



## **FLYING LESSONS** for February 14, 2013

suggested by this week's aircraft mishap reports

*FLYING LESSONS* uses the past week's mishap reports to consider what *might* have contributed to accidents, so you can make better decisions if you face similar circumstances. In almost all cases design characteristics of a specific make and model airplane have little direct bearing on the possible causes of aircraft accidents, so apply these *FLYING LESSONS* to any airplane you fly. Verify all technical information before applying it to your aircraft or operation, with manufacturers' data and recommendations taking precedence. You are pilot in command, and are ultimately responsible for the decisions you make.

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### ***This week's lessons:***

**There's no substitute** for knowing the workings and systems of your aircraft. It could be as simple as the difference between an Aeronca Champ and a Piper Cub, or as complex as a Boeing 747-8 compared to an Airbus A-380.

**Chances are** the airplane(s) you fly are somewhere in between. But each has its own characteristics and requirements. Take for example this question emailed to [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net) this past weekend from one of my friends, a flying student, late-model turbo Bonanza owner, and great *FLYING LESSONS* supporter. It and my answer venture far into type-specificity, which I try to avoid in *FLYING LESSONS* to make it applicable to pilots of all types. But bear with me—I have a point equally valid for all. My friend asked:

I was flying around Texas yesterday with a friend in his [Piper] Malibu and he mentioned that whenever he thinks there is a chance of ice he turns on pitot heat AND alternate air. I knew of pitot heat but never thought of alternate air. He heard this would keep icing from turbo system. Should I be doing the same?

#### **I replied:**

Some airplanes have a manually selectable alternate air system. This opens a panel inside the cowling to permit air to enter the induction manifold behind the air filter but ahead of the turbo compressor or, in normally aspirated engines, the throttle or carburetor as applicable.

Manually selectable alternate air is used for two purposes:

1. To increase manifold pressure slightly in cruise flight by bypassing the air filter (the filter reduces air flow into the system slightly), thus increasing airspeed. Some airplanes take alternate air through a ram inlet in the nose or the wing leading edge to increase this air flow further from ram air pressure.
2. As a precaution against possible blockage of the air filter by ice or impact ice (snow) build-up.

In all airplanes with alternate air, the alternate is also used as an emergency bypass of the air filter in the event of a filter blockage or obstruction.

Some airplanes' POHs (Mooneys and Twin Cessnas, I believe, and some very early Beech Barons) suggest manually activated alternate air as a normal procedure in cruise flight, for more power when above altitudes where there is concern about dust, etc. being ingested into the engine. Pilots of these airplanes need to follow checklists closely to remember to return to filtered air before descending, and for ground operations and the next takeoff.

Some ice-certificated airplanes' POHs (such as, apparently, the Malibu/Mirage) call for use of alternate air as a precaution prior to entering suspected icing conditions.

Your turbonormalized Beechcraft Bonanza has an alternate air system that opens automatically in the event air flow through the inlet filter is blocked. You do not have,

however, a means to open the alternate air door manually. When originally built your A36 had an alternate air handle (next to, and looking like, your parking brake handle). Pulling this handle pops open the alternate air door, but if air was still flowing through the air filter the alternate air door blows closed again and air flow continues through the filter inlet. So alternate air only works in your airplane if the filter is already blocked.

The turbonormalizing system on your airplane retains the alternate air door but, because of the complexity of routing the manual cable around the new turbo components, installation of the TN system removed the backup handle in the cockpit. When [a new firm] acquired rights to the [original turbonormalizer] design, it made several changes including moving the location of the alternate air door to the underside of the engine and closer to the exhausts. This makes the induction system in the area of the alternate air door less likely to freeze shut, making lack of the manual backup handle less critical.

Because the air inlet is in a hot part of the low pressure area inside your engine compartment, air through the alternate door is much less dense than air filter air. This means there will be a large drop in manifold pressure when the alternate air door opens on your airplane--common reports are seven or eight inches less indicated MP. The turbo will work harder to make up the loss so it is only seven to eight inches lost, but that means the compressed air is hotter and less dense. So there is a big drop in power, critical altitude, and resulting performance.

Hence, alternate air in your Bonanza is not manually selectable. It should open automatically of an emergency that blocks the air inlet filter. When operating on alternate air you will have significantly less power available at full throttle.

As I said, I try to keep *FLYING LESSONS* “type neutral” to appeal to a wide variety of pilots. My background just happens to be heavily weighted toward this particular type of airplane and this specific modification. My point in relating this exchange is this: **Don’t take what your friends say about their airplane as necessarily applying to flying yours**—regardless whether they’re models in the same manufacturer’s line of products, or even different production years of the same model.

