FLYING LESSONS for September 7, 2017

FLYING LESSONS uses recent 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 airplane have little direct bearing on the possible causes of aircraft accidents—but knowing how your airplane's systems respond can make the difference as a scenario unfolds. So apply these *FLYING LESSONS* to the specific 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:

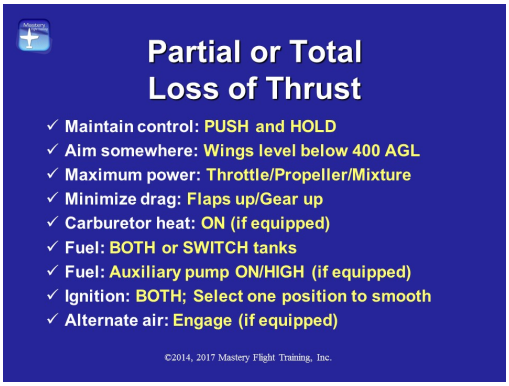
Recently we began to review a recent FAA preliminary accident report:

> The Beech Sport "was not climbing properly" after departing a high-elevation airport in the middle of a hot afternoon. The pilot "returned to land and went off the end of the runway, though a fence and onto a golf course." The pilot and passenger avoided injury despite "substantial" airplane damage.

See https://en.wikipedia.org/wiki/Beechcraft_Musketeer

The August 24th *FLYING LESSONS* discussed the first of two topics prompted by this very preliminary accident report…putting myself in the cockpit of an airplane with what *might* be a Partial Loss of Thrust (PLOT) during climb.

See:
http://www.mastery-flight-training.com/20170824-flying-lessons.pdf
http://www.mastery-flight-training.com/20141009flying-lessons.pdf



This week we'll address the larger concept of dealing with distracting airplane status, so that it does not negatively affect your ability to get the airplane back on the ground in one piece. Assume, as we discussed in the August 24th report, that you are in that Beech Sport. You have taken care of the memory items that apply equally to a PLOT and a Total Loss of Thrust (TLT). You have done everything you can…but full engine power has not been restored.

Once memory actions are complete and the airplane is flying under control toward a recovery zone (on or off airport), the next step is…to ***run the checklist***.

Now, you might think that a checklist is the *last* thing you have time for as you claw your way to pattern altitude in a heavy airplane at a high density altitude with a Partial Loss of Thrust. I submit, however, that this is *exactly* when you need to use your best checklist skills.

Why do checklists exist? There are five reasons to use a checklist…four of which apply directly to the type of emergency being discussed. Checklists exist:

1. **For training.** Checklists are abbreviated "how to" manuals for flying a specific airplane. We use printed checklists to orient ourselves to the airplane, its systems and their operation in normal, abnormal and emergency conditions. As we gain experience in the type we have to look at the checklist list frequently. Eventually most of us develop "flows," or habit patterns to accomplish blocks of items on the checklist. We lose dependence on

the printed checklist and can accomplish most items from memory…at least those tasks we perform or practice regularly.

Unfortunately this is as far as many instructors take their students with checklists. Pilots *think* they know it all and stop using most checklists—for some reason most pilots use the Before Start, Starting and Before Takeoff (Run-up) checklists but nothing else. After that they stow the checklists. I've even seen pilots throw it into the back of the airplane out of reach. This is tragic, because it eliminates the four additional reasons for checklist use that might have prevented the Beech Sport runway overrun and an incredible number of other crashes. The post-transition, performance enhancing uses of checklists are…

