on the button. The air was smooth of course as it was just prior to sunset.

Good Morning John,

It is fun to see what the machine will do isn't it?

While there is certainly nothing wrong with extending the gear and flaps at the limit speeds, I do believe that there will be less wear and tear on the mechanism if the speed is lowered to the minimum practical before the mechanism is activated. As an example, I normally slow to about 120 before extending the gear and 105 to 110 before hanging out the flaps.

Your comment, "chop the power," is interesting. I find it very hard to do that! For so many years of my life, I have been cautioned to handle the power controls of the engine slowly and deliberately, that I have my gear warning horn set to blow at 17 inches and I rarely reduce the manifold pressure below that amount before extending the gear. The admonition to "keep the engine pulling" was said to help avoid ring chatter and piston land cracking. We have all been warned of the dangers of shock cooling of the heads.

The things that Bob Hoover does with his engine during his routine seem to indicate that my concern for adherence to those "Old Wives Tales" of engine operation are superfluous!

George Braly and others have presented evidence that the shock cooling worry is misplaced, there does not seem to be any evidence of abnormal piston land or ring breakage problems with the Continentals and I don't have any idea why the darn things have started to exhibit so much cylinder wear the last few years. (I do think we would be a little better off if they used a little more oil initially, but that is an opinion not

scientifically grounded.)

As hard as I try, my engine gets pretty cool before landing, which is another reason I don't like touch and goes and I avoid go-arounds as much as possible. By carrying as much drag as practical, I keep my engine as warm as I can in case that go-around is inevitable. The folks who don't do that seem to have just as good engine life as do I so my concerns are likely misplaced!

Even considering all of that, I still recommend slow and deliberate power changes and that an effort be made to keep the engine pulling. I don't think it can hurt and it MAY help.

Happy Skies,

Old Bob

[ARTICLES/19990908_100016_msg08090.tex]

Speed**Thu, 15 Feb 2001 22:46:01**

In a message dated 2/15/01 7:52:43 PM Central Standard Time, flyguy@nobleknights.com writes:

Just brought my V35B back from MSP to CLE. after having the BDS IO550 with Gamis installed was a beautiful VFR all the way.....I cruised at 9500 due to better winds aloft.....I took some crude reading....Full throttle[21.5mp],and 2350....LOP my TAS was 174K and ROP it was 177K.....Both were 25Deg each side with a GEM.....Question? Is this about right?????/ I thought I'd go faster.....John

Good Evening John,

How fast was your Bonanza before?

I also have a V35B with an IO-550, GAMIs and the BDS conversion kit installed.

Now, I know that my airplane is a heavy and slow Bonanza. There are probably plenty around that are at least ten knots faster than mine.

My airplane cruises around 165 to 167 at the power setting that you were using.

174 would be pretty exciting for me!

But I wonder just how close to the same power we are talking about. It would be very helpful if you could tell us the amount of fuel being burned. Provided that you have some sort of accurate device for determining the fuel burn, that is by far the best way to determine the power output of the engine.

If you are operating 25 degrees lean of peak EGT, you can multiply the fuel burn in gallons by 14.9 and come up with a quite accurate number for the horsepower you are developing.

In order to really know how well the airplane is doing, it is important to know the power developed.

It would also help to know the gross weight at the time.

Happy Skies,

Old Bob

[ARTICLES/20010215_224601_msg03963.tex]

Use of the Engine to Slow Down

Thu, 8 Feb 2001 13:16:31

In a message dated 2/8/01 11:41:18 AM Central Standard Time, RSwaffer@1Canada.com writes:

I've see a lot of response to this but there was one thing I haven't seen (or maybe I missed)...if you go FULL FINE on the prop, that will create a lot of drag...instead of, as somebody said, 15" and 2100 RPM...go 15" and FINE (or at least 2500). This is how my instructor first schooled me on how to slow down a Piper Arrow I used to fly frequently...until a guy buried into a mountain in the Adirondacks in a hail storm. —————
————— Richard

Good Morning Richard,

That procedure will undoubtedly slow the airplane down. It MAY not be hard on the engine, however, it MAY cause the rings to chatter and do bad things to the rings, ring lands and other things that are flying around in those little engines on which we rely.

The commonly accepted theory has been that the engine lasts the longest if a balance is made between the RPM and the manifold pressure such that there is always enough pressure on the rings to keep them seated and stable. I know that I have subscribed to a lot of Old Wives Tales over the years which have subsequently been found to either never have had or, at least, not now have application.

That may be the case, but shoving the prop up creates drag because the propellor is being driven by the airflow and is subsequently driving the engine instead of the engine driving the prop.

That drag has to come from somewhere. I think it is detrimental and would not recommend it's use unless it is the only safe way to get slowed in a situation where safety is in question if I don't slow down.

I would never plan on using that technique as an optional way to add drag to the airplane.

While we are on the subject of slowing down, I would be more likely to throw out the gear a speed slightly above the gear

speed than I would to put the flaps out above the limiting speed.

I do think that there is likely to be a speed where partial flaps could be used safely, but I have never researched for, or seen, published data which would encourage me to do so. I know the later airplanes have an approach flap position that has a higher limit for fifteen degrees of flap. I would not be surprised if my flaps are just as strong as those on one of those airplanes. If I really wanted to use that fifteen degrees for drag at 152 knots, I would check the parts book to see if the parts were all the same. That still wouldn't make it legal, but I probably wouldn't be concerned if they were dropped a little early.

For What It's Worth!

Happy Skies,

Old Bob

[ARTICLES/20010208_131631_msg03133.tex]

Winter baffles**Wed, 1 Mar 2000 11:30:22**

In a message dated 3/1/00 9:47:28 AM Central Standard Time, flyinglo@msn.com writes:

Good evening Steve Kolacz, I notice that the 3 highest cylinders seem to be 2, 4, & 6. I wonder if all the baffles are installed correctly on the left side?

Good Morning Jerry,

That is typical of the factory supplied winter baffles when used with the IO-520 in the late model airplane and with factory baffling. I trimmed down a set in an effort to equalize things before I decided to limit the use of the winter baffles to only the most extreme cold conditions.

Happy Skies,

Old Bob

[ARTICLES/20000301_113022_msg03997.tex]

10.3 OPERATE-ESERIES

Hot Starts**Wed, 24 Jan 2001 12:45:26**

In a message dated 1/24/01 11:24:24 AM Central Standard Time, gfrank@d170.s-cook.k12.il.us writes:

I have an older Bonanza with out a boost pump. Hand pump only , & no primer. What procedure works best for hot starts. I thought I had it but lo and behold, I have had trouble getting it started. Other than add a boost pump, what can I do? Can I use the same procedure with my hand pump? With the hand pump dosen't fuel get pumped on the ground once the carb is pressurized? Jerry Frank

Good Morning Jerry,

I am no engine expert, but I have never noted a hot start problem with the PS5C.

The injection carburetor hangs below the engine and even the old engine driven fuel pump is kinda out in the open on the lower left side of the crankcase.

There are no fuel lines to the cylinders for the fuel to boil in whether the proponents of that thought are right or wrong!

I personally like the hand pump better than the electric for starting the E series engine. I think it allows much more precise control of the amount of fuel being injected into the intake air spider above the PS5C. As you note, applying pressure to the PS5C causes fuel to run out onto the ground if the engine is not cranking.

I would be especially careful not to flood it.

Try setting the throttle at a position that would allow about one thousand RPM if it were running. Set the mixture full rich.

Crank the engine. If it fires before you stroke the pump, give it a quick stroke to keep it running. If it doesn't fire after the prop has spun over three or four blades, just gently start pumping the hand pump and it should fire right up, if the engine fuel pump doesn't keep the fuel pressure steady, give it just enough help with the hand pump to keep the fuel pressure needle steady.

That should take care of any problem with the engine driven fuel pump being vapor locked.

It is important that the hand pump be working properly. Likewise, the PS5C must be in good shape as well. Both of those units will continue to operate reasonably well long after they should have been overhauled. If both are in good shape, the PS5C allows very close control of fuel and air delivery to the engine.

Historically, the E series with the PS5C has been the easiest to start of the bunch, regardless of the temperature!

Happy Skies,

Old Bob

[ARTICLES/20010124_124526_msg01651.tex]

Improving Fuel Distribution

Wed, 12 Jan 2000 12:22:04

In a message dated 1/11/00 9:52:36 PM Central Standard Time, Mavitor@aol.com writes:

Mike I have a E-225-8 too, though mines injected. I couldn't get any answers either. There are no GAMI's for the 225, and in your case with the carbureted engine not much you can do to balance the fuel mixture going into individual cylinders. When I get everything LOP I lose about 9 knots and the engine runs rough. So I am going back to the way I did it before EGT's and engine analyzers. Lean till it runs rough and then enriched it until the engine smoothes out. In that mode I have a cylinder that runs at close to 400 degrees F. I open the cowl flaps about an inch and it cools down to about 390.

Good Morning Mike and Al,

I would just like to mention that I have had some luck with improving the distribution in engines equipped with the PS5C. The first straight 35 that I owned had almost perfect distribution. Upon leaning the power would rise, then drop off smoothly till the engine quit. Just like the text books said it should!

I flew other airplanes with the PS5C that did not do as well, so I started to try various procedures to improve the fuel balance to that which I had enjoyed on my first Bonanza.

I was not always successful, but I was doing strictly trial and error. Nothing scientific!

The first thing I would do was check the condition of the injection tubes where the PS5C spits it's fuel into the intake manifold. A little bending sometimes made things worse, but other times helped. I also messed around with smoothing out the intake flow and other times with adding restrictions to create turbulence. One thing that seemed to work on many airplanes was to retard the throttle just till I could see the MP drop a little. Maybe a quarter of an inch or so. That meant that the enrichening jet was out of the picture and the throttle plate was cocked enough to provide a little turbulence. Sometimes that made the distribution worse, but on most

engines, it helped.

I guess what I am saying is that there are things that can be done to improve the distribution on the E series engines if you will just think about it and keep trying!

Happy Skies,

Old Bob

[ARTICLES/20000112-122204_msg00671.tex]

LOP Operation**Sat, 15 Jan 2000 04:09:45**

In a message dated 1/14/00 8:51:49 PM Central Standard Time, paulmil@webtv.net writes:

Does anybody out there have an opinion as to the consequences of running a pressure carb LOP.

Good Morning Paul,

There has been considerable discussion on this web site concerning that very thing recently. Perhaps you could check the archives for more complete information.

The fuel distribution that is obtained with the PS5C Injection Carburetor on the E-series engine varies widely on individual engines. Even different RPM settings will make a difference. When I had airplanes which were PS5C equipped, I operated on the lean side whenever practical. Some of them had almost perfect fuel distribution while others were atrocious.

Try to find my comments of the last few days in the archives.

Happy Skies,

Old Bob

[ARTICLES/20000115_040945_msg00854.tex]

Leaning**Tue, 28 Oct 1997 11:53:18**

Good morning Jerry,

In a message dated 97-10-28 11:16:24 EST, you write:

But at 2050 at 7500ft I'm burning 12 gpm I'm
not an aggressive leaner - My EGT is broke -

Do you still have the electric prop? If so just turn it off.
(put the switch in neutral) Lean for about a 5 mph reduction
in airspeed at 7500 feet with 2050 and full throttle,(no EGT
necessary) you cannot hurt the engine at that power provided
the timing is correct. You can do it with the hydraulic prop
also but it takes a little more perceptive touch.

If the distribution is good on your engine you should easily do
the 8 gph at 10T. I really don't remember what I burned at
7500 as I rarely flew that low. The airplane likes 10 thousand
feet but I would imagine the burn should be 10 GPH and
the true about 170 mph or a little higher if yours is a clean
airplane. The book calls for 180 in the G model with the 225
engine.

That must make a real nice airplane.

Yours,

Bob

[ARTICLES/19971028_115318_msg02240.tex]

Leaning**Mon, 30 Mar 1998 14:30:34**

Good Afternoon Bill,

In a message dated 98-03-30 13:57:55 EST, you write:

Incidentally, if you have that one-hole fuel injector, aka PS5 carb, and a GEM you will notice that closing the throttle a minute amount at cruise will even up your egts. You need not close it even enough to change the manifold pressure more than a tiny fraction of an inch. Can someone explain why this is so? I've noticed it on a couple of E airplanes with GEMs.

I have noted that effect for many years on the PS5C equipped engines and theorized that it was due to one or both of two possibilities.

Throttling back that far takes it out of the enrichment mode and may affect the distribution. The next possibility, and the one I think is more likely, is that when the throttle plate moves just a little, a beneficial turbulence is created that improves the distribution.

What say you?

Old Bob

[ARTICLES/19980330_143034_msg01639.tex]

Leaning**Wed, 27 May 1998 19:19:25**

Good Evening Robert Condon,

In a message dated 98-05-27 18:41:35 EDT, you write:

I just purchased a C35 with an E-185 and pressure carb. I'm not familiar with this technology. My understanding is that I should not have to manually lean the engine in cruise. However, on my first long trip last week I was very surprised that it burned 14.5 gph! The book and previous owner state that I should get 11.5 at 75%. (Electric prop @ 2150). I intend to experiment with leaning etc., but any existing wisdom on this would be appreciated.

This is the PS5C without an AMC unit. The same basic unit was used on the "H" model with an AMC unit and that reduced the necessity to lean but didn't eliminate it entirely.

It is an injection carburetor in that it reads the airflow and then injects the fuel downstream from the venturi thus almost eliminating carburetor ice. (Remember I said almost!)

It is an excellent system but does need to be leaned to operate properly. The three gallon per hour flow back to the left main tank is due to the pump being set up to supply more fuel than the carburetor needs. It is not difficult to figure out and if you are a long ranger with multiple tanks the fuel flow can be used to place a known quantity of fuel in the left tank for a last ditch fuel reserve. I think that subject has been adequately covered here recently.

I have been running tanks dry for over fifty years and have never experienced the rough running after re-establishing fuel flow, however I tend to set up a rather reduced power when I think I am about to run one dry and if I don't catch it on the fuel pressure drop, I throttle back a bit, richen the mixture just a little bit and then gently re-establish the fuel pressure with either a little tickle with the fuel pump or some gentle stroking of the hand pump and then restore normal engine operation after the fuel pressure is stabilized.

Try 8 or 10 thousand feet with full throttle and 2150 or better yet, 2050 RPM, put the prop in the manual position and lean for peak RPM, then put the prop back in automatic (if you have it) and lean for a 5 to 10 mph reduction in airspeed and you will be in good shape. If the engine won't run smooth at that power setting, check the intake pipes for proper fit and leaks and the carburetor injection tubes for cleanliness, lack of blockages and proper alignment. You should be able to lean to around a 15 mph

reduction in airspeed before the engine gets rough if the carburetor and intake system are in good condition.

The 1952 C model with an E185-11 and the Beech electric prop is one of the best Bonanzas ever built. You will love it!

Happy Skies,

Bob Siegfried Ancient Aviator

P.S. If you decide you don't like it, let me know! My oldest son is looking for just such an airplane.

[ARTICLES/19980527_191925_msg02866.tex]

Leaning**Tue, 29 Sep 1998 22:52:30**

In a message dated 9/29/98 9:17:24 PM Central Daylight Time, classicbonanza@juno.com writes:

Some time in the near past, six to eight weeks ago, someone posted a lean of peak test that could be used on an engine that did not have GAMIs installed. I printed the test and thought I had saved it to file. However, I can't find either of them. I have asked George Braly if he posted and that was negative. Would who ever posted the test please repost or send to me direct.

Good Evening Dwaine Moore,

I don't know whether this could be considered a test or not, but it is the method I used to use when operating E series engines to decide whether or not to operate on the lean side of peak power, not peak EGT. It used the only direct power indicating gauge we almost always had on the airplane, the airspeed indicator. If one is/was fortunate enough to have the electric prop instead of a hydraulic one, the tach also could be used in determining power output. The drill is to start leaning the engine until peak RPM (with the prop in manual) or peak airspeed is obtained then continue leaning until the airspeed or RPM drops off. The procedure is continued till the engine becomes rough or quits all together.

If the airspeed will drop 12 to 15 mph before roughness occurs, the distribution is pretty decent. If it drops twenty or more mph and then all of the cylinders drop out at almost the same time, the mixture is almost perfect at that particular combination of manifold pressure, throttle plate position, RPM and horsepower.

I figured that if I could get at least a fifteen mph drop before roughness, I could comfortably operate at a five to ten mph drop in airspeed. Nothing scientific and the most technical I ever got was to compare the resultant airspeeds to the performance chart in an effort to determine about what percentage of power I was losing by operating on the lean side. Once again, there was little scientific background to my efforts but I set a limit of 2050 as the highest RPM that I would use when operating on the lean side of best power.

Don't know if that helps or not!

I have Gamis now!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980929.225230_msg05715.tex]

Leaning**Wed, 30 Sep 1998 17:17:37**

Good Afternoon Dwaine,

In a message dated 9/30/98 2:27:21 PM Central Daylight Time, classicbonanza@juno.com writes:

to operate on the lean side of peak power, not peak EGT.