*A reader sent me this photo (below) of the ramp and taxiway at (U.S.) Naval Air Station Corpus Christi, Texas, taken (I know from the airplane markings) some time between June 1942 and April of 1943. Look closely and you’ll see several Naval Aircraft Factory N3N “Yellow Peril” biplanes among the Boeing (Stearman) N2S-series Kaydets. The most obvious difference is that the N3Ns are soloed from the front seat, while the N2S is soloed from the rear, a weight-and-balance consideration visible in the photo. I’m absolutely certain the military mindset required pilots to memorize and use different specifications, airspeeds and procedures applicable to the two distinct types, despite their similarity (most people confuse an N3N for a Stearman, and call a Naval Stearman a “Yellow Peril”—both incorrect). It’s within the scope of military thinking that students may have been confined to flying one type or the other during their tenure in Naval Aviator primary training. **Differences matter...even if the differences are small.***

*(If really into it: the N3N’s single horizontal stabilizer strut distinguishes it from the Stearman, and most of the N3Ns were prewar and retain the green unit band on the fuselage. Most N2Ss were acquired after the war began and had less colorful markings).*



**Seek out the experts** on your airplane type and get facts and informed opinion (full disclosure: I'm employed full-time by a "type club" that supports a particular line of airplanes). There's a wide variety of owners' organizations for the major types of general aviation airplanes. [Find the type club supporting the airplane you fly](#) or plan to fly. And read the Pilot's Operating Handbook, and POH supplements for optional equipment. Verify the best procedures that apply.

See <http://data.aopa.org/associations/>

**Most likely** something as vital as alternate induction air for icing conditions, if applicable to the airplane you're flying, will be prominently mentioned in the checklists, Limitations, and Systems Description. When in doubt, read the directions. And confirm the technique your friends recommend for you, are the best things to be doing in the airplane you fly.

Questions? Comments? Let us know, at [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net)

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## Debrief: Readers write about recent *FLYING LESSONS*:

Reader and instructor Alan Davis writes about [recent autopilot-related \*FLYING LESSONS\*](#):

We also have to be very aware of full or partial disconnect of the autopilot - especially in smaller aircraft where they don't have a loud warning that it has taken place. Lest we forget, it was an inadvertent autopilot disconnect, accompanied by what was then a soft chordal tone (instead of a klaxon type annoying sound), and an inattentive crew that allowed the Eastern L-1011 Flight 401 to simply sink into the Everglades when there was nothing wrong with the airplane - at great loss of life. Yes, the A/P definitely IS a "dumb" co-pilot, so the pilot(s) better be with it and "flying" the airplane (even if the A/P is doing the work) **all the time**. It is too easy to let "Otto" do the work and become involved or otherwise distracted - until it is too late!

See [www.mastery-flight-training.com/20130207flying\\_lessons.pdf](http://www.mastery-flight-training.com/20130207flying_lessons.pdf)

Reader Terry (no last name given) adds:

In your *FLYING LESSONS Weekly* issue entitled "[Autopilots bear watching](#)," you describe an event in which the pilot was flying a coupled ILS approach in the GPS mode when a sudden dive occurred. You mention three things that may have caused this excursion. I would add a fourth possibility.

If the pilot was using the GPS signal to navigate the initial part of the approach while on autopilot, then changed navigation modes to capture the ILS signal while above the glide path, this could result in a vigorous dive by the autopilot in an attempt to capture the glide path. I don't know this was the scenario or what type of autopilot was being used - not all will attempt to capture the glide path from above on an ILS coupled approach. Some will, however, and the pilot needs to know how this feature works and stay within its limitations to avoid unpleasant and perhaps hazardous results.

See [www.mastery-flight-training.com/20130207flying\\_lessons.pdf](http://www.mastery-flight-training.com/20130207flying_lessons.pdf)

Knowledge of autopilot systems, as well as other type-specific information such as in this week's *LESSONS*, is vital to safely flying an airplane. Gone are the days that reading and reviewing the Pilot's Operating Handbook is enough to be capable and confident in an airplane—now more than ever we need to read and fully understand the supplements as well. Thankfully, many avionics supplements (and even active simulators and tutorials) are available online.

