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MARCH

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DATE	LOCATION	HOST/AIRPORT
Apr 12-15	Woodland, California	Woodland Aviation (041)
May 3-6	Paducah, Kentucky	Midwest Aviation Services (PAH)
Jun 7-10	Spokane, Washington	Spokane Airways (GEG)
July 12-15	Greeley, Colorado	Harris Aviation (GXY)
Aug 16-19	Nashua, NH	Edmonds Aircraft Service (ASH)
Sep 20-23	Kalamazoo, MI	Kalamazoo Aircraft (AZO)
Nov 1-4	Hagerstown, MD	Hagerstown Aircraft (HGR)
Nov 29-Dec 2	Ramona, California	Cruiseair Aviation (RNM)

Register online at www.bonanza.org or ABS headquarters 316-945-1700.

B P P P S C H E D U L E

DATE	LOCATION	AIRPORT
Mar 16-18	Greensboro, North Carolina	(GSO)
Apr 27-29	Concord, California	(CCR)
May 18-20	Columbus, Ohio	(CMH)
Jun 22-24	Tulsa, Oklahoma	(RVS)
Sep 7-9	Manchester, New Hampshire	(MHT)
Sep 28-30	Milwaukee, Wisconsin	(MWC)
Oct 26-28	Santa Maria, California	(SMX)

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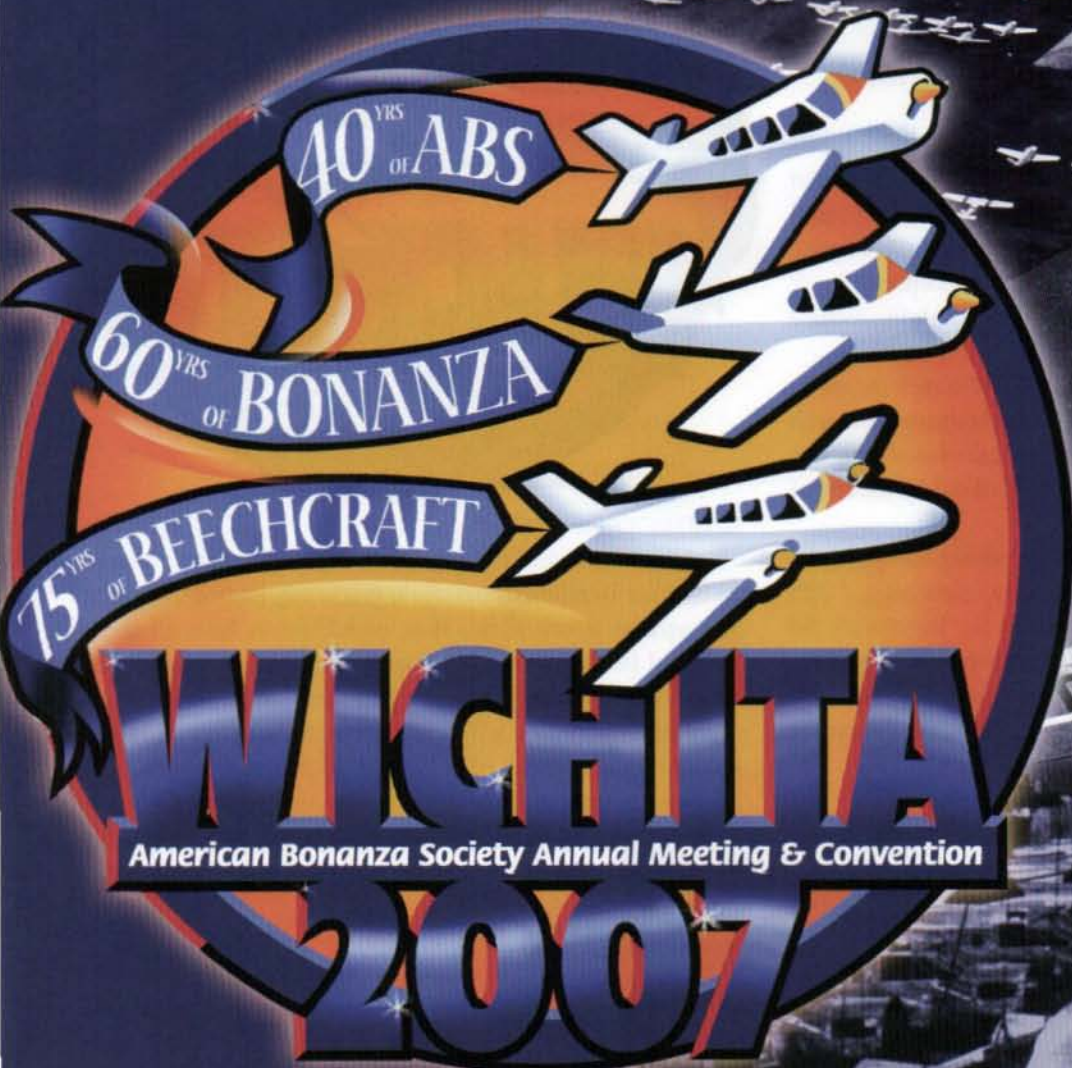
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JOIN US SEPTEMBER 5-9 IN WICHITA, KANSAS

Home of Beechcraft and
birthplace of the Bonanza!

For 40 years ABS has helped
increased the safety and
enjoyment of Beech aircraft
for thousands of pilots.



Watch upcoming issues of
the ABS Magazine for infor-
mation and events that will
take place in Wichita.

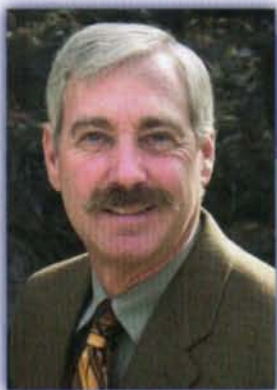
For this very special anniversary
convention, ABS is working to make
September 5-9 memorable through
educational value and as a once-in-
a-lifetime celebration.

We will fly into Beech Field at the
factory and are developing special
events in cooperation with Beechcraft.

**Mark your calendars
and stay tuned!**

60 years after its intro-
duction, the Bonanza is
still an aviation leader!

Beechcraft's 75-year legacy
of excellence began with
founder Walter Beech. Upon
his death in 1950, wife Olive
Ann continued that tradition.



PRESIDENT'S COMMENTS

BY JON LUY

CLICK YOUR
HEELS TOGETHER
AND REPEAT
AFTER ME...

I don't think we're in Kansas anymore, Toto!

Well, actually in early February, four Californians were in Kansas and it was very cold! ABS VP Art Brock and his wife Gwen, and my wife Polly and I arrived in Wichita on a frigid February 1 for the first planning meeting of the 2007 ABS Convention. Yes, it was pretty frosty in the Heartland, even though we did our best to bring along a little California sunshine.

We may not have generated enough heat to melt the snow, but we sure heated things up on convention brainstorming with staff planners Peggy Fuksa, Tom Turner and Nancy Johnson. In fact, all seven of us were downright wiped out by the end of our "working weekend."

For those of you who haven't been paying attention, the '07 convention will be a triple anniversary celebration – 40th for ABS, 60th for the Bonanza and 75th for Beechcraft. So naturally we had to bring it to the Beech hometown, Wichita, Kansas, September 5-9. Whether you've been to a lot of ABS conventions or have never been, this is one you won't want to miss!



Coming home

For starters, we're thrilled that Beech-Raytheon (soon to be Hawker Beechcraft) has again graciously invited us to land and park at Beech Field. How wonderful to have all those beautiful Bonanzas, Barons, Travel Airs and Debonairs on the airport where each of them first launched!

I really hope you will help us beat the last record of these models at Beech Field—234 in 2002. However, that wasn't the all-time convention record, which also took place in Wichita but at the commercial airport across town – for the 1987 convention there were 777 airplanes!

Party-planning

We have a lot of organizing to do before the convention, but if our two days in February are any indication, you will definitely enjoy yourselves. Plan on some surprises, some great parties and a lot of outstanding educational presentations.

Weather permitting, we'll start "under the Big Top" – a tented Welcome Party at ABS headquarters. Most members have never been to the Society's home office and we thought what better time to see it than during our convention. It's a small building so it'll be a quick tour, then out to a nearby tent for dinner and entertainment.

A lot of vendors have told us they're exhibiting at this anniversary convention, which makes us want to take advantage of the opportunity for



Californians Art and Gwen Brock, Polly and Jon Luy didn't get the concept of "snowbird." You go away from snow, not toward it!

something new. So Thursday night we're going to celebrate by having a combination Trade Show Grand Opening and Birthday Bash in the exhibit hall. This is going to be fun, and an early opportunity to see the vendors' goods.

Activities under development by Raytheon are the Hangar Party, which will be at Beech Field, and a tour of the Beech factory. And of course, we're creating ways to acknowledge past ABS leaders, charter members, first-timers and many more Very Special People.

A treat for the mind

A few years ago, Executive Director Nancy Johnson introduced us to the "track" system in educational programming, and the first year we received rave reviews. Since then, Technical Services Manager Tom Turner has been refining the selection to make the seminars even more attractive to the serious Beech aviator.

The seminars used to be developed by the "cart before the horse" method: We would see which vendors were exhibiting and ask them to speak. Many of the speakers and seminars were excellent, but there was quite a bit of repetition year after year so that if you came to one convention, the educational offerings looked nearly identical to the last one. Now, with the track system, we first focus on the subjects we would like covered, then look for qualified, quality presenters.

If you look on page 10098, there is a list of possible seminar topics. (This does not include product-specific subjects, which are reserved for exhibitors.) If you're interested in being a speaker, I encourage you to follow the instructions in that Call for Speakers. There's a lot of experience and expertise among our members, and we want to tap it for the convention.

If you'd like to attend but your wife is a nonpilot and thinks there's nothing for her at an ABS convention, make sure you show her the Right Seat's events when the schedule is published. The last few years we had a full program for the nonpilot companions, and this year is no exception.

More to come!

I realize I'm jumping the gun with all this discussion, when the first official publicity doesn't start till the May magazine. But we wanted to get started early, as there are so many details and extra events for our homecoming celebration.

I hope your anticipation builds and carries you to Wichita in September. After all, I don't think it was a figment of Dorothy's imagination—There really *is* no place like home, and for us it's called Beech Field! —Jon



ABS Staff Rule #1: When the ABS president comes to town, he must be put to work!

WANTED: your stories for upcoming issues!

Sharing your aviation experience and expertise with fellow readers benefits the entire Society. If you'd like to write a short article on one of the following subjects we'd be happy to edit and prepare it for publication. Please send articles or article ideas you have to: absmail@bonanza.org.

- MAY** Factory turbocharging: My personal experience
My favorite flight-planning software
Deadline for submitting: April 1
- JUN** Summer flying tips and tricks
Camping with my Beechcraft
Deadline for submitting: May 1
- JUL** Avionics upgrades
My favorite hangar gadgets
Deadline for submitting: June 1
- AUG** My flight plan to Wichita: Celebrating 60 years of Bonanzas at the ABS Convention
My best Beech flying experience
Deadline for submitting: July 1
- SEP** Propeller options, maintenance and repair
Major airframe restorations: My rebuilding stories
Deadline for submitting: August 1
- OCT** Flying new: G36/G58 ownership experience
How ABS membership has made a difference for me
Deadline for submitting: September 1
- NOV** Beech ownership trends: my predictions
Ice protection systems
Deadline for submitting: October 1
- DEC** State of the industry
Choosing a mechanic: What I look for
Deadline for submitting: November 1

BEECHCRAFT OF THE MONTH

N32BL

By Kirk Heiser

1982 B36TC TOP-OF-THE-LINE BONANZA

I had my first ride at age seven in a floatplane. It left a lasting impression and incorporated everything a child or even an adult could want. Contemplating flight itself is an amazing thing, but to be able to land on a lake and taxi to our summer residence in Clear Lake made it so much better for me. I knew that someday I would become an aviator.

Eleven years later I received my private pilot's certificate. And from then on, whenever an opportunity arose with friends or family, I logged time in a variety of aircraft.

Fast-forward 33 years and 4,200 hours—I'm holding commercial single-engine land and sea ratings, multiengine land with instrument rating and a glider certificate. Flying has provided me much pleasure, a true appreciation of all

flight and a unique perspective of each aircraft I have flown—ultralights, gliders, seaplanes, multiengine aircraft, turboprops and warbirds.

In 1980 I purchased my first aircraft, a Cessna 182 that I flew for about two years before trading it on a turbocharged 182 for greater capabilities of speed and altitude. I enjoyed flying this plane for 15 years and found it to be extremely reliable and economical.

With project sites under construction throughout California requiring me to fly an average of 300 hours a year, it became apparent that I needed to look for a six-seat, faster, roomier aircraft, one that would be economical to operate and provide comfort to passengers.

I started my search with light twins, looking at Cessnas, Pipers and Beech Barons. Each had unique qualities and weaknesses, but the commonality was high operating expenses and minimal performance improvements compared to

the turbocharged high-performance singles such as the Cessna 210, Saratoga and the Beech B36TC. Ideally, I wanted a single that was able to carry the load of an Aztec at the speed of a Baron.

Just when I was beginning to think there was nothing out there that would meet my needs, I received a call from Laferty Aircraft Sales in San Jose informing me of the availability of a newly converted B36TC. The modifications were unique—in fact, it was the first B36TC to receive STC approval for them. Besides an upgrade to a new IO-550 with investment-cast Millennium cylinders, it was turbonormalized with an intercooler, GAMInjectors and a new three-blade super Scimitar propeller.

All work was performed by Tornado Alley Turbo (www.taturbo.com). To say it is the ultimate aircraft would be an understatement. Certified flight test by Tornado Alley showed the following minimum speeds:



Kirk Heiser and his wife Diane (right) with friend Arlinda Attell.

EQUIPMENT LIST - N32BL

Avionics panel - Pacific Coast Avionics	WX500 Stormscope
Audio panel w/ CD player PMA700	GTX-330 Mode-S transponder
Garmin 530 GPS/Nav/Comm/GS	King electronic HSI
Garmin 430 GPS/Nav/Comm/GS	Bose headsets
	Beechcraft clock
	28v lighting



BEFORE: Panel before upgrading process.



AFTER: Panel in current configuration.

Altitude	Speed Knots True	*Fuel Flow
12,500'	192-194	15.5 gph
17,500'	200-202	16.0 gph
22,000'	205-206	16.5 gph

*varies by 0.5 gph +/-

While this aircraft started off as a B36TC with a factory turbocharged TSIO-520UB, the conversions made by Tornado Alley are amazing. The cooler CHT temperatures, longer TBO, faster speeds and lower fuel burn equals better economics. The maximum takeoff weight is 4,042 pounds, which I understand is the greatest of all Bonanzas.

This aircraft came standard with 102 usable gallons, plus it has factory built-in oxygen, so aftermarket add-ons are not required. A six-hour-plus reserve endurance at 70% power is easily obtainable, and 190 knots minimum provides an amazing range.

The B36TC has longer wings than the A36 and is a heavier aircraft, but even that does not take away from its

astounding handling. This plane is solid, quiet and comfortable and passengers, especially the ladies, love the large double doors for easy entry and exit.

One or more seats can easily be removed (takes about two minutes per seat), leaving a cavernous space. And if I decide to take out all four seats, I can carry cargo to my job sites. It makes a great instrument platform, which is extremely useful on business trips.

Other upgrades included the panel and avionics installed by Pacific Coast Avionics (www.pacific-coast-avionics.com). I was impressed with the quality of their work, which shows in the before-and-after photos above.

Cygnat Aero (www.cygnat.aero) provided the yoke-mounted writing tablet/flight desk, a real convenience that is easily installed and also adapts to a GPS mount. I have found it extremely useful for instrument flying and holding

charts. This manufacturer has a superb and reasonably priced product line.

In addition to Beech planes, I have had the pleasure of flying Diamonds, Cessnas, Pipers, Mooneys, Columbias, Lancairs, de Havillands and Yaks. While each has something special to offer, there truly is nothing like a Bonanza!

At the risk of upsetting some of you light-twin drivers, this aircraft will generally place you in my 6 o'clock position in cruise!

NOTE: According to Tim Roehl, president of Tornado Alley Turbo, Inc., there are now eight B36TCs flying with the turbonormalized IO-550 conversion. TAT claims longer range and cooler operating temperatures with the cowl flap and intercooler-equipped "TN" IO-550 and a 192-pound increase in maximum gross weight over the original. Roehl also said TAT can convert your B36TC to the Whirlwind TCP at a starting price of \$90,000.

—Tom Turner



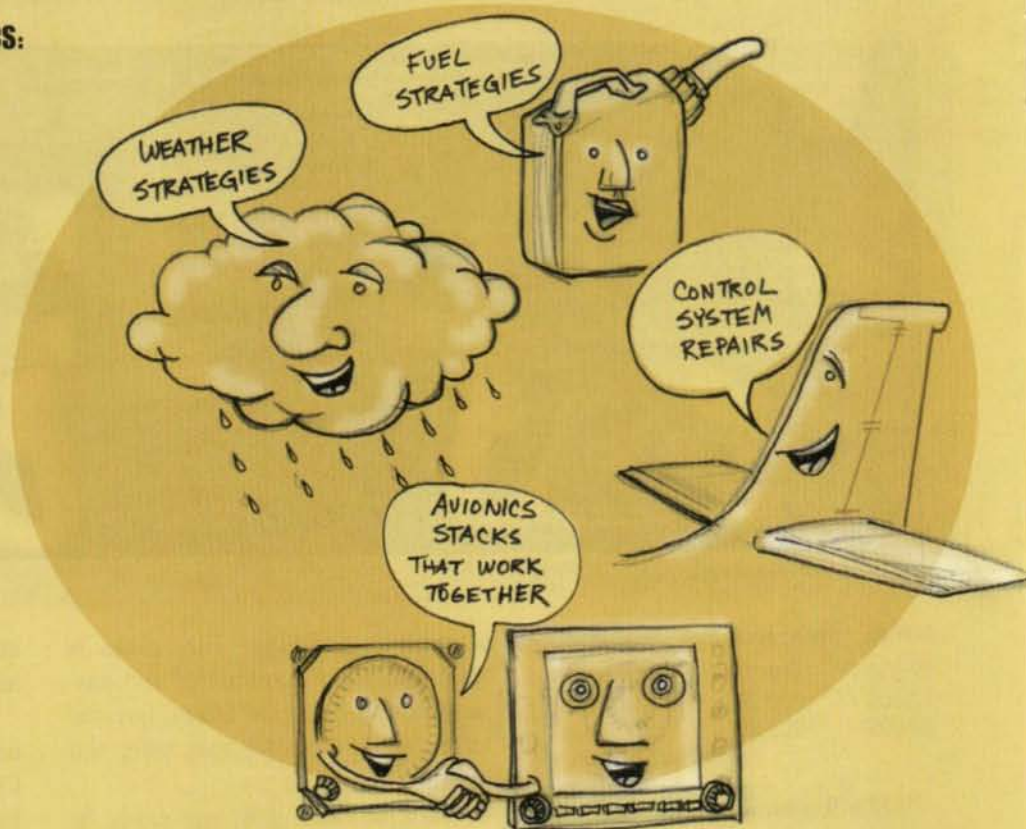
CALL FOR CONVENTION SPEAKERS

WE'RE PUTTING OUT THE CALL FOR SPEAKERS FOR THE 2007 ABS CONVENTION, SEPTEMBER 5-9 IN WICHITA. The ABS Education Committee is developing a schedule of forums to create the premier educational conference for Beech pilots, and you may have a

presentation that fits the program...or a suggestion that improves it even more. Seminars should concentrate on real-world situations and, where appropriate, accident avoidance. We will also consider seminars other than the topics below, so send in your proposals.

WE WANT YOUR PROPOSALS FOR 50-MINUTE SEMINARS ON THESE TOPICS:

Fuel strategies
Takeoff considerations
Inflight decision-making
Engine failures
Safety scenarios
Approach & landing
Engine management
Designing avionics stacks that work together
Weather strategies
Control system repairs
Painting considerations
Controlled flight into terrain
Low-cost upgrades & restorations
Beech ownership:
What to expect the first year



THE TOPICS CAN'T SPEAK FOR THEMSELVES

To be considered for a convention speaking engagement in the **FLIGHT OPERATIONS** or **MAINTENANCE AND OWNERSHIP** track seminars:

1. Come up with a short title and an outline of your proposed presentation and send it to Tom Turner at bonanza8@bonanza.org.
2. Include a concise resume or biography that describes your qualifications to present your topic.

The Education Committee will review your proposals and notify you whether you've been selected to speak. Remember that these presentations are volunteer, i.e. without compensation, in the spirit of members-helping-members that is the foundation of ABS.

Send your proposal no later than April 30, 2007.