Would you explain the "not peak EGT"?

I guess that is a poor choice of words. You undoubtedly will be lean of peak EGT by the time you get down ten or fifteen mph lean of best power. We just didn't have EGT gauges in those days so my reference was always to peak power. Peak EGT seems to occur about 50 degrees C lean of best power or at a drop in speed of around 2 or 3 mph on my current engine. Not sure how that would compare to an E model as I never owned or flew one with an EGT.

Happy Skies,

Bob

[ARTICLES/19980930_171737_msg05720.tex]

Leaning**Tue, 7 Sep 1999 08:42:34**

In a message dated 9/7/99 2:39:27 AM Central Daylight Time, requa@ibm.net writes:

— Original Message — From: Marc Cook marccook@earthlink.net

Now, a caveat. On my 470, I can't always run LOP with the throttle wide open. But I can almost always do so with the throttle very slightly closed. Either I've got an induction leak or there's some quirk of the 470 installation that needs a bit of differential across the throttle body or whole induction system.

I've found this to be true on my IO470c also.

Cheers, Ralph

Good Morning Ralph, Marc and All,

I don't have an answer, but would like to comment.

Back when I was regularly flying the "E" series engines equipped with the PS5C Pressure Carburetor, I found that on a few airplanes, lean operation was not comfortable. On some of those airplanes, I noted that reducing the throttle until I could observe a quarter to a half inch of reduction in manifold pressure would allow the engine to be operated substantially on the lean side of best power. No EGT gauges were available back then. This took the carburetor out of the fuel enrichment zone and that might have been the answer, but many of my cohorts and I thought that the extra turbulence created by the partially cocked throttle plate might have been contributing to more equal fuel distribution and smoothing things up somewhat.

There was a tremendous difference between identically equipped and operated engines in their ability to be operated on the lean side and with some of them, we were able to make it work, on others, we were not.

Inducing turbulence into the induction system to improve distribution was a hot item in automotive circles at the time and we were likely influenced by that thought.

I can see how swirling a mixture that contains the fuel might improve the distribution, but didn't think it would work with fuel injection. However, who knows!

For what it's worth!

Happy Skies,

Old Bob

[ARTICLES/19990907_084234.msg08007.tex]

Leaning/Preheat**Wed, 29 Oct 1997 10:24:21**

Hi Jerry,

In a message dated 97-10-29 01:05:22 EST, you write:

Pre heating I think also the Light might be ok if I put one on the external tank and one on the bottom of the motor. What do you think?

The Tanis or competitive fixed engine heaters seem to be very helpful in preheating. There are some problems with excessive localized heating and it adds a lot of wires and things to get in the way during maintenance. I personally don't like the heaters in the CHT probe holes as I want those for their originally designed purpose and I wonder about how effective the heaters are there. The new band style cylinder barrel heaters might be the answer for people who want the Tanis or other fixed heaters. There is more to that system than meets the eye.

In the days when I flew "E" powered airplanes, those fixed heaters where not available and I couldn't have afforded them anyway.

I used light bulbs and lots of big thick old blankets. Worked just fine! I always placed one near the oil tank, one under the crankcase (not withstanding the Ford Tri-Motor, we old fuddy duddys have engines in our airplanes, not motors) and one under the battery. I was a little concerned about overheating in localized areas and feel that it is necessary to experiment carefully with the size of the bulbs used and their placement to avoid that problem.

I occasionally carried the equipment with me so as to be able to use preheat while away from home.

Placing the bulbs and hooking things up is a lot more time consuming than using the Tanis style system but you don't have to do it all of the time.

Adequate covers for the engine are imperative for either system and if you have to be outside, it can be tough to get things sealed up against the wind. Nothing is easy is it?

I could afford the Tanis system now but have elected not to install one at this time.

My airplane lives in a nice heated hangar and rarely flies to places where preheating would be required. In the last ten years I have had to rent space in heated hangars a couple of times and have paid as high as \$45 per night for the privilege. So far it has worked OK for me but everyones situation is different. Freezing rain, ice and snow avoidance has been part of the decision to put the airplane in a hangar anyway and the additional cost for being in a heated one has generally been not too great.

Now for your more controversial comment!

I try to use the tach - when I see a drop then 3 turns RICH. I think thats

what the book says too.

The only reference about leaning I find in my 1947 Bonanza handbook is on page 50 under the CRUISE heading.

"For high altitude operation the mixture control should be used. This will not change the rpm on the tachometer, but a saving in fuel will result."

In the the 1956 "G" model handbook the section has been expanded somewhat.

"At altitudes above 5,000 feet, you may find leaning the mixture slightly will improve performance, in addition to decreasing fuel consumption, by keeping the fuel/air ratio nearer the optimum point. Leaning should be done cautiously, with a vigilant eye on the cylinder head temperature and tachometer, since overleaning can produce detonation, excessive temperatures and possible engine damage."

I think what they are saying is it is up to you to determine how best to operate your engine. Yes, we did have lawyers around even in those ancient days!

Jerry, I would strongly suggest that you read the comments by George Braly on the ABS HANGAR FLYING page. I am not very good with computers, but try <http://www.bonanza.org/cwchat/> follow the instructions and go to Hangar Flying Topic # 3 – Engines etc., then go to discussion topic #1 – Which is better etc., you will find a good discussion on the newer engines. The principles are the same for the E225 and lean operation has been around at least since Lindberghs day.

I ran my "E" series engines that way for years. The recommended overhaul time was 600 hours then and I ran the first one to 1200 before I finally became afraid and pulled it down for overhaul. It was in exceptional condition and was overhauled without even boring the cylinders!

Were I cruising your airplane at 4500 feet I would probably use 22" MP and 1900 RPM, put the prop in manual and lean for a 50 RPM drop on the tach or a 3 or 4 mph drop in airspeed. That should give you 155 to 160 mph on around 9 gph. Still not bad and very easy on the engine. High altitude is better though and the airplane really likes 10,000 feet. Incidentally I think the Beech electric prop with metal blades is the best one available for cruise performance on your airplane.

The PS5C injection carb generally has excellent distribution

and operates smoothly on the lean side of best power. Ya
gotta lean it!!

Yours,

Bob Siegfried

Ancient Aviator

[ARTICLES/19971029_102421_msg02244.tex]

Max Power**Mon, 23 Apr 2001 00:46:44**

Good Evening Thomas,

I believe I commented on the subjects you address in this message previously.

Maybe I do not understand how you are operating your engine, but I want emphasize that with the engine and propellor that you have installed in D-1473, there is NEVER any time that any RPM above 2300 is approved. Even 2300 is only approved for one minute during the takeoff maneuver.

ALL other operations MUST be conducted at 2050 RPM or less.

In addition, full throttle is NOT allowed on that aircraft and engine combination unless the aircraft is at a density altitude such that full throttle will not provide more than 26.5 inches while turning 2300 RPM or 27.5 inches while the engine is turning 2050 RPM.

The engine and propellor combination that you have is legal to use the full 225 horsepower if it is mounted in serial number D-1501 or later, but is restricted to a maximum of 185 horsepower for takeoff and 165 horsepower at all other times when mounted in a straight 35 unless that airplane has been rebuilt by Beech and designated as a 35R aircraft.

I am not stating that using more power is or is not safe, but that it is NOT approved by the certification status of the airplane.

If you elect to disregard the operating limitations of the aircraft and an incident occurs, your position would be difficult to defend.

Fly it legally and enjoy the airplane for what it is!!

Happy Skies,

Old Bob

In a message dated 4/18/01 4:47:07 AM Central Daylight Time, thomas.jankowski@profi-vision.com writes:

My plane is 1948 "strait" Bonanza S/N D-1497 with Beech 215-207-88 propeller and E-225-8. Unfortunately the previous owner and people who

were flying the A/C before confused me in the way how to operate her.

I have already got lot of help and comments but some things are still missing.

Engine operation: on the start-run i was having 2650 RPM (till now). Then i was told to reduce to 2300 RPM for normal climb. In cruise I have found that 2100 RPM is making less noise than 1950 or 2050 RPM. I keep MP at 19-20" to stay below 124 KIAS. —etc.—

[ARTICLES/20010423-004644_msg08072.tex]

Power Off Mixture Position**Fri, 13 Nov 1998 09:58:26**

In a message dated 11/13/98 8:29:58 AM Central Standard Time, RSBELOVICH@aol.com writes:

After shutting the engine off, immediately push the mixture control to full rich.

Good Morning Bob,

That is always good advice for the PS5C Pressure Injection Carburetor. It takes the stress off the diaphragms and unseats the needles. Makes it last longer and work better. That must be balanced against the possibility of a mag switch being left on or a primary lead wire being broken which could lead to a hot mag. In that event having the mixture in idle cutoff could prevent an unintended start if the prop were moved.

Nothing is easy is it!

Happy Skies,

Old Bob

PS I really don't see why it should affect the cold start unless the needle stuck when the unit cooled down or something. In any case, I always parked my PS5Cs with the mixture rich or close to it.

[ARTICLES/19981113_095826_msg06898.tex]

Power Settings/Weight**Wed, 14 Mar 2001 11:29:42**

In a message dated 3/14/01 9:04:41 AM Central Standard Time, thomas.jankowski@profi-vision.com writes:

a) I am missing the cruise power settings for the engine E225-8 on strait 35 Bonanza. b) The Wt and Bal is strange. The empty weight is 1923 lbs, the Maximum Take-off Weight 2550 lbs (not much left :- () Plane has Baron gear and 20 Gal Aux-tank) c) One landing mag-flap is corroded, I have new F33A landing flaps. will they fit or are there some restrictions. (temporarily BE36 flap is installed)

Thanks in advance. Longer I fly the plane, more questions will come.

Thomas, 35 Bonanza D-1497

thomas.jankowski@profi-vision.com

Good Morning Thomas,

Congratulations on your purchase of a fine and good performing flying machine.

Question a.) The power settings to be used for the E-225-8 engine when installed in the straight 35 airframe are the same as the ones used for the E-185-1, E185/205-8 or the E-205-11 except the manifold pressure is to be limited to no more than 26.5 inches for one minute at 2300 RPM. After the RPM is reduced to 2050 RPM, you may use 27.5 inches. Even though the more powerful engine is installed in the 35 airframe, the only power that is allowed is the same power as the original engine.

The maximum RPM allowed is 2300 during takeoff for no more than one minute. After that, the RPM is to be reduced to 2050 maximum for all other operations.

You may want to get the Type Certificate Data Sheets that apply to your airplane. All of the limitations are published there.

b.) The weight of the airplane was designed to be 1550 empty. I have only seen one airplane that was that light. It was unpainted, stripped of all equipment other than lights, a turn

and bank and a simple communications radio. It is rare to see one with an empty weight below 1700 pounds, but it can be done. The 2550 is the correct max gross for that airplane. I had one once upon a time that weighed 1590 empty, but I had made a massive effort to get it that light.

c.) The new flaps will fit and I THINK they are legal. They do have to be installed as pairs. The left and right have to be the made of the same material.

Why don't you call the ABS office and ask Frank? He will know for sure.

Happy Skies,

Old Bob AKA Bob Siegfried Ancient Aviator

[ARTICLES/20010314_112942_msg05876.tex]

Preheat/Primer**Fri, 13 Nov 1998 13:13:03**

Good Morning Bruce,

Good explanation of the proper procedure!

In a message dated 11/13/98 10:54:37 AM Central Standard Time, VTAIL1@prodigy.net writes:

I also have an electric boost pump, but have been told and find in practice, that the wobble pump does a better job for starting purposes. Why that is I'm not certain.

I have noted the same results and am of the impression (not scientifically validated) that the wobble pump comes up with a slightly higher pressure and pumps in more fuel when used aggressively. That is why operator technique is so important! If you will note, when you give the pump a good solid stroke, the engine will stumble more than it will if you turn the pump on and off for a similar length of time.

One comment on preheat. I have used small propane heaters (the ones designed for heating a tent that have no open flame) in the cowl area as well as small electric ones. The important thing is that the heat be supplied over a long period of time. Twelve hours if the engine is cold soaked or from some time not long after the engine is shut down if it is to be parked for less than twelve hours. It is important that an insulated blanket of some sort be provided. I have used everything from a horse blanket to a fitted engine cover. Everything works, but the custom manufactured cover was the lightest in weight and did an excellent job.

Happy Skies,

Old Bob

[ARTICLES/19981113_131303_msg06915.tex]

Straight 35 Max Power**Tue, 8 Sep 1998 20:43:03**

Good Evening Scott,

In a message dated 9/8/98 5:41:14 PM Central Daylight Time, sderrick@yahoo-eng.com writes:

Sorry Straight 35 (1948) E225-8 Pressure carburetor. Hartzell Hyd. Prop.

I suppose you are aware that the E225-8 when mounted in a straight 35 is normally restricted to 185 horsepower for take off and 165 METO.

I certainly don't pretend to say what is safe or practical but unless you have some sort of STC that I have never heard of, to be legal you should be using 2300 RPM for takeoff with a maximum of 26.5 inches of manifold pressure. That power is OK for one minute and then a reduction to 2050 RPM utilizing a maximum of 27.5 inches of manifold pressure is required. I think operating the engine in that manner is actually hard on the engine but that is what the type sheets call for.

When the engine is installed in an A35 or later, it is good for 2650 for one minute and 2300 thereafter at full throttle provided that certain fuel pumps and such are installed and a propeller is fitted that is approved for that power.

I know that most model 35s are flown at higher power and I am not aware of any specific problems that have occurred provided all of the other limits are adhered to.

I keep hoping that someone will show up with an STC authorizing the higher power but thus far when I have examined the paper work of folks who said they had such an STC, I was shown a copy of the approval showing that the Hartzell propeller is approved for 2650 RPM and 29.6 inches when installed on the E-225. I have yet to see any data supporting operating the engine at any power higher than 185 for T/O and 165 METO.

I hope that you do have such an STC and will share that data with the rest of us.

Happy Skies.

Bob

[ARTICLES/19980908_204303_msg05328.tex]

Straight 35 Maximum Power**Sun, 20 Dec 1998 16:24:40**

In a message dated 12/20/98 2:37:41 PM Central Standard Time, classicbonanza@juno.com writes:

If you want to take off at 2,300 rpm, I don't see any danger, as the earlier Bonanzas do it all the time.

True. However that was normally with the electric 88" prop and lighter airframes. With the 84" one should consider that you lose a LOT of horsepower by limiting rpm to 2300 and have more weight to lift off the ground if at gross in the C D E F G.

Dwaine

Very true. Incidentally I erred in the max MP allowed for the E225 when installed in a straight 35. It is, as stated, 26.5 for takeoff for one minute at 2300 RPM but 27.5 is allowed continuously at 2050 RPM.

As stated earlier, there are numerous other restrictions on the installation listed in the aircraft specs and it would be a good idea to look them over carefully to see exactly what is legal on the specific airframe, engine and propeller combination that is installed on any individual airplane.

Happy Skies,

Bob

[ARTICLES/19981220_162440_msg07727.tex]

10.4 OPERATE-FUEL

Boost Pump Use**Tue, 26 Jan 1999 19:42:30**

Good Evening John Small,

In a message dated 1/26/99 4:37:07 PM Central Standard Time, jtsmall@onramp.net writes:

So, why would it be on and requiring a check at launch? If it were on, what problems would it create?

I don't know why it might be on, but with the pump on, the mixture would be much richer than required and possibly so rich that there would be a reduction in power developed. It would probably be running terribly rough and might even foul the plugs. Best that it would be off. However! If your airplane has the two speed pump, there are times (usually at high temperatures and/or high altitudes) when low boost can be helpful to stabilize the fuel flow. If the boost makes the engine too rich, it can be leaned for smoothness. Just be sure that the engine is being properly cooled whether it is being cooled with air (as George described) or with fuel. Stay out of the "peak to 100 degrees above peak" operating range, especially for takeoff.

The fuel injection system used by Continental on the Bonanza series engine is a very simple device but it does require some study and thought to fully utilize its benefits.

Happy Skies

Old Bob

[ARTICLES/19990126_194230_msg01215.tex]

Desired Fuel Level**Thu, 24 Jul 1997 15:38:46**

RE: The ride with tip tanks

Once again this is very subjective , but I think the ride is the best with tip tanks full.

I usually leave mine full as long as possible. The structural integrity of the aircraft is improved with the tanks full so if you are going to penetrate turbulence there is a definite advantage to having the tanks full.

There is one problem. If you have a set using transfer pumps the pump may fail and the fuel would be unusable. The ones using direct to engine feed will occasionally end up with a vapor lock and it is recommended that you ascertain proper flow before T/O. In any case, I try to transfer or use the fuel while I still have enough fuel in the mains to get to a safe landing place.

I will quite commonly fuel the mains to fifty gallons (twenty five per side is when the fuel is visible on the bottom of the tank directly below the filler neck of the forty gallon tanks) and then fill the tips, That will give me the maximum gross weight of 3550 (my D'Shannon approval needs the weight above 3400 to be in the tips) and I end up with more allowable payload.

I like the tip tanks!

