



FLYING LESSONS for November 29, 2012

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:

Aviation lore is filled with stories of the pilot who soloed after only four or five hours of instruction in a Aeronca Champ or Piper Cub. As airplanes and the environment have become more complex, however, more and new skills added to the time it takes to be ready for that first solo flight.

The growth of light sport aircraft (LSAs) may put many students in airplanes with Cub-like handling, although many LSAs have decidedly different characteristics. A return to simplicity might signal a return to the four-hour solo pilot...except that the intervening decades of pilot training experience reveals that, while a great student may be able to fly alone after such a short time *under extremely controlled circumstances if absolutely nothing goes wrong*, even minor distractions, malfunctions or unforeseen environmental changes quickly erode any margin of safety. Instructors have a professional and moral obligation to make sure students are ready for whatever may occur on that first solo flight.

In the late 1980s a rewrite of FAR 61 codified those items on which a student pilot must be trained before solo flight. The result is that "first solo" often does not come until after 12, 15 or even 20 hours of dual instruction. Pilots learning to fly under U.S. Part 61 rules can still solo as early as the instructor says they're ready, but *only* after they have logged training in 15 task areas:

Note that the student must *log training* in each of these items before solo flight. They are not required to show mastery (i.e., meeting Practical Test Standards); it's up to the instructor to determine if the student shows enough proficiency in each task to safely solo.

If these 15 things are so important that pilots must be exposed to them before they can command a flight alone, perhaps they are a list of the items we should *all* practice occasionally. After all, it's usually a deadly crash that results in this sort of regulatory requirement. With that in mind, let's look at the 15 Things, and why some level of proficiency and currency in all 15 items is vital to ensuring a safe flight by *any* pilot-in-command.

1. Proper flight preparation procedures, including preflight planning and preparation, powerplant operation, and aircraft systems.
2. Taxiing or surface operations, including run-ups.
3. Takeoffs and landings, including normal and crosswind.
4. Straight and level flight, and turns in both directions.
5. Climbs and climbing turns.
6. Airport traffic patterns, including entry and departure procedures.
7. Collision avoidance, wind shear avoidance, and wake turbulence avoidance.
8. Descents, with and without turns, using high and low drag configurations.
9. Flight at various airspeeds from cruise to slow flight.
10. Stall entries from various flight attitudes and power combinations with recovery initiated at the first indication of a stall, and recovery from a full stall.
11. Emergency procedures and equipment malfunctions.
12. Ground reference maneuvers.
13. Approaches to a landing area with simulated engine malfunctions.
14. Slips to a landing.

15. Go-arounds [balked landings].

Several years ago I was providing a Beech Baron initial checkout to a pilot from Guatemala. He had learned to fly in his home country in a Cessna 172. During his first solo flight in the Skyhawk he flew his pattern a little wide; on downwind he flew over some drug smugglers who apparently assumed Antonio's Cessna was a government plane out searching for them. So they did what drug runners do—they shot at the Skyhawk. Antonio's engine was hit and immediately lost power. He was able to glide back to land safely on the airport grounds, although he could not quite make it back to the runway.

Most of us don't have to worry about being shot down on our first solo flight. But Antonio's experience teaches us two things: Don't fly your traffic pattern beyond gliding distance of the runway, and be ready for anything when piloting an airplane. Engines fail, the wind changes, radios fail, screens go blank, pitot tubes get blocked, flaps won't go down, conflicting traffic blasts through the pattern, and sometimes you have to go around. Even if it wasn't required by FAR 61.87, no student should want to go up solo, and no instructor should permit it, until the student has learned these 15 things.

I spoke with a pilot this week who phoned asking me about the differences between soft- and short-field takeoff and landing techniques. He is preparing to participate in a fly-in "poker run," a mass flight to several airports with several other aircraft. Each pilot will be judged on his or her abilities with a Private Pilot skill at each airport stop, including short- and soft-field takeoffs and landings.

This was a tremendous choice by the flight organizers to demonstrate how we can include practice of basic stick-and-rudder skills on every flight. We can add constant practice of the essential basics without adding any time (or expense). Just as the FAA Practical Test Standards have increasingly tighter tolerances for the maneuvers for advanced certification—an Airline Transport Pilot (ATP) must be more precise than a Commercial pilot, who must fly more precisely than a Private pilot—strive not to achieve minimum standards in each of the 15 Things, but endeavor to improve your skills through practice.

Use the 15 Things as a list of things to fit into your everyday flying, to retain the basic skills deemed essential to anyone who acts as sole manipulator of an airplane's controls. A thorough review of the 15 Things makes a pretty good Flight Review for any of us, too, regardless of experience.