CAUSES OF ACCIDENTS: BONANZA/DEBONAIR/BARON/TRAVEL AIR

What's bringing us down? What can we do about it?

BY THOMAS P. TURNER, WICHITA, KANSAS

AOPA Air Safety Foundation's *Joseph T. Nall Report* for 2006 details NTSB-reported general-aviation accidents for calendar year 2005, the most recent for which NTSB final report data are available.

The total accident rate was up from the previous year: 7.2 accidents per estimated 100,000 flight hours in 2005 compared to 6.5 in 2004. The fatal accident rate is slightly up: 1.4 vs. 1.3 in 2004.

The majority of GA accidents in 2005—nearly 75%—were pilot-related as they have always been. "The record we chalked up in 2005 could stand some improvement," said Bruce Landsberg, executive director of the AOPA ASF.

Specific *Nall Report* findings showed that the total number of weather-related accidents was down in 2005. Takeoff

and landing accidents, while usually not fatal, also continued to show up in high numbers.

There was a significant increase in fatal maneuvering-flight accidents; in 2005, there were 80 vs. 52 in 2004. *Many of these accidents involved poor pilot decision-making, not lack of skill.*

What about 2006?

FAA Administrator Marion Blakey told attendees at the AOPA Expo in November that 2006 was on track to be the safest year since record-keeping began in 1939. This figure includes all commercial as well as general aviation. *However, preliminary data shows this does not hold true for Beech piston airplanes.*

Most common causes of Beech piston mishaps in 2005

Mishaps in piston Beech airplanes were up in 2005 vs. the previous year—226 in 2005 vs. 190 in 2004. And a greater percentage of the accidents were fatal: 17% in 2005 compared to 14% the year before. At the same time, the industry estimates GA flying hours were down 11% in 2005 vs. 2004, indicating a much higher rate of accidents per flying hours.

Almost none of the accidents had a known mechanical cause, which allows us to identify things we can do to have a much safer future.

1. Landing gear-related mishaps (LGRMs)—gear-up landings, gear collapses on the runway or taxiway, and mechanical malfunctions consistently account for about 40% of all known piston Beech accidents. Since most of these are not "reportable" under NTSB 830, this most common mishap cause is all but absent from the NTSB-derived *Nall Report* data.

Some of these mishaps result from mechanical failures the pilot cannot overcome in flight, but the vast majority appear to be purely pilot error.

2. Engine failure—the deadliest single cause of Beech accidents, represents 21% of all Bonanza/Baron mishaps. 37 reported engine failures can be broken down further:

- 10 incidents of fuel starvation, with fuel otherwise available but not reaching the engine because a tank was run dry or the pilot did not successfully switch tanks.
- 4 incidents of fuel exhaustion, or completely running out of fuel.

- 3 reports of cylinder or piston rod failure.
- One incident each of fuel injection system failure, oil system failure, fuel contamination (with water) and engine fire in flight.

- 16 additional engine failures with no identified cause: six on takeoff, 10 in cruise, 2 on go-around and one on approach.

3. Impact or loss of control on landing—this does not include LGRMs. 14% of reported Beech mishaps happened during landing:

- 8 reports were of impact with an obstacle on or alongside the runway. Significantly, six of these were deer strikes landing at dusk or after dark—a fairly common occurrence.
- 6 reports were of the pilot's loss of directional control.
- There were 4 hard landings (from inadequate airspeed control on final) and 4 incidents of landing short of the runway, also often an airspeed issue.
- 2 pilots landed long and a single airplane's propeller struck the pavement, likely from either improper airspeed control or incorrectly serviced landing gear.

4. Controlled Flight into Terrain (CFIT)—6% of the accidents resulted from flight, under control, into the ground. All but one was fatal. Causes:

- 6 were descents below published minimum altitudes in the conduct of an instrument approach procedure in IMC.
- 3 were collisions with mountainous terrain in cruise flight, one in visual conditions.
- 2 resulted from attempted visual flight in IMC.

5. Impact or loss of control on takeoff—5% of the accidents were impacts on takeoff unrelated to other issues (such as an engine failure), including 3 impacts with objects, 3 losses of directional con-

trol, 2 runway overruns (not getting airborne in the available distance) and one blown tire on takeoff.

6. Stalls accounted for 3% of the 2005 Beech mishaps, including:

- 3 stalls on takeoff.
- 2 stalls on a go-around or missed approach.
- One stall on final approach.

The remaining accidents resulted from miscellaneous causes, including two bird strikes, one airframe ice accumulation, and other one-time items like pilot incapacitation, loss of control in dark-night VFR, and the pilot hitting his head on the cabin ceiling in turbulence.

Fatal mishaps

One out of every five Beech accidents in 2005 was fatal. Of these:

- 13 fatal mishaps (38% of all fatalities) resulted from engine failures. 6 of the 14 total fuel starvation and fuel exhaustion incidents resulted in death.
- 10 of the deadly accidents were CFIT, which is almost universally fatal.
- 2 stalls killed people, one on takeoff and one on final approach.

• The sole reported icing encounter was fatal, as was one each loss of control in dark-night VFR, collision with an obstacle on landing, medical incapacitation and an in-flight explosion.

- 4 fatal accidents remain with unknown causes.

Contributing factors

What were the high-risk environments and operations for Beech pilots in 2005?

Contributing Factor	Total Beech Mishaps	Total Fatal Mishaps
VMC	72%	71%
IMC	6%	21%
Weather not reported	21%	9%
Night	12%	15%
Surface wind > 15 kts	2%	3%
Dual instruction in process	4%	0%
Aircraft registered within 12 months prior to report	20%	21%

The real standout, of course, is the much higher percentage of fatal mishaps in instrument conditions. Put another way, 70% of the reported mishaps in IMC were fatal, while only 16% of mishaps in VMC or "weather not reported" resulted in death.

Dwindling airframes

Our fleet continues to shrink as a result of airframes destroyed in accidents, or so significantly damaged that they are "totaled" or parted out. The NTSB rarely calls an airplane "destroyed" even when FAA preliminary reports make that determination.

With that in mind, in 27 accidents, airframes were destroyed in 2005 by NTSB reckoning and another 70 received "substantial" damage (and in many cases totaled out of the active flying fleet).

A check of US-registered ABS-type airplanes shows that, even though Beech built 99 Bonanzas and Barons in 2005,



One out of every five Beech accidents in 2005 was fatal.

total numbers are declining about 2% per year—more evidence that NTSB records do not fully reflect the state of the fleet.

AOPA's *Nall Report* is a very useful reference for pilot instruction, and reveals many lessons for pilots of all types of aircraft. To see how the Beech record compares, see the *Report's* conclusions and those '05 Beech accidents.

Important: Remember, only 34% of the known Beech mishaps in 2005 are included in NTSB reports.

Category	Beech Piston Aircraft	Nall Report
Accidents per (est.) 100,000 flying hours	11.7 (all reports) 4.5 (NTSB reports)	7.2
Fatal accidents per (est.) 100,000 flying hours	1.5 (all fatalities are NTSB reported)	1.4

The Beech mishap record in some ways bucks the trend of overall GA accidents as revealed by the *Nall Report*.

Using only NTSB-reported numbers, the overall Beech accident rate is substantially better than GA overall—but the fatality rate is slightly higher.

While the majority of GA accidents, according to the NTSB record, occur in maneuvering flight (which includes takeoff and landing, AOPA notes) and attempted visual flight into IMC, the NTSB-reportable Beech record is more heavily weighted toward engine failures and controlled flight into terrain—perhaps reflecting the fact that Beechcraft tend to be used more as cross-country airplanes flown largely by instrument-rated pilots.

Thomas P. Turner is ABS manager of technical services and a widely published aviation author. He holds a master's degree in aviation safety and is an NAFI Master CFI.



Tom Turner in the left seat of a new G36 at the Beechcraft factory.

WHAT WE CAN LEARN FROM THESE STATISTICS

How can ABS members reverse the trends in Beech mishaps to be safer and keep our planes flying?

MONITOR YOUR FUEL

Nearly half of all engine failures, many of them deadly, could be avoided if pilots merely confirm fuel loads before flight, track fuel burn aloft and switch tanks on a schedule. Use auxiliary tanks in level flight only, and land short of destination to add fuel if computed fuel remaining at arrival time will be less than one hour.

ADHERE TO IFR PROCEDURES

Watch your altitude and track, en route and on approach. This may take more regular practice under the hood, in "actual" or in a simulator, than most of us currently get.

PRACTICE TAKEOFFS AND LANDINGS

We should be practiced enough to avoid the losses of control we're seeing on the runway: Our lack of airspeed and glidepath control is apparent in the many runway overruns, hard landings and "landed short" accidents. Quality practice should also sharpen your landing-gear discipline to avoid an LGRM.

PRACTICE STALLS

Although we worry most about stalls turning base to final, it's the power-on stalls on takeoff, go-around and missed approach that are getting us. These are hard to replicate in normal training configurations, with two aboard and perhaps a light fuel load, so we tend to practice them less—which probably contributes to the accident record. If the plane is loaded to max gross, which naturally moves c.g. rearward as well, the power-on stall is much more likely—and more dramatic when it occurs. Consider securing ballast in the back seats and baggage area to create a max gross, aft-end-of-the-envelope load and carefully experience power-on stalls with a Beech-savvy instructor.

PUT IN SOME GROUND TIME

Study rules and techniques for reducing pilot workload so that you are better able to detect and deal with the inevitable distractions and abnormalities of single-pilot flight.

VOW TO TAKE MORE TRAINING

Take recurrent training in the areas where accidents are most common. A wide variety of options are available for flight training and ground instruction, many recognized by the ABS AVIATOR program.

For more information, see the *Nall Report* at www.aopa.org/asf/publications/nall.html, ABS AVIATOR program information at www.bonanza.org/news.cfm?id=207 and the Beech Safety section of www.thomaspturner.net.

SAVVY OWNER

BY MIKE BUSCH

THE WHYS AND HOWS OF PREHEATING

A single cold start without proper preheating can produce more wear on your engine in less than a minute than 500 hours of normal cruise operation. If it's cold enough, a cold start can cause the catastrophic destruction of an engine shortly after takeoff!

How cold is cold?

How cold does it have to be before preheating is necessary? There's no hard and fast answer. The amount of damage done by a cold start depends on a variety of things, including the type of engine, its age and condition, and what kind of oil is being used. (A brand new or freshly rebuilt engine is more vulnerable to cold-start damage than a tired old engine at TBO.)

As a general rule, I consider any start in which the engine is cold-soaked to a temperature below freezing (32°F or 0°C) to be a cold start, and any unheated start below about 20°F (-7°C) to be a capital offense. The colder the temperature, the worse the crime.

Oil pressure isn't enough!

Many pilots believe that the main reason cold starts are bad is that the engine oil is thick and viscous and doesn't flow well. Since it takes longer for oil pressure to come up when the oil is cold, the engine sustains excess wear in the early seconds after start because of inadequate lubrication.

While that's true of single-weight oils like Aeroshell W100, it's not true of the modern multiviscosity oils that are universally used today for cold-weather operations. Multivis oils like Aeroshell 15W-50, Exxon Elite 20W-50 and Phillips X/C 20W-50 flow extremely well even at 0°F (-18°C) or less. Pilots who use multivis oils observe that their oil pressure comes up quickly after starting, even in cold weather, and most figure that therefore everything's OK. Wrong!

Bearings need clearance

The biggest culprit in cold-start damage is the fact that our aircraft engines are made of dissimilar metals with very different expansion coefficients. The crankcase, pistons and cylinder heads of your engine are made from aluminum alloy, while the crankshaft, connecting rods, piston pins and cylinder barrels are made from steel. Aluminum expands about twice as much as steel when heated, and aluminum contracts about twice as much as steel when cooled.

Consider your steel crankshaft, which is suspended by thin bearing shells support-

ed by a cast aluminum crankcase. As the engine gets colder, all of its parts shrink in size, but the aluminum case shrinks twice as much as the steel crankshaft running through it. As ambient temperature goes down, so does the clearance between the bearing shells and the crankshaft—and that clearance is where the oil goes to lubricate the bearings and prevent metal-to-metal contact. If there's not enough clearance, there's no room for the oil, regardless of oil pressure.

The Teledyne Continental IO-520 overhaul manual lists the minimum crankshaft bearing clearance as 0.0018" (that's 1.8 thousandths) at room temperature. What happens to this clearance in cold temperatures? Tests performed in 1984 by Tanis Aircraft Services in Glenwood, Minnesota (where it gets mighty cold), showed that an IO-520 loses 0.002" (2.0 thousandths) of crankshaft bearing clearance at -20°F. In other words, a tight new engine built to TCM's minimum specified bearing fit at room temperature would actually have negative bearing clearance at -20°F; the crankshaft would be seized tight!

You've probably noticed how difficult it is to pull the prop through by hand before starting in cold weather. Now you know why. It's not that the oil is thick (and if you use multivis oil, it's not). It's that the clearance between the crankshaft and bearings is tighter than normal. If it's cold enough, you might not be able to pull the prop through at all.

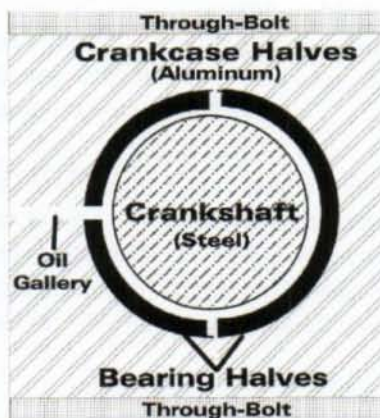
Start an engine in this condition and you're likely to experience accelerated bearing wear and possible scuffing of the crankshaft journals in the first minute or two of engine operation. In the extreme, it's even possible for the bearing shells to shift in their saddles (a so-called "spun bearing"), misaligning the oil feed holes and starving the bearing of lubricating oil.

Ironically, this problem is at its worst with a fresh-from-the-factory engine built to the tightest new-engine tolerances. A tired, loose, high-time engine with worn bearings might well have plenty of clearance even at subzero temperatures. But even if your engine is approaching TBO, you can't afford

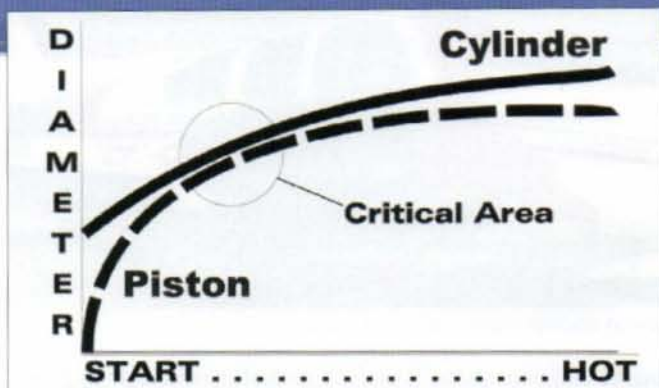
to be complacent about cold starts. That's because inadequate bearing clearance is only one of several evils associated with cold-starting.

Pistons need clearance, too

Consider what happens to your pistons and cylinders when you cold-start an engine. Here, the situation is the opposite of the one we just talked about. Instead of a steel crank inside an aluminum case, we have an aluminum piston inside a steel cylinder barrel. So the clearance situation is reversed: Piston-to-cylinder fit is loose when the engine is cold and tightens up as the



The clearance between crankshaft main journals and their bearings may become critically low (even zero) at frigid OATs.



As the piston and cylinder heat up after a cold start, the piston-to-barrel fit may become critically tight, and metal-to-metal scuffing can occur.

engine comes up to full operating temperature. (This is why compression tests are normally done when the engine is hot.)

When an engine is started cold, the piston heats up very rapidly after start, while the cylinder barrel may take quite a long time to warm up. Why? The piston is small and light, so it heats up quickly. The cylinder is big and heavy and covered with cooling fins bathed in frigid ambient air, so it warms up quite slowly (as you can easily see on your CHT gauge). The result is that the piston expands to its full operating dimension quite quickly after start, while the cylinder takes a lot more time to expand to its full operating diameter.

The fit of the piston in the cylinder bore may quickly become tighter than normal shortly after starting when the piston has come up to temperature, but the cylinder still has a way to go. If it's cold enough, the piston-to-cylinder clearance can actually wind up going to zero, resulting in metal-to-metal scuffing between the piston and cylinder barrel. As the piston quickly comes up to temperature but the cylinder is still relatively cold, it's easy to see how severe scuffing can occur at the top of the stroke.

Therefore, warming up the oil alone is definitely not enough to avoid cold-start damage. All the warm oil in the world won't help if the crank-to-bearing or piston-to-cylinder clearances go to zero. To avoid this, it's essential to have a preheat to warm up the crankcase and the cylinder barrels (especially the top of the cylinder barrels near where they mate to the heads).

The world's best preheat

The best way to accomplish this is to put the airplane in a heated hangar overnight. Why? Because this preheats every part of the airplane to an even temperature. After 8 to 12 hours in a 40°F hangar, the oil is at 40°F, the case is at 40°F, the cylinder heads are at 40°F, the gyro instruments are at 40°F (gyros have their own cold-starting problems), the windshield is at 40°F (so it won't fog up the minute you breathe), and even the pilot's seat is at 40°F (which solves another problem).

I'm based on the California coast where the weather hardly ever gets below freezing. But when I travel to cold country, I always try my best to use the overnight-in-a-heated-hangar

method of preheating. Most FBOs charge from \$25 to \$75 to store my twin in their heated hangar overnight. Even at \$75, I figure it's quite a bargain compared to the alternative (accelerated wear of my two expensive TCM engines).

If I'll be staying at a cold-weather airport for awhile, I'm generally too much of a skinflint to pay for the airplane to be hangared for the duration. Instead, I'll arrange with the FBO to pull the airplane into the heated hangar the night before my scheduled departure.

If it's really, really cold out on the morning of departure, I've been known to preflight the airplane in the hangar, climb into the cockpit, secure the door, then have the line crew open the hangar door and tow the airplane onto the ramp with me in it. As soon as they unhook the tug, I start the engines before they've had a chance to get cold.

Multipoint electric heaters

Short of an overnight in a heated hangar, the best preheating method is a multipoint electric heating system that has individual heating elements attached to the oil pan, crankcase and each cylinder. By plugging such a system into 115v power a few hours before departure (overnight is even better), you can at least be assured of warm cylinders, a warm case and warm oil when you start up.

The best-known multipoint electric preheating systems come from Tanis Aircraft Services (<http://www.tanair.com/>). The Tanis TAS100-series systems consist of eight electric heating elements connected by a wiring harness. Six 50- or 100-watt cylinder heaters screw into the threaded CHT-probe bosses in each cylinder head.

The heating elements are available with built-in CHT thermocouple probes that work with most digital engine monitor systems. A flat silicone rubber heating pad is glued to the crankcase with high-temp RTV, and another is glued to the bottom of the oil pan. The wiring harness terminates at an ordinary AC plug that is usually mounted near the oil filler door in the cowling. You simply run an extension cord out to the airplane, plug in the preheating system and let it cook for four to six hours.

Reiff Preheat Systems (<http://www.reiffpreheat.com/>), offers a similar product called the HotBand system. In lieu of cylinder head heaters, the Reiff system uses 50-watt heating elements mounted on large stainless steel clamps that mount on the non-finned portion of each cylinder barrel. As a result, there's no interference with existing CHT instrumentation.

The Reiff system also includes an oil pan heater, but not a crankcase heater (because the crankcase receives sufficient heat by conduction from the cylinder barrel heaters). It is less expensive and easier to install than the Tanis, but requires somewhat longer to fully heat-soak the cylinder heads.

Engine and prop covers

If the temperature is not too frigid and the aircraft is being preheated in a T-hangar or other protected area, a multipoint electric heating system is all you need to do the job. But if it's really cold, or if you have to preheat outside on an exposed ramp (particularly if it's windy), you also need some means of insulating the engine compartment and keeping most of the heat from escaping.

At the very minimum, you'll need an insulated engine cover. Although you may be able to make do with a quilted blanket, custom-fitted insulated covers are available from Kennon Aircraft Covers (www.kennoncovers.com), as well as from Reiff and Tanis and a few other firms.

In intense cold or windy conditions, the propeller becomes a major source of heat loss during preheating. Kennon, Reiff and Tanis all offer insulated propeller and spinner covers to solve this problem.

Another compelling advantage of insulated engine and prop covers is that using them may eliminate the need for a preheat altogether if you're going to be making a quick-turn. By installing the covers promptly after shutting down, engine heat can be retained for three or four hours even when the airplane is parked outside on a cold, windy tiedown.

Leave it on all the time?

There has been considerable controversy about whether it's a good idea to leave an electric preheating system plugged in continuously when the airplane isn't flying. Both TCM and Shell have published warnings against leaving engine-mounted electric preheaters on for more than 24 hours prior to flight.