Bob

[ARTICLES/19970724_153846_msg01359.tex]

Fuel Boarding Requirement**Fri, 21 Apr 2000 12:30:54**

In a message dated 4/21/00 10:15:23 AM Central Daylight Time, jtsmall@onramp.net writes:

do you have a std amount you always carry then another number for significant trips depending on distance and weather, etc?

Good Morning John,

No, I don't have a standard figure. I suppose thirty-eight years with United figuring the fuel load based on the operating conditions so as to provide the optimum efficiency consistent with safety has instilled the practice so thoroughly into my being that I find it difficult to do otherwise!

On my airplane, the FAA has stupidly declared that I must have a minimum of 13 gallons in each tank prior to takeoff. Before that ridiculous rule was promulgated my position was that, for a normal takeoff, I wanted at least ten gallons in the tank on which I was operating the engine.

It was very rare that such an operation was done because I didn't always have that great a confidence in the amount of fuel onboard. It took some rather unusual conditions to make me comfortable with that amount.

Now that I have a fairly reliable digital fuel flow meter to aid in determination of the fuel remaining along with fuel gauges that read consistent with the burns calculated by the electronic fuel flow, I often depart with just a little more than the minimum required 26 gallons on board. That is two hours of fuel at my most common consumption.

Since I have no way of determining visually when there is thirteen gallons in each tank, I don't use that low a fuel for takeoff unless the flight is one in which I have flown the airplane the same day or at least recently enough to have confidence that the minimum required fuel really is on board.

If I thought I had 13 gallons in each tank, but was not sure and still wanted to be as light as possible for the takeoff, I would add ten gallons to the tank being used and launch!

If it has been a few days, or if I am fueling the airplane to just be ready for whatever comes up, I will generally fill it to

twenty-five gallons on each side. That amount can be determined by looking in the tank. When fuel is visible directly below the fill port, it contains twenty-five gallons. Fill to the bottom of the tab and we have thirty and up to the slot in the tab, thirty-five.

If I have need for a maximum payload trip, I will try to arrange to be at the departure point with thirteen gallons in each main and twenty-five gallons in the tips, twelve and a half in each. That configuration allows me the greatest amount of payload legally possible along with fuel enough for close to five-hundred miles with almost an hour of reserve fuel. One thousand and eight pounds in the cabin and three hundred and six pounds of fuel. If I utilize the one hundred pound increase in gross which BDS has approved for the 550 installation, the figures change a little. The fuel required in the tips reduces by one hundred pounds and the cabin load goes up to 1108 with a commensurate reduction in range. I don't generally use that configuration as I am not all that confident of my interpretation of the application of the one hundred pound increase combined with the tip tank approval. I have received different opinions from different folks and I don't want to press the issue at this time.

It is very difficult to load a thousand pounds or more in the cabin on my airplane and still be within the CG.

For what it's worth, that's the way I like to do it.

The main thing is to do that with which you are comfortable.

Happy Skies,

Old Bob

[ARTICLES/20000421_123054_msg06858.tex]

Fuel Boarding Requirements**Fri, 21 Apr 2000 13:38:24**

In a message dated 4/21/00 12:08:22 PM Central Daylight Time, epoole@scoot.netis.com writes:

I'm pretty sure that if you have 13 gallons in the tank being used for takeoff, you can have whatever you want in the others.

Good Afternoon Eric,

The required fuel must be in each main. That is what is so ridiculous. If it were only in the tank that was being used, it would make sense.

The auxiliary tanks and the tip tanks have no such restriction.

When Beech built your airplane, the unusable fuel was listed as one half gallon per tank. There was no requirement for a minimum fuel for takeoff. After some unthinking pilots made turning type takeoffs with low fuel quantities without considering which tank they were feeding from, the FAA issued AD 72-11-02 which, among other things, required that yellow marks be placed on the fuel gauges and a placard be placed near the fuel selector delineating the appropriate minimum fuel for takeoff. If you have the forty gallon tanks, the placard should tell you to have at least 13 gallons in each main tank for takeoff. For those airplanes with the twenty gallon tanks installed, I believe the required amount is seven gallons in each tank.

Happy Skies,

Old Bob

[ARTICLES/20000421_133824_msg06866.tex]

Fuel Boarding Requirements**Mon, 24 Apr 2000 09:19:56**

In a message dated 4/24/00 7:27:00 AM Central Daylight Time, ajlspero@home.com writes:

Does anyone know the rationale for the FAA rule that you must have at least 13 gallons in each tank for takeoff?

Good Morning Alan,

The rationale for the thirteen gallons is that if one is making a fast turning style of takeoff while feeding the engine from the tank on the outside of the turn, there is less chance of the fuel outlet being unported with thirteen gallons than with say, five gallons. The rationale for needing that amount of fuel in both tanks rather than in just the one used for takeoff is that the same folks within the FAA who feel that we aviators are so stupid as to make those turning style of takeoffs are also too stupid to know which tank has fuel in it.

I know that is a flippant answer and for that I apologize, but I really feel the answer is that simple and that stupid.

There are many fine conscientious folks within the FAA. Most of them are aviation enthusiasts who work very hard to make aviation practical and safe, but the FAA suffers from the same difficulties as most professional groups. We tend to not criticize our colleagues in public. The FAA folks are very protective of their own.

Once one of the idiots in the group starts pushing for something stupid, few of the others will stand in his/her way unless the results of that effort are horrendous. Something like the requirement for fuel in each main tank is rather innocuous, it doesn't interfere with the operation of the airplane very often, so the rule is shoved through with little opposition.

Sorry for the tirade, but that is the way I saw it when the AD was issued!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/20000424_091956_msg06965.tex]

Fuel Flow with Low power and Full Flaps**Thu, 4 Feb 1999 16:44:03**

Good Afternoon All,

I just went out and tried a few configurations and speeds to prepare for some flight testing of the full flaps and idle or low power configuration.

At around 2900 pounds, gear down, full flaps and sufficient power to maintain a stabilized 80 knots at 500 fpm descent, the aircraft attitude was very close to level. I am sure that there would be no unporting problem with that configuration.

With the throttle closed, full flaps and gear down the rate of descent at 80 knots was around 1700 FPM. When I slowed to 70 knots, the descent slowed to 1200 FPM.

At 80 knots the nose was about 7 or 8 degrees below the horizon while at 70 it was less than 5 degrees below. I don't think the tank would unport with low fuel at the 5 degree down attitude but it might be close at 7 or 8 degrees.

It appears that if the airplane is flown at a speed appropriate for the flaps that are set, there is very little possibility of the tank unporting until all of the fuel is gone. If the speed is substantially higher as one is diving for the runway I guess it might happen, but if you are diving for the runway at high speed do you really care if the tank unports?

In any case I will try to make a flight test to determine the accuracy of that theory. Like the man said: One experiment is worth a thousand theories!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990204_164403_msg01937.tex]

Fuel Management**Mon, 5 Jul 1999 09:39:52**

In a message dated 7/4/99 11:02:28 PM Central Daylight Time, lance40@earthlink.net writes:

If your Primary Gauges are 1/4 tank or less put it on the ground ASAP. If the are inaccurate fix them.

Good Morning Lance N. Terrill,

We have thoroughly beaten this discussion around cyberspace within the last few months but I can't resist some comment.

I cannot disagree with the comment concerning repairing the aircraft's equipment if it is not working to the limits required for certification. However it is my understanding that the fuel gauges only need to be accurate when they are indicating empty! I haven't reviewed the wording in the FARs and maybe someone else would like to take the time to do so.

As to the statement "If your Primary Gauges are 1/4 tank or less put it on the ground ASAP." I do have some reservation.

This implies that one would never want to fly without at least two adequate sources of fuel available for their airplane. Do I read this right? Do you really feel that one should not fly an airplane equipped with only one source of fuel?

I personally prefer to have all of my fuel in one tank when I am flying a flight segment that brings me to my destination with the minimum fuel with which I have planned to arrive. I run all of my other tanks dry to assure that I know as closely as practical the flight duration that is remaining.

The desired flight duration remaining at landing is a function of all of the factors affecting the flight among which are the weather at my destination, the reliability of my aircraft fuel system, the available alternate landing sites near my destination and 'most everything else that has an effect on the individual flight.

If one were to presume that you mean you are flying at straight model 35 equipped with an E-225 which you like to operate at 75 percent power, 1/4 tank equates to 23 minutes of fuel in each tank or a total of 46 for the pair together (12.6 GPH at 75%, 1/4 of a twenty gallon tank). While I might on occasion

plan to arrive in very good conditions with only 46 minutes of fuel on board, I would prefer that it all be in one tank.

If you are one of those who believe the lawyer inspired restriction concerning the possibility that there might be only 17 gallons usable in those early tanks rather than the designed usable fuel, 1/4 tank would mean that you are down to 9.5 minutes of fuel per tank. I think that would be considered a little skinny even by the Top Gun Jet Jockeys!

As to landing my airplane with 1/4 tank indicated in each "Primary Gauge" equipped tank ASAP, that would mean I would be looking for a place to get on the ground when I still had one hour and forty minutes of fuel on board at my normal cruising power. Even if I only consider the one tank as being available, that still means I would be landing with more fuel in each tank than the FAA considers pertinent for planning purposes on an IFR flight!

My old J-3 Cub held twelve gallons of fuel, at 4.5 GPH, 1/4 tank would be 40 minutes of fuel available. Under that condition I would likely be looking for a landing site ASAP.

One of the airplanes I flew for a living had four hours of fuel on board when the "Primary Gauges" showed 1/4 tank.

I think we need to make our decisions based on a LOT more information than just the reading of 1/4 tank on the Primary Gauges.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990705_093952_msg05709.tex]

Fuel Reserve**Wed, 3 Feb 1999 01:47:42**

Good Morning Ralph,

In a message dated 2/3/99 12:23:25 AM Central Standard Time, requa@ibm.net writes:

He made the comment that the objective is to not land with 45 minutes of fuel spread out in 6 tanks.

How true!

If I am down to 10 gallons or less for landing, I definitely want it all in one tank and I will try to plan to have it in a tank appropriate for the landing conditions that I think will exist.

If there is no crosswind to consider, I like to have my last fuel in the left tank. Probably not much difference between the two though the routing from the right tank is slightly longer than the path from the left.

Happy Skies,

Old Bob

[ARTICLES/19990203-014742_msg01789.tex]

Fuel Tank Unporting**Sat, 29 Apr 2000 09:58:48**

In a message dated 4/29/00 8:31:15 AM Central Daylight Time, ajlspero@home.com writes:

Well, I (a new V35 owner of 1 month) avoid turning takeoffs. However, this makes me wonder if it is possible to unport the fuel after departure, while turning crosswind. Can this happen?

Alan

Good Morning Alan,

As long as you are in coordinated positive G flight, that is, with the ball in the middle, you can do loops, Barrel rolls and Cuban eights and the tank will still feed. The combination of centrifugal force and gravity work to our advantage. The only time you have to worry about unporting the tank is when your flight is slipping, skidding or in a very rare, extremely nose low, yet stable, attitude.

Happy Skies,

Old Bob

[ARTICLES/20000429_095848_msg07295.tex]

Fuel Unporting**Tue, 2 Feb 1999 14:37:48**

Good Afternoon Paul Whitesell,

In a message dated 2/2/99 11:00:00 AM Central Standard Time, commreps@airmail.net writes:

I agree with Bob but would like to add one note to his comments. The fuel pickup is in the rear corner of the tank. When the flaps are lowered it produces a marked pitch down attitude. When the tank is below the usable fuel limit and the aircraft is configured for landing the fuel can run forward and the tank may unport. Higher approaches and slips can make the situation worse.

Good point Paul, I haven't done any flight tests in that configuration. The next time I want to run a tank dry I will give it a try!

I THINK that on a normal 3 degree glide slope with full flaps and power to allow stabilized flight around eighty knots, the tank would not unport till it was down to the 1/2 gallon point or less. If I were ever down to less than 3 gallons and I had a choice, I would probably go for a full power off approach.

My "off the top" feeling is that even with full flaps, the fuel port will not uncover unless the speed is well above the appropriate speed for the flaps that are used and the power is at idle or nearly so. I will probably try it at best L/D speed for full flaps plus maybe ten knots and idle power.

My major question is: How am I going to get in that configuration with reasonable knowledge that I have only a pint or two of fuel on board when I establish the desired configuration? The easiest way would be to run the tank dry in normal flight and then, after landing, add a pint of fuel to the tank, takeoff, setup the test and switch to the tank to be checked.

Let's say I'm burning 3 GPH at idle, it would take two minutes and thirty seconds to burn one pint of fuel. If the descent were around 800 feet per minute that would mean a loss of 2000 feet while burning the pint. At 1200 fpm descent, the loss would be 3000 feet. I guess I will have to make some preliminary tests to establish the best setup. But the biggest problem is: Since the rules were changed to require that stupid minimum fuel in BOTH tanks, I would be illegal if I took off with only

a pint in the tank to be tested!

Nothing is easy is it?

And a little more—————

From John Small:

I'm been working up the courage to do this at altitude so I'd know for sure about my tanks. Are there precautions to be taken?

I generally run my tanks dry at relatively low power, somewhere around 20 inches and 2000 RPM. I do this so that if I don't catch it when the fuel pressure flickers, I will be less likely to get an overspeed on the restart. It is easier to see the fuel pressure flicker at higher powers and that is when I normally switch, when the fuel pressure flickers. There was a major and prolonged discussion on the forum about running tanks dry a few months ago.

I did a fair amount of testing some forty years ago associated with a planned long range flight (that never came off), and found that the one half gallon figure was very conservative.

From a mechanic who's changed several Bonanza tanks (the one I spoke about in another message today), he's found that the 40 gal/37 useable tanks ALWAYS have 40 gal useable. So I'm really starting to wonder where that 37 useable came from. Is it for real or a legalism?

I have NEVER put less fuel in the tank than the full amount that the tank was built to hold other than in the case of the unbuttoned tank to which I referred this morning.

That is 20 gallons for the early airplanes, 25 for those few that were so equipped, 10 per aux when they are installed and 40 for the long tanks. The same results have been obtained with both Safe Flight Extender/BDS and Brittain/Osborne tip tanks

I don't remember when the 3 gallon unusable figure was added, but I seem to remember that the S35s still listed just 1/2 gal as unusable when they were new. I am sure someone will correct me if I am wrong.

I think it is strictly a "lawyer" input IF the airplane is properly flown and consideration of the potential for unporting the intake is considered by the pilot.

I have the forty gallon mains and 15 gallon BDS tips. I count on the full 110 gallons for all of my flight planning and if conditions are good at my

destination with plenty of alternate landing sites, I will plan for an arrival with as little as seven gallons reserve.

That is 45 minutes of fuel at economy cruise at the weight consistent with that amount of fuel on board. The fuel would all be in my left main tank unless I knew that I was going to encounter a strong left crosswind for landing and then I would have it all in the right main.

Works for me!

Happy Skies,

Old Bob

[ARTICLES/19990202_143748_msg01731.tex]

Full Boarding Requirement**Fri, 21 Apr 2000 11:34:31**

In a message dated 4/21/00 10:16:53 AM Central Daylight Time, epoole@scoot.netis.com writes:

Anyway, topping off all tanks (if load allows) at the start of the mission often allows me to comfortably complete the mission (here to there to there and back to here again) without having to spend time or money refueling at some other airport whose avgas might be 40c more expensive than the gas at my home base.

Good Morning Eric,

That is the point, you have filled your tanks to provide benefit that you perceive, not just because the tanks are there.

All of the points you use for the amount of fuel you carry are considerations that would lead me to carry full fuel as well. But there are many other trips where payload is high and the required range is short. Sometimes the available takeoff conditions do not favor a maximum gross takeoff. All are conditions that should be considered in determining the amount of fuel to be boarded.

Happy Skies,

Old Bob

[ARTICLES/20000421_113431_msg06846.tex]

High Fuel Flow**Thu, 28 May 1998 00:00:32**

Good Evening Robert Condon,

In a message dated 98-05-27 18:41:35 EDT, you write:

However, on my first long trip last week I was very surprised that it burned 14.5 gph!

I just had an additional thought concerning your high fuel consumption. Does your airplane have an electric backup fuel pump? I have known people that had an unusually high burn and when questioned, I found they were in the habit of turning on the auxiliary electric pump for takeoff and landing and operating it at other times as a backup. The fuel consumption will increase drastically while the fuel pump is turned on. It will even make the engine run rough!

The auxiliary fuel pump on an airplane with an injection carburetor is only to be used for times when the engine pump is not supplying adequate fuel. It should not be used routinely as it is on a Piper equipped with a float carburetor.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980528.000032_msg02874.tex]

Maximizing Range and Payload

Tue, 26 Dec 2000 11:52:35

In a message dated 12/26/00 9:27:34 AM Central Standard Time, MikeM86949@aol.com writes:

Ken

I agree completely. I live in NJ, and IFR departures are a busy affair. I don't need the distraction of lean climbs to save a gallon of fuel. I can't figure why anyone else would either, but different strokes for different folks.

Mike McNamara

Good Morning Gentlemen,

I think the point that needs to be addressed concerns how important additional range or payload is to the operation you are conducting.