Reader Mike Jesch follows up about declaring an emergency...and an apparently reluctance to do so by many pilots:

Further to the emergency declaration subject of the last couple weeks: I am the Chief Orientation Pilot for the Southern California Wing of Angel Flight West (and an ATP and CFI). I conduct the orientation briefings of our new Command Pilots, and part of the discussion is **knowing when and how to declare an emergency**. Over the years, I've had the opportunity to talk with many [general aviation] pilots about their thoughts regarding "the E-word." When I brief a group of a dozen or more pilots, I'll ask them "How many of you have ever declared an emergency?" Normally, one or two, maybe three hands go up. Then I ask "How many of you have been in a situation where maybe in hindsight, you should have declared an emergency, but didn't?" Usually another 2-3 hands go up. Then I ask "**Why didn't you?**" Usually, the answer is either "I thought I could handle the situation myself," or "I didn't want to do a bunch of paperwork." Then, I go back to the pilots who had actually declared an emergency and ask, "Did any of you ever get asked to do any additional paperwork by the FAA after your emergency?"

Not once has a hand gone up. Lose the fear of paperwork! In any case, I'd rather be doing paperwork than not be able to do paperwork.

When I administer a Flight Review (lately more likely to be Wings Flight Activities), I'll **have the client demonstrate a declaration of emergency** as part of our ground time. If you've practiced it a bit, it's easier in the heat of battle. I'll also be demonstrating and teaching an emergency descent in IMC direct to an airport, and lifting the hood at 1000 [feet AGL] more often.

Finally, I'll reference the AIM's guidance on emergency situations (Section 6-1-2, Paragraph B):

Pilots who become apprehensive for their safety for any reason should *request assistance immediately*. Ready and willing help is available in the form of radio, radar, direction finding stations and other aircraft. Delay has caused accidents and cost lives. *Safety is not a luxury! Take action!*

Great addition to the ground portion of any Flight Review or checkride preparation, Mike! Thank you.

Mike Massel chooses the effect instructional technique of humor to make his point:

I just finished reading your latest addition of *FLYING LESSONS Weekly*, excellent as always, and I would like to add a couple of quotes regarding your Mastery Flight Training Airmanship Awards program with which I wholeheartedly agree:

- *A superior pilot never lets the situation deteriorate to the point where superior skills are required*
- *I want to die like my grandfather did, peacefully in his sleep. Not screaming in terror like his passengers.*

Thanks, Mike.

A couple of readers took me to task about my concerns about arriving at destination at a minimum fuel state. As I tell my flying students about my instruction, use what you like, modify what you want and discard the rest—so long as you have a plan. I write what I write because of the unrelenting number of airplanes that go down needlessly because of fuel mismanagement and a desire to “get there” seemingly at all costs...resulting in most fuel-related engine stoppages occurring within a very few miles of the intended destination airport.

One reader who (I believe) wishes to remain anonymous did include some gems of wisdom that apply no matter what your personal fuel management strategy:

I think landing with [the FAA-mandated minimum] 30 minutes of fuel [under Day/Visual rules] is just fine **provided that good planning precedes that event.** In my book, that **good planning includes iron clad weather evaluation and plenty of landing options** within no more than five or ten minutes from the planned destination.... **Good fuel planning includes the extra fuel need for expected holding and missed approach fuel.** All of those factors are considered by every professionally flown flight, but I know of no airline that wants a back up tank of fuel to be available "just in case."

For my personal long range flying, I keep close track of the fuel by knowing how much I should burn, by keeping track of how much I AM burning, and carefully watching the destination and alternates to assure that the trip is going as planned.... **It is planning and careful monitoring via a howgozit plan that determines safety,** not multiple tanks and...extra [fuel]weight carried.

*That I agree with. Whether you wish to avoid intentional engine stoppage in flight (like me), or risk the extremely unlikely (but historically not impossible) chance of failure to get a restart after draining an in-use tank completely dry in flight, it takes good fuel planning for expected (and unexpected) holding and alternates, and in-flight monitoring to achieve the goal. Thanks very much, reader.*

What do you think? Let us know, at [Mastery.flight.training@cox.net](mailto:Mastery.flight.training@cox.net)

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*FLYING LESSONS* supporter Brian Conway writes:

Thank you for putting *FLYING LESSONS* together each week. It is easily the best safety info that I see. It helps me to keep me and my family safer. For instance, I was wondering if I had been going overboard spending a night in a hotel so that I could fly my 1973 Beech Baron back home in daylight rather than dark a week ago Friday. When I read your Beech Weekly Accident Update report of the spin-stall of a Baron on [its] initial flight after annual, I felt I had been correctly prudent. Please keep up the good work. It helps 150 hour/year pilots like me.

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***Personal Aviation: Freedom. Choices. Responsibility.***

Thomas P. Turner, M.S. Aviation Safety, MCFI  
2010 National FAA Safety Team Representative of the Year

2008 FAA Central Region CFI of the Year

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