Their concern is that heating the oil pan will cause moisture to evaporate from the oil sump and then condense on cool



Kennon insulated engine and propeller covers.

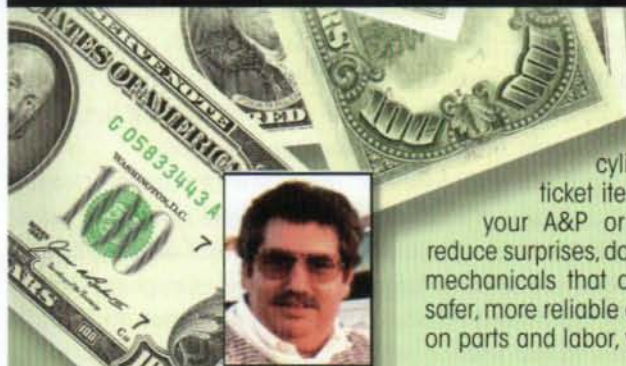
engine components such as the camshaft, crankshaft or cylinder walls, resulting in accelerated corrosion of those parts. However, if the entire engine is heated uniformly and especially if the engine and propeller are covered with insulated engine and prop covers, such condensation is very unlikely to occur. In fact, using an insulated cover and a multipoint preheating system that is plugged in continuously is one of the most effective methods of eliminating internal engine corrosion, particularly if the aircraft is kept in an unheated hangar rather than outdoors. If the entire engine is maintained above the dewpoint, condensation simply cannot occur.

Questions for Mike Busch may be e-mailed to mike.busch@savvyaviator.com

Mike Busch has flown for more than 40 years and 7,000 hours and is an A&P/IA. He cofounded AVweb and served as its editor-in-chief for more than seven years. His "Savvy Owner Seminars" teach aircraft owners how to obtain better aircraft maintenance while spending a lot less money. www.savvyaviator.com

NOTE: *Low Gage's article in this magazine gives further information on corrosion and preheating.*

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You'll receive a \$50 early sign-up discount if you register at least 45 days before the class start date. If you register early and have to cancel, your fee will be refunded or transferred to another class. View further details and comments from previous seminar graduates at www.savvyaviator.com

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Jun 23-24 Cincinnati OH (I69)

Jun 30-Jul 1 Frederick MD (FDK)

Sep 8-9 Boston MA (OWD)

Sep 15-16 Atlanta GA (FFC)

Oct 27-28 Albuquerque NM (ABQ)

Nov 3-4 Tulsa OK (RVS) (ABS Sponsored)

Dec 1-2 Los Angeles CA (VNY)

AIRLINER INCIDENTS

BY JOHN MILLER, POUGHKEEPSIE, NEW YORK

ONE NIGHT I WAS FLYING A DOUGLAS DC-4 on a trip from Houston to New York, with a stop at Washington and again at Philadelphia after midnight. There was about half a load of passengers aboard, some of them desiring to debark at Philadelphia.

When I put the lever down to extend the landing gear, no green light lit to indicate that the nose wheel was down and locked. Fortunately, it was good weather, so I circled the field a few times to determine what to do. We opened the trap door in the floor of the cockpit and could see that the entire downlock for the nose wheel had come off the frame and was dangling and useless, and so was the nosewheel.

The airplane had only a light load of fuel, passengers and cargo. So I had all passengers move to the rearmost seats to make the airplane as tail heavy as possible and the only partially full fuel tanks also helped that.

As I approached for landing, I could feel the tail heaviness, and when I approached the runway, I cut all four engines to avoid as much damage as possible to the propellers. I adjusted the trim for tail heaviness, but I did not fully extend the flaps because they would tend to make the plane nose down.

As the wheels touched, I retracted the flaps to decrease nose heaviness, held the yoke all the way back and, without touching the brakes, dragged the tail on the pavement to slide on the little tiedown ring under the tail. The plane coasted to a stop, tail down.

I warned the passengers to stay in their seats while a crew drove out and put pins in the dangling nose wheel assembly and the mains. Then I announced on the loudspeaker that the passengers could move back to their seats until the nose of the airplane came down on the locked nose wheel, and I taxied to the gate.

After the Philadelphia passengers

debarked, I had the safety pins in the main gears removed, but of course the pin in the nose wheel left in, and took off for Newark with the nose wheel in the locked-down position. Thus I avoided any publicity in the newspapers.

The tower operator at Philadelphia said that when the tail tiedown ring dragged on the pavement it made a huge shower of sparks as it wore off on the concrete pavement. That was the only damage to the airplane.

The short flight to Newark was uneventful, with the nose wheel locked down. By radio, I warned the maintenance crew at Newark about the defective downlock and that they would not be able to use the airplane until it was repaired. No one in management said a thing to me about avoiding damage to the airplane. Maybe they did not know about it.

DURING SEVERAL THOUSAND HOURS OF SCHEDULED FLYING IN DC-3 AIRPLANES with Wright engines, I did not have a single-engine failure, so never had to shut down an engine in flight. However, on an instrument checkflight with a brand new airplane and engines that had never yet made a scheduled flight since being ferried from California, an engine failed and the other engine began to fail as we approached LaGuardia. The Wright Co. brought and installed two new engines that night. I probably did 15,000 hours of flying with those Wright 1200-hp engines, two at a time, without a failure in scheduled operations.

ONCE WHEN FLYING A FOUR-ENGINE CONSTELLATION, one of the engines failed, causing severe internal damage due to a master connecting rod failure.

The master rod on the front row of seven cylinders of #2 engine failed and cut through the steel cylinder wall and then cut the propeller's feathering oil line

alongside the #1 cylinder. When I felt and heard that big thump, I glanced at the four little tachometers, saw #2 flicker and instantly reached up to the overhead panel and punched the #2 feather button, and got the propeller feathered before further damage occurred.

If the feather line had been fully cut, it would not have been possible to feather the propeller, and it would have windmilled at very high rpm due to the air-speed of the airplane. With the feather line cut and the engine severely damaged, but still windmilling, the lubricating oil would have quickly leaked out. Then the propeller reduction gears in the big cast magnesium gearbox on the front of the engine would have caught fire from friction in all of the unlubricated gears, which would have set fire to the magnesium casting, which would have blown back and melted through the firewall and melted the wing off the airplane—and my passengers, my crew and me would be long dead.

In spite of the fact that this had happened in just that way before with two or three other airplanes and resulted in full fatalities, the Pilot Operation Manual had not been revised. My quick action definitely saved the day, but I did not receive a commendation. It would have been an embarrassment to management for not having a correct procedure in the Pilot Operation Manual.

It is certainly most remarkable that those engines, with hundreds of moving parts, were so reliable. Piston engines are now past history on the airlines, of course, having been replaced by the extremely reliable and smooth turbojets and turbopropeller engines.

John Miller welcomes reader's comments. Write him at 201 Kingwood Park, Poughkeepsie, NY 12601 or e-mail him at jennys2jets@juno.com.

"Flying Stories," John Miller's collection of aviation articles, is available from the ABS Store at www.bonanza.org

VACUUM AND PRESSURE PUMPS

Know your limits and defenses

BY GEORGE WILHELMSSEN, MORRIS, ILLINOIS

By looking at any airplane, you can see an assortment of critical parts that work together to allow it to fly. But some parts are more critical than others, since they work with the systems of the aircraft to provide essential information to the pilot to keep it safely flying.

One such instrument is the pneumatic vacuum or pressure pump, which creates low or high pressure primarily by moving vanes inside an eccentric cylinder. The pressure change is used to drive instruments that may include the artificial horizon, some old models of turn coordinators, some HSIs and even the Brittain and some Beech pneumatically driven autopilots.

To understand the importance of the pneumatic pump, this article will focus on the three instruments that are driven by it.

The *artificial horizon* provides an attitude reference when pilots are flying in instrument conditions.

The *turn coordinator* indicates that an airplane is turning and, using the turn and slip ball, whether that turn is coordinated.

The *horizontal situation indicator*, or HSI, combines heading and navigation information in a single display.

Combination vacuum/electric-driven turn coordinators were used with Brittain autopilots, and were also provided to Beech and some other brands. This device is generally backed up with an electric motor, so a failure of the pneumatic supply generally doesn't render it inoperable.

The directional gyro and some pneumatic HSIs, specifically the NSD360 or Narco DG 09 models, provide a pilot with heading and direction-change information, as well as navigation data. These devices are not backed up electrically, and will tend to fail as-is when the driving source is lost.

Taking a step back, it is easy to see that with a failure of the pneumatic pump, a pilot has lost a lot of critical information. This can lead to a much more challenging flight and—if the pilot isn't proficient in partial-panel operations—one that is potentially dangerous.

History

After the use of the venturi tube for vacuum systems, a better system was developed in the "wet" vacuum pump. This pump was called wet because it attached to the engine and was lubricated with engine oil.

By lore, it was commonly considered that wet pumps would last forever. This is not a correct assumption, however, since various failed components have been discovered in wet-pump overhauls and failures have occurred.

Some years later, a dry-type pneumatic pump was devel-

oped that used carbon vanes inside a smooth cylinder. These "consumable" vanes gradually wore down over time and required more frequent maintenance than the wet pumps.

When these dry pumps started to get into aircraft, some pilots treated them the same as wet pumps. This led to some surprises, challenges and accidents when the dry pump subsequently failed in flight.

Airborne brand pneumatic pumps have an expressed time-in-service limit of six years or 500 hours in most cases, with more restrictive 400-hour limits applied to the 420 through 442 series, and 300-hour limits applied to the 832CW and 842CW series.

Airborne has ceased making dry air pumps, and is actively trying to buy back any outstanding stocks, as the last pump is approaching the life limit. While these actions are likely linked to the concern of liability, there are some important points to consider.

Some alarming facts were noted in a study by the US Dept. of Transportation titled *General Aviation Pilot Performance Following Unannounced In-Flight Loss of Vacuum System and Associated Instruments in Simulated Instrument Conditions*.

The first point was that "mechanical failures, including the vacuum system or related instruments, had been documented as a causal factor in only about three accidents per year, which is 11% of all documented spatial-disorientation accidents."

Such events were of more concern because the report noted "these accidents resulted in fatalities approximately 90% of the time."

The report used a Piper PA28 and a Bonanza A36 and showed that Bonanza pilots typically caught the pneumatic system failures faster. But 25% of those who lost both their artificial horizon and HSI lost control of the aircraft. Interestingly, the pilots in this case knew they were participating in an experiment and something was going to happen, and they still lost control, which highlights the risk that comes with the loss of a pneumatic pump.

Going-forward actions

The failure of a pneumatic pump can have various effects on an aircraft, depending on how it is equipped and flown. Pilots who are most at risk are those who fly single-pilot IFR, followed by those who fly IFR with a qualified pilot to share the load, and then VFR pilots.

Even VFR pilots shouldn't think that they can wait until the pneumatic pump fails in flight. One can never tell when the unexpected will be encountered. In such cases, a properly working vacuum pump may spell the difference between a safe exit from adverse conditions or a further challenge.

There are several actions that can be used to mitigate the risk and improve flight safety. The first is an uncompromising effort to properly maintain your pneumatic pump, including assuring it is promptly removed and replaced at 500 hours

time-in-service or as otherwise recommended for hour or time limits with dry pumps. Wet pumps should be overhauled by a qualified shop when the engine is being overhauled.

Problems and changes in the pneumatic system need to be promptly and thoroughly investigated and corrected. A change in the system in the normal or idle pressures is the system trying to tell you something bad is going to happen. Heed those warnings.

Beyond these steps, you can install a backup pneumatic system. These backups, which are driven from the engine accessory pad, manifold pressure or an electric drive, will provide defense in depth for your system should your pneumatic pump fail in flight.

One of the reasons the Bonanza pilots in the study identified the failures faster was their use of warning flags to indicate failures on the instruments. While a full annunciator system can be expensive, there are artificial horizons available that will indicate a loss of pneumatic supply by dropping a flag into view. This gives the pilot precious additional seconds following the identification of a failure, and thus a better chance to maintain control.

Purchasing a backup electric artificial horizon can also improve redundancy and avoid accidents. Some of these devices have built-in battery backups, making them a potential drop-in replacement.

Pilots should also consider keeping something in the cockpit to cover instruments that no longer provide accurate



These artificial horizons can provide you with prompt notification (red flags) of a failure of the instrument or vacuum source.

information. Instrument covers from Sporty's or simple inexpensive Post-It notes to block the instruments from view will help keep you from being confused by the inaccurate data.

Finally, pilots who fly in single-pilot IFR conditions need to make sure they maintain their partial-panel skills on a routine basis. This will help you recognize when a failure occurs, and how to deal with it when it does happen.

How many or how few of these defenses you employ is up to you. But the best defense would include most of these options, and really ought to be considered by the single-pilot IFR operator who is at the greatest risk.

One thing is certain: If you do encounter a pneumatic pump failure in IFR conditions without adequate practice and support, the statistics are clear regarding the outcome.

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DOT/FAA/AM-02/19, October 2002, Authors Roy, K.M. and Beringer, D.B.

Summary of Mandatory Service Instructions for Airborne Pneumatic Components, S1300-17, Rev. D, June, 2006. (www.parker.com/ag/nad)

ABS member George Wilhelmsen is the nuclear oversight engineering assessor at Exelon's Dresden Generating Station. George is a commercial instrument-rated pilot, and is a contributing editor for Sport Aviation and Avionics News.



CONGRATULATIONS TO THESE MEMBERS WHO HAVE RECENTLY EARNED DESIGNATION AS AN ABS AVIATOR (AS OF 2-8-06)

TO DATE 105 MEMBERS HAVE EARNED ABS AVIATOR STATUS

JAMES BIEMER, Tampa, Florida, earned 130 points by completing BPPP, BPPP Mountain Flying ground school, and eight recognized ABS Convention seminars.

GEORGE POWELL, Yorktown, Virginia, earned 110 points by completing BPPP and four AOPA online seminars.

ANDREW REARDON, Lake Forest, Illinois, completed BPPP and a separate level of FAA WINGS for a total of 110 points.

WILLIAM DUE, San Antonio, Texas, earned 180 points by passing FAA checkrides for Airplane-Single Engine Sea and Airplane--Multiengine Sea ratings.

RICHARD DAVIS, Miami Beach, Florida, amassed 110 points by completing 11 AOPA online seminars.

FRANK WOOLARD, Greenbrae, California, earned 100 points by completing Phase VI FAA WINGS and the FlightSafety G36 initial pilot course.

MIKE REANEY, Westminster, California, earned 100 points with BPPP and three AOPA online courses.

RALPH REQUA, Henderson, Nevada, earned 110 points through BPPP and four AOPA online seminars.

LEVEL 2 ABS AVIATOR

ART BROCK, Rancho Palos Verdes, California, earned Level 2 status by completing BPPP, formation flying at the '06 Grayson, Texas clinic, and three recognized seminars at the '06 ABS Convention for a total of 145 points.

TECH TIPS

BY THE ABS TECHNICAL STAFF & TECHNICAL CONSULTANTS

Hot Baron CHTs

Elliott Ross
Tampa, Florida

Q: While I was flying my friend's 58, in level cruise CHTs with cowl flaps closed were 390° - 410° with #2 the hottest on both engines. OAT was 10°C, at 6,000', with 24" MP, 2400 rpm and 36 total gph. Oil runs 180 and 190. I think these 520s are running too hot. What do you think? His mechanic says baffles are fine. I am not convinced. My 55 never gets this hot, even in a climb.

A: I agree with you. In my experience, Barons don't usually run that hot. I would suspect, in this order:

1. Baffling issues.
2. Fuel injection system setup, leading to excessive heat on climbout that cannot be quickly dissipated in cruise, hence the high cruise CHTs.
3. Pilot engine management issues—reducing throttle below wide open during climb (which is the "book" procedure for the IO-520s but which limits fuel flow and therefore affects heat, as in #2 above), or leaning too close to peak CHT (about 40°F rich of peak EGT).

Check the baffles by inserting a trouble light up the cowl flap hole in a dark hangar with the cowling lids closed. You should not see any light when looking through the forward cowling cooling air inlets. Check the fuel flow setup in accordance with Teledyne Continental Motors 97-3c. And consider taking the online engine management seminar at www.advancedpilot.com. —TT

Replacement CHT probe

Patrick Armstrong
El Granada, California

Q: The cylinder head temperature probe has failed on my J35. I called Raytheon and they want to sell me an instrument cluster replacement. I don't

mind spending the money, but they say it is 30 hours of work. Raytheon won't tell the dealer what is in the kit. I would like to know something about this before I spend over \$4,000. Do you have any information?

A: The engine gauges used in your aircraft were originally manufactured by AC and are no longer available. The reason the Beech kit is so expensive and labor-intensive to install is that it replaces all the engine gauges, fuel gauges and all sending units.

Airparts of Lockhaven (800-443-3117) can modify your instrument to be compatible with a currently available probe, which they can supply.

Another option would be to replace the CHT with a unit approved as replacement for required instruments. The only approved unit I am aware of is by Electronics International (877-318-6060) model CPIP. This unit mounts in a 2-1/4" instrument hole. —AM

Oil temperature inaccuracy

Daniel Jordan
Parker, Colorado

Q: I fly a stock 1980 A36. The engine oil temperature gauge sometimes indicates a cooler temp than it should as compared to the JPI oil temp indication. Sometimes the oil temp indicator just begins to slowly fall off toward zero. If I switch the magneto switch out of the BOTH position, the oil temp needle will pop back up and read accurately. This can occur while taxiing out, during runup or in flight. I've seen one other A36 with this condition.

A: You may have a ground problem on the temp probe wiring or the engine grounding straps may be loose. Try to clean and secure the ground to the temp probe and tighten the engine grounding straps. If this doesn't fix the problem, I suggest replacing the connector first and then the probe. —BR

MP rise during taxi

Janet Lapp
San Diego, California

Q: Just after annual, I landed my B36TC back home and on approach could bring manifold pressure back to 10-12". But while taxiing, it started to rise and I could not bring it back down. At idle, it was rising, fluctuating between 15-17 inches, even with the throttle closed. The alternator-out light came on (it never has before, regardless of rpm or MP). The JPI download shows a strange peaking, up to 1400° F at shutdown.

A: I suspect an intake leak. I doubt the alternator light is related, except as regards to rpm being low. —NP

Oil pressure high

Jeff Martin
Rockwall, Texas

Q: The oil pressure indication on my V35B is showing higher than normal. All other indications are fine. At takeoff power, the gauge is 3/4 to the right but never hits redline. At cruise, it will move closer to normal range, but still remains outside green. Is this a problem, and how can I regulate pressure?

A: Oil pressure could be checked with a direct reading master gauge. In some cases, you may have a relief valve sticking, but it's more likely a gauge error. —NP

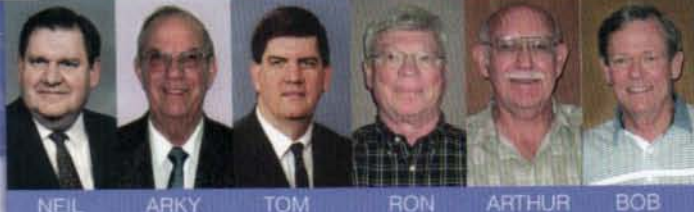
Baron IO-550 and stress

Michael Fagan
Washington, D.C.

Q: As I consider converting my 55 to 550s (Colemill), I wonder whether the increased thrust (and occasional high asymmetric thrust during annual single-engine training) would affect carry-thru spar loads sufficiently to increase the probability of crack formation. I have no cracks now. If yes, would it be correct to assume that limiting the

Answers are marked with initials of the tech staff or consultant who answered it. NP-Neil Pobanz, AF-Arky Foulk, TT-Tom Turner, RG-Ron Gros, AM-Arthur Miller, BR-Bob Ripley.

Answers to technical questions are the best information available based on indications presented by the member asking the question. Actual inspection of the airplane or system in question may change an initial



NEIL

ARKY

TOM

RON

ARTHUR

BOB

telephone or email suggestion. Aircraft owners, pilots and readers are advised to physically present airplanes and indications to a qualified mechanic before choosing a course of action.

550s' power to 470 numbers would negate those effects? I understand that the benefits of the 550s in that case would be available only at altitude.

A: We have no data to support a contention one way or another that a higher horsepower would affect the spar-web cracking issue. ABS is in final review of proposals for a spar-web engineering study; its results may answer your question. If in fact it is an issue, artificially limiting power to original horsepower levels as you suggest would logically negate any adverse effects.