John has made the flight tests which determined that he can save seven gallons by using the lean climb program.

That equates to at least thirty minutes more fuel at the destination or an increase in payload of almost forty-two pounds on a trip when maximum payload is paramount.

When I was gainfully employed, we didn't make a major effort to maximize payload or minimize fuel for a trip from O'Hare to Idlewild. Maybe we should have, for maximum income, but the trip could be operated easily with any payload that the airframe could accommodate and we could carry enough fuel with maximum allowable payload that we could probably have named Miami as an alternate if we wanted to.

However, when we were loading up for a nonstop from O'Hare to Seoul, Korea, every ounce of payload and every minute of reserve fuel made a difference.

There is a cross over point in every airframe from a J-3 Cub to a 747 where such a calculation is just as important as it is in a money making 747.

If you have the need for maximizing payload, range or both, it can be very important.

The rest of the time, it is probably just an interesting exercise, but isn't it nice to be familiar with the operational procedures required to gain those maximums for those rare occasions when they may be needed?

I enjoy gaining the knowledge and have occasionally used the maximization techniques to good advantage.

Happy Skies,

Old Bob

[ARTICLES/20001226.115235_msg18387.tex]

Reserve Fuel**Thu, 21 May 1998 09:19:14**

Good Morning John Ornellas,

In a message dated 98-05-21 07:37:04 EDT, you write:

Don't forget about fuel reserve requirements for all flight!

I still have a hard time understanding what you are referring to by this statement.

For flight planning purposes, the FAA requires that you have planned for certain minimum amounts of fuel to be added to the burnout fuel for your flight based on the current forecasts and a reasonable analysis thereof. It is expected that you will monitor the flight and your fuel usage and take reasonable actions if conditions are worse than forecast.

What you do after that is a function of your own personal minimums.

There is no requirement that any certain amount of fuel be on board the aircraft for landing. There is certainly no requirement that every tank on board have fuel in it!

Where fuel is to be located in the aircraft and the sequence for using it is what we are discussing on this thread.

Some of us prefer that our minimum fuel be in one tank and use various procedures to assure that the desired amount is there. There are others who want a certain defined amount of fuel to be in another tank so that it might be switched to in the event that the other tank ceases to feed. In either case, if you do not have a rather precise knowledge of the amount of fuel available and a reasonable willingness to use that fuel, it is of no use to you!

I would not condemn anyone who wants to land with five or ten or more gallons in each tank but I certainly wouldn't recommend it and I will argue that it definitely is not required by the FARs.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980521_091914_msg02739.tex]

Running Tank Dry

Thu, 4 Sep 1997 21:53:03

Ron Davis and Randy Bailey,

I never did receive the message which generated Randys reply but I would like to comment on the procedure for restarting an engine after running a tank dry.

First off, the proper procedure to be used is dependent on several factors among them being the type of fuel system, the type of propeller, the power at which the engine is being operated and of course the altitude (determines how much time is available for restart). I'm sure many of us could think of other things too.

Obviously if one is close to the ground when a tank is run dry, it is an emergency and rapid action must be taken even if it is detrimental to the life of the engine.

Assuming that one is at altitude and is intentionally running a tank dry, (NOT a recommended procedure in most cases) it is preferable that the engine be at a lower power setting, say 50 or 60 per cent power. The RPM should be in the lower operating range and if you have the electric propeller, it should be in the manual not the automatic position.

All of this is to avoid the potential for an overspeed on engine restart. That could be very damaging to the engine. It is nice to be at a lower power setting so that the possibility of shock cooling (if there is such a thing) is lessened.

Unless the flight is in a critical phase there is really no hurry to get the engine going again. and it is worth the time to do it right. It wouldn't be a bad idea to reduce the throttle a bit if the flight is high enough that it is being flown at full throttle. The next order of business is to re-establish fuel flow. If the airplane is equipped with the hand wobble pump, that is the nicest way to do it. NO big hurry just wobble until the fuel pressure is normal and then the engine will refire and start very nicely. If you were leaned on the lean side of best power or even close to peak it would be a good idea to richen it a bit. Once the engine is firing smoothly normal power can be established.

I once helped pick up a Bonanza that was put down in a soft corn field after a tank was inadvertantly run dry at low altitude. The pilot realized what he had done and switched tanks, hit the boost pump, richened the mixture and shoved the prop in. I'm not sure if he opened the throttle or not but in any case he flooded the engine out and it never did restart! (Opening the throttle might have given it enough air to get going)

This airplane was a nice shiny V35 with about fifty hours on it and it was very badly damaged. The pilot elected to land gear up due to the muddy condition of the local fields (Probably a good decision).

Unfortunately, his airplane was equipped with the then new "Magic Hand" and the gear extended. In the rush of things this was not noted by the pilot and the gear dug into the mud and ripped the devil out of the airplane. Fortunately no damage to the pilot.

The fuel injected engines are the easiest to flood out but it can also be done in certain conditions to the PS5C airplanes with the electric boost pump.

Back in the days of yore when the DC-4s and 6s were king it was common (I won't say desirable but still common) to run fuel tanks dry. We would try to watch the fuel pressure and you could usually see the fuel pressure dropping in time to switch the tanks and catch it before the engine quit. Company policy said that if the power was interrupted to close the throttle and re-establish fuel pressure before trying to get the engine going again. Those engines were more sensitive to overspeed than our little engines but I still think the same theory applies.

Some years before the Jets arrived the airplanes were getting powerful enough to carry more fuel and our fuel gauges got better and company policy was changed to one of not running tanks dry intentionally. Probably a very good policy, unfortunately though after that time there was no training on how to restart the engine properly after an inadvertant interruption of power.

To sum up, I am not recommending that people run their tanks dry intentionally but do feel that proper procedures should be taught to restart in the most desirable manner for the individual airplane and situation.

Yours,

Bob

[ARTICLES/19970904_215303_msg01651.tex]

Running Tank Dry**Fri, 5 Sep 1997 19:06:53**

Hi Ron,

Your original message just showed up on my set. Boy! Some of these messages are really out of sequence.

The information that has been on the board is all pretty good.

Just remember that it was running when you lost the fuel. All you have to do is replace it!

Try not to flood the engine. It is very easy to do on the fuel injected models but if your "E" still has the PS5C it starts real easy with just the hand pump and quite often with out anything but patience. As I said earlier if you have it way on the lean side of peak you might want to richen it a bit, but not much! If you still have the electric prop, overspeed is not much of a problem. Especially if you are running in manual without the "APC" unit.

I got in the habit of always running my tanks dry when I was flying straight 35s and especially when I had airplanes with the small 10 gal wing aux tanks. If you don't run them dry you end up with a little bit (maybe a couple of gallons) in each tank and pretty soon it adds up to an hour or so worth of fuel. It is a problem.

I always told my wife to watch the fuel pressure gauge when my fuel was down to an estimated five or ten minutes supply in the tank on which I was operating.

I would usually get about three yelps – BOB! – BOB! – BOB! - and by then I would have the tank switched and the engine never missed a beat. It sure helps to have a copilot who doesn't like to have the engine quit!

Modern thinking is to not run the tanks dry. If you have a bunch of small tanks you might want to find a knowledgeable person who has a LOT of experience in running tanks dry and get him or her to check you out on the procedure. Be careful, it is getting to be (and probably deservedly so) a lost art.

Gotta run, if you have specific questions feel free to contact me directly.

Yours,

Bob

[ARTICLES/19970905_190653_msg01661.tex]

Running Tank Dry**Tue, 12 May 1998 00:23:58**

Good Evening Dr. Larry Grimm

In a message dated 98-05-11 23:21:28 EDT, you write:

I could not find anything in the POH and I am wondering if the fuel pump needs to be turned on just before tank switching?

No, definitely not necessary, in fact it would be detrimental to do so. Turning on the fuel pump will enrichen the mixture as it raises the fuel pressure. If something does cause an interruption in fuel flow or pressure, activation of the pump would be proper for the length of time necessary to establish normal fuel pressure.

While current thought is that fuel tanks should not be run dry, it does happen on occasion and I would suggest that you find a knowledgeable Bonanza instructor to show the proper technique for restoring normal operation following such an occasion.

The fuel system on the 36 is a very reliable one and momentary fuel absence is not difficult to handle.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980512.002358_msg02410.tex]

Running Tank Dry**Mon, 18 May 1998 11:14:48**

Good Morning All,

Been out of town for a few days and just checked back in this morning!

I absolutely have to put my two bits in on this controversy. I want everyone to know that I am squarely on both sides of the fence on this one.

If you don't want to run your tanks dry, then by all means don't do it. A firm management and warning system should be devised so that you will never accidentally do so and fuel management and flight planning procedures should allow for carrying that extra fuel around that you absolutely never will attempt to use.

The turbine engines do not take kindly to fuel outages and restarts so most are designed with warning devices, fuel management procedures or automatic switching to see that it does not happen. As a consequence, training and recommendations for the last twenty or thirty years has moved away from teaching proper procedures for running a tank dry.

In the days of yore it was generally accepted that having a number of fuel tanks was a good thing as they could be run dry in sequence to evaluate fuel burn and enable the aviator to properly plan his arrival fuel for the conditions encountered. Modern fuel flow devices and improved fuel gauges have made such operation less of a necessity. There was also the thought that multiple fuel cells were a safety factor in the event of fuel leaks developing. Such leaks were more common fifty or sixty years ago than they are now.

Bill Hale mentioned the advantage of leaving a little fuel in one tank just in case the one you are relying on ceases to supply fuel and I don't think any of us will argue that having multiple redundancys is often desirable whether it be fuel sources or otherwise.

The simplest fuel system is still one tank. Also back in the days of yore, many airplanes had a standpipe in the one and only tank so that fuel could be taken from the top of that standpipe until the fuel level fell to that point. At that time the system would be switched to a drain on the bottom of the tank and a known quantity of fuel would be available to execute a (hopefully) safe landing. The standpipe position of the fuel valve was generally called "MAIN" and the bottom of the tank position was known as "RESERVE". The aircraft was usually placarded to takeoff and land on reserve only. Not a bad system and it was also used on the early Volkswagen to avoid the cost of a fuel indicating device.

If you fall onto the "I absolutely will never never let a tank run dry" side

of the fence and still want tip tanks I would suggest that you utilize the transfer system as provided by most versions of the Safe Flight Extenders as produced by BDS ever since he acquired the STC and by Osborne for the last several years.

I have a close acquaintance who wanted to figure out a way to run his small ten gallon wing tanks dry without having to encounter a fuel flow interruption. We designed a method of using some of Al Peterson's components to provide the transfer of fuel from those aux tanks through the same system as used for the tips. I called BDS to see if they had any comments and was told that Allen had thought of the same thing several years ago but decided that the market would be too small to warrant going to the trouble to get it approved. They suggested we try to install it on a local approval. The tip tanks that the owner was going to install have not yet been acquired, but if they ever are, we will at least apply for approval for the transfer system for the aux tanks.

If you get the system down to where there are only two tanks available to run dry, carrying a small amount of fuel that you don't ever intend to use is not too great a penalty.

I have seen at least one airplane that had the ten gallon aux tanks in each wing, a twenty gallon aux tank in the baggage and wing tip tanks. When you include the mains, that adds up to seven separate fuel cells. If the owner used the figure of never going below five gallons in any tank, which has been suggested by some, then he would be carrying 35 gallons or 210 pounds of extra weight around at all times.

All of those except the mains would be easy to transfer using either the BDS or the Osborne system which would make the airplane effectively a two tanker as far as having to retain fuel to avoid fuel flow interruption.

Let us say, though, that you do intend to run the tanks dry (as do I), whether you want to learn to do it safely in case of accidental mismanagement or intentionally for precise fuel use control and evaluation.

I would suggest that you try to plan to run the tank dry while at a relatively low power.

With the PS5C equipped engines and an electric prop, I would place the propeller control in manual and assign someone to constant monitoring of the RPM and or fuel pressure. You will find there is a noticeable drop in both a sufficient time before the engine quits to give you plenty of time to switch tanks. A gentle stroke on the wobble pump to assure stable fuel pressure will help. I like to use the hand pump in lieu of the electric even if one is installed. It seems to work much smoother and avoids any excessive richening of the mixture.

The fuel injected engines don't react quite as friendly as do the PS5C ones

but there is still a major warning from the fuel pressure gauge. I have a warning device that monitors the fuel pressure for me on my V35B and when she says: Bob, BOB, BOB! I switch tanks!

By the time the third "Bob" is out, I have switched tanks and there is never a burble of any kind.

If the tank does run dry and the engine does cease providing thrust, there is no chance of it stopping turning. I have tried many times to stop the engine from windmilling using such time honored methods as putting the prop in maximum high pitch (low RPM) bringing the aircraft to stall and slipping drastically. It always keeps on turning. I think you would have to cut off the oil supply and wait a considerable time for it to seize to get it to stop.

If the tank is run dry, chances are that just switching tanks and waiting a few seconds will bring it back to life with little trepidation.

I am familiar with one case in which an individual was flying at about 400 feet above the ground slipping a V35A steeply toward the tank on which he was operating. The tank outlet unported and the engine quit. In an effort to reestablish power as rapidly as possible, the pilot switched tanks, then shoved in the throttle, prop and mixture controls. The engine flooded out and did not restart in the time remaining before ground contact. I do believe he also closed the throttle before ground contact but am not sure of that. It was spring and the ground was soft so the pilot elected to land gear up. Since the airplane was equipped with the "Magic Hand" system, the gear came out anyway. Damage was severe. It was questionable as to whether it should have been rebuilt but since it was almost new, it was.

I have never known of any one having any trouble restarting if they just switch tanks and wait.

I personally like to tinker with things so I usually tickle the fuel pump while watching the fuel pressure gauge till fuel flow is reestablished and if I am at high RPM and MP I will throttle back a bit and bring down the RPM somewhat before switching tanks. If I were fifty feet in the air on takeoff and it happened, I would probably switch tanks if I recognized what was happening. I feel that it would restart with no problem but I haven't tried it!

Incidentally, I normally try to run each main tank dry at least once a year just to check that full fuel capacity is still available to me in case I am planning on it. I have never put less than the rated capacity in a tank that I have run dry. If the airplane is flown in coordinated flight and extreme nose low attitudes are avoided, there is no unusable fuel in any Bonanza main tank unless it has unsnapped and folds have occurred which could trap fuel. I have never had it happen on any of my Bonanzas but have

heard of it occurring and that is one reason I check mine at least once a year.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980518.111448_msg02637.tex]

Running Tank Dry**Mon, 18 May 1998 11:29:49**

Good Morning Again,

In a message dated 98-05-18 11:14:48 EDT, I wrote:

If the tank does run dry and the engine does cease providing thrust, there is no chance of it stopping turning. I have tried many times to stop the engine from windmilling using such time honored methods as putting the prop in maximum high pitch (low RPM) bringing the aircraft to stall and slipping drastically. It always keeps on turning. I think you would have to cut off the oil supply and wait a considerable time for it to seize to get it to stop.

I have managed to stop the old wood blade electric Beech props on occasion but never the metal bladed ones. So if you really want to see the engine and prop not turning on your wood prop airplane, cut the mixture, take full flaps, zoom it up into a high angle in relation to the horizon and right at the stall, kick it into a strong slip. It may stop! I don't know why anyone would want to do that anymore but that did work many years ago when we were trying to get some drag performance figures on an early Bonanza.

Bob

[ARTICLES/19980518.112949_msg02638.tex]

Running Tank Dry**Mon, 18 May 1998 12:37:20**

Good Morning WHITESELL, PAUL,

In a message dated 98-05-18 10:45:19 EDT, you write:

I think Lucky's point was that a vane pump that has been run dry may have trouble generating 1.5 psi before it is primed. This would only be a problem if the fuel level in the tank that was switched to was very low because the boost pump would have to pull fuel up into the pump. I agree that a primed boost pump will generate plenty of pressure.

Very interesting! I have never heard of that problem. I will say that I generally have quite a bit of fuel in the tank I am intending to switch to if I am intentionally running a tank dry. Generally at least ten or fifteen gallons on the later airplanes and five to ten on the early small tanked ones. I would think that even four or five gallons on either size tank should provide plenty of head to the hand wobble pump or the electric boost pump if installed. At least a couple of inches. Obviously if one can plan to switch the tanks at a point where a safe landing could be executed without power, that is always a good idea.

Happy Skies,

Bob Siegfried Ancient Aviator

P.S. I NEVER buy lottery tickets!

[ARTICLES/19980518.123720_msg02640.tex]

Running Tank Dry**Mon, 18 May 1998 23:41:36**

Good Evening John Ornellas,

In a message dated 98-05-18 20:01:57 EDT, you write:

I don't mean to quote the reg's and I'm not a "regs" junky however there is something in them that says a certain amount of reserves must be maintained for VFR and IFR flight. I understand that to mean all flight whether it's circling the patch or going somewhere.

I don't see how that would have any effect on the legality of running a tank dry.

The reserve fuel requirements are for planning purposes, not required for operational use if conditions change from those of a reasonable forecast.