2. **To confirm actions have been done completely and correctly.** High workload phases of flight are when you have the most to do, and also when (because of the distraction of workload) you are most likely to miss something. The proper use of a *check*list (as opposed to a training "do"-list) is to confirm all actions are actually complete when you *think* they are. Complete the action or transition, then reference the checklist as a form of quality control. The shorter and more focused your checklist the better. It can even be a mnemonic (short memory checklist, like GUMPS), but then you're still relying entirely on memory. Regardless, back up your memory action with a quick checklist confirmation to ensure you have done everything you need in the manner it needs to be done.
3. **To consult the experts.** What do I mean by this? Aircraft checklists are usually written by teams of engineers, instructors and sometimes marketers. They are the result of calm, deliberate debate and consideration, done when there is absolutely no stress of actually flying the airplane or dealing with an unusual or emergency situation. When you look at a checklist you are looking at the combined, deliberate wisdom of this team of experts. You might have some difference with what checklists contain, but if you study the checklists on the ground and amend them *in writing* on the checklist form, then you add your learning to the expertise reflected in the checklists. In any form, when you fly with a checklist you are flying with the airplane experts.
4. **To set the pace for what comes next.** Taking a quick moment to confirm your actions with a checklist is an operational pause that prevents you from doing *something* fast, even if that something is the wrong thing. Old-time pilots tell us the first thing to do in an emergency is to *wind the clock*. What they mean is: **slow down so that you act *deliberately* and *correctly***, not hastily. Referencing a checklist is a form of "winding the clock."
5. **To re-establish the pilot mindset.** Why do we need this clock-winding operational pause? To help us get over the bad thing that just happened and focus on how we'll do the next thing. A quick check and consideration of what comes next just might prevent the sort of mishap that so often ends up in the accident record…when one thing leads to another until the pilot makes a mistake.

Lack of checklist use and noncompliance with the Standard Operating Procedures they describe is such a common factor in air crashes that you can write a book about it. In fact I did. You don't need to hunt down a copy (it's also translated into Chinese); it's primarily what I've written here with numerous case histories to back it up, in the format of editor Tony Kern's 13-book Controlling Pilot Error series.

See https://www.amazon.com/Controlling-Pilot-Error-Checklists-Compliance/dp/0071372547/ref=sr_1_1?s=books&ie=UTF8&qid=1504722824&sr=1-1&keywords=checklists+and+compliance

Look at our example one last time:

> The Beech Sport "was not climbing properly" after departing a high-elevation airport in the middle of a hot afternoon. The pilot "returned to land and went off the end of the runway, though a fence and onto a golf course." The pilot and passenger avoided injury despite "substantial" airplane damage.

If the preliminary report is accurate, the PLOT didn't cause the crash, it just precipitated a chain of events that led to it. Ultimately the mishap was a runway overrun, perhaps resulting from a

turn-back or possibly a complete pattern and landing, that was an exercise in airspeed, flight path and energy management. The crash might have been prevented if the pilot slowed down, took an operational pause, and moved on from the initial failure to a mindset of properly landing the airplane. Familiarity with and using checklists just *may* have helped.

Comments? Questions? Let us learn from you, at mastery.flight.training@cox.net

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Debrief: Readers write about recent *FLYING LESSONS:*

Frequent Debriefer Lorne Sheren asks about the August 17 *LESSON* instigated by an apparent stall/spin during an attempted short-field takeoff. Lone writes:

> Any comment on the usefulness of AOA [Angle of Attack] indicators in high performance takeoffs?

The industry hysteria about Angle of Attack Indicators (AOAIs) has died down significantly. For a time virtually every discussion of fatal general aviation accidents included string inference that the widespread adoption of AOAIs would virtually eliminate Loss of Control – Inflight crashes… eradicating stalls and spins. I admit that I was on the AOAI bandwagon myself for some time in *FLYING LESSONS*.

An AOAI is a very sophisticated stall warning horn. The advantages are that the AOA is presented as a series of graduations, not an all-or-nothing, either-the-horn-is-blaring-or-it-is-not on/off device; and in most cases the AOAI provides audible as well as visual indications to better command the pilot's attention. Although there are potential installation and calibration issues, and military test pilots have reported the low-cost civilian AOAIs are not nearly as precise as similar devices on military aircraft and high-end corporate jets, the low-cost devices *do* provide at least a rough target for short-field takeoff and landing. They provide indication of **a *trend*** toward aerodynamic stall sooner than a traditional stall warning horn. Overall I laud the FAA for loosening rules to make approved AOAI installation far easier than it had been before.