That said, in some configurations the Colemill IO-550 installation is limited to your original horsepower anyhow, with a placard limiting your manifold pressure to a maximum, less-than-full setting at low altitudes under the STC. This is mentioned in Pete Bedell's article on this conversion in the December '06 and January '07 issues of the *ABS Magazine*. Ask Colemill if this applies to your serial number airplane.

In all cases, in my opinion, this limitation goes out the window in an emergency. Don't be afraid to power up to full throttle in the event of an unplanned stall or an engine failure, returning to placarded power levels ASAP once the emergency is under control, and inspecting the engine mounts and associated areas carefully after the event. —TT

IO-470 baffle seals

Randy Carmichael
Melbourne, Florida

Q: I would like to replace the flexible cowl seals on my P35's IO-470 since the current rubber strips are old and out of shape. Also, the chafe strips around the

edges of the cowl cover openings have worn through to the metal in several places and need to be replaced. Any help regarding different options and pros and cons would be appreciated.

A: The material for the baffle seals I prefer is 3/32" thick silicone material with a fabric woven into the center. The silicone alone, while quite good, has a tendency to tear at the corners. My method of installing it is to use a backing strip of about .032 x 1/2" aluminum strip and secure with soft solid aluminum rivets or aluminum pop rivets. To get a good fit, use a leather punch to make the holes in the silicone rather than drilling it.

I recommend buying this material in flat sheets so curved sections can be cut out. A good way to check for proper fit is to put a drop light under and then aft of the engine, and observe from the opposite side of the top cowl any light coming around the seals. The seals may need to be notched to fit tight around ignition leads and plumbing. Small areas can be sealed using high-temp RTV. Getting a good airtight seal can't be over-emphasized.

For the cowl chafe strips, use chafe tape or a kit made for this purpose. The tape and silicone sheets are available at homebuilder supply houses such as Aircraft Spruce (877-477-7823, www.aircraftspruce.com); Chief Aircraft (800-477-3408, www.chiefaircraft.com); or Wicks Aircraft (800-221-9425, www.wickaircraft.com).

The tape and chafe strip kits are available from Performance Aero (600-200-3141, sales@performanceaero.com). The only source I have found for the

silicone sheet with the fabric woven in the center is Gee Bee (800-556-3160).

—AM

Speed restriction AD

David Samons
Phoenix, Arizona

Q: I have an E35 and was reading the ABS V-tail Fact Sheet. Am I to understand that the Vne redline on this aircraft now stands at 144 mph /125 kt?

A: The original airspeed limitations from your POH apply. The ABS Fact Sheet applies to the Model 35 (1947-48), 35R, A35 and B35 only. The speed restriction option for complying with this AD with those airplanes expired in December 2005. There is a separate Fact Sheet for the C35 and later V-tails and both are linked from the Members Only page of www.bonanza.org. —TT

Throttle position for climb

Marc Santacroce
Concord, California

Q: On occasion I fly a friend's A36 with a TCM IO-550 engine. We have some disagreement over whether it's proper to reduce MP on climbout. My friend reduces MP to 25" starting at 600' AGL, then reduces rpm to 2500. I maintain the throttle should be kept wide open until level-off and reduce rpm to 2500 at a safe altitude. Which is correct?

A: The Beech A36 POH calls for leaving the throttle fully forward for climb with the IO-550. This provides additional fuel flow to the cylinders to assist with cooling. It's not a bad idea with IO-520 engines either. —TT

Brakes hanging up

J. Patrick Kilfoil
Fort Wayne, Indiana

Q: Cleveland brakes on my J35 are hanging and two mechanics have offered differing methods for the squawk. The brakes seem to be working better now, but the plane is still showing some signs of at least one side hanging. I notice this when pulling the plane from the hangar.

A: Make sure the guide pins are lubricated and move freely in the torque plate. Also look at the linings for an even wear pattern. If they are wearing at an angle, the rotor may be warped and need replacing. If all of this looks good, remove the wheel cylinders, remove the pistons, clean and replace the O-rings. At times the piston/cylinders get dirt and grit buildup or corrosion and prevent the piston from returning completely. —AM

Panel upgrades

Dan Meester
Longmont, Colorado

Q: I am in the middle of planning a panel overhaul for a K35. Without putting in an STC'd replacement panel, space is at a premium. As I intend to retain the original panel, I am eyeing areas that would increase the available space without requiring massive modifications. The "six-pack" instrument cluster is an area that looks attractive for a potential radio/GPS installation and is in the right center panel location.

My thought is to obtain TSO'd replacement instruments and mount them to a bezel where the glove box is currently located. (1) Are there TSO'd third-party instruments (fuel and oil pressure, voltmeter, oil temp, fuel tank level indicators, etc.) that will work with the existing sensors? (2) I am using a JPI EDM-700 with fuel flow and oil temp sensor options. JPI claims this is a TSO instrument. Is it adequate (and compliant) to replace CHT and oil temp gauges with this instrument?

A: The area where the six-pack of instruments is located can only be used for relatively short instruments and very limited for radios due to clearance required for the flight controls. On older Bonanzas, the area to the left of the flight instruments and the area below the left keyboard switches is where most of the additional equipment is usually installed.

Required primary instrument (oil pressure, oil temperature, CHT, amp meter and fuel gauges) can only be replaced with instruments that are approved via STC for that purpose. It's my understanding that the JPI instruments are not so approved.

Electronics International (877-318-6060) does have some of their instruments approved for this purpose. Another avenue, depending on your local IA/FSDO, would be to request field approval for JPI instruments or other TSO'd instruments.

Any fuel gauges you use will need to be compatible with your current sending units or they will require replacement and approval. Manufacturers are introducing new products quite rapidly, so call them direct for the latest word on what is approved. —AM

Flap breaker pops

John Hand
Atlanta, Georgia

Q: I was flying my A36 and upon raising the flaps for a missed approach, the "in transit" light remained on. There was a burning smell for a moment and the flap motor circuit breaker tripped, but not the circuit for the flaps relay. We left the flaps up for landing and did not try to reset the breaker out of fear of further damage.

Is there something obvious that would cause the problem? Is it OK to replace the circuit breaker and try to see if the flaps will work, or is there risk of damaging the flap motor or circuit? Is this a common issue or a problem in the 1985 A36?

A: It's not a common problem, but I suspect the motor is damaged at this point. Your mechanic should be able to verify if the motor has been overheated. —NP

Multiple electrical failures

Andrew Harris
Fairfield, New Jersey

Q: Our F33A experienced a complete electrical failure about an hour into flight. The primary alternator failed, our standby failed and the battery had virtually no power remaining. Any ideas on what would cause this?

A: I suspect the battery caused all three problems. Alternators require a functioning battery and an internal short in the battery could cause the alternators to go off. If they work OK with a new battery, then that's probably the case. —NP

Autopilot fails when wet

Steve Everett
Valdosta, Georgia

Q: I have a Century III autopilot in my B55 that has worked wonderfully since I purchased the airplane. But lately when I depart in rain or wet weather, the unit wants to act up. When roll and/or heading is engaged, the plane hesitates for a moment and then starts a turn to the left. I then have to deactivate and fly by hand when I really need the unit the most. I have not actually watched to see what happens if I continued the turn because I am in IMC.

I keep the plane in a hangar, so it does not seem to be a problem when I leave my home base. But when I leave it out in the weather at another airport, it's at its worst. When it's dry, it performs flawlessly. I cannot detect any leaks but I have not looked everywhere.

A: It certainly sounds like water shorting somewhere in the system. Autopilot Central (918-836-6418) may be able to tell you where to look. —NP

Overvoltage trip

Michel Aiello
Incline Village, Nevada

Q: Recently I had a rebuilt alternator and a new regulator installed in my V35TC due to shorting wires that disabled both units. Often on start the alternator is off line and I can get it back on by cycling the battery switch. My POH states this is possibly an overvoltage situation, disconnecting the regulator from the alternator. Is this the likely cause or could there be another reason?

A: It sounds like an overvoltage trip-off that you're resetting. Terry Norris at Aircraft Systems (815-399-0225) may be able to help you isolate your problem. —NP

Unbalanced electrical load

Stephen Romaine
Hopewell Junction, New York

Q: My 58 has an alternator light that blinks dimly when the associated engine is running. The amp gauge shows draw, and shutting off that alternator increases the draw on the other alternator to compensate. Therefore, the alternator seems to be functioning properly. I would like your advice for my mechanic before he tears it all down.

A: The Baron has a tendency to have alternator imbalance, especially with light amperage draws. A little corrosion in connectors or variance in the grounds can cause this. A recent Service Bulletin applicable to very late-model 58s and the G58 suggests that owners not even try to balance the loads. —NP

Periodic alternator bearing inspection

Gary Read
Orion Township, Michigan

Q: Years ago there was a recommendation to pull the alternator from IO-520-B engines and inspect the bearing every 300 hours. This was intended to avoid an unexpected failure that would send coupling pieces into the crankcase.

Did this only apply to a certain brand of alternator? Is this still recommended?

A: The recommendation still stands for any type of alternator. The problem arises when the alternator bearings fail and the alternator locks up, allowing the drive coupling to break and fill the engine with metal. The inspection should include the bearings on both ends. There is a new elastomeric coupling that replaces the old coupling and will not fill the engine with metal. Cost is around \$800 for the coupling and it should be installed as noted in Service Bulletin 95-3B. —BR

Alternator-out indication

Bernhard Randerath
Drochtersen, Germany

Q: On a recent trip in my F33A, the voltage indicator illuminated. I checked the ammeter by switching on all lamps and the needle went positive as expected. The bulb is not on permanently, and switching the alternator and battery switches off and on again doesn't help.

A: I would check the battery condition—its fluid level, hydrometer reading and static voltage. Then use an accurate voltmeter to monitor while you run up the engine and as you increase the load by turning on equipment. It could be battery condition or corrosion on connections. —NP

Alternator drops off line

John DeThomas
Prescott, Arizona

Q: I recently added a new engine on my V35A with a 12-volt 72-amp Kelley Aerospace alternator. Intermittently, about every third flight, the alternator drops off line immediately when the landing gear switch is selected down. The gear then extends fine with battery power. My aircraft has the factory-installed Magic Hand landing gear safety system, which is also working fine.

I have been unable to reliably duplicate this problem using maximum electrical load, numerous gear cycles, etc. I

have a voltmeter built into the GPS system; the voltage looks great, about 14.1 volts throughout flight with various electrical loads.

I sent the Zeftronics solid-state voltage regulator for a bench check and it is good. I've cycled the gear on jacks with the battery several times and all the limit and position switches seem fine. Any ideas?

A: You could be having overvoltage trips caused by some intermittent high load. It could also be caused by corrosion anywhere in the electrical system, because the regulator may sense that as a voltage interruption. Clean all crimps and connections (including ground connections). Then have someone watch the voltage while you test fly. —NP

Generator can't keep up

Eric Saylor
Elverta, California

Q: When I turn on both landing lights on my A35, the ammeter goes into full discharge. The lights continue to work fine, but I have to let the plane run on the ramp for a while to recharge the battery. Is this normal, or do I need to check my generator or voltage regulator?

A: Depending on engine rpm, it's possible for the landing light load to show full discharge in airplanes of that vintage. You could hook a generator tester to the aircraft and, while on the ground, see if at 1500 rpm or above the generator maintains at least 13.5 volts while carrying the rated load.

Your amp requirement of installed items quite possibly exceeds system capacity. In that case, you have to manage load and use equipment selectively. Landing lights were not considered continuous-use items in the days your Bonanza was built. —NP

Avionics light bulbs

H. John Kuhl
Gardnerville, Nevada

Q: My C33A has a KI-525A with a burned-out light bulb. I have been told

by our local shop that this is an "overhaul" replacement. Is this really the case? The instrument works fine, I'd just like to have the internal lighting back. There can't be that much to replacing the bulb. Would you have a part number?

A: Probably the reason your shop doesn't want to do it is that it takes a shop that is rated for instrument repair. The light needs to be soldered on a circuit board for replacement. I suggest trying another local shop or try Porter Straight Instruments in Tulsa, Oklahoma (918-838-8711); MidContinent Instruments, Wichita, Kansas (800-821-1212); or Aero Lab Aviation, Leavenworth, Kansas (913-680-4168).

Be sure to ask any shop you call about the cost and if they would need to do a full test on it prior to returning it. Some do, some don't! If they need to do the full test and some minor item isn't up to spec, they won't be able to return it with a Serviceable tag unless they repair what isn't up to spec. —AM

Rebuilt engine gauges

Jack Juraco
Tucson, Arizona

Q: Who can rebuild engine instruments on my J35?

A: Air Parts of Lock Haven (570-748-0823) does some of the small six-pack gauges. For tachometers and manifold pressure gauges, try Kelly (800-835-1054) or Century (800-733-0116). —NP

Fluctuating fuel pressure

Gary Nicola
Lansing, Michigan

Q: I have been noticing a change in my C35's fuel pressure indication and wonder what it portends. The fuel pump was rebuilt at the time of E-225 engine rebuild, 300hrs +/- ago. Since that time, the fuel pressure indication has been steady at 15 psi. I have recently noticed that, at cruise, the pressure runs slightly below the 15-psi mark, and the needle pulsates rapidly over about a one-pound

range. At a steady 1000 rpm taxi-idle, pressure runs near the 15 psi, but at intervals, drops to as low as 5 psi and then returns to the former value without noticeable change in engine operation. When it does this, a slow stroke of the plunger-pump restores normal pressure.

I have not operated the aircraft since noticing this; my main concern is the possibility of pump failure. I have the Dukes electric pump, but I don't want to set myself up to have to use it.

A: I believe you have an indication problem. If you actually had only 5-psi pressure during idle, the engine would have quit. It takes about 9-psi pressure to keep the carburetor functioning. I would start by bleeding the line to the fuel pressure gauge. It's possible that it has some trapped vapor in the line.

To bleed the line, loosen the fitting on the gauge, run the boost pump or actuate the wobble pump, and catch the expelled fuel in a cloth positioned under the loosened fitting. If the problem reappears, try filling the line to the gauge with hydraulic oil. —AM

Overhauling/installing gear motor

Bernhard Randerath
Drachterson, Germany

Q: Do you know of some good spare parts dealer for a landing gear motor (P/N 35-380094-3) for an F33A? When I want to reinstall, are there any special procedures?

A: I suggest having your gear motor overhauled. Some overhaul shops we get good reports on are Aircraft Systems, Rockford, Illinois (815-399-0225); Cruiseair, Ramona, California (760-789-8020); and B&S, Wichita, Kansas (316-264-2397).

Reinstalling is pretty much straightforward. Make sure the spacer/thrust washer is on the gear reduction gear in the gearbox. It usually stays on the gear when the motor is removed, but at times comes off and sticks to the grease on the motor or

worse yet, falls in the belly, never to be found. —AM

Rear seats center armrest

Adrian Chapman
Annandale, Virginia

Q: In preparation for a new interior for my V35A, I would like to add a center armrest for the rear seats and do not know if the existing seats can accept the attachment of an armrest. Do I need to find a seat that includes the armrest from a salvage yard? Were they standard or an option on my vintage plane?

A: According to the parts book, S/N D8599 and up did not have an armrest attached to the rear seats either as standard or optional equipment. I have never seen or heard of an installation where one was added. The seats for the V35 through S/N D8598 had a fold-up armrest attached to the seat frame. You could possibly adapt one of those to your seat with parts from a salvage yard. —BR

Interchangeable seats

John Crum
St. George, Utah

Q: Are the pilot and copilot seats 1 & 2 interchangeable with seats 3 & 4 in a 1969 36?

A: They have different mountings and structure. It would be a major alteration requiring engineering work and FAA approval to change them. —NP

Missing starter bolt

Ronald Roberts
Destin, Florida

Q: While tinkering with my Debonair, I noticed that one of the starter through bolts was missing. The safety wire was broken and still in place. The starter is a Prestolite MCL-6501. Do you know if there is a cross-reference for the bolt (actually a long screw) or a possible source for a replacement?

A: Most any accessory overhaul shop should be able to supply you with a new

bolt. Some I suggest are Aircraft Systems, Rockford, Illinois (815-399-0225); Accessories Inc., Wichita, Kansas, (800-926-0707); Quality Aircraft Accessories, Tulsa, Oklahoma (877-833-6948). You might want to inspect the other bolt and starter in general for any additional problems. —AM

Send your questions to ABS and we'll have one of the tech consultants respond <absmail.bonanza.org>.

Neil Pobanz, ABS lead technical consultant, is a retired U.S. Army civilian pilot and maintenance manager. He is an A&P and IA with more than 45 years experience.

Glen "Arky" Foulk, owner of Delta Strut, has been ABS assistant technical consultant since 1986.

Ron Gros retired after 35 years with Beech, completing his career there as head of piston aircraft technical support.

Arthur Miller has won numerous FAA awards as a mechanic, and runs a Beech specialty shop in central Florida.

Bob Ripley retired from Delta Airlines as a manager of line maintenance (Atlanta) and has run an FBO focusing on Beech maintenance for more than 20 years.

Tom Turner is ABS manager of technical services. Holder of a Master's degree in Aviation Safety, he has specialized in Beech pilot instruction for over 15 years.

NEIL'S NOTES

Neil's Notes are from ABS Technical Consultant Neil Pobanz unless otherwise noted.

PROP TORQUE - Installation torque values vary by prop model. The Beech 215 electric prop on a splined shaft is 400-415 foot-pounds. If you have a splined-shaft Hartzell prop, you should read Lew Gage's articles on installation for torque values; old parts call for 300 foot-pounds, while new slip rings and seal rings require 400 foot-pounds.

For the Beech 278 on a flanged engine, use nuts 600-800 inch-pounds, bolts 600-700 inch-pounds. Torques for the Hartzell flanged shaft also vary by model, so you should check with your prop shop. The values are different than they used to be because manufacturers now recommend the use of thread lube, which changes the values compared to dry.

If you have a new prop book, you can use its values, but if it is a few years old, recheck with a current source. McCauley has the same situation. They used to vary by model, but now they also use a thread lube.

MORE ON E-SERIES OIL LEAKS - In January's Tech Tips, in the answer to the E-225 scavenger pump question from Brett Johnson, pg 10004, I missed mentioning that the check valve at the bottom of the tank should have been removed, or the interior parts removed by Bulletin, quite a while ago. The check valve, which can have an adverse effect, is the metal-to-metal poppit valve located behind the oil screen. With the screen out, you can feel its castle nut and cotter key.

Of course, the oil must be drained before removing the screen. This valve is held in by the screen's pressure against the O-ring interference fit in the housing. Gripping the nut and shaft and wobbling it, you can work it out to clean the metal surfaces. The main leak source may be the end clearance on the main oil pump gear.

On the E-series engines, it's important that the repair facility has the machine shop capability to achieve proper clearances on the rear case. It also affects oil pressure.

ELEVATOR CONTROL ARM - If you decide to install the new aluminum elevator control arm and eliminate the 100-hour inspection of the magnesium arms, you should think about having one of the good reskinning shops do it. They have jigs to drill the locating holes that prevent misrigging.

MAGNETOS AND SPARK PLUGS - While the 500-hour AD on mags is on the Bendix impulse coupling, even shower-of-sparks Bendix and Unison (Slick) mags usually need to be inspected at 500 hours. Bearing, points, internal timing and brush dust are all areas of concern. Use the manufacturers' manuals as a guide, and for standards and procedures for spark plug maintenance. While spark plugs have gotten more expensive, good ones can make a considerable difference in engine performance.

Some of us have had wildly divergent success with certain brands. There have been comments from one plug manufacturer that their performance varies with the brand of magneto. Learn as much as you can and be aware there will be varied opinions.

BRAKE LINING CONDITIONING PROCEDURES - Different procedures are used for organic and metallic linings when new. On asbestos organic linings, taxi 1,500' with the engine at 1700 rpm, applying enough brake to hold speed down to 5-10 mph. Allow brakes to cool for 10-15 minutes and try at high power. If they hold, conditioning is complete.

On metallic linings, perform two consecutive full stops from 30-35 knots. Don't cool between stops. Then let cool for 10-15 minutes. If afterward the brakes hold at high power, conditioning is complete.

Brakes dragging from bent pins or warped components can affect takeoff performance. Improper conditioning can also cause ineffective brakes. Some non-Beech model aircraft with wheel pants have recently experienced brake fires from excessive braking.





EMERGENCIES

REAL OR IMAGINED?

BY PAUL GRETSCHER, CORAM, NEW YORK

During pilot training, either initial or advanced, we are repeatedly taught how to deal with emergencies. Engine-outs, gear failure, partial-panel, electrical failures—all of these and more are all addressed and sometimes scare us away from flying!

I have flown with a number of pilots, both high time and low, who honestly believe they will never experience a true emergency. Other pilots I have flown with are similarly convinced they will experience an emergency on every flight and eventually give up aviation.