While most of us have personal minimums that we apply to our flight operations, the FAA does not have very stringent requirements and I am certain that fuel located anywhere in the airplane would be considered adequate to meet the required fuel reserves regardless of whether it is all in one tank or split up among many.

I have a preference for having my fuel in one tank when I am approaching my personal minimum fuel state.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980518.234136_msg02671.tex]

Running Tank Dry**Mon, 25 May 1998 20:11:10**

Good Evening Carmine Pecoraro,

In a message dated 98-05-25 19:52:00 EDT, you write:

Has anybody considered that running tanks dry could introduce water or dirt into the fuel system from the bottem of the tank? This could be the reason some people have experienced rough running engines after running tanks dry!

I really don't see how that could happen. The fuel is coming from the same outlet all of the time. It does not have a floating pickup. The low point in the tank is supposed to be the point at which the sump drain is located. Any water or crud should be eliminated by conscientious use of the fuel drains.

I have been running tanks dry for over fifty years and so far so good!

I tend to agree with John Deakin, I like to know how much fuel is left, where it is and have it all in one tank for that last bit of reserve.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980525_201110_msg02818.tex]

Running Tank Dry**Wed, 16 Sep 1998 01:30:55**

Good Morning Dwaine,

In a message dated 9/16/98 12:08:12 AM Central Daylight Time, classicbonanza@juno.com writes:

I have never - ever - experienced the above in any airplane I have flown in over 30 years - but then again I have never flown an M35. My D35, with Osbornes (Brittania/Beech), will lose pressure once (in level flight) and before you can switch tanks (1 or 2 seconds) the engine is winding down. Same is true with the mains. I wonder if anyone else has had your experience?

I find that the situation described by Joe Salyer is prevalent in all of the airplanes I have flown which use the Continental mechanical type of fuel injection. i.e. all IO470, IO520 and IO550 engines. I imagine it would be the same on IO360s but have not tried it. There is sufficient time to switch tanks, generally with no loss of power whatsoever. This has been true regardless of which tank the engine is being fed from including direct feed from the early style Brittain tanks.

I assign my wife the duty of watching the fuel pressure gauge. When it starts to wiggle and drop, she says: Bob, BOB, BOB! By the third very loud BOB, I have the tank switched and all is well. I have never actually timed it, but I would say there is a least a four or five second delay from the time the needle starts to wiggle and drop till the engine starts to lose power.

A couple of weeks ago I purposely let one run dry while I watched the needle to see just how it reacted if I did not switch. It dropped a couple of pounds and wiggled for a couple of seconds and then steadily dropped on down to zero. The power fell off slowly with the dropping fuel pressure. It took a few seconds, maybe eight or ten to reestablish fuel pressure and normal operation of the engine.

I used to run my PS5C fed engines dry also but the engine quit more often than it does with the current crop of fuel injected units.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980916_013055_msg05437.tex]

Running Tank Dry**Wed, 16 Sep 1998 15:07:14**

Good Afternoon Dwaine,

In a message dated 9/16/98 1:07:16 PM Central Daylight Time, classicbonanza@juno.com writes:

I agree AND the difference between 1 to 2 seconds and 4 to 5 seconds is not much when it comes to the engine quitting. I hate that.

I find that as long as I am expecting the tank to run dry, have my power adjusted accordingly and have Thelma Jean along to watch the fuel pressure, I rarely get even the slightest burble. That was not true with the E series engines. I often had the engine stumble a little even when T.J. and I were expecting it to quit. I have never had one fail to restart under those conditions and do try to run my tanks dry as often as possible just to check that their full capacity is still available. No folded tanks or anything.

I did tend to run my E series engines quite a way on the lean side of best power. My usual leaning procedure was to lean for a ten mph drop in airspeed.

Don't know if that made a difference or not!

Happy Skies,

Old Bob

[ARTICLES/19980916.150714_msg05460.tex]

Running Tank Dry**Mon, 17 Apr 2000 02:04:01**

In a message dated 4/17/00 12:13:15 AM Central Daylight Time, kcorliss@bentonrea.com writes:

The first time it quit in air I hit the boost pump just after I switched tanks. The engine coughed and popped a few times before catching and I'm assuming it was too much fuel.

Good Evening Kevin,

If your engine coughed and popped, it was most likely still too lean. A rich engine will roll and lope.

Learning to listen to and recognize the difference in sound between a rich and a lean engine is a helpful diagnostic tool for normal starts as well as inflight restarts.

The fuel system which you have for your tip tanks was a very good one in the days when fuel tanks were regularly run dry. The technique of how to properly restart an engine that had run dry was widely taught and understood.

A float carbureted engine or one equipped with a pressure injection carburetor such as the PS5C is relatively easy and benign to restart. The more "modern" fuel injected Continental can be a little more stubborn.

I think if you will look in the FAA Approved Airplane Flight Manual Supplement for your tip tank fuel cells, you will find that there is an instruction stating that the tanks should be checked for proper fuel flow on the ground before attempting flight, especially if the tanks have previously been run dry. They do have a tendency to vapor lock. The boost pump on your airplane is a suction pump, the same as the engine driven one. It sucks the fuel. It is not a fuel tank submerged pressure pump such as is found on many other aircraft.

If the tank has been run dry, it sometimes takes a fair amount of time to establish adequate fuel pressure. The lower flow required to run the engine on the ground allows the engine driven or the electric pump to suck the air from the line, generally without the engine faltering, but if it does, causing little consternation to most participants. A couple of minutes operation on each tip tank is usually sufficient.

If the thought of running a tank dry is unsettling, why don't you consider getting a local approval to add a transfer pump system such as BDS provides on their current production tanks. That allows the fuel to be pumped from the tip to it's associated main fuel cell.

Such a system could be added without bothering your current feed system in any way other than adding a tee fitting and check valve to accommodate the pump and should be a relatively easy approval to obtain.

Osborne/Brittain has gone to the transfer type system in lieu of the direct feed now that very few people are taught the proper way to run a tank dry. In addition, the cost of the direct flow valves such as you have on your airplane has risen to the point of being prohibitive!

This subject was heavily discussed on this site a year or so ago. You might try researching the archives.

Happy Skies,

Old Bob

[ARTICLES/20000417.020401_msg06486.tex]

Running Tank Dry**Wed, 20 Sep 2000 23:18:36**

In a message dated 9/20/00 8:49:09 PM Central Daylight Time, MalLShaw@aol.com writes:

I have heard and been taught don't run 'em dry. You suck in all the dredge and residue in the bottom of the tank, and also run chance of messing up the fuel pump when you suck air into it. Any other comments or opinions on this?

Good Evening MalLShaw,

I have a very hard time understanding how anyone could even think such a thing could be true.

The pickup does not float on the top of the fuel and if there is crud in the tank, it is unlikely that it would float on the top of the fuel.

If the crud is not floating on the top of the fuel and the pickup is not on the top of the fuel, why would there be any greater likelihood of sucking crud into the lines when running the tank dry than when it is feeding in the ordinary and normal manner?

Some fuel pumps might be damaged if they ran for an extended period with no fuel to help lubricate and cool them, but I have never heard of any pump being damaged by operating dry for the length of time it takes to run a tank dry and then perform a restart.

In the large piston airliners, where we had a lot of tanks and limited range, it was common practice to run tanks dry. With multiple tanks, a lot of excess fuel can be left around the airplane that is doing no one any good and adds undesirable weight.

When turbine engines became the norm, things changed. Turbines don't restart well and fuel quantity measurement became more accurate. In addition, the systems were designed so that fuel could be transferred to a tank that was feeding the engine so that some tanks could still be run dry and yet not have the engine experience fuel starvation.

Running a tank dry is a technique that should be learned just like a crosswind landing is a technique that should be learned. Because you know how to do it doesn't mean you have to do it, but it is nice to know how.

Different engines and different fuel systems have different problems so it pays to have aircraft specific knowledge.

First off, there is no unusable fuel in any Bonanza model 33, 35 or 36 if the airplane is flown in a normal coordinated manner. You will always get at

least as much fuel out of the tanks as they are said to hold.

The original ones were twenty gallon tanks. They were listed as having 19.5 usable and one half gallon unusable. I have never seen one that took less than twenty gallons to be filled unless the tank has become unsnapped. The twenty-five gallon tanks were listed as twenty-five usable with one half gallon unusable and the forty gallon tanks were listed as forty gallons usable with one half gallon unusable.

Unfortunately, there were some very uninformed people who didn't realize that if you slipped toward the side of the tank on which you were operating the engine that there was a chance that the tank inlet may be unported.

The lawyers and the FAA got involved and now we have some very stupid rules concerning unusable fuel and excessive amounts of fuel that are required for takeoff. In addition there were flapper valves and containers added to the fuel tanks which decrease the quantity of fuel they will hold and have introduced crud which clogged screens and injectors. The FAA and the lawyers keep thinking we should make the airplanes idiot proof, but I would sooner eliminate the idiots!

Airplanes which are equipped with float type carburetors generally restart very easily. The ones with pressure carburetors, such as the early Bonanzas, restart relatively easily and the fuel injected ones can be started safely with just a little knowledge of the technique required.

Most tanks can be run dry without the engine actually being ran dry of fuel if the fuel pressures are adequately monitored and suitable action taken with proper dispatch.

Even if the engine does quit, I have never seen one that could not be restarted if it is given even half a chance.

I always run my tanks dry anytime I have a range requirement at all and I try to run each one dry at least once a year just to make sure that I don't have collapsed tank or some other anomaly which would preclude my aircraft having all of the fuel capability which I think it has.

Yours for running the tanks dry and keeping all of the last ditch fuel in one tank!

Happy Skies,

Old Bob

[ARTICLES/20000920_231836_msg13795.tex]

Running Tank Dry**Thu, 21 Sep 2000 00:07:19**

In a message dated 9/20/00 10:58:04 PM Central Daylight Time, epoole@scoot.netis.com writes:

In the large piston airliners, where we had a lot of tanks and limited range, it was common practice to run tanks dry.

I'll bet the passengers loved that! ;-)

Come on now Eric,

I said we ran the tanks dry, I didn't say we let the engine quit!

There is a major difference.

There is technique involved and knowledge is required to do it correctly.

I run the tanks dry on my airplane all of the time. My engine rarely quits or even hesitates. I did run a tank dry and allow the engine to quit a couple of months ago just because it had been so long since I had had one quit when running the tank dry that I wanted to make sure that my restart procedures were still valid.

Happy Skies,

Old Bob

[ARTICLES/20000921.000719_msg13798.tex]

Running Tank Dry

Thu, 21 Sep 2000 10:23:48

In a message dated 9/20/00 11:35:12 PM Central Daylight Time, epoole@scoot.netis.com writes:

I did run a tank dry and allow the engine to quit a couple of months ago just because it had been so long since I had had one quit when running the tank dry that I wanted to make sure that my restart procedures were still valid.

What are the procedures? I just switch to another tank and give it a short shot or two of the boost pump and it fires right up.

Good Morning Eric,

On the passenger carrying large piston aircraft, we monitored the fuel pressure and it generally gave more than adequate warning such that we were able to switch tanks and reestablish fuel flow with no interruption of the steady beat of the engine.

However, we were taught to be ready to take immediate action should there be an interruption in the power. The suggested procedure was to reduce the throttle to somewhere between closed or a zero thrust position, switch tanks, reestablish fuel pressure, slightly enrichen the mixture, add throttle to normal power and then releas the engine.

The fear was that the engine might surge and even overspeed if the fuel pressure was not established smoothly. The governors on those big engines were relatively small compared to those that we have and could not compensate as rapidly as ours do.

I tend to do a similar dance when I let the engine quit in the Bonanza. It probably isn't required, but I do it anyway, just in case.

One point about the four engine aircraft though. Even if the engine were to quit, it wasn't a very pronounced and noticeable event. There was a slight change in the droning sound, but the rpm remained the same with maybe just a slight warble as the governor reacted to flatten the prop to maintain engine rpm. On airplanes that were equipped with an autopilot and that did not have torquemeters, if the engine quit for some reason other than fuel starvation, the only engine instrument indication of a power failure might well be the drop in cylinder head temperatures.

As you have noted, most modern engines and props will restart with no action other than to switch the tank. A gentle massage of the electric boost pump may help and definitely makes the pilot feel he/she is accomplishing something. Depending on the altitude, shoving in the mixture may flood the engine and possibly delay or preclude a restart. A similar situation could occur if the boost pump is turned on and operated continuously on a fuel injected engine or an engine equipped with a pressure carburetor. The engine could be flooded.

If the mixture had been set far on the lean side, I have always enriched it a bit as

I was taught. After the education we have received from George, I now wonder if the enrichening was necessary at all and I may eliminate it from my procedure or, at most, twist it in a half turn or so.

Happy Skies,

Old Bob

[ARTICLES/20000921_102348.msg13813.tex]

Running Tank Dry**Thu, 21 Sep 2000 12:06:53**

In a message dated 9/21/00 10:57:46 AM Central Daylight Time, Billearls2@aol.com writes:

Bob, How do you know you have run a tank dry if the engine does not quit?

Thanks,

Bill A36

By a drop in fuel pressure or fuel flow. Not perfect substantiation, but it seems to work quite well for me. My tanks always take all of the fuel I expect them to after using that procedure. My electronic fuel flow shows a drop just before the fuel pressure gauge starts to wiggle.

I have a very reliable warning device on my airplane. It is called Thelma Jean. I tell her to monitor the fuel flow and fuel pressure. When she says: bob Bob BOB, with increasing emphasis on each bob, I generally have the tank switched before the third BOB and the engine rarely misses a beat.

Works as well as any system I have ever used.

Happy Skies,

Old Bob

[ARTICLES/20000921_120653.msg13822.tex]

Running Tank Dry**Thu, 25 Jan 2001 00:29:59**

In a message dated 1/24/01 11:08:36 PM Central Standard Time, kcorliss@bentonrea.com writes:

I have Brittain tips - the ones that gravity feed to the main sump. Once last year I ran one dry, switched to a main with fuel in it and continued the flight (with elevated blood pressure). The next flight I switched to the tip (now full) and had no fuel - a surprise that was not appreciated by my wife. Mechanic and I could find no problems after draining/pumping fuel from all tanks. I have had no problem since - but I don't run them dry anymore.

K Corliss N911EZ E35

Good Evening K,

The operating instructions for the Brittain tip tanks suggest that anytime you have run a tip tank dry in flight you should always run off of the that tip for a few minutes on the ground before takeoff.

It takes a few moments to clear the air out of the line and establish proper feed.

At idle or slightly above, the engine won't even sputter or fluctuate while refilling the line due to the very little amount of fuel needed at that low power.

It always worked fine for me on any Brittain tip tanks I had.

I always ran my Brittain tips dry.

Happy Skies,

Old Bob

[ARTICLES/20010125_002959_msg01736.tex]

Running Tank Dry/Fuel Capacity**Tue, 2 Feb 1999 09:54:46**

Good Morning Tom and All,

In a message dated 2/2/99 7:19:01 AM Central Standard Time, tturner@vol.com writes:

So, don't worry about losing an engine on a go-around if you're feeding from a tank with only 10 (not the minimum takeoff 13) gallons on board. But, for goodness sake, don't initiate a flight with this bare-minimum fuel load.

I would like to take this opportunity to add my agreement to Tom's statement.

Strictly from memory, I haven't looked it up, the listed unusable fuel in the early straight 35s was one half gallon per side.

I did a fair amount of testing some forty years ago associated with a planned long range flight (that never came off), and found that the one half gallon figure was very conservative.

Every time I ran the tank dry, including in some very high angle of attack situations, the tank took over twenty gallons to fill.

I was in coordinated flight at all times. It didn't occur to me that any one would fly around in a skid with low fuel state but since so many people were stupid enough to do so, we are stuck with the current totally ridiculous restriction requiring over an hours fuel in each tank before we can takeoff!

I make a point of running each of my tanks dry at least once a year just to check that things are still OK. The only time I have ever had a fuel tank accept less than the placarded fuel was on an occasion in someone else's Bonanza when the tank had become unsnapped due to a plugged vent and it had wrinkled up enough that it retained about a gallon of fuel that was not available. In that case, we were aware that the tank had come loose and were flight checking it to see just how much difference the unsnapped tank would make in the fuel retained.

Long before the Beech lawyers stuck us with their totally unnecessary takeoff fuel requirement, I had established a minimum takeoff requirement of my own of ten gallons in the tank on which I was taking off. If someone else said that they were willing to depart with five gallons I would NOT consider that to be foolhardy.

The fuel system on the Bonanza, Debonair, Travelaire and Baron line is one of the best in the industry. Any long slim tank is going to have problems with feeding during slipping or skidding situations, whether airborne or on the ground.

You can unport the fuel pick up in any short wing Piper (certainly NOT equipped with a long slim tank) if you are in a sustained slip toward the side on which the tank is located with less than full tanks.

Fortunately, no one has been stupid enough to require an hours fuel to be in both tanks on those airplanes for every takeoff.

Do you suppose that means that the short wing Piper pilots are better pilots than the Bonanza drivers?