Since you asked, I'll answer your question in two parts. ***First,*** if the airplane in the cited crash had been AOAI-equipped and its pilot trained in its use, it's likely the pilot would have aimed for a specific indicate AOA instead of an airspeed or pitch attitude (or making it up as he went). Consequently it would have been less likely to inch into a stall and subsequent spin. Of course we could also say the same thing if the pilot was well-trained in the 1G pitch attitudes and airspeeds for V_X at the airplane's weight in the current configuration, with or without an AOAI.

Second, assuming the airplane's stall warning horn was working properly, it would have sounded at an indicated airspeed approximately five to seven knots higher than the stalling speed at that given airplane weight and G-load. Yes, traditional stall warning horns sense AOA directly in exactly the same way as most AOAIs, and automatically compensate for airplane weight and G-load too. They just don't provide any indications other than the just-shy-of-stall warning.

An aside: I disagree with recent FAA Practical Test changes that do not expose pilots to prolonged flight a high angles of attack, and therefore make it less likely they will respond correctly in situations like the one that prompted the August 17 *LESSONS*. I understand, however, that FAA's motivation for making this change is precisely so pilots are not desensitized

to the stall warning horn. Like the decades-long debate about including spins in Private Pilot training, there are valid arguments for supporting both viewpoints.

My short answer to Lorne's question: AOAI or no, pilots *should* be spring-loaded to lower AOA, add power as needed and recover at the first *unexpected* sounding of the stall warning horn (or first flash of the stall light in very old airplanes). In that respect, an AOAI might have warned the pilot of impending stall sooner, but if the pilot did not heed the blaring stall warning horn under the extreme stress of trying to clear an obstacle, I expect the AOAI would not have prompted stall-evasive action either.

See http://www.mastery-flight-training.com/20170817-flying-lessons.pdf

Comments? Questions? Let us learn from you, at mastery.flight.training@cox.net.

Best info that I receive about flight safety! - Brian P Conway

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For U.S. pilots:

The End of the Area Forecast

The long-reported replacement for the Area Forecast (FA) is now scheduled to go into effect. FAA Information For Operators (InFO) 17013 reports:

This InFO serves to inform industry of the [National Weather Service]'s plan to discontinue production of the FA and transition to the Graphical Forecast for Aviation (GFA). The intent of transitioning to the digital GFA is to allow …improved weather information to decision-makers. The GFA will…add graphical displays of the predominant weather, sky cover, and wind speed and direction. GFAs will replace the textual FA only for the CONUS [Continental United States]. The FA for Alaska, the Gulf of Mexico, Hawaii, and the Caribbean will remain unchanged.

GFAs are a set of web-based displays that provide observations and forecasts of weather phenomena critical for aviation safety. GFAs cover from the surface up to 42,000 feet MSL. Wind, icing, and turbulence forecasts are available in 3,000-ft increments from the surface up to 18,000 ft MSL, and in 6,000-ft increments from 18,000 ft MSL to 42,000 ft MSL. Turbulence forecasts are broken into low (below 18,000 ft MSL) and high (above 18,000 ft MSL) graphics. A maximum icing graphic and maximum wind velocity graphic (regardless of altitude) are also available. Multiple fields of interest are combined in categories that the user is able to select from the top-level "Weather" menu. Data is time-synchronized and available hourly from 14 hours prior, to 15 hours after a selected time. The data for each category is determined by the time period: observations (current time and the prior 14 hours) and forecasts (valid up to 15 hours in the future). All NWS products will be available during the transition period of three (3) months starting July 10, 2017. On October 10, 2017, the NWS will cease production of the CONUS text FAs.

Visit http://www.aviationweather.gov/gfa for detailed information on GFAs. After clicking the link, select "INFO" on the top-right corner of the map display. The next screen presents the option of selecting "Overview," "Products," or "Tutorial." Select the tab of interest to explore the enhanced digital and graphical weather products designed to replace the legacy FA. Questions or comments regarding this InFO should be directed to the Future Flight Technologies Branch, AFS-430, at (202) 267- 8795.

See https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2017/InFO17013.pdf

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Thomas P. Turner, M.S. Aviation Safety
Flight Instructor Hall of Fame 2015 Inductee
2010 National FAA Safety Team Representative of the Year
2008 FAA Central Region CFI of the Year
Three-time Master CFI