So what is real and what is not? Obviously, many factors will influence the outcome of any flight, i.e. how well you have maintained your aircraft, how thoroughly you perform your preflight inspections—and how well prepared you are.

During the 25 years I have flown general aviation airplanes, I have personally experienced a few emergencies: one when an engine was lost at night in a single-engine airplane, one alternator failure in IFR conditions and one failed HSI in IFR conditions.

During the 20+ years I've been an instructor, I have met pilots who had also experienced what I had, plus engine losses on takeoff in single- and multiengine airplanes, complete electrical failures at night and in IFR conditions, propeller over-speed, broken throttle cables, many landing gear failures, double vacuum pump failures, electrical fires, serious icing conditions, inadvertent spins, and at least two carbon monoxide incidents.

Be prepared

Emergencies are real, but they don't occur frequently and many can be avoided. No matter what, we should always be well prepared for most emergencies.

When I had my engine failure at night, I was sitting in the right seat of a single, and it was just like practice. I barked out: "Best glide airspeed. Pick a suitable spot. Fly the plane. Declare an emergency." I also told the pilot, "Tighten your seat belt," advice I took myself. We landed on a beach at 11:20 p.m.—and it was almost a nonevent.

With proper training, emergency management becomes second nature and a lot of the fear (but little of the surprise) becomes nonexistent.

Some emergencies can be practiced and, when practical, they should be. In the BPPP clinic, for instance, we routinely train pilots in engine-out procedures in the traffic pattern and at altitude, in both single- and multiengine airplanes. We prepare for gear failures and practice partial-panel IFR procedures. We also work on stall recovery and stall avoidance techniques, as well as emergency descents (in case of an inflight fire).

Some emergencies cannot be safely practiced in flight, but they need to be discussed between instructors and pilots so a plan can be implemented. Examples of this would be icing, CO poisoning, spin recovery and engine failures immediately after takeoff.

To be forewarned is to be forearmed. Prepare for as many emergencies as you can with your CFI. Never believe that it can only happen to the other guy. It's happened to lots of experienced, well-trained pilots. And just because it hasn't happened to you in 30 years, doesn't mean that it will not happen tomorrow.

Of course, with proper training, thorough preflight inspection and good maintenance, you can minimize the chance that anything will go seriously wrong.

Paul Gretschel is a BPPP instructor and Master CFI with ATP, CFI and MEI who flies a Baron out of Islip, New York.

Established in 1983, the Beechcraft Pilot Proficiency Program (BPPP) promotes aviation safety and is the most effective model-specific flight training available. Initial, recurrent and mountain-flying programs are available for Bonanzas, Barons, Travel Airs and Dukes. There is also a Companion Clinic for right-seaters. BPPP has been approved as a recurrent training program by virtually every insurance company in the nation.

See BPPP Clinic schedule on pg. 10092.

I'm a 4-time BPPP Companion Course veteran.



"I believe you learn in 'layers'; the first time I attended the Companion Course, I learned quite a bit. In subsequent Companion Courses, I've gained additional 'layers' of knowledge. It's a great course!"

Rosemary Waidrop
Pullman, Washington
Flies with husband Barney in N3788, an H35

Sign up today for a Beechcraft Pilot Proficiency program (BPPP) near you. Visit www.bppp.org or call 1-970-377-1877 for complete details.





BY BOB RIPLEY, GRIFFIN, GEORGIA
ABS TECHNICAL CONSULTANT

TROUBLESHOOTING

Troubleshooting skills are something every aircraft mechanic needs to have, since our fleet of general aviation aircraft does not have computers to aid in identifying problems. Troubleshooting skills are learned over a long period in a mechanic's career. The basics are taught in aviation schools and during the working process to gain an Airframe and Powerplant license. The *real* skills are learned through many mistakes and lots of trial-and-error sessions to locate a problem.

To an aircraft owner, it may seem simple to find why a light doesn't work or the fuel quantity is not reading correctly. In the real world of troubleshooting, in addition to addressing the specific symptom, you have to try to eliminate any items that may interface with the

main issue to aid in leading you to the true problem.

Troubleshooting is like finding the cause of an accident: First you need all of the details leading up to the accident, then you can compile all this information, which in the end will lead to the root cause. In some cases, the root cause will not show up without the benefit of knowing all the additional details.

Information is the key

As a pilot and aircraft owner, you can aid your mechanic by providing as much information as possible. Don't think anything you see or hear when the problem arises may be trivial, as many systems in our aircraft are related in more ways than one. As a pilot, you may not be aware of all the connections involved.

Write down any abnormal indications you see—whether or not you think they have anything to do with the problem. Take off your headset and note any strange or different sounds. The more information you give your mechanic, the better. Each piece may help locate the issue or eliminate other areas that in the end lead to the specific problem.

Sometimes finding a problem may be very lengthy, especially when it involves, say, a single broken wire in hundreds of feet of wiring. Please be

patient when your mechanic asks many questions about what indications and failures you experienced during your situation. The answers to these questions may lead to valuable information that will help locate the issue more quickly, which will have your aircraft back in service sooner, and in the long run, save you money.

Your mechanic must be willing to discuss with you anything you feel did not look or sound right, then take all of that information and use it effectively. It's the owner's job to provide as much information as possible to narrow the focus of troubleshooting.

Bob Ripley retired from Delta Airlines as a manager of line maintenance (Atlanta) and has run an FBO focusing on Beech maintenance for more than 20 years.

CORRECTION:

There is an error in the Beechcraft Service Letter reproduced in Tech Talk (February 2007, page 10048). The 1957 fuel cell vent modification instruction states the #40 hole should be drilled 1 3/8 inch from the open end of the tube, not 3/8" as appears in the article. ABS regrets any inconvenience that may have resulted from this typographical error that occurred in article layout. —Dick Pedersen, ABS Technical Consultant

WHAT'S WRONG?

BY ADRIAN EICHHORN & RON TIMMERMANS

This older model Bonanza was repainted and the 10° and 20° flap extension markings were not reinstalled on the outboard end of the flap. The flap switch indicator on this aircraft has settings for fully extended or fully retracted; there is no interim setting for approach flaps.

Read the next part of this article to see how you can set approach flaps on a Bonanza, Baron or Travel Air that does not have the factory-installed markings on the flap. *See page 10120 for the answer*





AVIONICS

BY JIM HUGHES

How and where to get AVIONICS TRAINING

By now my regular readers know I make most of my living as a contract corporate pilot. Perhaps your biggest hint was the "WILL FLY FOR FOOD" shirt I was wearing at the last ABS convention. Currently I'm flying a Navaho, a King Air B100, occasionally a Citation II, a B55, a Duchess, an A36, and sometimes a 414 for various clients.

Business is good in this area. (How else do you get to your townhouse in the Bahamas for a weekend, especially if your "Island in the Sun" is not served by an airline?) During the week I mostly fly a King Air B or C-90 for a flight school, training foreign students in turbine airplane operations.

The object of the above paragraph is not to say, "Hey, look at me, folks," particularly to those of you who don't get enough of flying your Bonanzas. What I'm leading into is that *each of those airplanes has a different long-range navigation system.*

The Navaho has (one) Garmin GNS-430 and an old M-5 autopilot. The B-100 has a Bendix KLN-90B. The Citation II has an early Bendix GNS-XL Flight Management System. The Baron has an Avidyne Multi-Function Display with radar, Stormscope and satellite weather. The Duchess has a single GNS-430 and dual King KX-155 navcoms. The late-model A36 has a GNS-530 and a factory King suite. The 414 has Cessna/ARC radios plus a Trimble 2001I/O GPS. Each of the three King Air B/C-90s we use has a different avionics suite. Oh, yeah, and the Rockwell Commander I sometimes fly has a Sandel 3400 HSI.

What instruction is available?

Is there any instruction available for using any of these long-range nav systems? The answer seems to be, "Well, yeah, kind of..." There are several CDs and interactive programs for the Garmin 430/530s, logical since these are the most popular and relatively newest GPS systems out there.

The local purveyor of Cirrus SR20/22 checkouts, sales and rentals wisely insists on a three-day school on the Garmin G1000 glass cockpit before you can darken the cockpit of the airplane.

One of my friend's customers traded his King Air for a brand new Cirrus SR22 and wanted his pilot to fly it for him. Pilot friend proclaimed loudly all over the airport, "No way is it going to take me three days to learn that darned G1000 glass cockpit!" Pilot friend even negotiated the G1000 school down



to two days as a condition of sale of the airplane to his boss. The result? After two days of intensive instruction on the G1000 system, pilot friend said he went back for a third day "just to clear up a few things."

In our ABS membership, most fly the same airplane all the time with whatever equipment we are fortunate enough to have. We are even more fortunate to be members of ABS where we can attend BPPP, the ABS Convention educational presentations and other seminars on the operation of our chosen equipment.

I have flown with operators of other airplane brands who do not have such an advantage, and some of them, especially those who have recently moved from a simple single to a sophisticated twin, can barely turn on the avionics. Now whose fault is that?

As avionics has grown more sophisticated over the years, the operator's manuals have gotten much better. Most are composed in English, as compared to a bad translation from another language (Engineer-ese) into English.

I once wrote an article about how operators' manuals are created. At the time I wrote it, most of the avionics manufacturers were either in too much of a hurry to get their product to market or too cheap to hire a genuine tech writer. So the task usually fell to the engineering department because they had just finalized the design and therefore needed the work! You can only imagine the results.

I make fun of engineers because "I are one!" Those of you who have pursued that honorable profession have heard all the semi-serious remarks such as, "Don't ask an engineer what time it is; he'll tell you how to build a watch!" The fact is that most aviation manuals are now well-written, complete, indexed and rather easily read by those who take the time to read them.

And almost all of the Supplemental Type Certificates issued with the installation of the equipment specify that *the operators' manuals for the equipment installed must become part of the Pilot Operating Handbook (POH) and must be kept in the airplane.*

Should an airplane sales broker instruct a new airplane buyer on how to operate the avionics in his/her new airplane? Not on your life! The people I know in airplane sales are a lot like me: They fly many airplanes. Some of them buy, recover, sell, deliver and fly every brand of airplane known to man. On most of their inventory, they know how to turn on the avionics, maybe know how to find "direct to," and that's about it.

When quizzed about the avionics in their stable, they may say, "Hey, I'm not an avionics salesman, I'm an *airplane*

salesman! But I'll find a sharp instructor who knows the avionics in the airplane to teach the new owners how to use it, and I'll factor the instructor's fee into the sales price!"

What about the local airport flight instructor? Right now, I'm on a personal crusade for new airplane owners to contact the avionics shop to find them a good, conversant flight instructor who can teach them how to use their new (to them) avionics.

Why not use the young and eager flight school instructor? Because that instructor is usually hungry and probably underpaid and is building time so he/she can get a better job! When asked if he/she can teach the operation of, say, the Northstar M3 Approach GPS, they may be tempted to say "Sure!" And then add, "By the way, could you lend me the Northstar M3 operator's manual for a couple nights before we fly so I can refresh my memory?" Translation: I've never seen a Northstar M3 in my life, but maybe I can read the book and muddle through.

Where do you get help?

So what is the pilot/owner of a new (to them) airplane to do? In our case, as members of ABS, we can call for help! Somewhere, somehow, there's an instructor who knows intimately the complete workings of the avionics in your Bonanza or Baron. If we don't know one in your area, we can help you find one!

As for me, so far I have *never* thrown away a POH for any avionics equipment that I have had any dealings with; TI9100/91? Yep, I've still got it. ARNAV 40, 50, 15, 20, 21? Yep, still have those, too. Garmin 100AVD, 150, 155, 50, 95, 195, up to the 530/430/480? Yep, got all those.

As for the Apollo 601, 602, 618, and so on, I'm a little skinny on those, but I'll bet I can find them. Northstar M1, M2, M3 approach? Got it! Jet and turboprop stuff like the Honeywell GNS XL and XLs? Got those! Collins Proline? I don't have that, but I know an aviation library that does and will let me take notes.

What about autopilots?

The local \$10/hour primary flight instructor probably has not had much experience with autopilots, so the Century I, II, III, IV and V are still a mystery to them. In Bonanzas and Barons, not only are they our installed lifeblood on a long trip, but if ignored, they can hurt us! Have you ever seen a KFC-200 installed in a Cessna 150? No, but there are a lot of them in Bonanzas and Barons.

Do any of you remember my articles about autopilots? Quick! What are the five ways to disconnect a runaway autopilot? Most will remember that it has a disconnect switch on the pilot's yoke. Most remember that it can also be turned off at the autopilot control panel. And as a last resort, you can pull

the autopilot circuit breaker. (But did you remember to tie a piece of string around the A/P circuit breaker so you can identify it quickly? Of course you did!)

Most autopilots can be overridden by a sharp pull of the airplane's yoke, which breaks a pin on the autopilot servo. (But beware! This solution cannot restore autopilot operation until the airplane has visited Mr. Avionics Shop!) Did anyone think to cycle the avionics switch from ON to OFF to back ON? Aha! I thought not.

If it is daytime, you can even cycle the airplane's master switch OFF to back ON to get rid of a runaway autopilot. (If it is dark, cycling the airplane master switch to OFF will make things very dark and scary until it is cycled back on!)

Homework

What about any other sources of information where a conscientious Bonanza/Baron owner can thoroughly learn the avionics in his/her Bonanza/Baron? Well, yes, there's homework!

When we bought the new stuff or the new-to-us avionics, it came with the aforementioned avionics manuals. And you'd be surprised at how many of those manuals I've found floating around in the back of airplanes. Some have obviously never been read. Others have been read while watching TV or doing something else other than concentrating on the information at hand.

The solution? Read the manual from front to back. Then take it out to the airplane on a quiet day, apply power to the airplane and, with the airplane at hand (on the ground, of course) and the book in your lap, read the manual again! My observations are that by the second reading, you will learn about 70% of all you need to know to completely understand how to work your new avionics miracle.

There are, of course, CDs, books, manuals, videotapes and structured manuals available on how to operate your new avionics. You can find them from a variety of pilot supply houses, and be sure to check through the advertising pages of this magazine.

Everyone learns at a different pace and everyone has his or her best system for learning. Right now, mine is to close this article so I can be ready to fly early tomorrow morning.

See ya next month.

Jim Hughes of Orange City, Florida, is the former chief pilot, corporate aviation for Embry-Riddle Aeronautical University. He now heads Marketing & Professional Services, a consulting firm specializing in flight support and avionics integration. His ratings include ATP and A&P licenses and type ratings ranging from Boeing to Sikorsky helicopters. He has more than 22,000 hours, including more than 3,000 in Bonanzas, Barons, Dukes and King Airs.

FLIGHT OF FANTASY: STAGGERNANZA

BY DENNIS WOLTER, CINCINNATI, OHIO

My articles in this magazine have always dealt with serious technical subjects, and I've certainly enjoyed sharing my part of that Beech world with you. However, I think it's about time to have a little fun.

I have always been intrigued with history. Knowing what made our world, our culture, our technology and our hopes for the future fascinates me to no end. No matter what the subject, I always seem to wonder, "What if things had been different?"

What if World War II had ended differently? Going back another century, what if Tecumseh had been successful in uniting the Native American nations in the struggle against the onslaught of Europeans? Better yet, what if Columbus had been an incompetent seaman? Intriguing stuff, don't you think?

What fun we Beech lovers can have playing the "what if" game. Sit back and let your mind wander into aviation history to, say, the late 1930s. Aviation was alive with innovation and wonder. The American public was enamored with the glamour and thrill of record-breaking flights and futuristic-looking airplanes.

Let's begin in the late '30s

Aviation heroes were as famous as any baseball or movie star. People were moving away from tedious, slow train travel and giving flying a try. Thanks to major advancements in airframe and engine technology, long flights at (then) unheard of speeds were possible. Gyro technology and electronic navigation aids made weather flying safe, convenient and practical.

American business was ripe for new development. Sons and daughters of our pioneers had a strong desire for challenge and commitment. Folks like Walter Beech, Stearman, the Loughhead brothers out at Lockheed and Donald Douglas and the boys were not hampered by armies of MBAs, bean counters and lawyers. Long-term planning wasn't limited to two years.

These aviation pioneers were free to make commitments and take the risks of bringing an idea to market. And boy, did they! They all bet the company fortunes on a dream, and airlines and businesses were snapping up new designs as fast as they could be developed.

Douglas put airline travel on sound footing with the DC3, and long-distance travel filled the skies with the mellow sound of two 1820 Wrights or 1830 Prattis. Man, I miss that sound.

Lockheed was busy designing the Constellation, while their factory met the short-haul airline market with the 16-place Loadstar and the 10-place Electra of Amelia Earhart fame.

Beech had a hit with the small airline and business market by producing the Twin Beech and the Staggerwing.

Being a designer and dreamer, I know the folks in Beech's design and engineering departments didn't leave their creativity at the office. I can just see them stopping off for a cold one on the way home or at a party and the conversation drifting to airplanes.

Since the short-haul airplane market was sound with air-mail contracts and eager passengers, you just know that the Beech folks wanted to take their fair share of that business away from the Lockheed Loadstars and Electras.

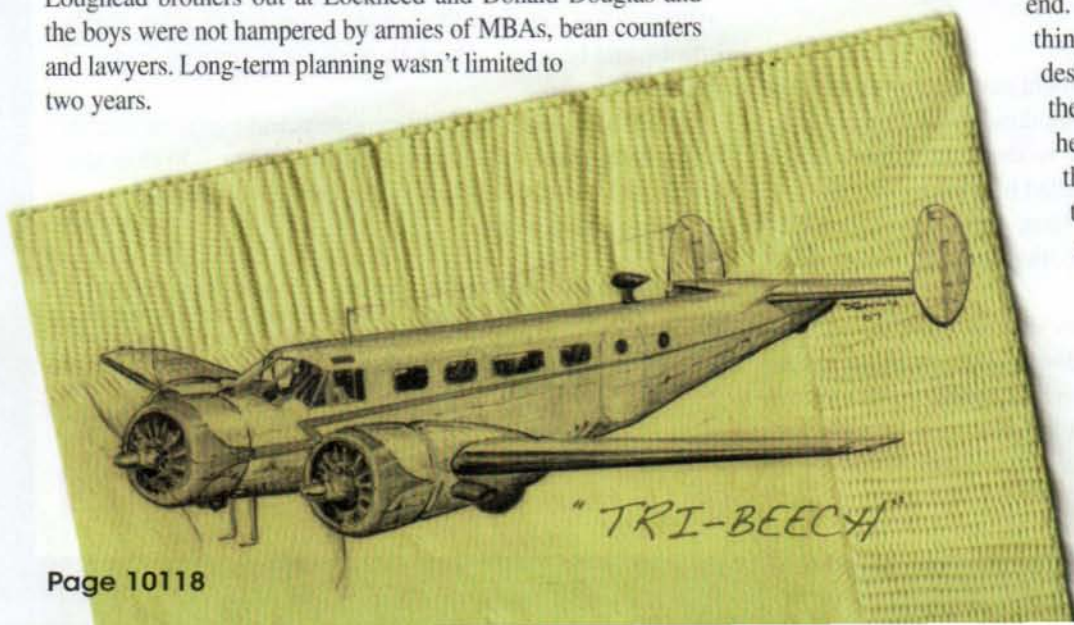
I can just hear them saying, "Look, we have a winner with the Twin Beech. What if we add a third 985 on the nose, extend the fuselage aft of the trailing edge for balance, beef up the spar for strength, add more fuel in the wing for range, and extend the wing tips for more lift?"

And right there, drawn on a cocktail napkin in a bar in Wichita, is Beech's latest hit, the "Tri-Beech." (Look out, Lockheed, here we come.) Ten to 12 seats, great climb and short-field performance, and the flying public will like the added safety of a third engine. Life is good!

Jump ahead to 1944

Things are finally going our way on the war front. There's still a long and terrible way to go, but victory is likely. Walter Beech, like so many other forward-thinking manufacturers, is looking out over the factory wondering what to do at war's end. We all know what a wonderful thing he did with the Bonanza design, but if he hadn't been quite the risk-taker and innovator that he was, following the thinking of the time he could have decided to take a more conservative approach to the Bonanza design.

This might have been his thinking: "You know, this 165-hp engine seems a bit anemic when what we are now building has at least 450 hp. Most airports are



"STAGGERNANZA"



unpaved, and high lift and slow landing speeds are important. Maybe I'll stick more with the tried-and-true bi-plane program for the private market."

So instead of the Bonanza, Walter comes up with the not-so-new for 1947, "Staggernanza." I've rendered it here with the gear up, so the big question is: Would it have been a tail dragger? Hey, it's plenty modern for the time. I could have put a 985 on the nose, and then it would have to have a tail wheel. Isn't this fun?

