

FLYING LESSONS for January 6, 2011

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.

If you wish to receive the free, expanded *FLYING LESSONS* report each week, email "subscribe" to mastery.flight.training@cox.net.

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This week's lessons:

Loss of directional control on the runway continues to be among the top 10 causes of light airplane mishaps, according to the FAA and the private aircraft insurance industry.

When rolling out from a crosswind landing, progressively apply more and more aileron to keep the upwind wing from rising. As the airplane slows down the controls become less effective since there is less airflow over the ailerons.

Many airplane types will also turn noticeably by deflecting the ailerons in the same way. Adverse yaw drag (from the downward-displaced aileron in designs with a strong aileron differential, or greater deflection downward than upward relative to the wing's trailing edge) also helps with directional control on the runway. Employing the proper combination of aileron effectiveness and adverse yaw increases your airplane's ability to counteract crosswinds.

Maintaining proficiency in crosswind landings requires recent practice and active, deft feet and hands on the controls. Set personal crosswind limits based on an honest evaluation of your currency in handling crosswinds.

Just as an instrument pilot might try to seize the chance to practice in ceilings or visibilities near the pilot's personal limits, to stay sharp and confirm those limits are realistic, so too should pilots look upon a windy day as an opportunity to refresh their crosswind technique, as long as they remain within their personal crosswind limits, or bring along a flight instructor current and familiar with crosswind capabilities of the type of airplane you fly.

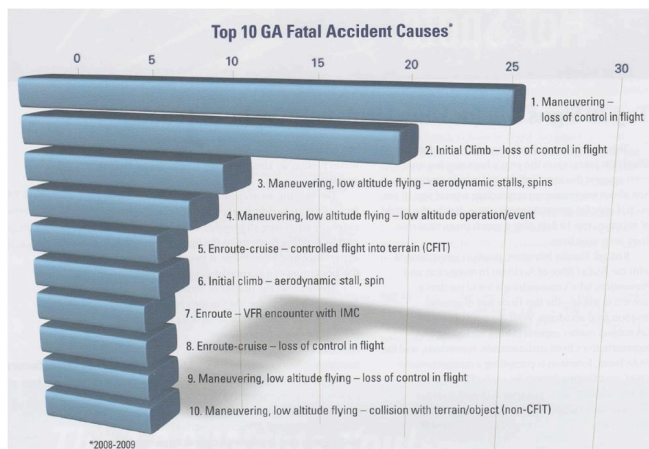
It's easy to decide not to take off when the crosswind is too strong for your current capabilities. It's far more challenging to get the ATIS or AWOS/ASOS weather, make an in-flight calculation of the crosswind for landing, and decide based on the crosswind component to divert to another airport with better conditions, or advise controllers you need to use a runway other than the one you've been assigned or told to expect if the airport has another runway of acceptable length with a lower crosswind component.

Comments? Questions? Tell us what you think at mastery.flight.training@cox.net.



Last week we began our discussion of the Top 10 causes of fatal general aviation accidents, as reported in [FAA Safety Briefing's November/December 2010 issue](#). Each month of 2011 *FLYING LESSONS* will focus on one of the Top 10, exploring ideas for changing certificate/rating and recurrent/flight review syllabi to directly attack the root causes of these tragedies...hopefully making a real difference by learning from the unfortunate experiences of others.

See www.faa.gov/news/safety_briefing/2010/media/NovDec2010.pdf



Before we launch into January's Top 10 topic, let's first look at some generalities in the causes of fatal GA crashes. This alone tells us where much of the problem lies.

The phrase "loss of control" (LOC) appears in four of the 10 top causes. If you consider a stall/spin mishap to be a form of loss of aircraft control (and I do), then LOC is a stated factor in six of the 10 causes. Any mitigation strategy to prevent fatal general aviation accidents absolutely must

emphasize stick-and-rudder, coordinated flight, angle of attack (and airspeed) management.

Pilot certificate training (Sport, Recreational, Private, Commercial and ATP preparation, or international equivalents) stresses stall recognition, avoidance, and (at least in Sport, Recreational and Private) recovery from full stalls. Most ratings training (notably, Instrument) does not (although I personally have done stalls "under the hood" at my CFII's direction). Recurrent training (refreshers, Flight Reviews or the international equivalents) very frequently does not.

Some instructors fall into the trap of presenting only one or two stalls in a Flight Review, if even that. Sometimes stalls are glossed over under the excuse of "taking care of your engine"; other times the review is so focused on IFR operations or engine management or how to use the latest avionics that "there's no time" to review basic airmanship skills. In fact, I've heard from customers of one very highly respected type-specific recurrent training program that the instructor asks the student if he/she is "comfortable" performing stalls, and if the answer is "no," the instructor omits slow flight and stalls from the syllabus. Unusual attitude recoveries are also often a casualty to the schedule or to complacency in recurrent training. And there seems to be a general lack of emphasis on ball-in-the-center rudder coordination in recurrent flight instruction. Instead, we tend to focus important, but less deadly, tasks and piloting skills to the exclusion of, instead of in addition to, simply flying the airplane.