Questions? Comments? Let us know, at mastery.flight.training@cox.net



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Debrief: Readers write about recent *FLYING LESSONS*:

Frequent Debriefer David Heberling writes:

In a recent online poll about approach speeds and speed across the fence, some of comments were surprising. Some pilots are comfortable with a speed of 90-95 knots on final with a speed over the fence at 85 knots [in a type of aircraft with much slower published final approach speeds]. They characterized 80-85 knots on final as feeling "mushy". My 1973 era airplane comes with an airspeed indicator marked in MPH in big numbers and knots in smaller numbers. Even so, my approach speed is 80-85 mph on final, and an over the fence speed of 70-75 mph. **Pilots need to become more comfortable flying at slower speeds in their airplanes. If they are uncomfortable, they need to hire an instructor and go up and do some pattern work**

including short and soft field operations. Everyone is all agog over the latest offerings from Garmin, and Apple. **I think basic pattern work has taken a back seat to the pull of technology.**
Thanks, David. I agree, as stated in *FLYING LESSONS* many times before, that avionics training must supplement, not replace, basic stick-and-rudder airmanship in our transition and recurrent instruction. Reader Tom Allen addresses recent *LESSONS* concerning this very topic. Tom writes:

Great article. So, if I avoid LOC [loss of control] in the [airport traffic] pattern and do not try to turn back to the airport on engine failure, I have improved my odds significantly based on the stats.

Correct, Tom. These won't protect you in all instances, of course, but they will save you in the most common scenarios and therefore should be at the forefront of your thinking every time you line up for takeoff.

Ken Zimmerman writes about David Heberling's mid-November guest editorial about his response to reading *Stick and Rudder*:

I read the book decades ago, and learned a lot from it. I demonstrate the skidding turn to final leading to the spin with every primary student. I explain it as he did. It's an eye-opener for the student.

Reader Max Wrodnigg writes about last issue's discussion of accepting an aircraft after maintenance:

Thank you very much for your very interesting weekly letter which I highly appreciate. I am just about to get my 1959 V-tail Bonanza back from the paint and interior shop, and thus would be very interested in reading your "collection of articles" as mentioned in [last] week's *FLYING LESSONS*. Unfortunately the provided link does not open the related page. Can you provide me with an alternate link to get there?

Sorry for the difficulty, Max, and I hope your acceptance inspection and flight go smoothly. [Here's a link](#) that works.

See <http://bonanza.org/documents/ABS%20After-Painting%20Articles.pdf>

An anonymous reader caught an error in the last report:

Unless I'm mistaken, I see one minor point of correction in that the parasite drag increases as the square of the airspeed, rather than the cube. The overall analysis looks spot on to me though. I suspect others have already mentioned this, but just in case...

Good catch, anonymous...and you were the only one to write. Thanks for the quality control check!

Reader Marty Vanover writes about our recent discussion about flight with a newly installed engine:

The article about the guy with the engine break in got my attention. Last year I found a bad cam lobe on my Beech Sierra's engine. So I decided to overhaul it myself. The summer killed the project as hangar temps soared to over 120 degrees here in Phoenix. So the brunt of the project was held off until last autumn. I opted for new Lycoming cylinders as I had two cylinders that had unknown hours. I also had the cylinders drop-shipped to Ly-Con in Visalia, CA for flow matching. The extra power is there but now the engine burns 12.5 gph at 75% and best power mixture. With the price of 100LL I'm now running LOP [lean of peak EGT] and still seeing true airspeeds of 138 - 140 knots on 9.0 - 9.5 gph.

Nice, Marty! I never saw speeds like that in the A24R Sierra I co-owned (for a very short time), even at Maximum Horsepower mixture setting (75°F rich of peak EGT). Marty continues:

For the last 95 hours I have been struggling with the number three cylinder head temperature. So I removed it and had it re-honed and the piston re-ringed. I think swapped it to the number four cylinder position and put the cool running number four in the number three position. [Number three] still ran warm. So, I am addressing baffling issues at the moment. But my engine shop recommended using ECi rings over the factory Lycoming rings. I did the test flight and gathered data at regular intervals during the 2-hour break-in flight (conducted per the Lycoming service instruction). Per the data, the CHT stabilized after 20 minutes and [the new cylinder] had the lowest CHT of all the cylinders. I did the rest of the break-in anyway, just to make sure. But, I was amazed at the rapidness of the break-in.

Oh yeah, I did something I've never done before. I installed the cylinder/piston dry. After all was in place but the top spark plugs and top cowl, I motored the engine with the starter. I had no oil pressure for the first 15 seconds, and 60 psi for the [next]15 seconds. This was a trick told to me recently by an old timer A&P. To be honest, I don't know if this enhanced the break-in or the ECi rings were the reason. But I've never seen a cylinder break in so fast. Using the Lycoming instructions, I couldn't say the cylinders were broken in until after 10 or so hours after the overhaul. I have five hours on the cylinder and the oil level hasn't noticeably moved. I'm flight testing to see if the minor baffling changes I've done will help on the cooling . Gotta love these engine analyzers!

Sounds like a good approach to post-installation adjustments and monitoring, Marty. Keep us posted.

Reader Doug Cheney also wrote about new-engine operations:

I was reading *FLYING LESSONS* today and coincidentally a buddy sent [this clip](#) about a (safe) landing on a freeway, apparently during initial test flight with new engine. He should have read your newsletter!