Fast forward to 1969

I'm out of school, a freshly minted industrial designer hanging out at (where else) the airport. Off in the distance I see something unfamiliar, something very different and, as it taxis closer, very striking. Man, this thing is cool, much like the first tail-finned cars of 1957. An airplane built for speed; looked like it was going 300 mph sitting on the ramp.

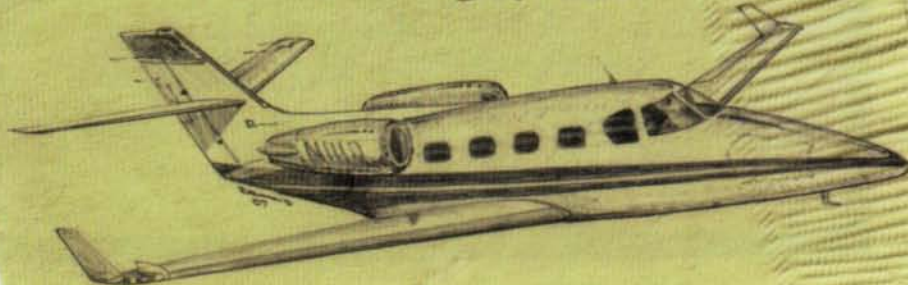
As soon as the pilot got out, several of us were all over him with the usual pilot question: What is it, and how fast does it go? Me being me, I got my enthusiasm and my mouth ahead of myself and said, "This thing has 'jet' rolling off of it like water off a duck's back." I think the pilot was a little surprised by my comment, but he did step back to look at his new Duke and

said, "Yeah, I see what you mean." Ever since then, the idea of a "Du-Jet" has been rumbling around in my head.

Vern Raburn did the research verifying the existence of a "Very Light Jet" market, and it's definitely an up-and-coming business phenomenon. Before the higher-ups at Beech start thinking of all that would be required to pull it off, they should consider all that's already been done: Wing design. Most of the aerodynamics. Flight control system. Most of the pressurization. Cabin and pressure vessel. Vertical and horizontal stabilizer. Flight deck. Seating and passenger restraints.

Here's the plan: Extend the fuselage forward of the wing. Send those 541s to the overhaulers; they are crying for good cores.

"DU-JET"



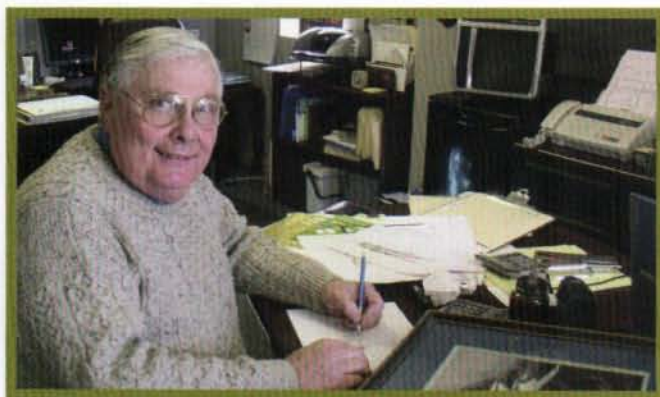
Make the wing wet for more fuel. Have two small jets mounted in pylons on or very near the already strong aft pressure bulkhead. Raise the horizontal stabilizer to the midpoint of the vertical, and hey, guys and gals, make it all out of aluminum this time. Maybe some extended wings from the King Air 300, get my drift? I'm excited.

There's a bunch of proven material here, brought together to make the right product for a ripe market. The VLJ buyers will snap up these babies like hotcakes. And I'm sure the Baron, Duke and King Air owners would definitely get excited just thinking about the Du-Jet.

Another major benefit is that Beech already has a service and parts supply system in place. The new kids on the block will just have to develop and train for all the logistic stuff to ensure good field service of their new airplanes. And who wouldn't fall in love with a good-looking airplane that's solidly built and lands as soft and handles as well as a Baron?

Now I'm going to steal a little of Mike Smith's thunder, as it has a place in this article. Many ABS members probably remember Mike; he's the big guy who developed and marketed Bonanza speed mods back in the '70s and '80s. He also developed a V-tail leading-edge support kit long before Beech even realized that the tail movement was an issue.

Mike was a savvy, quality guy. He was also quite a dreamer. He took a P Baron, removed the two wing-mounted 520s,



Dennis Wolter dreaming up new ideas.

installed one PT6 turbine in the nose and added a T-tail. He ended up with a TBM 700-type of airplane using mostly existing Beech parts. I'm sure he ran out of money before he could get it certified and on the market.

Am I nuts, or is some of this stuff just too good to ignore? Now that we have new ownership at Beech, who knows what design ideas might find their way home. See what Walter Beech started? Never stop dreaming...

Dennis Wolter is an A&P, IA and a 3,000-hour instrument pilot who started AirMod in 1973 to bring innovative design and high-quality renovations to the general aviation market. Dennis has a degree in industrial design from the University of Cincinnati.

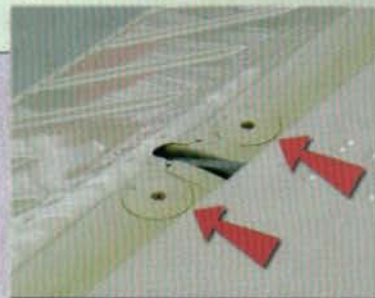
WHAT'S WRONG?

BY ADRIAN EICHHORN & RON TIMMERMANS

Continued from page 10115

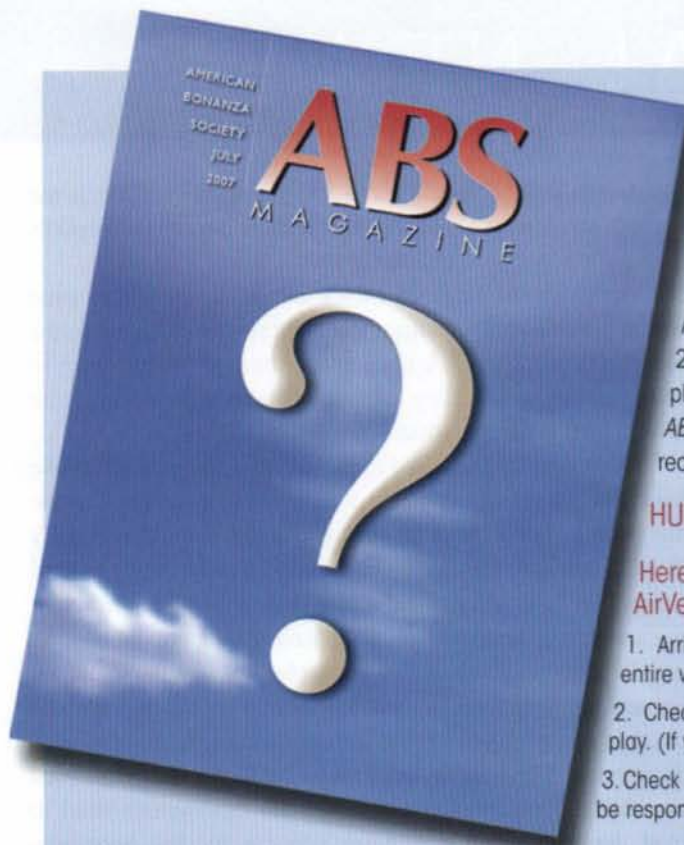
While older model Beechcraft (like the one shown in the first picture) do not have an interim flap position setting for approach flaps, newer model Bonanzas and Barons do have a separate position on the flap switch for an approach-flaps setting. You can, however, use the flap switch and lower the flaps to a position similar to the approach-flap setting (about 12-15° extension of the flaps) and stop them at this position.

How do you estimate this setting? Lower the flaps while peering out the pilot's side window and stop the flap extension when the forward edge of these round access plates are just visible beyond the trailing edge of the wing (red arrows). This will approximate 12-15° of flap extension, an "approach flap" setting. This will configure your airplane yielding a slightly slower indicated airspeed (about 10 kts slower) and a more stable configuration for your approach to landing.



LTC (Ret) Adrian A. Eichhorn of Alexandria, Virginia, is an A&P with Inspection Authorization and a BPPP instructor. He owns a 1962 P35 and flies an A320 Airbus for a major airline.

Ron Timmermans of Fort Worth, Texas, is a civil engineer for the US Army Corps of Engineers in Dallas. He is a BPPP flight instructor and owns a 1965 S35.



Make Oshkosh 2007 Your Special Year!

HEY, ABS MEMBERS! WANNA SEE YOUR AIRPLANE IN THIS SPACE?

Are you planning to be at Oshkosh for AirVenture 2007, July 23-29? If so, here's how to make it extra special! The honor of displaying your airplane at the ABS tent AND on the cover of the July ABS Magazine is up for grabs! In addition, the selected owner will receive two passes to AirVenture and to the ABS dinner!

HURRY, THE DEADLINE FOR ENTRY IS APRIL 30.

Here's what you must agree to do to be considered for the AirVenture ABS display airplane:

1. Arrive July 22 to place your airplane on display at the ABS tent the entire week of AirVenture (July 23-29).
2. Check in at the ABS tent each morning to prepare your aircraft for display. (If you want to open it up for people to see inside, that is up to you.)
3. Check in each afternoon to secure your aircraft. (You, not the ABS staff, will be responsible for your aircraft.)

IF YOU CAN MEET THE OBLIGATIONS LISTED ABOVE, HERE'S HOW TO PUT YOUR PLANE IN NOMINATION:

- **SUBMIT A PHOTO SUITABLE FOR THE COVER OF ABS MAGAZINE.** Look at past covers for ideas. Print or digital pictures are acceptable. The most important points are that the photo needs to be high resolution, clean, clear and show your airplane at its best.
- **WRITE AN ARTICLE ABOUT YOUR AIRPLANE,** and include an equipment list. You need not be concerned about your writing skills. Just give us the facts and your best effort at putting your thoughts on paper. You will have an opportunity to review the article after editing to make sure you're pleased with the final result. Again, review past Beechcraft of the Month articles, select a style that suits you and tell your story!

- **SEND ADDITIONAL PHOTOS OF EXTERIOR AND PANEL.** Other than the cover shot and an equally sharp photo of the panel, we encourage you to provide a variety of pictures that the magazine designer can choose from. "People pictures" are great—with you, or you and your family or friends, posed with your airplane. (Identify all people in photos.)

Do not send your only copy of a photo, as they are not returned to you. Place a label on the back of each photo with your name, tail number and model of your airplane. But do not write directly on the back of the photo as that can sometimes make it unusable.

MAIL YOUR SUBMITTAL TO:

Oshkosh BOM
American Bonanza Society
PO Box 12888
Wichita, KS 67277

OR absmail@bonanza.org
E-mail subject line:
OSH Display Plane

REMEMBER, THE DEADLINE FOR ENTRIES IS APRIL 30.

If your airplane is selected, you will be notified by early June.

If your entry is not chosen, the material you send will be filed for possible future use as a Beechcraft of the Month or as a feature story.

"But I'm not going to Oshkosh!"

WHAT ABOUT THE COVERS FOR THE OTHER 11 MONTHS OF THE YEAR?

IF YOU CANNOT COMMIT TO BEING AT OSHKOSH FOR AIRVENTURE 2007, YOU CAN STILL HAVE YOUR BEAUTIFUL BEECHCRAFT ON THE COVER OF THE ABS MAGAZINE.

Submit all the photos and text described above and send to ABS headquarters labeled Beechcraft of the Month and we'll consider it for use on one of the monthly covers in the future. Now is a great time to send your information in, as we are looking for additional Beechcraft of the Month stories.



AEROMEDICAL NEWS

BY CHARLES DAVIDSON, M.D.

THE WINTER BLAHS

There's no doubt that winter's short days and gray skies can bring on blue moods. In fact, the medical community even coined a specific name for the severe winter blahs: seasonal affective disorder, or SAD. Catchy, huh?

SAD was defined as a seasonable depressed mood brought on by lack of sunlight. The treatment was to stare at some form of bright light for a certain period every day. I don't know if this is still a diagnosis and treatment, but SAD was at that time one of the many mood-altering disorders.

Some years later, after I learned to fly and knew a little more about weather, I understood why Kentucky, Indiana and Ohio got those endless spells of gray overcast skies and clouds spitting rain/snow during the winter months. Those states were stuck there, just above the Mason-Dixon line between the Great Lakes weather systems and the Gulf of Mexico weather systems, with the Smoky Mountains to the east just to slow down and lift any good ol' moist air mass moving through.

I now think I understand why basketball is a fanatical sport in those states. In almost every little town there is one or more high school or college basketball team. There was and is great support of these teams that nearly mandates attendance, not only by the students but the parents and populace. (Ever see the movie *Hoosiers*?)

What do these folks do twice weekly? They go to a big building with very bright lights and scream their lungs out for their team and at the opposing team or the refs. Talk about a great stress reliever...and if you've got a little SAD mixed in, well, three hours under the fluorescent bulbs even at little Podunk High gym has got to last you for a few days.

Depression and medications

It's a pretty loose segue into this month's subject, but here goes. I recently received a query from a member asking if there has been any change to the present policy that does not allow use of selective serotonin reuptake inhibitor (SSRI) medications for depression.

The short answer is: No, there have been no changes. To my knowledge, there are no medications that an airman may take for treatment of depression that are allowed at this time.

For the purposes of this article, I checked AOPA's website for medications. This site shows 13 antidepressant medications listed as "Not Allowed." An excellent website about depression and medications is also available at www.aviationmedicine.com.

This question comes up on a fairly regular basis at EAA seminars, at our ABS convention and from individuals. Little wonder, since depression is a common diagnosis in most primary-care practices.

Depression has about a 5% prevalence in medical prac-

tice. Considering there are about 500,000 licensed pilots in the United States, it stands to reason that there may be many pilots at risk for depression at some time.

According to the DSM IV, the diagnostic dictionary used by the psychiatric specialties, there are several different forms of depression. The FAA does allow some pilots to return to active duties when they have documented recovery from milder forms of depression.

Depression is classified as an affective disorder. Everyone has "bad" days—times when we feel sluggish, down in the dumps or just don't have enthusiasm for any activities. Usually these "blues" are transient. They might last a few days or until some stressor in life passes. When these symptoms persist or worsen, the sufferer may be diagnosed with depression.

Depression is treated by psychologists and psychiatrists. Sometimes they treat with nonmedicinal modalities such as psychotherapy, psychoanalysis or counseling and sometimes these methods are combined with medications. Both the mood disorder caused by depression and the medications used to treat depression are reason for concern for the Aerospace Medical Certification Division (AMCD).

Depression can vary from mild to severe. Difficulty concentrating and sleep disorder are among the other major manifestations of depressive mood disorders that can impair piloting skills. Most of the early antidepressant medications used in the 1960s and '70s and still today have sedative side effects. These side effects are deemed contraindications for persons piloting aircraft.

In the 1980s a sea change occurred in the treatment of depression with the advent of a new class of antidepressant medications. Floxetine (Prozac) was introduced as the first of a new class of medications for depression called SSRIs, and the biochemical basis for depression became the catch phrase.

Persons with depression were no longer labeled with the stigma that they could not cope with life. Chemicals in the brain known as neurotransmitters, among them serotonin and norepinephrine, were thought to be in imbalance in the patient with depression. Psychiatrists and primary-care doctors were empowered with a new tool to treat depression. Prozac became a widely used drug and it was quickly followed by several other antidepressants that were tailored to work in the same manner.

One of the benefits of these newer antidepressants was that some (not all) lacked the sedative side effects of the older types. These medications generally improved the mood of depressed patients more quickly than the older types.

At present the AME Guide states that the AME may issue a certificate if the applicant has "a history of bereavement, dysthymia or minor depression if the airman submits to the AME all pertinent clinical data and the symptoms have resolved and the condition is stable and there are no associated

disturbances of thought and no recurrent episodes; and psychotropic medications were used for less than six months and have been discontinued for at least three months or more or no medications were used in the treatment."

This guideline enables the AME to issue under these circumstances if the airman provides the AME the proper documentation and the applicant otherwise qualifies for the class of examination desired.

Evaluation of any airman with an affective disorder is a highly individual process. These disorders have many variations and the diagnosis is not always clear-cut. There are mild forms, severe forms, mild forms that become severe, and forms of depression that are associated with other psychiatric diagnoses, i.e. anxiety/depression or bipolar disease.

Often more than one medication is used, i.e. something for depression and a medicine for anxiety. Also, psychiatric diagnosis is often not as definitive as a purely medical problem. High blood pressure has defined limits for its definition and the medications that treat it can be judged by the changes in the blood pressure numbers. The side effects of drugs in this class are usually predictable. A cholesterol level that is elevated above a certain level is likewise treated and easily measured after treatment. This is straightforward. But affective disorders can take weeks or months to establish proper diagnosis and treatment.

Depression medications in other countries

Other countries have the same policies toward medications used for depression and some allow the use of these medications. Canada has a policy similar to the United States. In a "frequently asked questions" area of the website for the Canadian Civil Aviation Medical Examiner, the following is part of their response to the question of why SSRI-type antidepressant medications are not allowed for use by pilots:

"Transport Canada is concerned with both the side effects of, and the underlying indication for using these potent medications. Clearly, if a pilot is depressed, he should not be flying. The difficulty lies in the fact that these medications are often prescribed for less serious reasons (we live in a feel-good society) and it must be determined if there is an illness that could be a threat to flight safety. For this we often request letters from the attending physician in order to understand the reason for prescribing as well as the severity of the illness. If a major depression exists, we consider the pilot unfit until a minimum of six months after discontinuing the medication with a satisfactory follow-up report from the attending psychiatrist.

"For lesser problems, the pilot may resume flying at an earlier date based on independent considerations. As far as the side-effect profile is concerned, anyone taking these medications should be aware of the wide array of potential side effects. Granted, most of the effects are of little significance, [however] some serious alterations in thinking, mood, judgment and personality may occur which could pose a threat to safety in a small number of pilots.

"At the present time, all category applicants using these medications will be refused medical certification with extraordinary exemptions. Ongoing studies are attempting to determine if a certain population whose underlying illness is stable and who have close follow-up, may be considered safe. In the meantime, you would be best advised to discontinue the drug at the earliest time medically indicated and be sure your stress is controlled prior to returning to aviation."

Australia has allowed the use of antidepressants in some active pilots since 1993. "Antidepressant Usage and Civilian Aviation Activity in Australia, 1993-2004," a study funded by the Civil Aviation Safety Authority (CASA), reviewed accidents and incidents over a 10-year period comparing those pilots who had reported use of antidepressant medications vs. a control group of pilots who had no reported antidepressant medication use. This paper is more than 100 pages in length, but the entire report is available for viewing on the CASA website, www.casa.gov.au/avmed/

The Executive Summary of the report highlights the findings and conclusions. Among the recommendations reported by this study were:

1. CASA can continue to certify aircrews and ATCs for aviation activities whilst taking antidepressant medication subject to adherence to certain guidelines.
3. CASA should cease certification for pilots and ATCs taking Mirtazapine, TCAs (apart from low-dose usage of amitriptyline for sleep management) or MAOIs. This should include Moclobemide. Already existing approvals can continue, provided adherence to certain guidelines. However, it should be suggested that, on certificate renewal, a change to an SSRI or selective norepinephrine reuptake inhibitors (SNRI) would be appropriate.

Item 3 above refers to different classes of antidepressants. The study authors recommended the use of the SSRI or SNRI and suggested no longer allowing some other classes of antidepressants.

To summarize all this: At present, the medical certification standards in the United States and Canada do not allow the use of any medications classified as antidepressants while exercising pilot privileges (although I have heard it rumored that Canada may be moving closer to a policy that allows some medication use). Australia has a 14-year history of a policy of allowing certain antidepressants in pilots who meet certain criteria. At present they continue that policy.

Charles S. Davidson, M.D., holds board certification in family medicine and emergency medicine. He has been an aviation medical examiner since 1978 and serves as a senior AME. He holds a private pilot license with multiengine and instrument rating. He is an active pilot using general aviation for business and pleasure for 23 years and is also an ABS board member. He flies an A36.

This column is intended as general information only for the ABS membership; it should not be construed as providing medical advice or creating a doctor-patient relationship. Consult your own doctor for personal advice or your AME for aeromedical advice.



CURRENTS

BY LEW GAGE

PREHEATING AND INTERNAL ENGINE CORROSION WHAT TO DO AND WHAT NOT TO DO

During the past several months I have received a number of contacts regarding the use of preheat during wintertime, cold-weather operations. To be knowledgeable about the use of built-in, permanently installed preheat systems, it is necessary to understand why we would do some routines with these and not do others.