This kind of feel-good refresher training has got to stop if we are to make any change in the cause of more than half of all fatal GA crashes.

The first *FLYING LESSON* from the FAA's Top 10 fatal accident causes, then, is:

Thoroughly review and practice:

- **Stall recognition and recovery, and real-world stall scenarios;**
- **Unusual attitudes causes, recognition and recovery, even with VFR-only pilots (who may need these skills for a LOC in poor visibility or at night);**
- **Proper rudder use and coordination in all phases of flight (except intentional slips); and**
- **The relationship between angle of attack, g-load, airspeed and airplane configuration to flight maneuvers...**

...especially in the takeoff/landing configuration, and at varying aircraft weights and center of gravity locations.

I suspect that a good number of CFIs do not present a thorough stall-series review or unusual flight attitudes because they themselves are not comfortable with the maneuver. This is increasingly common, I believe, in higher-performance airplanes, light twins and owner-flown turbines. Through instructor omission, skill atrophy can be passed along from one generation of pilot to the next, to the point that no one thinks practicing a particular task or maneuver is important any more.

If you're a CFI, and you're not comfortable flying stalls or unusual attitudes in the type of airplane you're asked to fly, then get some dual in type before you give a lesson, or refer the pilot to someone who has the type-specific experience necessary to review these literally life-saving skills. If you're receiving instruction and your instructor isn't willing to practice stalls with you, get another instructor to round out your recurrent training. Like a physician, an attorney or a car mechanic, a professional flight instructor will not hesitate to refer a student to someone else if he/she cannot meet the student's needs him/herself. And like all professionals, flight instructors should actively seek out opportunities for continuing education in order to more effectively present quality training to the pilots who depend on them.

My own students are going to see a much greater emphasis on angle of attack/airspeed management, unusual flight attitudes recognition and recovery, and rudder-coordinated flight, even compared to what I've presented in the past...because the record shows that it is much more likely to save their life. We'll focus on real-world scenarios (which *FLYING LESSONS* will review in detail in our monthly emphases). I challenge other instructors to return to this stick-and-rudder, angle-of-attack emphasis as well, and for all pilots to demand a thorough review of realistic stall scenarios in all your recurrent training.

The word **maneuvering** appears in half of the Top 10 causes of fatal mishaps.

"Maneuvering" is very generic, however, encompassing everything from unauthorized aerobatics to circling instrument approaches to lazy sightseeing turns. We'll comb through the actual scenarios and find some actionable *LESSONS* as the year moves on.

Low altitude flying is stated as a factor in three of the Top 10, arguably four if you include initial climb. Obviously there are overlaps between this and the LOC items. While we should still drill crosswind control on takeoff and landing as a leading cause of non-fatal mishaps, we need to openly discuss the scenarios that cause us to fly close to the ground (justifiably, legally and not), and devise exercises we can practice at altitude that will help us better control our airplanes (and our urges) closer to the ground. Again, we'll take the specific scenarios apart in future *FLYING LESSONS*.

Next week... Cause category #10: Maneuvering, low-altitude flying—collision with terrain/object (non-Controlled Flight into Terrain). How does the NTSB specifically define this? How do pilots get themselves into a situation where they impact the ground in something other than wings-level, controlled flight? How can we train to avoid those situations? We'll begin the focus on Cause #10, next time in *FLYING LESSONS*.

What do **you** think? Chime in at mastery.flight.training@cox.net.

Debrief: Readers write about recent *FLYING LESSONS*:

Readers respond to last week's FLYING LESSONS, and the call for changes to pilot training to reduce the number of fatal accidents:

Reader Lorne Sheren writes:

Read last week's. All I can say is WOW! I thought your thinking in [*FLYING LESSONS*] was out of the box and very on point. Obviously we are not so much losing [airplanes] due to deficient basic skills (though that does play a role) as much as we are from deficient decision-making skills.... Part 121 [air carrier] training recognized this a long time ago, now we have to catch up.

Thanks, Lorne. I greatly appreciate your support. As I've written above, there is a stick-and-rudder component as well as a human factors causation to fatal general aviation accidents. We'll be looking at both aspects of flight instruction as our 2011 review of fatal accidents progresses.

Jim Herd writes:

Let me know if I can help, although I am not an instructor. I just have a bad habit of identifying unmet needs! I fill those needs where I can, and pass them on to others where I cannot.