See <http://news.yahoo.com/plane-makes-emergency-landing-calif-highway-211825745.html>

The pilot indeed did do a good job of getting the airplane down safely after engine failure, traced to fuel starvation because of a mechanical issue with a fuel flow transducer. The only thing that might have been done differently would be to have spiraled up directly above the airport and conducting an extended flight check overhead for the post-installation test flight, so when the engine quit he could have landed back on the airport. Good job under the circumstances that existed at the time of failure, though. Thanks, Doug, for passing that along.

"Your Flying Lessons Weekly is about the only weekly I receive that I read end to end, twice over."

--Paul Sergeant, flight instructor, Beech Bonanza owner and *FLYING LESSONS* reader

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NTSB Most Wanted

Each year the U.S. National Transportation Safety Board (NTSB) issues its "[Most Wanted](#)" list, identifying what it feels are the highest priority safety issues concerning the five transportation modes—highway, marine, rail, pipeline and aviation—the Board is responsible to investigate. Aviation made two of the Top 10 priorities for 2013, with [improving general aviation safety](#) making the list for the second year in a row:

The NTSB continues to investigate about 1,500 accidents each year in general aviation. **In many cases, pilots did not have the adequate knowledge, skills, or recurrent training to fly safely, particularly in questionable weather conditions. In addition, the more sophisticated "glass" cockpit displays present a new layer of complications for general aviation pilots.** And not only are pilots dying due to human error and inadequate training, but also they are frequently transporting their families who suffer the same tragic fate.

What can be done

The NTSB sees similar accident circumstances time after time. **Adequate education and training and screening for risky behavior are critical to improving general aviation safety.** For example, guidance materials should include information on the use of Internet, satellite, and other data sources for obtaining weather information. Training materials should include elements on electronic primary flight displays, and pilots should have access to flight simulators that provide equipment-specific electronic avionics displays. Knowledge tests and flight reviews should test for awareness of weather, use of instruments, and use of "glass" cockpits. And there should be a mechanism for identifying at-risk pilots and addressing risks so that both the pilot and passengers can safely fly.

Human error in general aviation accidents is not solely a pilot problem. Aircraft maintenance workers should also be required to undergo recurrent training to keep them up to date with the best practices for inspecting and maintaining electrical systems, circuit breakers, and aged wiring.

General aviation has the highest aviation accident rate within civil aviation. The rate is 6 times higher than for small commuter operators and 40 times higher than for transport category operations. Although the overall general aviation accident rate has remained relatively steady at an average of 6.8 per 100,000 flight hours, the components of that figure have changed dramatically over the last 10 years. In particular, **personal flying accident rates have increased 20 percent, while the fatal accident rate has increased 25 percent over the [past] 10-year period.**

See:

www.nts.gov/news/2012/121114.html

www.nts.gov/safety/mwl5_2012.html

NBAA Safety Committee Addresses Pilot Training Concerns

The National Business Aircraft Association's safety committee wants pilots to think differently about how they prepare for both initial and recurrent training. "Although the accident rate for business aviation has been very low ... a number of accidents have occurred in which pilot training has been identified as a contributing factor," [the committee reported](#) in a seminar held at the National Transportation Safety Board HQ.

Steve Charbonneau, the committee's secretary, says that one identified weakness is the gradual shift away from training that provides pilots with learning and toward a process of simple recertification. "The industry needs sound leadership that believes **complying with the regulations [on initial and recurrent training] is not enough ... just not acceptable.** The environments in which we operate today are much different from the way we train." Charbonneau maintains it is time pilots become more engaged during training sessions and not sit passively waiting to complete the course. Richard Walsh, the committee chairman, says "we need to change attitudes about training—it's not a passive event. **Unless pilots are committed to learning, training programs will not be successful.**"

See www.nbaa.org/about/leadership/committees/safety/20120827-safety-committee-sponsors-panel-on-pilot-training.php

"I Have the Traffic"

When ATC alerts you about other traffic and you do not see the traffic, what is the best response? What is the best response when you finally spot the traffic? Pilot Workshop's John Krug tells you what ATC wants to hear.

See www.pilotworkshop.com/tips/pilot_atc_response.htm

Vectors for Safety

Gene Benson's "Vectors for Safety" is a monthly e-newsletter also dedicated to flying safety. Gene's non-nonsense (some might call it confrontational) approach is especially interesting this month, including:

- The "What's New?" section discusses the recently released Nall Report on general aviation accidents that happened in 2010. A couple of pointed questions about the data used in the calculations are asked. The same section also provides a link to a valuable service provided by NASA and discusses one of the reasons it costs so much to fly.
- The "Operational Tip" section deals with structural icing. Don't live in a cold climate or don't fly IFR? Don't click this away just yet. You might be surprised by some of the content. Two icing accidents are detailed.
- Gene's commentary this month revisits the "slippery slope of non-compliance" that I discussed back in April. It seems that the slope is getting even more slippery.

Read the [November issue of "Vectors for Safety."](#)

See www.genebenson.com/newsletter

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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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