Preheat using portable propane, gasoline or electrically powered heaters is a totally different concept than the built-in variety. For all practical purposes, these portable units are useless for doing a preheat that accomplishes the desired effect. Blowing 15 minutes of hot air over the engine—be it from above the engine or below it—only provides meaningful heat to the cylinders for an easier cold-weather start. *The oil is the real item we want to be up to some higher-than-static temperature.*

Before I installed a heating pad on the oil reservoirs in my airplanes, I had done a fair job of heating the oil by using a 1,500-watt hair dryer blowing directly on the oil reservoir for about 25 to 30 minutes. However, a glued-on heating pad left on for about four to six hours before engine start does a much better job, taking the oil up to around 120° F. Yes, it is indeed nice to have the entire engine heated to some warm-to-the-touch temperature, but if there is a choice to be made, do the oil heating.

Now, the question is: Do you want to leave the built-in engine heater systems plugged in all the time the engine is sitting idle in the hangar? Read on, fellow aviators.

The following pages contain information I wrote for the August 2004 and other earlier articles in the *ABS Magazine*. It is very necessary to understand this information to make wise use of the engine heater system and, for that matter, to understand what is taking place in that gadget that pulls us along the airways. Most members who contacted me were unfamiliar with the information contained in those writings.

ENGINE CORROSION

One much-misunderstood subject among pilots is the corrosion that takes place inside an engine, especially those that are operated only a few hours a year. If those few hours are accumulated during one yearly trip and the airplane just sits for the remainder of the year, the damage is compounded by those months-long periods of inactivity.

The engine manufacturers have very detailed instructions for preservation of their engines when a situation exists as I've just described. However, it is unlikely that those who would allow an aircraft engine to be used in such manner would

follow the manufacturer's very detailed long-term storage instructions in their entirety. They would probably just park the airplane with no steps taken to ward off any ill effects of not flying the beast. The only thing they might do would be the necessary pumping up the tires and charging the battery—just before the next months-away flight.

The purpose of this missive is not to detail the process of long-term storage, but rather to inform those who may not already be informed about the main source of corrosion that attacks all those high-priced engine parts.

Trapped water

The main ingredient of the mechanism that causes the corrosion is water and water vapor that is trapped within the confines of the engine. The main source of the trapped water is not what one might think. That is, the often-quoted "breathing" of the engine due to temperature and barometric pressure changes. Although that plays a small part in the crankcase moisture content (depending on the conditions that exist where the airplane is stored), it is comparatively a nonfactor.

As everyone knows who has ever observed an automobile being started and operated in cool-to-cold climates, there is a considerable amount of water and water vapor that will exit the exhaust pipe until the exhaust system gets to the point where it is hot enough so that the piping, muffler and other parts do not act as a condenser. At that time, the water is still being carried out the exhaust system, but it is in the form of invisible vapor—unless the outside air temperature is low enough to do the condensing in the free air.

An example of that trick would be the contrails left by high-flying airplanes. I am sure you have seen the photos of the B-29 and B-36 as well as high-flying fighters of WWII leaving those trails just as the more familiar turbojets of today do.

According to chemists I've talked to, when a gallon of gasoline or jet fuel is burned, it will produce more than a gallon of water, hence the contrails and tailpipe water. There is no significant water vapor at a jet cruise altitude, so all the trail is fuel-produced water vapor. At ground levels, there is some water vapor in the atmosphere, but the main producer of the exhaust water is burning the engine's fuel.

Engine rusting

Just exactly what does all of the above have to do with the dreaded potential for internal rusting of our engines?

In contrast to modern automobile engines, our airplane engines have no means of crankcase ventilation. That is, no outside air flows through the crankcase to remove the accumulated gases. The only gases that flow out the engine breather system are those that have been introduced to the lower end of the engine via the process known as piston-ring blowby.

With regard to moisture content, it matters not whether there is a large amount of blowby or a little. The relative humidity of the entrapped gas is the same.

An engine suffering from a large blowby problem will show higher oil temperatures, oil will turn black quickly after an oil change, and the resulting sludge accumulation will be greater than on a more normal engine.

Some of the gases passing into the crankcase do so during the compression stroke, some during the power stroke. Just what the mix is, I cannot say exactly. But even if it might be a 50/50 mixture, the resultant gas would still be very moist.

As these gases enter the crankcase, they cause a positive pressure to develop. The breather system is so sized that an engine that has a normal (not excessive) amount of blowby will produce a resultant pressure that will not exceed the specified crankcase pressure as spelled out in the manufacturer's overhaul manual.

All of that assumes the crankcase pressure is being contributed equally among all of the engine's cylinders. There could be one sick cylinder with the rest being normal, and the pressure would still not exceed the limit. Compression testing, borescoping and other means would be used to detect the problem cylinder—in each case assuming that the breather system is not plugged with sludge or restricted in some other way, such as having the termination point of the breather inside the cowl pressure vessel.

When the engine is shut down, the interior is filled with this very moisture-laden concoction. As the exterior of the engine cools, the water vapor forms beads of liquid water on the interior of those cool surfaces. The relative humidity hovers around the 100% level.

The cooler the gases become, the less total water vapor they will hold, and the condensation process continues until a point of equilibrium is reached. The water droplets fall into the bottom of the engine and pool at the lowest spot available. There may be several teaspoons of water, or perhaps more, that condenses out. I have seen oil sumps, especially those made out of magnesium, that show a ring of heavy corrosion extending out from the drain plug, which is the lowest point of the lubrication system.

The combustion chambers are purged of exhaust gas by shutting down the engine with the mixture control with the resulting coast-down of the engine to a stop, thereby ventilating out any exhaust gas. The now-cooled gases above the oil still have very high humidity and cause an attack on the protective oil film left on the exposed parts after shutdown.

This very marvelous stuff we put in the engine to make everything slick enough to run under the very severe conditions produced by the engine under load will fend off the attack for some variable length of time. If one could cool the engine to a



Badly corroded IO-520 cylinder (all six were damaged) from an engine with the heater left on all the time. This airplane is flown very regularly so a lack of oil coating due to inactivity is not an issue. See text for details.

temperature well below freezing, the corrosion mechanism would come to a near halt, or perhaps a complete halt.

Witness the WWII aircraft frozen for 50-plus years under the Greenland ice cap showing little or no corrosion after being exhumed. Since not many of us have a walk-in freezer large enough to accept an engine, let alone a complete airplane, the best solution is to rid the crankcase of the residual moisture after we shut down the engine.

Operation of the engine by flying it and bringing the engine and oil up to normal operating temperature (oil above 160°F) will vaporize the accumulated water. Indicated oil temperature does not have to get to water's boiling point for vapor to form in other parts of the engine. Ground-running the engine will not produce the desired results. The extreme thrashing-around of the oil/water mixture, plus a temperature of around 160° F or higher, assures that all the liquid water has returned to vapor and will exit the breather with the flow.

Reducing the damage

A very simple solution to greatly reduce the damage caused by all of the above events is to evacuate the crankcase interior of this moisture-laden gas after shutdown and fill it with comparatively dry ambient air. Actually, dry nitrogen would be best, but not very practical. Of course, just how dry this air is depends on the location. Unless one was on the island of Guam on a 95° F day with the rain coming down in a steady downpour, the outside air would be dryer than what could be drawn out of the engine.

Some engines lend themselves very nicely to ventilating the crankcase. These include the E engine, the C series, any O-470 or 520 that has the breather exiting the crankcase at the top front of the engine with the oil dipstick/filler cap toward the top rear/center of the engine, and many Lycoming engines of that same general layout.

Permamold 520/550 engines (ones with the alternator at the front of the engine) that have both the oil filler and breather exiting the engine at the same location are not so easy to do. But this may be done if the proper fitting is fabricated and used

so both a vacuum to withdraw the gases and the supply of outside air can enter and exit the one opening available.

On the "easy" engines, the procedure is simply to slip the suction end of your shop vacuum over or into the end of the breather line, remove the oil cap/dipstick and run the vacuum for about three to five minutes. The draft created may be checked using a lighted match or candle held at the dipstick opening.

There will still be some "dead" areas of the engine such as the rocker boxes, push rod tubes, etc. that will not be ventilated as the crankcase will. But their volume is only a small percentage of the total volume of the engine interior. After the ventilation procedure is completed, the moisture left in these small areas will migrate into the remainder of the engine. The net result will be a vastly dryer environment than what would result if the engine were simply allowed to shut down and fend for itself.

Visual evidence

I know this process improves the situation as witnessed thusly: As many of you observe when checking the oil quantity of 0-470/520/550 engines, there will be beads of moisture on the inside of the dipstick cap and on the dipstick when the engine is cold. This will even lead to a rusted appearance of the steel parts of the dipstick assembly.

Although I am unable to observe this moisture on the dipstick of my trusty E-225 engine, I am able to see it on the dipstick of the Lycoming O-235 engine that powers my 1946 Luscombe.

As a test (done several times during cold weather), I would fly the airplane and—without ventilating the engine as described above—the dipstick would show beads of moisture along its length the next morning. However, if the vacuum was applied and fresh air was drawn through the engine, the dipstick would be dry with no evidence of any moisture.

All of that is strictly anecdotal information, but at the same time it convinces me there may be something beneficial in the process.

Preheating

What does all of this have to do with heater usage? Well, if the crankcase is not evacuated of the residual moisture cited above, and even if it is and some slight amount is present after ventilating the crankcase, leaving the heater system on contin-

uously will simply accelerate the corrosion the remaining water will produce.

Warm air, as would be sustained with the heater left on, will hold a greater amount of water vapor than air at the static (outside surrounding air) temperature. Also, there would be a certain amount of circulation of this moist warm air within the engine interior to assure that all surfaces are equally treated to this corrosion-causing brew.

The oil factor

The remaining coating of engine oil at shutdown will protect the engine innards for some long period of time, varied by the existing conditions. A warm moist atmosphere, such as that in the engine after an unventilated shutdown, will greatly decrease the time this oil film will protect those exposed engine parts. Even the much drier ventilated atmosphere left after ventilation will still have some amount of moisture in vapor form. Some of this moisture vapor remains suspended in the air and does not condense out and make its way into the lowest place in the engine. So keeping the engine warm with the heater simply increases the rate of corrosion.

As cited above, the best scenario would be to shut down, evacuate the residual exhaust gases from the engine interior and then take the engine down to around 0° F to freeze any remaining moisture. Again, think of those WWII airplanes and their frozen condition.

By the way, we may have many more of these relics of that world conflict appear in the not too distant future. Global warming will expose them with no digging necessary. In researching this possibility, I discovered that the ending of the last Ice Age some 10,000 years ago was the result of the wet, green wood used in the cooking and warming fires of Neanderthal people, compounded by the contributions of herds of flatulent woolly mammoths and mastodons. An inconvenient truth!

ABS Life Member Lewis C. Gage has ATP multiengine land with Boeing 707/720/747/Airbus-310 ratings; Commercial single-engine land; flight instructor MEL/SEL airplanes and instruments; ground instructor advanced and instrument; flight navigator; flight engineer; mechanic-airplane and engine; and FAA parts manufacturing authorization. Flight time: 15,000-plus hours. Lew may be contacted at 2255 Sunrise Dr., Reno, NV 89509. Phone/Fax: 775-826-7184. E-mail: sunrisereno@gmail.com

ABS needs Sun 'n Fun volunteers!

So pack those sunglasses and come enjoy the Florida sunshine with us.



To staff its table in the Type Club tent during Sun 'n Fun, April 17-23, ABS needs a few members to volunteer some time in the shade near Air Show Center to talk about Beech airplanes with fellow and future ABS members. If you plan on attending Sun 'n Fun and want to help represent the premier aircraft type club, please contact Tom Turner at bonanza8@bonanza.org or 316-945-1700.



Propane preheat

BY BILL STOVALL, EVERGREEN, COLORADO

Until recently I never had a hangar with heat or electricity and it takes 50 minutes to get to the airport. If I am going to preheat, propane has been the only choice. If it has been below freezing in the hours prior to departure, it is necessary. But then again, Denver weather is mild, with an average December temperature of 29.7°F and in January 31°F, and a departure before midmorning is rarely necessary. This year has been an exception, requiring preheat for every departure.

Years ago I bought a Red Dragon heater and an extra propane tank. The fan requires very little DC amperage. I kept my last three-year-old 24v battery, which was still adequate, and left it in the hangar. I have no table for how long to heat,

but longer if it is 20° F than if it is 30° F; never less than 30-40 minutes.

I keep the heater hooked to the propane tank and the battery several feet behind the main gear and off center but well clear of the right main. When heat is necessary, I move the heater and tank close enough to hook up to the battery, placing the 5" hose tightly in the right exhaust opening. I open the tank valve, turn on the heater switch and press the start button. There is a loud swoosh and the process begins.

My wife Phyllis stays in the car. We have an understanding that there is no limit on her baggage short of weight and CG, so I use the time to load and secure luggage and never complain. I also preflight. Phyllis is an instrument pilot as well, so she gets out the charts, organizes them and copies the ATIS using our handheld.

Fast-forward to 2004. We got electricity! I got rid of the battery and now plug in my 24v charger, connecting it to the Red Dragon leads. DC is DC! I also place a small electric heater on the copilot floor and Phyllis can now do checklists and set up the cockpit.

The 30-40 minutes goes by quickly, so I disconnect and stow the heater apparatus, pull the warm airplane, with Phyllis in the left seat, out onto the ramp, put the car in the hangar and close the doors. When the battery switch is turned on, oil temperature CHT and EGT all read about the same on my engine monitor, and we are airborne shortly after getting to the runway.



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Century Air Bonanza Recurrent Program

I took Century Air's Bonanza Recurrent (IPC) Program in Fairfield, New Jersey, and found it to be very beneficial. Ground school was four hours divided into three periods. Covered were intro to the A36, aircraft review, required equipment, weight & balance, cockpit familiarization, use of checklists, fuel system, CRM training, performance, airworthiness, flight planning, automation dependency (a video presentation), electrical system (normal & abnormal), emergency procedures, systems abnormalities, engine abnormalities and emergencies, flight controls, taxi technique, IFR procedures and regulations, CFIT and Jepp chart review.

Simulator training in the Frasca 242 (Bonanza-specific simulator) was five hours accomplished in two sessions with my concurrence, otherwise we probably would have flown the five hours in three sessions. It was a grind but I didn't feel over-saturated.

Subjects covered included checklists, takeoffs and landings, power management, attitude flying, approaches, any number of system failures and Line Oriented Flight Training (LOFT) scenarios.

Yes, it was intense and president/instructor Rich Greene is demanding. He doesn't give it away and only wants serious pilots. He is a 35-year veteran of American Airlines who retired with seniority No. 14. Much of his career was spent as an instructor and check airman for AA. He expects professional performance from his students and is a very apt instructor at breaking seemingly complicated tasks into readily understandable components.

The Garmin 430-equipped Frasca is really neat! The visual cues and flight control feedback was very good. More than 30 years of simulator training at FSI has made me a demanding simula-

tor customer. I found the Frasca 242 simulator to be far superior to others that emulate Bonanzas. Century Air's program is at least equal to and in many way superior to Recurrent Training Center's program.

Century Aviation says it is insurance company-approved and will also provide flight training. I highly recommend its Beechcraft (IPC) Recurrent Program for pilots based in the northeast.

—Doug Olson, Wood Bridge, New Jersey

NOTE: Century Air is recognized by ABS AVIATOR program, with completion worth 60 points. For more information, see www.centuryair.com.

Two products I love

It will be years before I have enough knowledge about flying techniques or mechanics to interest the other members, but I want to give something back in return for all I have learned from the *ABS Magazine*. I have found a couple of products that I love and I think would interest other members.

The first is a stick-on LED light. I use one in the baggage compartment and another one as a dome light. They work, look great, are cheap. And there is no STC required. <<http://www.amazon.com/Sylvania-Self-Adhesive-Bright-White-Black/dp/B000CMGXPM>>

The other is a storage box that is perfectly sized to fit in the back of my S35 (it won't fit in the earlier doors). I use it as luggage when weight and balance may become an issue. It holds a lot of stuff neatly and does not add much weight like luggage does. I wouldn't recommend it for overly sophisticated destinations, but it works great for skiing trips or packing Christmas presents. It folds down flat when not needed <<http://www.officedepot.com/ddSKU.do?level=SK&id=322575&Ntt=bankers%20box%20liberty&uniqueSearchFlag=true&An=text>>.

—Steve Carson, River Forest, Illinois

Door seals

The November '06 *ABS Magazine*, page 9901, included a Q&A on door seals. There are three items to deal with: door rigging, the rubber weather strip and the windlace. For weather issues (rain water entering the plane when at rest) and wind issues (wind noise into the cabin when in flight), the door rigging is always an item to check. If the door is rigged well and is in good condition, then the other two items should be looked at when appropriate.

For most issues of wind noise or seeing light around the door frame in flight, the first item I would look at is the condition and position of the windlace (and not the rubber weather strip).

For most issues of rainwater getting into the cabin when at rest, the first item I would check is the rubber weather strip.

—Steven Oxman, Riva, Maryland

Thanks to advertisers

I want to thank three advertisers in the *ABS Magazine* whose products I own that really work and are priced fairly.

1. *Arrow Light Co.* <www.arrowlightco.com> I couldn't keep a landing light bulb in my A36. Now I have more than 700 hours on the bulb and I use the light, night and day, for recognition.

2. *PowerTow.* <www.powertow.com> Their 6-hp gas model works better than anything I have used. I have an incline to my hangar and there is no way I could push in my plane. With PowerTow, it is fast and easy.

3. *Angerole.* <www.angerole.com> Thanks for holding the Garmin 496 (which by itself is priceless). It holds the 496 firm, much better than the mount provided by Garmin, and it keeps the cockpit neater.

If you have any questions about these products, feel free to contact me at leighc46@hotmail.com.

—Leigh Smith, Knox, Indiana



Beech memories?

Do you have a memory of a personal encounter with Beech Aircraft Corporation founders Walter and Olive Ann Beech?

Mary Lynn Oliver, the youngest daughter of Walter and Olive Ann, is gathering stories about her late parents and hopes to hear from Beechcrafters and Beechcraft customers.

Please submit your memory in writing, along with your name and daytime and evening telephone numbers to: employee_communications@rac.ray.com.

You may also mail this information to Raytheon Aircraft Company, Employee Communications, Mailstop B91/583, P.O. Box 85, Wichita, KS 67201-0085.

Get-home-itis recalled

I read with chagrin the account of N627B's engine failure in the December *ABS Magazine*, and would suggest editorial comment not just about the failure but about the handling of the emergency. This severe case of "get-home-itis" belongs in AOPA's "Never Again."

Tucson to Deer Valley is 112 nm. The pilot noticed both dropping oil pressure and rising oil temperature in a newly overhauled engine—that combination a very red flag—near the halfway point. Eloy airport is at that halfway point. Between Eloy and Deer Valley are several more airports lined up along the interstate and two Air Force bases. The flight proceeded past all of them, and flight time was actually increased by flying to the west around PHX to avoid Class B airspace.

With oil temp rising to red line, and the pressure still dropping, the flight even proceeded past Glendale Airport and about 20 more miles to DVT, with no declaration to ATC until engine sounds indicated imminent failure and a passenger suggested the call. ATC took the initiative to handle the flight as an emergency and roll the trucks.

Lesson #1 The lucky outcome was not due to some "miracle" but pure

chance that Deer Valley was the intended destination. Had it been any further away, this airplane would have landed in the rocks, because it appears that the pilot intended to keep it pointed at home base, come what may.

Lesson #2 Landing at one of several convenient airports long before temp redlined (and then pegged), and pressure kept dropping, would have avoided catastrophic engine failure and the risk to life and property created thereby.

—Brooke Lewis, Arlington, Virginia

NOTE: ABS prints members' accounts of in-flight failures so readers can evaluate what they might do if faced with similar indications. Certainly if engine indications are abnormal, landing at the first suitable airport is strongly recommended. Member Lewis correctly points out that fixation on the intended destination, especially when it is the home airport, is a great temptation that may cause a pilot to discount other options. —Tom Turner

If you have information to share with fellow members, e-mail your letters and to absmail@bonanza.org.

You won't get the ABS FLYER

unless we have your e-mail address.
Send it to absmail@bonanza.org

SURLY BONDS

ABS extends condolences to the family and friends of this ABS member who recently passed away.

Capt. Herndon O. Wright
New Concord, Kentucky
(member since 2002, flew a 1963 P35)

ABS WEBSITE ONE OF BEST

An article in the February *Plane & Pilot* magazine has a compilation of 50 top aviation websites. In the category of Aviation Organizations, author David Ison lists the ABS website as one of the most useful and user-friendly, with its photos, links, news and ad marketplace. If you haven't visited it yet, give it a try. No need to enter the www prefix, just type Bonanza.org to get the latest information by and about your Society.