Maintain balanced flight and if you must slip for landing purposes, do it with the tank from which you are feeding on the downwind side.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990202_095446_msg01705.tex]

Running Tanks Dry**Wed, 24 Jan 2001 23:42:35**

In a message dated 1/24/01 10:30:01 PM Central Standard Time, ralph.requa@attglobal.net writes:

On the fuel injected engines it's easy to see the end of the tank coming. Just watch for a fluctuation in fuel pressure and you can make the switch without losing any power. If you miss that indication the wife is sure to let you know it's time to switch tanksg.

Cheers, Ralph

Good Evening Ralph,

I'm with you!

I run my tanks dry on a regular basis just to check that all of the fuel capacity that I think is there really is.

If Thelma Jean is aboard, the engine rarely actually quits. I assign her the task of monitoring fuel usage so we know when the tank is likely to run dry and then assign her the task of watching the fuel pressure gauge during the last few minutes before the tank is empty. When the fuel pressure needle wiggles, she will say Bob, BOB BOB, each time with increasing intensity. By the third Bob, I always have it switched and fuel flow reestablished.

Sometimes, when I am without a passenger, my attention will be diverted and I do not note the fuel pressure wiggling before the engine starts to lose power. Generally I will catch it before it actually quits, but there might be a small surge or two. Even if it quits totally and I decide to reduce the power settings somewhat prior to the restart, it always starts within three or four seconds. No big deal.

Thelma Jean does help a lot though!

Happy Skies,

Old Bob

[ARTICLES/20010124.234235.msg01727.tex]

Running Tanks Dry**Thu, 25 Jan 2001 16:19:20**

In a message dated 1/25/01 3:09:06 PM Central Standard Time, jmckeith@hsc.vcu.edu writes:

Now is this Thelma Jean an approved model with an STC or do you get a field approval. Seems to be a very effective low fuel warning. If we all had a Thelma Jean, maybe there wouldn't be any more quiet crashes.

Good Afternoon Jim,

When I first started to use the Thelma Jean, I was a little concerned about the legality, but research has assured me that as long as the Thelma Jean is not attached to the airframe by any device more permanent than the seat belt, it is OK to use.

It comes under the same rules as an Oxygen system. A long as is it suitably restrained, no special approval is required.

Happy Skies,

Old Bob

[ARTICLES/20010125_161920_msg01782.tex]

Unusable Fuel**Fri, 5 Nov 1999 18:30:02**

In a message dated 11/5/99 4:50:44 PM Central Standard Time, jtsmall@onramp.net writes:

If the airplane is flown at normal approach speeds, the outlet will not unport, regardless of the flap setting and the quantity of fuel in the tank

In the pattern, even the turn to base and final will be no problem PROVIDED it is coordinated?

I didn't know about the unporting due to flaps and exteme vertical descent.

Thanks.

-jts

Good Evening John,

There is just NO time that the tanks will unport if the airplane is flown properly. Some of those who fly with their feet on the floor and give our favorite steed an unsavory reputation as a tail wiggler may have some difficulty. The worst offender of that group won't find more than a gallon or so of unusable fuel even in fairly turbulent air.

The forty gallon tanks were originally listed by Beech as having forty gallons usable and one half gallon unusable on each side. The twenty and twenty-five gallon tanks listed one half gallon of unusable per side that was part of the twenty or twenty-five as appropriate.

I have never ran any tank dry which did not take at least the amount of fuel for which it was placarded. Some of the forty gallon tanks have taken as much as forty-one and one-half gallons to fill!

If the tank is not properly installed or is allowed to become unsnapped, there is a possibility of some wrinkles developing which would cause fuel to be trapped and not available to the outlet. That is one reason for intentionally running a tank dry now and then, so that if your capacity is less than it is supposed to be, you will find it out!

The addition of the fuel limitations for takeoff and the increase in listed unusable fuel was strictly a lawyer driven stupidity, but, it is the law. To disregard it for takeoff would be a violation, but there is nothing that says we can't use it all!!

Happy Skies,

Old Bob

[ARTICLES/19991105.183002.msg10208.tex]

Tank Capacity**Wed, 21 Feb 2001 21:58:01**

In a message dated 2/21/01 8:31:03 PM Central Standard Time, res02xmz@gte.net writes:

I notice that when topping the tanks (93 A36, one 40 gal tank each side), there is still airspace left when no more fuel can be added because it threatens to spill out through the hole. Does anyone know how much unused room there is in the tanks? For those with tip tanks, a way to find out would be to fill them, fill the tip tanks, then transfer as much fuel from the tips into the mains as they will hold, then re-fill the tips. Has anyone tried this? Does anyone know how much extra space there is?

tia dvh

Good Evening David,

I have never tried to transfer from a tip to a full main when the airplane was on the ground, but I have accidentally turned on the tip pumps when airborne and dumped twenty or more gallons over the side!

I often fill my mains to the maximum they will hold when planning a very long flight. I have noted that if I fill them till they do overflow the fill port, then wait two or three minutes, there will be room for another two or three-tenths of a gallon to be squeezed in. I have always assumed this was caused by the weight of the fuel pushing the tanks out to more completely fill the cavity.

If I do this on a hot day and then park the airplane for an hour or two, the fuel will expand and flow out the overflow vents.

From this completely unscientific and unsubstantiated data acquisition procedure I have deduced that the tanks just won't handle any more fuel than can be put in via the fill ports!

If you, or anyone else, should try transferring the tip fuel and find I am wrong, I would look forward to being told all about it!

Incidentally, I have never found a "Forty Gallon" tank which did not have over forty gallons of USABLE fuel. The so called "three gallons of unusable fuel" just does not exist if the airplane is flown in a normal coordinated manner.

If you want to get the maximum range from your airplane, check with your fuel supplier to see if a higher density fuel is available in your area. In addition to using that higher density fuel, chill it in a deep freeze to just as cold as you can get it and don't put any fuel in your tanks until just prior to takeoff. Takeoff on one tank and switch to the other one just as soon as you are safely airborne.

That should burn out enough fuel to allow for expansion as the fuel warms up!

Happy Skies,

Old Bob

[ARTICLES/20010221..215801.msg04337.tex]

10.5 OPERATE-LDGGEAR

Gear Extention Speed**Thu, 8 Feb 2001 09:37:19**

In a message dated 2/8/01 1:15:15 AM Central Standard Time, Ernie_Ganas@email.msn.com writes:

Bob,

153 IAS is the V_{lo} and V_{le} for the 36 series with the caveat of "Do not extend, retract or operate with landing gear extended above this speed except in emergency"

Ernie Ganas BE36 E-160 DVO (Novato, CA)

Good Morning Ernie,

Interesting. My V35B POH shows 152 for Calibrated Airspeed, 154 for Indicated Air Speed with the same caveat. Probably just a few changes made along the way in who was writing the handbooks.

When I owned my straight 35s, I stuck religiously to the 100 mph (87 Knots) limit, but I knew a lot of folks who didn't.

Those teeny little rods on the nose gear doors were the ones that bothered me.

My discussions with the Beech test pilot occurred during those days. I never owned, or to my knowledge, flew one that had the beef up kit installed so I am not sure what all it consists of.

The main gear doors don't look much different on my V35B than I remember them on the straight 35s except for the actuating arms and the hinges. They appear to be a little heavier, but I don't have any around to check these days.

I still normally slow my airplane to around 120 knots before throwing out the rollers and down to 105 to 110 before extending the barn doors. My former employer requested that we try to get the machines slowed to the minimum speeds for gear and flaps before using them, if at all practical. They claimed it not only saved fuel to do it that way, but that less wear and tear was evident on the components.

I figure if it was good for a 747, it's good for a V35B.

However, as I believe you, Tom and all have said, I wouldn't hesitate to throw out the gear anytime if safety demanded it!

Happy Skies,

Old Bob

[ARTICLES/20010208_093719_msg03120.tex]

Gear Extention Speed**Thu, 8 Feb 2001 09:54:46**

In a message dated 2/8/01 7:47:56 AM Central Standard Time, swo49@hotmail.com writes:

Bob: Mine are definitely larger than 1/8" - they are pretty beefy. By the way, in my new POH, under emergencies, it says that for stability in IFR or poor weather or bumpy conditions - throw the gear out - it does not even state a maximum speed for doing this !? I still wish I had a higher, "official" gear extension speed. Steve

Good Morning Steve,

Your airplane is one of the late airplanes, not an early one!

There were a ton of changes between the straight 35 and the A35, a lot of changes on the B35, quite a few on the C35 and then just a few now and then from there on out. The major changes to the structure and the airframe, especially as concerns maintenance and durability items, occurred on the very early airplanes.

My gut feeling is that your K35 gear doors are not a lot different from mine, but I would still stick to the published speeds unless there is a safety issue involved.

I suppose you could get out some parts books, check all of the part numbers of the doors actuating mechanisms, skin thickness at the attach points and such. Maybe that would allow you to make a determination to your own satisfaction that no serious damage is likely to occur with a higher gear extension speed, but I think it is easier and more comfortable to just educate yourself on the techniques required to get it slowed down to the published operating speeds when needed.

Happy Skies,

Old Bob

[ARTICLES/20010208.095446.msg03121.tex]

Gear Position Indicator**Thu, 24 Feb 2000 12:41:04**

In a message dated 2/24/00 10:54:39 AM Central Standard Time, jtsmall@onramp.net writes:

Have you seen or has anyone on the list rigged something like this and found it of use? In thinking about it the info seems not much different from 'not up' and 'not down' that the single light system provides.

The Swift arrangement has, as you note, the same problem in that it does not let you know if the knuckles are over-center. By the way, they still need some spring pressure to remain over-center. If I were to ever land when I had any indication that the gear might not be fully down and locked, I would choose the smoothest runway I could find that was dead into the wind, try to avoid all side loads on the landing and rollout, then park it straight ahead and get out of the airplane very gingerly. I would make no effort to leave the runway or move the aircraft until I had checked the spring load on the gear knuckles.

Happy Skies,

Old Bob

[ARTICLES/20000224_124104_msg03519.tex]

Landing Gear Position Indicator**Wed, 23 Feb 2000 11:42:39**

In a message dated 2/23/00 9:27:37 AM Central Standard Time, beech_35@yahoo.com writes:

Has anyone worked on this thing? Can they be made to work reliably? Presuming I have to fix it, is there anything someone can tell me about any peculiarities during repair? Thanks in advance!

Good Morning John,

You're right, it is kinda flimsy!

On top of that, it doesn't tell you much. If it says the gear is up, that means that the nose gear is not down. If it says the gear is down, that means the nose gear is not up. It is connected to nothing but the nose gear and will not tell you whether even that gear is down and locked. It is a rather poor device, but it is required to be in operable condition.

I would recommend just messing around and bending things as necessary until you are happy with the looks! Don't rely on it for anything!

Happy Skies,

Old Bob

PS One of our Chicago area pilots recently had an alternator failure which he did not notice. By the time he wanted to throw out the wheels, the battery was gone.

He cranked it down, but it didn't go all of the way. You know the rest, the gear collapsed after landing.

I wish Beech had never mentioned the fifty turns in their manuals! Some take fifty-three or fifty-four turns!

In any case, please crank until you can crank no more!! Forget about the number of turns!!

If you crank so hard that you break something, at least the gear will be down and locked when you do it.

On the earlier gear boxes, you will feel a very positive stop when the gear is all the way down. On the newer ones, it just gets hard to crank. Crank until you can crank no more!

[ARTICLES/20000223.114239.msg03422.tex]

Manual Gear Extention**Thu, 7 Jan 1999 15:39:05**

Good Afternoon All,

Just got to add my two bits!

The early airplanes are MUCH easier to crank down the gear than the new ones. You sit enough lower so that the handle falls more comfortably to hand. Unfortunately many folks have added padding to the seats in the early airplanes such that the seating is almost as high as the new airplanes with adjustable seats.

I always taught that one should trim the airplane for flight at the slowest speed comfortable in the conditions that prevail. That means 80 mph or less for light weights and 80 knots or less for the heavy ones.

It goes without saying that there should be adequate room for a stall recovery if one should be encountered.

I then recommend setting up at least a 500 foot per minute climb rate before starting the gear down.

It helps a little for those last few turns, if one will pull the nose up to almost the burble and then ease it forward to a little less than one "G" as the last few turns are performed.

With a little practice, even an old worn out weakling like me can get the gear down fairly smartly and with little fanfare.

The extension during a climb adds a lot of stability due to the power that is carried and it covers for the extra drag that will occur as the gear comes down.

Works for me!!

Happy Skies,

Ancient

[ARTICLES/19990107_153905_msg00314.tex]

Manual Gear Extention**Wed, 23 Feb 2000 22:31:01**

In a message dated 2/23/00 9:06:56 PM Central Standard Time, flyinglo@msn.com writes:

— Original Message — From: Phaedra Hise phaedra@aerobat.com I had to hand-crank mine...and it was really hard to fly the plane AND crank the gear. . I learned to crank a bit, fly a bit, crank a bit, adjust the trim, crank a bit, fly some more, etc. It took a long time and I was really tired.

For What It's Worth,

The procedure I recommend for cranking the gear down is as follows.

On the later model aircraft, slow the airplane down to 80 to 85 knots, on the early ones use 80 to 85 MPH. Apply enough power to fly level at that airspeed and trim the airplane appropriately. Add about five inches of manifold pressure and allow the airplane to climb at the trimmed speed. Start cranking. You may count the turns if you want, but keep cranking until you can't crank it anymore. The airplane will gradually come back to level flight. Keeping the speed as low as possible will make it easier to extend the gear. Going from a climb to level flight is a LOT more comfortable than having to continually add power and adjust the trim between bouts of cranking the gear. On the earlier airplanes with the bench seats, the seating position is enough lower that the cranking is much easier. With the adjustable seats, the seating position is enough higher that even a gorilla will have to bend down to an uncomfortable position to handle the crank! I find it easier on the later airplanes to have the seat in the furthest aft position possible.

It works for me! (But it was a lot easier when I was fifty years younger!)

Happy Skies,

Old Bob

[ARTICLES/20000223_223101_msg03466.tex]

10.6 OPERATE-LOP

LOP Opeartion**Tue, 11 Jan 2000 19:35:04**

In a message dated 1/11/00 4:37:00 PM Central Standard Time, guntalk@guntalk.com writes:

I've heard of the nitrous oxide/nitric acid thing, Howard. I'm not a chemist, not a scientist, but I just don't believe it. Sounds like theory borne of "we don't know, but here's an idea" type thinking.

Wonder if anyone has any data supporting the corrosive gas theory???

Has anyone who is flying LOP seen evidence of this? Did it show up in any of the big radials over a 40-year period?

Good Evening Howard and All,

I have been gone for a couple of days and have several hundred messages which I have not yet read, so if this comment is off subject, please accept my apologies in advance!

When I was studying for my Flight Engineer Rating in the early fifties, one of the texts which I used mentioned a problem with "oxygenation" of the valves on certain prewar P&W 1830s.

I don't recall the exact model numbers involved, but we were taught that some of the engines should not be leaned on the lean side of best power due to a characteristic of some of the early valves whereby they would shed metal around the stem and produce a "necking" thereof when operated in an environment of surplus oxygen. Sometimes the heads would even break off. We were also taught that all of the "modern" engines, (1946 or so and later) had valves made from a material that was not susceptible to the oxygenation problem.

Every big round engine that I ever operated was generally run on the lean side of best power. Note that I have said lean of best power! We had no EGT gauges in those days and only the R2800s and R3350s had torqueometers. The R2000s and R1830s which I flew didn't have such fancy stuff. We would occasionally power lean the 1830s by leaning one side till we could feel the power loss and then leaning the other side to get the ship in trim. When we first got the DC-6, we only leaned two BMEP below best power. Hardly any drop at all. After a few months, we went to abut a twelve BMEP drop which would have been around five percent on the lean side.

The machine that really went lean was the R3350 turbo compound on the DC-7. Right from the time they were delivered, they were aggressively leaned. We had a lot of training about the engines and it took some time to convince the troops that it really worked, but if the specified procedures were followed, things worked fine. The guys that were constantly losing engines were the ones who didn't follow the book and ran them too rich!

I believe Jim Northcutt mentioned that we had a CHT gauge on both the front row and

the rear row of cylinders on the R3350 so that we could spot the problem if a distribution shaft had slipped and was unbalancing the fuel distribution between the front row and the rear. If that happened, it wasn't the row that was lean that had the problem. It was the one that was too rich. It would burn the cylinders up! If we found a difference of 25 degrees or more between the front and the rear rows, we would either feather the engine or at most, operate it at very low power.

Rambling on and possibly out of context!

Happy Skies,

Old Bob

[ARTICLES/20000111_193504_msg00612.tex]

LOP Operation**Tue, 11 Jan 2000 22:50:18**

In a message dated 1/11/00 6:05:40 PM Central Standard Time, glenno@sgi.com writes:

I am posting this to this group because in addition to your answers, I am interested in knowing the type of engines of the people in this group who are running LOP with GAMI injectors. I am interested in knowing the approximate ratio of installs of GAMI injectors on IO-470 verses the IO-520/550 engines. Also, do you have a comparable number of test hours in your shop on 470's verses 520/550's? Thanks...