LIFETIME OIL FILTER SYSTEM

In December, Challenger Aviation Products introduced its Lifetime Oil Filter System for piston engine aircraft, with the claim, "The last oil filter you'll ever buy."

The oil filter is machined from 6061-T6 aircraft billet aluminum. Inside the aluminum housing is a high-flow, 22-micron, cleanable woven stainless steel filter element. Large inlet and outlet passages provide for a maximum oil flow rate of 22 gal. per min.—



double the flow of the largest throw-away oil filters.

Challenger's cleanable oil filter, with up to 100 hours between oil changes, will help reduce waste. www.challengeraviation.com.

AIRCRAFT DOOR SEALS

Aero-PMA-Parts Company has FAA PMA approval for aircraft door-seals that rival ones found in luxury European sports cars.

Most aircraft door seals are solid or quarter-round, a form that does not allow seal material to "form fit" to changes that each aircraft door undergoes over years of flexing. Aero-PMA-Parts Twin-Air-Chambers cushion and seal the doors like an inflatable, without the cost and mechanics of pressurizing. Instead, the nonpressurized air chambers allow the soft-seal material to find gaps in your door and seal them.

All Beech models are approved. The seal is installed on the door, so damage from foot traffic is eliminated. Peel 'n Stick makes installation fast and owner-install approved. 1-800-770-3265 or www.aero-pma-parts.com for more info.

TEST YOUR HEARING

An informational letter from the FAA recommends pilots test their ability to hear cockpit noises, alarms and warnings while wearing noise-canceling headsets. The nonregulatory InFO ("Information For Operators") letter alerts pilots "who may be using noise-canceling headsets [to] the potential for misdetection of audible alarms and other environmental sounds."

The FAA recognizes the many beneficial effects of noise cancel-

ation but the specific frequencies masked by different headsets vary by make and model and are often proprietary to the manufacturer.

It is recommended that pilots determine, both on the ground and in flight, if they can adequately hear audible alarms such as abnormal engine or mechanical noises, vibration or wind noises, communications with passengers not wearing headsets and other aircraft during ground operations with the noise-canceling feature engaged. If the pilot cannot hear these sounds, the FAA suggests he/she "find other solutions" to detect these sounds or "discontinue the use of noise-canceling headsets."

For more info, read the FAA's InFO letter at www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2007/info07001.pdf.

KING'S NEW VIDEO COURSE

Pilots now have a new way to learn operation of the Garmin 430/530 through an interactive video course from King Schools. The course has hundreds of video lessons that demonstrate its use and covers all aspects of the 430/530 including best practices,

moving maps, flight plans, "Direct-To" usage, page groups, nearest airport, navigation aids, what to do when there is an inflight problem, activating approaches, departures and arrivals, course reversals, holding, missed approaches, terrain features, system customization and malfunctions.

Flying the Garmin 430/530 contains seven CD-ROMs and runs approximately four hours before interactive questions. The student can print out a course completion certificate for the checkout instructor, FBO or insurance company. The price is \$249.

To order, call 800-854-1001 or visit www.kingschools.com. ABS is evaluating this course for possible recognition in the ABS AVIATOR program.

STC FROM WESTERN SKYWAYS

Western Skyways announces it has STC approval to turbonormalize the IO-550. The company has turbonormalized IO-520s for two years, and can also convert the IO-520 to a normally aspirated IO-550.

The turbo system optimizes engine performance by providing sea-level power to 18,000'. The system is certified to 24,000'. Shorter takeoff rolls, increased climb rates and reduced high-density altitude takeoff issues are the hallmarks of the STC'd process. Reduced air resistance at altitude results in higher cruise airspeed, improved fuel efficiency and maximized engine operations.

For more info, see www.westernskyways.com or contact Trent Tubbs or Eric Barker (800-575-9929/970-249-0232).



REGIONAL NEWS



The Gainesville (Florida) Museum of Natural History captured the attention of SEBS visitors.

Southeastern Bonanza Society

SEBS members met in Gainesville, Florida, for our annual winter fly-in January 25-28. A forecast of icing, booming thunderstorms and cool rainy weather did not happen. Instead, the entire weekend provided a measure of relaxation under warm sunny skies.

Our first activity took place at the Gainesville Museum Complex where a docent guided us through a unique contemporary collection at the Samuel P. Harn Museum of Art. After lunch, we moved next door to the Museum of Natural History, ending with a walk through the Butterfly Rainforest, a four-story screened enclosure with waterfalls, a walking trail, lush subtropical and tropical plants and hundreds of live butterflies. There is something really exciting about having a butterfly or a large moth flutter inches from your nose.

The high volume of camera clicking was evidence of how much our group enjoyed the atrium.

Saturday at the Hoggetowne Medieval Faire, guards in the castle turrets welcomed us to this land of Kings, Queens and Knights of the Round Table. There was music and jousting and more than 100 different vendors were making, demonstrating and selling all kinds of things.

Sunday morning arrived on the cusp of some rain, but by mid-morning members had good flying conditions for their return home.

Gainesville turned out to be a fly-in that surprised us all by the number of unique activities planned for us by hosts Anne and Howard Wallace. To join a future fun fly-in described on our website, contact Steve and Elinor Kline at stelik@comcast.net or elijo924@comcast.net. —Jay Wilson

UPCOMING FLY-INS

Southwest Bonanza Society

For our March 31 Hangar Party in Bridgeport, Texas (XBP), contact Pete and Ginny Peleberg (940-627-0199 or e-mail pvp6688@hughes.net). —Boyd Proctor

Pacific Bonanza Society

The PBS calendar for 2007 includes fly-ins to Mexico to pet whales, one to ride the train into Copper Canyon and an air safari to the Bahamas.

Check www.pacificbonanza.org for details on these and all PBS upcoming events and sign up as soon as possible. Don't miss an opportunity to meet other pilots and log some solid hours flying to some incredible fun places.

We would also like to add a few one-day fly-ins this year. If you are interested in hosting such an event, contact our events coordinator, Georgia McCaffrey (georgie11@adelphia.net). —Kathi Blythe

Rocky Mountain Bonanza Society

Severe winter weather as well as cold and flu symptoms being experienced by some of our registered attendees caused our bald eagle viewing trip in January to be canceled the day prior to the event. We heard there were more than 30 bald eagles at Kingsley Dam that weekend, so it would have been a spectacular sight to see! Maybe next year...

On April 20 we will fly to Page, Arizona, home of Lake Powell and the Glen Canyon Dam, and in June to the Niobrara River at Valentine, Nebraska. For info and/or to register for these events, log on to www.rmbs.ws.

—Ron Schmidt

Brazilian Bonanza Society

On May 14 our members have a fly-in to Itirapina, Sao Paulo, to enjoy the Broa Lake and its surroundings. The next day we will fly to Sao Carlos to visit the new airplane museum Asas de um Sonho (Wings of a Dream) to see WWII fighters, airliners and classic general aviation airplanes that have been restored to perfection. Visit www.bonanzaclub.com for more info or to register to join us.

—Luis Gustavo



ABS LIFE MEMBERSHIP

ABS welcomes New Life member

Keith Mervyn Duce, Sinnamon Park, Australia
He has been an ABS member since 1999 and
flies a 1972 A36.



INSURANCE

BY JOHN ALLEN, FALCON INSURANCE

TRANSITION TRAINING

BY JOHN ALLEN, FALCON INSURANCE

One of the most exciting events for an aircraft owner comes when it is time to move up to a nicer, faster or more complex aircraft. With the excitement also come concerns about safely transitioning into that new aircraft. There will be questions during this process. Am I insurable in the new ship? If so, at what cost? What training will the underwriters require? How can I fulfill those training requirements?

The process of moving up is referred to in the aviation industry as *transitioning* from a fixed-gear to a retractable-gear aircraft, from a single to a twin.

This is an issue that underwriters have been addressing for a long time and the process is pretty standard. They will require you to obtain ground and flight training in the new aircraft.

The bigger the step up, the stiffer you can expect the underwriter's transition training requirements to be. For late-model Bonanzas and Barons, you may even be required to attend formal courses, some of which employ simulators of varying sophistication and capability. After all, if you are transitioning into a new Baron or Bonanza, the underwriters have a real interest in seeing that you do it safely and that your shiny new machine is not damaged or destroyed in the first hours of ownership.

Another factor to consider is the advent of glass panel instruments and avionics systems. Along with their vastly improved capabilities comes a corresponding increase in complexity. The amount of training to master these new avionics systems will sometimes take as much time as you will spend learning about your new airframe and power plant.

Simulators are excellent tools to learn and practice the use of these marvelous systems. Such training also saves wear and tear on your new aircraft, and—because of the efficiency and effectiveness of the simulator training environment—it can also save wear and tear on you and speed up your training.

With a smaller transition step, say from a fixed-gear model to a V35 or from a Duchess to a B55, underwriters may only require some dual instruction in your new

aircraft that can be obtained through BPPP or locally with a qualified CFI.

Sometimes underwriters will require that you spend some solo time in the new ship after your checkout is complete before you have coverage carrying passengers. Just remember that you need to understand exactly what is required. Almost invariably, any dual instruction or solo time that underwriters are requiring will be included as an approved use on your new policy.

Using someone else's airplane

What if you would like to receive your instruction in a friend's aircraft or at your local FBO? As long as the make and model of the training aircraft is the same as your new purchase, this is generally acceptable to underwriters. Keep in mind, however, that with regard to the new avionics packages, *training requirements may preclude this possibility if the training aircraft is not similarly equipped to your new one.*

If you do decide to take this route for your training, make sure that you thoroughly discuss the insurance ramifications of relying on your friend's insurance policy or the insurance afforded you by the FBO's policy. In most instances, you will discover that the insurance extended to you by policies owned by others will not adequately protect you.

There are nonowned liability and hull insurance policies offered by Falcon and others that are ideal for these situations. Take the time to thoroughly discuss your transition training plans with an experienced aviation insurance broker. Make sure you know the risks and take the steps to properly protect yourself and your family before launching that new airplane.

Falcon Insurance has assisted in the transition training and insurance for hundreds of your fellow ABS members. We are always ready to discuss your plans for your aircraft upgrade. We will take the mystery out of the process and make sure the excitement and satisfaction of your transition experience is all it should be.

If you are not insured in the ABS Aircraft Insurance Plan, please check it out when your policy comes up for renewal or when you purchase that new aircraft. Call the ABS Plan at 800-259-4ABS (4227).

John Allen may be reached at 1-800-259-4ABS (ext. 4227). Falcon's website is <www.falconinsurance.com>.

Thanks to all members who have their insurance coverage through the ABS program administered by Falcon Insurance Agency. There is no extra charge to the individual member, and Falcon's active sponsorship of ABS programs helps us expand services to all members. The more members who use Falcon, the more clout the agency has in the aviation insurance industry on our behalf. If you're not part of the ABS Insurance Program, we urge you to obtain a quote from Falcon prior to your next renewal.



BOM & THE EC

When I titled this article, I got tickled because it's reminiscent of acronym-laden rock bands from my youth. Remember ELO? BTO? CCR? Since the average age of ABS members is 58, surely many of you danced, sang, whistled or hummed your way through the tunes of those popular groups. (If you just don't remember, see the end of the article.)

But *BOM & the EC* isn't an old garage band. It refers to Beechcraft of the Month (BOM) and the Editorial Calendar (EC), two very important components in the monthly development of the *ABS Magazine*. I'm bringing them up to remind you that much of the content of the magazine is up to you.

BOM - Get on the cover!

At any given time, we might have eight or more BOMs in our files and we try to use them in order of receipt. Sometimes we have to do some switching around, either because the "package" is incomplete or we have had a run of several issues with the same model and want to mix things up.

EC - Get published!

We instituted an editorial calendar four years ago, if memory serves me. It's advanced nicely, especially since Technical Services Manager Tom Turner was assigned to develop the list each year. He submits it to the pilots on the Media Committee, who add ideas to the list; so it's full of useful topics on aircraft operations and maintenance.

Frankly though, we're still hit-or-miss on whether anyone submits any articles on the monthly designated subjects. Sometimes we can fill the pages with wonderful member-submitted articles, but occasionally we get none at all.

Review the calendar each month to see if there's a topic on which you would like to write. Or come up with your own Beech-specific topic of interest to the ABS audience. In this issue, the Editorial Calendar appears on page 10095.

For both BOM and EC articles, call (316-945-1700) or e-mail (absmail@bonanza.org) for the very helpful article, "How to contribute to the *ABS Magazine*."

ROCK BAND LEGEND: ELO - Electric Light Orchestra; BTO - Bachman Turner Overdrive; CCR - Creedence Clearwater Revival

ABS MEMBERSHIP APPLICATION

Name: _____ Spouse: _____

Address: _____

City/State or Country/Zip: _____ Date of Birth: _____

Telephone (Home): _____ (Work): _____ Fax: _____

Occupation: _____ E-mail: _____

Aircraft Model: _____ Serial #: _____

Year: _____ Tail #: _____

VOLUNTARY:

Check here to allow ABS to make your

☐ home phone number available to other members.

☐ work phone number available to other members.

☐ e-mail address available to other members.

Domestic (US, Canada, Mexico) \$55 \$ _____

Foreign (includes additional postage) US Dollars \$93 \$ _____

* Family (each additional person; must be same household) \$25 each \$ _____

Life Membership (one-time payment) \$1,000 \$ _____

Air Safety Foundation donation \$25 \$ _____

(ASF donations are voluntary & support safety, education & research projects)

TOTAL \$ _____

* Name(s) of additional family member(s) _____

☐ Check (payable to ABS) ☐ VISA ☐ MasterCard

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CALENDAR

ABS Headquarters
1922 Midfield Road
P.O. Box 12888
Wichita, KS 67277
tel: 316-945-1700
fax: 316-945-1710
e-mail: absmail@bonanza.org
website: www.bonanza.org



ABS AVIATOR POINTS

Join ABS' lifetime learning program and earn your designation as an ABS Aviator. Events that earn points toward ABS Aviator status are marked below with an asterisk*

Check those calendars! The new date for the 2007 ABS Convention is Sept. 5-9. This is a date change to avoid conflicting with AOPA Expo. Plan to join the ABS celebration in Wichita this year!

MARCH

10 - North East Bonanza Group Brunch.

NORTH - Sky Acres, NY (44N). Contact Jack & Sheila Schneider 845-677-8845, or sheila.jack2@earthlink.net.

SOUTH - Georgetown, DE (GED). Contact: Mike McNamara 856-768-6730, or mmcnamara88@aol.com.

16-18 - BPPP Clinic. Greensboro, NC (GSO)

* 70 ABS AVIATOR points

17-18 - Intro to Formation Flying Clinic. To qualify to participate in B2Osh. Contact: Jim Posner Captainjim@northwestbonanza.org.

22-25 - Southeast Bonanza Society Fly-in. Montgomery, AL. Art, Shakespeare theatre, Hyundai factory, golf resort. Contact: Steve & Elinor Kline 941-575-2001, or stelik@comcast.net.

31 - Southwest Bonanza Society Fly-in. Peleberg Hangar Party. Bridgeport, TX (XBP). Contact: Pete & Ginny Peleberg 940-627-0199 or e-mail pvp6688@hughes.net.

APRIL

8-15 - Pacific Bonanza Society Fly-in. Copper Canyon, El Fuerte, Mexico. Contact: Stephen & Kathi Blythe blythe@blytheco.com 949-951-4857

12-15 - ABS Service Clinic. Woodland Aviation (041) Woodland, CA.

17-23 - Sun 'n Fun, Lakeland FL.

20-22 - Rocky Mountain Bonanza Society Fly-in. Lake Powell/Glen Canyon Dam. Page, AZ (KPGA). Contact: Ron Schmidt rons@schmidtmotors.com.

21 - North East Bonanza Group Brunch.

SOUTH - Hummel Field, VA (W75). Contact: Mike Butz mike@peaklandcoffee.com, or 410-299-5444.

21-May 6- Pacific Bonanza Society Bahama Mama Air Safari. Contact: Steve & Teri Walker swalker@sonasearch.com 425-883-1984.

27-29 - BPPP Clinic. Concord, CA (CCR)

* 70 ABS AVIATOR points

27-29 Beech Enthusiasts Round-Up.

Sponsored by the Staggerwing Foundation. San Diego, CA. For more information contact: Harold Bost 770-719-0638, or Hbostmail@aol.com. Or visit www.staggerwing.com.

28 - Southwest Bonanza Society Fly-in. Pig

Roast, Boyd, TX (6XS7). Contact: Herschel & Linda Crump 817-658-3070.

29 - North East Bonanza Group Brunch.

NORTH - Falmouth, MA (5B6). Contact: Ron Tracy rwtracydmd@att.net; Bill McClure 508-272-1128.

MAY

3-6 - ABS Service Clinic. Midwest Aviation Services (PAH). Paducah, KY.

11-13 - Southwest Bonanza Society Fly-in.

Nashville, TN. Opryland Hotel. Contact: Randy Taylor 830-625-6155 or tayco@nbtx.com.

11-13 - Midwest Bonanza Society Fly-in.

Rough River State Park (213). Falls of Rough, KY.

12 - North East Bonanza Group Fly-in.

Udvar Hazy Air & Space Museum at Dulles (IAD). Contact: Alan Witkin 860-644-1136, or NEBG info@aol.com.

18-20 - BPPP Clinic. Columbus, OH (CMH)

* 70 ABS AVIATOR points

25-27 - Pacific Bonanza Society Fly-in.

Jazz Jubilee. Sacramento, CA. Contact: Ray & Zana Redden baron73wa@comcast.net or zredden@comcast.net 916-331-9530.

25-27 - Australian Bonanza Society Fly-in.

Narooma, NSW. Contact: Gail & Robert Kerr kerr@mira.net.

31-Jun 3 - Southeast Bonanza Society Fly-in.

Bowling Green, KY. Corvette Factory/Mammoth Cave. Contact: Steve & Elinor Kline 941-575-2001, stelik@comcast.net or elijo924@camcast.net.

ABS SERVICE CLINIC & BPPP SCHEDULES ARE ON PAGE 10039.

31-June 10 - Australian Bonanza Society Fly-in.

Noumea and Lord Howe Island Safari.. Contact: Jack Folan & James McDonald jfolan@fosma.com.au.

JUNE

1-3 - North East Bonanza Group Fly-in.

Black Island (BID). Contact: The Old Town Inn, Dave Morrison 401-466-5958, or info@oldtown-innbi.com.

2-3 - Savvy Aviator Seminar. San Francisco, CA

* 30 ABS AVIATOR points

7-10 - ABS Service Clinic. Spokane Airways

(GEG). Spokane, WA.

15-17 - Southwest Bonanza Society Fly-in.

Palo Duro Canyon. Canyon, TX (AMA). Contact: Shirley Roberts 817-485-0253 or aviaal@cs.com

15-30 - Pacific Bonanza Society Fly-in.

Sutter Creek Gold Mine. Westover, CA. Contact: Dave & Tilden Richards Richards@volcano.net; or 209-267-0640 or Jon & Polly Luy jdebonair@hotmail.com, or 209-267-0167.

22-24 - BPPP Clinic. Tulsa, Oklahoma (RVS)

* 70 ABS AVIATOR points

22-24 - Pacific Bonanza Society Fly-in.

Santa Rosa, CA. Contact: Larry & Anita Carrillo ljcarrillo@msn.com 707-528-9727.

22-24 - Rocky Mountain Bonanza Society Fly-in.

Niobrara River rafting. Valentine, NE (KVTN). Contact: Ron Schmidt rons@schmidtmotors.com.

JULY

10 - Southwest Bonanza Society Fly-in.

Let's Fly Alaska. Contact: Dale Hemman 866-359-8625.

12-15 - ABS Service Clinic. Harris Aviation

(GXY). Greeley, CO.

FOR FURTHER DETAIL and more events, visit the NEWS AND EVENTS link on the ABS website <www.bonanza.org>.

REGIONAL WEBSITES

AUSTRALIAN BONANZA SOCIETY www.abs.org.au
BRAZILIAN BONANZA SOCIETY www.bonanzaclubes.com
MIDWEST BONANZA SOCIETY www.midwestbonanza.org
NORTH EAST BONANZA GROUP www.northeastbonanzagroup.com

ROCKY MOUNTAIN BONANZA SOCIETY www.rmbs.ws
PACIFIC BONANZA SOCIETY www.pacificbonanza.org
SOUTHEASTERN BONANZA SOCIETY www.sebs.org
SOUTHWEST BONANZA SOCIETY, INC. www.southwestbonanza.com

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TELEDYNE CONTINENTAL MOTORS, INC.

Entrants must complete the Aviator Services registration form to enter the "Win An Engine" sweepstakes. No purchase is necessary to enter. All entries must be received by midnight CDT July 19, 2007. The winner will be announced at AirVenture 2007.