Glenn

Good Evening Glenn,

I am currently operating an IO-550B with GAMIs and regularly operate it on the lean side of peak EGT. At very high altitudes when I can't get over 65 percent or so, I will occasionally operate it at peak to get a little more power.

I have been operating on the lean side of best power in Bonanzas and other airplanes for over fifty years. It was the way I was taught and I have seen no reason to do otherwise, except on those airplanes and engines where the distribution between cylinders was too poor to be able to do so. I have had various E series engines that had almost perfect distribution and others of the same model where the distribution was terrible. The same thing goes for the IO-470 except that I have flown very few that had any decent distribution at all!

Does that help?

Happy Skies,

Old Bob

[ARTICLES/20000111_225018.msg00623.tex]

LOP Operation**Sun, 16 Jan 2000 15:23:21**

In a message dated 1/16/00 12:26:11 PM Central Standard Time, Dave@VanHorn.com writes:

What I want to know is, how far LOP should I go?

Good Afternoon Dave,

It depends!

The key element is, how good a job is the engine doing of converting the pressure developed in the cylinder into productive propulsion power. If you lean to the extreme at a high RPM, low manifold pressure situation, there is the possibility that you might move the pressure developed down so far on the power stroke that some power is lost. There is also the potential for having a higher than desirable temperature of the gases as they pass the exhaust valve.

The leaner the mixture, the slower it burns, the lower the pressure, the slower it burns. Both are effectively retarding the timing of the engine. The high RPM effect is also toward retarding the total timing.

Sure would be nice if we could adjust the mechanical timing on the fly wouldn't it?

Until that happens and until we get better information about where the peak pressure is occurring, I limit my leaning to a maximum that still results in a steady decrease in EGT.

If the EGT starts to stabilize, or goes up a little with continued leaning, I figure that the flame front is being moved too late in the stroke and I change something, RPM, manifold pressure or mixture being the only things over which I presently have control. Most generally that happens at high altitudes and I don't have any option other than to run somewhat richer than the leanest at which it will run. It is my totally uneducated feeling that avoiding the point at which the flame front is still active close to the time that the exhaust valve opens, has to provide more power than if it is still burning at the bottom of the power stroke! It also reduces the temperature of the gas as it passes out through the exhaust valve.

The power curve on the chart shows a very flat curve from a point rich of max economy to the point at which it ceases firing. I figure anywhere from peak EGT to the point at which the engine quits is relatively efficient as far as economy is concerned. Further leaning mainly provides additional control over the temperature at which the engine operates. In addition it affects the timing of the power pulse.

Once you have leaned past peak EGT, take note of the airspeed. Try leaning another 20 to 25 degrees, let it stabilize and note the speed and fuel flow. Keep doing that and you should be able to judge fairly close where the optimum lean point occurs.

Sure will be nice when George provides us with a method of controlling just when that peak pressure will occur!

Happy Skies,

Old Bob

[ARTICLES/20000116_152321_msg00887.tex]

LOP Operation**Sun, 16 Jan 2000 16:38:21**

In a message dated 1/16/00 2:39:25 PM Central Standard Time, gwbraly@gami.com writes:

At high power (70 to 85%) leaning to 60 to 90F LOP works well to modulate the horsepower and still use a wide open throttle for lowered engine pumping losses. I do this routinely, down low in normally aspirated engine operations.

At lower power, say, 60 to 70%, leaning anywhere past 50F lean of peak on a normally aspirated engine is really self defeating, as the BSFC gets slightly worse at 60F LOP, rather than 30 to 50F LOP.

Below about 60%, leaning to 10 or 20F lean of peak works fine, and leaning further makes the BSFC go up.

Good Evening George,

Thanks for the accurate data!

The numbers you provide are consistent with the experiences that I have encountered.

Happy Skies,

Old Bob

[ARTICLES/20000116.163821.msg00893.tex]

10.7 OPERATE-MISC

Cold Weather Operation**Thu, 30 Oct 1997 08:15:27**

HI Ron Davis,

In a message dated 97-10-29 14:03:24 EST, you write:

I was planning on going down to the local K-Mart and buying a cheapie full or queen-sized electric blanket and laying it on top of the cylinders overnight with the setting on low or medium, and plug the cowl vents with old pillows or whatever's handy.

Sounds interesting. Never tried that. The big thing seems to be able to contain the heat. You will probably need good insulation on the inside or outside of the cowling. I made mine from some old comforters, blankets and plastic but those professionally made ones are surely lighter and easier to use.

One thing that I used for heat many years ago was a little propane heater. I have forgotten what they are called and I am not a camper but they are flameless after they are lit and are OK for use in a tent or other enclosed space. I pulled the lower cowl cover and placed it inside, then covered the engine with my Blankies and an outer moisture proofing of plastic material. It always worried me a little bit but I never discerned any problems.

I knew of some people who used the exhaust of a car to heat the engine. They would put the covers over the cowling, run a flexible pipe from the tail pipe up under the cowl near the aircraft exhaust, go have a cup of coffee and when they returned the engine would be warm to the touch. I think that is an atrocious idea. It didn't heat the interior of the engine at all and the combustion residue from the car exhaust was all over the engine compartment. Bad idea.

I made a device to run the heat from the car interior into the cowling thru the bugeyes. Had a board which fit in the car window and one duct to the left side with another from the right and a fan powered from the cigar lighter plug in one to get the air circulating. That heated the engine at least as well as the systems that an FBO would put on your airplane but the engine people tell me that an hour or so doesn't really heat the engine through and through so that is no longer recommended.

Don't forget to see that the battery is properly warmed. A lead acid battery fully charged has no cranking power left at somewhere around 36 degrees F below zero. Even down around 10 or 15 degrees above, heating the battery helps a lot. I don't know if yours is still buried behind the firewall or not, but if it is, I would pull the cover and maybe even slide it out a little to get the heat around it.

If you get a start and then don't keep it running you may ice the spark plugs even on a fairly warm engine. If it's real warm, no problem, but when the cold air is sucked in on the start and the initial firing occurs H₂O is released from the combustion and if the plugs are below 32 degrees ice may form across the plugs and short them out. It usually

happens on those times when each cylinder only fires one or two times before it quits.

Obviously the best bet is a thoroughly warmed up engine!!!

Nothing is easy is it?

Your Electric Blanket idea sounds neat. Can't wait to hear how it works.

Yours,

Bob

[ARTICLES/19971030.081527.msg02258.tex]

Cold Weather Operation**Sat, 1 Nov 1997 18:37:10**

Hi all,

I sent this out Friday morning and it hasn't shown up on my list yet so I thought I would try again. If you are receiving a duplicate, please accept my apologies.

Hi Bruce,

In a message dated 97-10-31 06:30:33 EST, you write:

I saw a drawing and I believe an article, I think in an old ABS Mag., which adapted an electric space heater for heating the engine compartment. The author attached an outside vent plate used for an electric clothes dryer, to the front of the space heater. Then attached the dryer duct hose to that and ran the hose into the engine compartment.

This sounds good to me but I want to caution again that heat must be applied for a long time.

HOW LONG?

I don't know for sure but I would probably go for 8 hours or so, at LEAST two or three as a minimum.

A high heat such as the old Herman Nelson heater can make the engine too hot to touch in fifteen minutes but the crankshaft may still be ice cold. A small amount of heat applied with good insulation and protected from the wind over a long time will do a better job than rapid heat.

I think that electric heat will be just fine, but I wonder about the propane units that do not have heat exchangers. Some years ago I tried a small gasoline fired heater which did not have a heat exchanger and when the heat was applied to an engine at around zero degrees F, a 1/4 inch coating of ice covered the entire engine and interior of the compartment within about fifteen minutes. It eventually melted and in an hour or so the engine was dry and warm. This was before I had been enlightened to the necessity of long term heating but I still never did it again. I didn't like all of the moisture and I wonder about the residue of the combustion being deposited on the engine and electrical components.

Does anyone know if propane has the same problem? Even the WW II Herman Nelson heater used a heat exchanger. I imagine that was the reason why.

Yours,

Bob

[ARTICLES/19971101.183710.msg02310.tex]

Cool Down After Parking**Fri, 10 Sep 1999 00:21:52**

In a message dated 9/9/99 11:01:41 PM Central Daylight Time, jeo1@primenet.com writes:

Murphy's Law and Mother Nature I don't want to test any more than I have to. If the cowl is left open without the owner there to close it if a gust of wind comes up, he/she is asking for a bent cowl door. Jerry O.

Good Evening Jerry,

I am a devotee of the open cowl door for cool down purposes, but I agree totally that the door must be guarded carefully to avoid problems.

I have been doing it for over forty years now, but it still worries me every time.

I find that if I open it right after parking there is about a fifteen to twenty minute period during which I am around the airplane, either for fueling or just securing it. There is often a considerable delay getting transportation available which gives me a reasonable time to cool things down

I am something of a fuss budget with my airplane and I don't use it for fast transportation. I fly it for the pleasure of messing around with the aircraft and the more time I can spend with it, the better I like it!

I suppose those who are flying for the speed it provides are in a hurry to leave the airport and wouldn't want to spend time baby-sitting the cowl doors.

Happy Skies,

Old Bob

[ARTICLES/19990910.002152_msg08217.tex]

Cool Down After Parking

Fri, 10 Sep 1999 12:47:58

In a message dated 9/10/99 10:10:25 AM Central Daylight Time, jeo1@primenet.com writes:

Bob, I love you, man. But I hope I can conclude that after your post-flight duties, you close the cowl doors before leaving the aircraft. Jerry O.

Good Morning Jerry,

Most assuredly!

I don't leave the airplane alone at all without closing the cowl doors. If a rapid pit stop is required, the doors aren't opened till after I have returned! I have considered methods to brace the cowls more securely so that such close attention would not be required, but have come up with no light weight and yet, secure method. Does anyone have any neat ideas?

Happy Skies,

Old Bob

[ARTICLES/19990910.124758.msg08246.tex]

De-icing Airplanes The Easy Way**Sat, 2 Jan 1999 19:00:11**

Good Evening All,

There are probably better and lighter weight garden sprayers available now then there were back when I was actively involved in an air taxi operation but here is how we did our deicing.

We carried a two gallon garden sprayer of the type which has a pump to build up air pressure for spraying the liquid.

We also carried two or three gallons of plain old automotive antifreeze, I guess that's ethylene glycol, but don't really know. It could be that some of the modern aircraft specific deicing fluids might be better.

We found that almost every fixed base operation had a janitor sink or other facility where we could obtain hot water.

The snow would be removed with brooms or whatever 'til there was just a layer of ice left on the aircraft.

We would spray the aircraft with hot water 'til things were fairly clear and then throw one gallon of antifreeze in the sprayer and fill it up with the hottest water we could obtain.

A thorough spraying using that two gallons of mixture seemed to be plenty for a Bonanza, Baron or other small aircraft (in most cases).

Once in a while, a second gallon might be required, but that was rare.

It is cheap and not excessively heavy to carry in the airplane as standard winter equipment.

I have used that procedure with temperatures as low as zero F with good results.

For what it's worth!!

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19990102_190011_msg00037.tex]

Hung Starter**Tue, 29 Aug 2000 10:40:14**

In a message dated 8/29/00 12:53:10 AM Central Daylight Time, carminefp@home.com writes:

Hi Bob, The voltmeter shows actual battery voltage. When cranking the starter it will bottom out because the meter minimum scale is approx. 10 volts. With alternator on engine running it indicates approx. 14.2 volts. Alternator off engine running it indicates batt. voltage. It's an after market gage with a two position switch. the other circuit goes to my emergency batt. bus ie; 7 amp hr. sealed wet cell. I have a 71V35B. It was added by the original owner Brainard Holmes who was the CEO of Raytheon. Cheers Carmine

Good Morning Carmine,

Sounds good, voltage is nice to have.

While I hope you never have the opportunity to see what happens if the starter hangs up, I think the voltage would go back to normal as soon as the starter disengages. Once it is free spinning and no longer required to push around that old engine, the amperage should drop way down. I don't think you would note any difference in voltage.

Right off the top of my head, I can't think of any way to tell that the starter is still running after an engine start other than to check for power on the starter buss, flow through that buss or abnormally high output from the alternator. The light checks for power very well at relatively low cost. It would take an awfully big shunt to carry the normal starting current of the starter in order to have an ammeter in the circuit.

Somebody may have a Bonanza wired for that, but I have never seen one.

The thought just popped into my head that we did have such an indication on the Caravelle, but that's another story!

To check for the high output on the alternator, you would need an ammeter in the alternator output circuit. It is my recollection that the early Bonanzas had the ammeter wired to indicate the output of the generator, not the input into the battery. Most of the later ones have the stock ammeter wired the same as most automotive applications, the ammeter shows flow to or from the battery.

I have an Electronics International Volt/Ammeter installed with three shunts, the original factory one that reads in and out current to the battery and another one in the output lines of the standby and primary alternators.

I THINK I could tell that the output was higher than normal if I thought to check it!

I installed the warning light shortly after Beech started offering it on the production airplanes. Fortunately, I have never had the occasion to find out if it works!

Have you ever had occasion to use the standby battery? I know Mooney is offering a dual battery setup, but I don't know how it is hooked to the system.

There are many so possibilities and ways to spend our money, it gets very confusing!
(Plus Heavy!)

Happy Skies,

Old Bob

[ARTICLES/20000829_104014_msg12770.tex]

Hydraulic Parking Brakes**Tue, 12 May 1998 21:33:32**

Good Evening All,

For what it is worth, I have never flown an airplane with hydraulic brakes which was deemed safe to leave parked with only the parking brake set. Most airplanes that I have flown were chocked and then the brakes were released to avoid excessive heat build up in the brake units. Even if the brakes were cool it was never deemed prudent to rely on the hydraulics holding pressure. Even our food service and fueling vehicles were equipped with chocks which were always used even for short term parking to avoid the possibility of the vehicle rolling into the aircraft.

It may have been just a company policy, but that is how we did it on everything I flew from the DC-3 to the 747. I have flown a couple of small planes with mechanical brakes which had separate parking brake levers similar to those found on cars of the thirties. One of my bosses felt it was OK to park those with just the parking brake set but most of the pilots chocked them or used tiedowns anyhow.

Leaving any airplane without chocks or tiedowns seems to border on carelessness considering the industry history of aircraft parking brake usage. I would like to hear what your lawyer thinks about that.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980512.213332.msg02444.tex]

Noise**Mon, 26 Oct 1998 19:05:48**

Good Evening Skip Weld,

In a message dated 10/26/98 4:43:39 PM Central Standard Time, Sweld11111@aol.com writes:

How loud is a Bonanza supposed to be? I flew my k-35 [with a 520 and black mac 3 blade prop], the other day for the first time in several months and was astounded at the level of exhaust noise from the engine.

Obviously there will be a difference of opinion as to what is noise and what is the lusty sound of power to be relished by we aviators.

I would first check to see whether the flame cones are still in your mufflers. They tend to burn out rather quickly and will make some difference in the perceived noise level.

I installed BDS silencers on my tailpipes a couple of years ago and they reduced the noise somewhat though they tend to lose effectiveness after a few hundred hours of operation.

Various sound deadening materials are available for the Bonanza and all are productive with the heaviest doing the best job of noise reduction The later airplanes with heavier windows and more insulation as standard equipment are quieter but your airplane can be made as quiet as any if you are willing to put up with the extra weight.

The Aero Sound Shield folks do a good job but so do lots of interior shops.

Our five children were all raised in Bonanzas from day one and we never used anything special to protect their ears. The airplanes were obviously very early models with relatively poor soundproofing but we also used a lot less power while flying. Maximum allowable cruise RPM was 2050 on the early Bonanzas.

The oldest is now forty-eight and none of them has any abnormal hearing loss. Our youngest son is currently flying a Beech model 18 that is in need of some super soundproofing and in the meantime he has purchased some child sized headsets which his two and six year old children wear.

He has set up a VCR and a portable television so that the children can watch movies and cartoons while they fly and they seem very happy to wear the headsets so that they can enjoy the show.

There have been discussions on children's headsets and soundproofing of the Bonanza on this site within the last year or so. You might want to check the archives to see what you can find.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19981026_190548.msg06307.tex]

OWT

Sat, 15 Aug 1998 00:37:32

Good Evening CBarnhart,

In a message dated 98-08-14 18:08:51 EDT, you write:

Isn't it strange that some bits of information come to be believed by large segments of a population even when they are untrue?

Comments?

A lot of the OWTs that we contend with were derived from reasonable efforts to put a lot of bodies into airplanes over Europe and Japan with the greatest possibility of getting them back home in one piece while still spending minimum time training for the job.

Those that did survive the wars and evidenced an interest in staying in aviation, became the CAA (later FAA) inspectors, flight instructors, test pilots and other experts of post war aviation.

It was reasonable that they felt what they had been taught was the gospel and the only truth. After all, it had brought them home!

Unfortunately, many of those wartime training expediencies found their way into training manuals and airplane operating manuals over the years and it is extremely difficult to get them out of our hair.

After all, it's in print so it must be true!

Not only that, but that neat old P-47 pilot who taught me how to fly said that was proper and how could he be wrong?

Look at the difficulty George is having convincing modern pilots that the methods used by Lindbergh and others of the era were technically sound and reasonable.

George even has modern instrumentation and evaluation techniques to provide direct information that was not available earlier to bolster his position and yet many refuse to accept it because that is not what they were taught.

We need to continue to question and evaluate all that we hear, be skeptical but not closed minded.

There is a lot to be learned, but there is also a lot to be relearned.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980815_003732_msg04361.tex]

Tie Down Technique

Sat, 12 Feb 2000 22:33:44

In a message dated 2/12/00 7:27:28 PM Central Standard Time, BobsV35B@aol.com writes:

I used the old Cessna gust lock technique (pilot's seat belt around the yoke).

Good Evening Once Again Bill,

Just a little more comment! Tying down the airplane with the stick back as you describe is always the wrong thing to do! This is true whether on conventional gear or tricycle gear aircraft.

The elevator should be nose down or neutral, never in the nose up position. That is a common error and is responsible for a lot of blown away aircraft.

Happy Skies,

Old Bob

[ARTICLES/20000212.223344.msg02863.tex]

Towing**Tue, 16 Sep 1997 10:33:54**

Hi Buz,

A very wise decision!!

I have one of the axle tow units from Idaho and I love it. At my advanced years and with the overweight Bonanza (fits well with it's overweight pilot) I now own it has been essential to my being able to operate without assistance..The one thing that I have been nervous about has been putting that stress on the yaw damper ram and the nose gear steering mechanism. I try to watch very carefully to be sure that the towing turn limits are not exceeded. I think that the tire on my unit might slip before damage was done but I sure wouldn't count on it! I think it would be great if they would adapt it to use the pins.

The pins are definitely the way to go!!!

I have had the pins broken by line service at a couple of very top line FBOs. When it has happened, they have called to ask permission to replace the pin at their expense. I have asked that it be done by a licensed mechanic and I have checked the job after. I can't imagine anyone being charged as one of our members mentioned!

Let us all know how your new tug works out.

PS Some one mentioned towing the airplane backwards by using the tail tiedown. Beech evaluated that some years ago and said that it should NOT be done. After considerable pressure they came out with a tow force that could be used without damaging the structure of the airframe (the tiedown itself is not the weak point) and it was in the order of 550 pounds. They specified that a weak link of the required strength be inserted in the towline and further stated that they still didn't recommend towing by the tail. If the airplane was to be towed the recommended procedure was by attachment to the MAIN gear with a bridle to equally distribute the load. The preferred attachment point for the tow line was at the main gear axle and if that was not practical, as low on the gear structure as possible.

Yours,

Bob

[ARTICLES/19970916_103354_msg01746.tex]

Towing Backwards**Tue, 13 Jul 1999 13:26:25**

In a message dated 7/13/99 11:31:38 AM Central Daylight Time, rcb@appsig.com writes:

Wonder if you could pull it backwards hooked to the nose gear.

Bob Briggs

The factory also says that the nose gear is not the strongest thing on the airplane. I do believe there is something in the manual about the design limits being exceeded if it hits a four inch curb at normal taxi speed? I don't think it would be as strong towing backwards as it is towing forward. The factory recommended procedure is to tow it backwards by hooking to the main gear as close to the axle as possible.

One of their bulletins described a towing bridle which consisted of a couple of small pipes fitted into the axle as the small jack fittings do. Those were fastened to two equal length ropes which were long enough to reach just aft of the tail. They were then joined to the towing means.

I have never seen such a device used, though I have tied rope around the struts just above the axle and made such a bridle when extracting an airplane from the mud!

Works great!

Happy Skies,

Old Bob

[ARTICLES/19990713_132625.msg05978.tex]

Towing By the Tail

Tue, 18 Aug 1998 13:21:13

Good Afternoon Joe and Larry,

In a message dated 98-08-18 12:31:31 EDT, you write:

We will attach the cable to the tail tie-down and pull it into the hanger.

Be sure and put a "weak link" in the tow cable. Beech some years ago sent out a service notice concerning pulling the airplane backwards by the tail tie down and I believe they recommended a weak link that would break at around 550 pounds of pull to avoid overstressing the tail assembly.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980818_132113.msg04492.tex]

Towing By the Tail**Fri, 28 Aug 1998 10:47:04**

Good Morning Michael J. Beccario,

In a message dated 98-08-28 07:34:59 EDT, you write:

I also have a 35-J and I installed a winch in my hangar about 6 months ago. I have quit an incline and a 1 inch step up at the entrance to the hangar. I was very concerned regarding towing the aircraft by the tail so I reasoned that I could safely tow it from the nose gear in the same manner a tow bar would.

It is proper that you worried about the strains that would be put upon your J35 aircraft by winching it up the incline and over the 1 inch step up into your hangar. The solution you arrived at is quite ingenious.

The only difficulty is that Beech does not endorse aggressive towing of the aircraft either forward or backward by the use of the nose gear.

That is one of the reasons the shear pin was put on the nose gear and moving it by any other method than those shear pins is not encouraged by the factory.

Their suggestion for moving the aircraft over any but the smoothest ground is to attach ropes to the main gear and, in extreme cases, to the nose gear so that the pull is applied low on the gear legs and does not transfer through any of the structure but is applied directly to the wheels.

Any operation other than the Beech recommended procedure makes your operation a "test" operation and may lead to damage to the airframe.

I understand that many of the commercial aircraft towing devices (including the one I use) attach to points other than the towing pins. That does not relieve us from the responsibility of evaluating the force that might be applied by methods other than those approved by Beech or Raytheon.

I don't know of any "weak link" number that has been recommended for towing such as you use, but I would definitely determine a safe amount of pull and install a weak link in the towline.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980828_104704.msg04928.tex]

Towing By the Tail**Tue, 13 Jul 1999 08:38:53**

In a message dated 7/13/99 6:04:28 AM Central Daylight Time, epoole@scoot.netis.com writes:

I thought you weren't supposed to haul the plane around by the tail tiedown; it's reported to not be stressed/braced adequately for that.

Good Morning Eric,

Very true statement!

Beechcraft did bow to the pressure of those who wanted to pull the airplane backwards by using the tail tiedown and ran some tests. The bulletin that resulted still recommended that it not be done, but stated that if one really wanted to do so, a weak link be inserted in the line at the tail tiedown. To the best of my recollection, the strength of that weak link was to be no more than 550 pounds.

They further specified that the loads be applied very much in line behind the aircraft. I don't remember the cone of acceptability, but I do believe it was something like ten or fifteen degrees from the centerline.

I am sure I have a copy of the report somewhere because I used the data to get a local approval for a glider tow hitch on several Bonanzas. If anyone is real interested, I will try to locate it. Worst case, I could probably contact the FAA and look up the 337 from some of those airplanes.

Happy Skies,

Old Bob

[ARTICLES/19990713_083853_msg05968.tex]

Towing With Gust Lock Installed

Mon, 22 May 2000 09:00:51

In a message dated 5/22/00 7:05:04 AM Central Daylight Time, ajlspero@home.com writes:

Hello, I inadvertently pulled my '66 V35 out of the hanger with the control lock in place. This involved turning the nose wheel with the tow bar. Did I damage anything? During taxiing, the aircraft seems to steer as always. I haven't flown it.

Alan S.

Good Morning Alan,

If you are discussing the pin in the control column control lock, there is no problem at all. You can tow your airplane anywhere and turn the nosewheel to the turn limits all you want without causing any damage at all. If you have installed some sort of a pin in the rudder pedal casting, I would limit movement of the aircraft, though I have seen towing done without damage while a rudder pin was installed.

Happy Skies,

Old Bob

[ARTICLES/20000522_090051_msg08461.tex]

Towing backwards**Mon, 13 Mar 2000 00:43:42**

In a message dated 3/12/00 3:56:56 PM Central Standard Time, newmanb@rocketmail.com writes:

But I think I would just pull carefully by the tail ring, or if I felt really anal about it I would build a fixture to attach to each side of the nose gear for a balanced pull...the way the tugs attach.

Good Evening Bob,

The method called the "Pobanz Method" is the one recommended by Beechcraft. I don't know what Raytheon recommends.

No strain should be put on the nose gear which is not applied via the tow pins on the strut. They are designed to break before something critical breaks. No stress either forward or backward should be applied to the nose gear in any other spot, but a rearward force would be much worse than a forward force.

Beech did not approve of pulling on the tail tiedown either. It wasn't the strain on the tiedown ring that they were worried about, it was the strain being put on other components of the rear portion of the fuselage. After extensive pressure from users, they finally came up with approval to pull via the tail tiedown if a weak link was inserted in the line. To the best of my recollection, the allowable force was around five hundred pounds.

The best way to pull the airplane backwards is to tie a rope around each main gear strut and attach them to a balanced bridle.

The second best way is to use the method recommended by Beechcraft and which has recently been referred to as the Pobanz Method. If the tow ring portion of the pin which is stuck in the axle of the main gear is rigged properly, the pull will be so close to the strut that the angular strain on the scissors will be inconsequential.

Be especially careful about putting rearward strains on the nose gear. They have been folded by pushing backwards on the approved towing pins. Shouldn't have happened, the pins should have sheared, but it has happened. Pushing or pulling backwards on the nose gear is probably the absolutely worst way to move the airplane!

Happy Skies,

Old Bob

[ARTICLES/20000313_004342_msg04669.tex]

Towing by the Tail**Mon, 2 Jun 1997 18:46:46**

Use caution if you intend to pull it by the tail! Beech recommends that it be pulled by the main gear. They did come out with some information about 40 years ago concerning a weak link to be used in the tow line if you intend to pull it back by the tail tiedown. I think it was around 450 or 500 pounds maximum. If anyone is really interested I might be able to find the data in some of my old files. I used the information as substantiation for some glider tow hitches that I made for Bonanzas many years ago. Incidentally I use a five or six year old Power Tow and am quite pleased with it. There have been many design changes in these units over the years and not all of them were improvements. My son recently bought a new one with the clutch and likes my old one without the clutch better. (So do I)

[ARTICLES/19970602_184646.msg01029.tex]

performance Numbers**Sat, 5 Sep 1998 14:58:50**

Good Afternoon Larry Templeton,

In a message dated 9/5/98 8:59:56 AM Central Daylight Time, ltemplet@dnai.com writes:

We have a 1963 Deb with an IO-470N. Trues out at about 158-160 kts at 10,000 ft on 11.5-12 gph. This is slower than I would have expected, but has been fairly constant throughout several engine rebuilds and a prop change. We do have a number of external antennas but not enough to make more than a 5 kt difference. Larry Templeton

I am not real sure what your Deb should be doing but those numbers seem consistent with what I have experienced in my limited experience with those airplanes.

As to speed of the Bonanza/Debonair line in general. I believe that some of them are just plain fast and some are just plain slow.

You can strip off all of the antennas, fit all of the doors just right, re-rig to your hearts content and some of them will still be relatively slow.

I think there is the possibility of as much as ten mph difference between the fast and the slow of any certain model, weight or whatever.

The airplane I currently have is the slowest of it's gender of any I have owned or flown. One of my children has a J35 that is the fastest J that I have ever seen.

There was a rather lengthy discussion of speed and some of the efforts made by Mike Smith to increase the Bonanza speed on this site a few months ago. You might check the archives.

I am of the opinion that if all else is equal, there is a four or five mph advantage for the V-tail over the straight tail but I have flown Debbie's that were faster than similar vintage V-tails with equivalent power and weights. If you really want a fast airplane I guess the only way is to test hop the individual airplane and buy the fast one.

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980905_145850.msg05271.tex]

10.8 OPERATE-PROP

Excessive Prop Cycling**Fri, 28 Aug 1998 01:51:55**

Good Evening Glenn Humann And All,

I just wanted to comment that I agree completely with the evaluations contained in Glenns communication.

In a message dated 98-08-27 02:07:32 EDT, you write:

I acquired the following article excerpts from past issues of the ABS Magazine regarding excessive and/or deep cycling the prop. Sounds like cycling the prop multiple times and deep cycling are not too good for the engine and prop.

From the November 1987 issue:

Mr. Reick's mention of "deep cycling his prop three or four times now" is also an unnecessary and VERY HARMFUL action during runup. NEVER exercise a propeller mounted on an engine which has a counterweighted crankshaft any more than once, unless extreme cold soaking has occurred, and then only to make note of the first indication of RPM drop. Except at installation of the propeller, the prop dome and remainder of the system is full of oil and needs no fillup of "warm, clean oil."

From the February 1994 issue:

The prop on the new engine should not be cycled. Cycling the prop will fill it with oil, but places an extreme load on the piston rings and cylinder wall. This load could cause the rings to fail to seat. (probably doesn't do a broken in engine too much good either.)

From the October 1995 issue:

Does it do any good to deep cycle the prop several times during engine run-up to purge the air from the system? No! Deep cycling the prop is not recommended by any engine manufacturer on engines that have a torsionally damped crankshaft (so-called counterweights).

I hope the above information is of benefit.

Glenn Humann

Happy Skies,

Bob Siegfried Ancient Aviator

[ARTICLES/19980828.015155.msg04910.tex]

Excessive Prop Cycling

Fri, 28 Aug 1998 02:02:21

Good Evening George,

In a message dated 98-08-27 09:53:11 EDT, you write:

Why does running the engine at 1700 rpm and deep cycling the prop, which maybe loads the engine up to a 30 to 40 psi BMEP, "bad" for the engine, but loading the engine up at 100 to 140 BMEP at cruise "good" for the engine?

Only what I've been told but it make sense to me. The problem is not the "loading" of the engine but stealing the oil away from the front main bearing before it has fully warmed up. The necessary amount of oil to operate the prop during a normal takeoff is a lot less in proportion to that necessary to cycle the prop heavily before takeoff.

Happy Skies,

Bob

[ARTICLES/19980828_020221.msg04911.tex]

Stopping the Prop in Flight**Wed, 22 Sep 1999 10:08:40**

In a message dated 9/21/99 10:12:00 PM Central Daylight Time, epoule@scoot.netis.com writes:

Do you set up for "landing assured" and then try the old routine of stopping the prop and kicking it horizontal with the starter, or do you just let the insurance company have it?

And from Tom Turner this morning:

2. Level the prop: Gosh, almost every Beech I've ever flown has a three-bladed prop, so this point is moot g. If landing was assured, I was completely configured for touchdown and hand a couple hundred feet left to go, and I had a two-bladed prop, I'd try to level it out with the starter.

tt

Good Morning Eric, Tom and All,

The only way that I have been able to get a Bonanza prop stopped in the air, has been to put the aircraft in a ballistic curve, slow it below the one "G" stall speed and put it in a skid. Even then, it won't always stop turning. With the electric prop, placing it in maximum pitch (low RPM) position helps. I doubt that the engine will stop turning before touchdown from a normal approach even with the fuel and ignition shut off. BUT! I haven't tried it with a three blade or four blade prop!

Incidentally, one of the very few advantages of the four bladed prop is that it will help prevent nose bowl damage during a maingear extended, nose gear retracted landing!

Happy Skies,

Old Bob

[ARTICLES/19990922.100840.msg08718.tex]

10.9 OPERATE-TIPTANKS

Fuel Management**Fri, 16 Mar 2001 18:14:43**

In a message dated 3/16/01 4:12:05 PM Central Standard Time, Pete.Bedell@aopa.org writes:

I liked to empty the tips as soon as possible if we were to be heading into bumpy weather.

Good Afternoon Pete,

This is an interesting statement!

I do just the opposite. I try to have the tip tanks full if I am going to be heading into turbulence. The bending moment on the wing is definitely less with the tanks full than it is with the tanks empty. In fact the bending moment with the tip tanks installed, but empty, is about five percent greater with the empty tanks installed than it was before the tanks were installed. The tip plate effect of the tip tank moves the center of pressure outboard enough that the wing is slightly weakened with the tanks installed, but empty. Adding the fuel overcomes that deficiency and adds extra margin to the structure. I don't think the structure is dangerous either way, but the aircraft is definitely less likely to lose a wing with the tank full than it is with the tank empty.

Happy Skies,

Old Bob

[ARTICLES/20010316_181443.msg06000.tex]

Tip Tanks - Effect on Speed?**Tue, 13 Jan 1998 11:35:17**

Good Morning Tom,

In a message dated 98-01-13 11:10:04 EST, you write:

At both locations I found that, with tip tanks installed and at approximately equal takeoff weights, the airplanes took about 200 feet more to break ground (using the POH takeoff procedure), and at V_x climbed at 100-150 fpm lower climb rate, than the same airplanes under the same conditions with factory tips installed.

That is real interesting! It never dawned on me to check T/O and climb performance. I would be very interested in anyone elses experiences or thoughts on why this might be so.

Maybe I have been blinded by my positive view of tip tanks.

Thanks Tom.

Happy Skies,

Bob Siegfried

[ARTICLES/19980113.113517.msg00276.tex]

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