I will just add that the mere generation (and even FAA approval) of a Top Ten list won't be adequate. There is a dimension of "modulation level" with which students are trained – in study books, by instructors, in tests, etc. They absolutely need much stronger (louder and repeated) emphasis on the critical few versus the trivial many. Also, in terms of making accidents and deaths go down, it's not really a matter of identifying the Top Ten killers, per se. In my view it is much more important to identify the Top Ten (or 8 or 12) items that are fully within the pilot's control and also subtle and insidious. This specific list is the areas where fantastic safety improvement can be gained, and very quickly! What possible excuse is there to see even one more stall-spin on base-to-final? If your list was only this one item, and it was drummed into students aggressively and repeatedly, I'm sure lives would be saved.

My point is that there may be items in the Top Ten list of killers that are mostly not under the control of the pilot, so don't dilute the training focus on them. The whole point is to reduce the vast array of complexities in aviation to a very short and manageable list for any bewildered student pilot. In fact, this is no less relevant to seasoned pilots who may be a tad rusty. For all of us, a rote list must be short and entirely relevant to what we can do personally.

Anyway, I think you are perfectly positioned to make a major contribution to safety in this area! And thanks for your tireless contributions.

Outstanding, Jim. I think you'll see our emphasis is going to go much deeper than merely generating a list. Stay tuned. Readers, you'll find more from Jim Herd later in this week's *FLYING LESSONS*. Reader David Heberling adds:

Ambitious agenda for 2011. I like the direction you are headed and with the help of all of us out here, you will succeed. One issue I do not see talked about very much is heavy weight take-offs with an aft C.G. Sure, the accidents are analyzed, but it is never talked about as a training issue. From my own experience I know how different the same airplane can feel when flown heavy.

A long time ago, when I was a senior in High School with my PPL, I took two buddies flying with me in a {Piper Cherokee} PA-140 (This was in June). I flew down to a favorite grass field and landed to the north as the wind was favoring that direction. For the take-off, I had the option to take-off to the south. This would have had maybe an 8KT tailwind, but no obstacles for the climb out. Or, I could take-off to the north into the

wind. However, I would have to climb out over a hill topped by power lines. Being young and invincible, I chose to take-off to the north.

No charts were consulted, only my recent experience which consisted of many solo flights into and out of that field. Consequently, with 3 people in the airplane, I used up a lot more runway than I was used to. With the hill approaching fast, I lifted off knowing it was the bare minimum speed necessary to do so. I managed to climb up the hill, and vault the power lines. I was so lucky that there was a gravel pit across the street from the power lines. I dove into the pit to gain airspeed and then climbed out at Vy. My buddies never knew that I was sweating bullets getting out of that field.

I believe that most people do not get training flying the same plane at different weights. I have read too many accident reports of airplanes loaded to the gills staggering off the ground below speed necessary to climb.

This is often in conjunction with higher density altitudes. So to go along with scenario based training, we should also introduce real world problems that pilots face every day like high DA and max gross operations.

Good reminders, David, and we'll return to them as the year goes on. Frequent Debriefers Tom Rosen, a retired TWA captain, writes:

GREAT Mastery of Flight this week on the AOA [Angle of Attack]. On [a recent] flight...I was in the right seat of a Beech 200 [Super King Air]. During climb and approach I was paying attention to the IAS and wondering what the "desired" optimum speeds would be. After reading *FLYING LESSONS* I was again reminded that an AOA like the one I have in my plane [A Beech Bonanza] would have provided the information a glance.

Thanks as always, Tom! Reader Alan Davis of the Society for Aviation and Flight Educators ([SAFE](#)) adds:

1. Great front end piece with the info about the upcoming meetings (especially the [May 2011] SAFE-sponsored one in ATL) for people to start thinking about how we change the training process. The process is definitely needed to redirect and revitalize flight training!
2. On the "by example" piece, this is something that I have stressed to new and in training CFI's for years. The key concept is - Never be in a position where you have to say to any pilot (your student, other's students, or any pilot with whom you speak), "Do as I say, not as I do/did." The moment that we do anything that is not in keeping with what we instruct, and it is seen by anyone else - especially one of our students - the training we did goes right out the window. The thought in their mind is, "If he/she doesn't do it why should I?"

The example that I use most commonly is the pre-flight. If WE don't do the full preflight ourselves - every time - we have negated all the training we have done for "them" to do it. So, regardless of timing, pressure, etc., ALWAYS assume that a student is watching what you are doing - and do the full preflight as you describe it to your students - ALL OF IT. Of course this should be done just for the safety of it to begin with, but if we keep in mind that there is always a "student watching" what we do when we are not with them, the import is even greater for us as instructors. And, of course, this applies to everything we do in the airplane.

3. Thanks for all the great stuff you present, and I hope that you have a great New Year in 2011.

Thank you, Alan, and all readers for your help in attacking the true causes of fatal general aviation accidents. Readers, what do *you* think? Let us know at mastery.flight.training@cox.net.

Share safer skies. Forward *FLYING LESSONS* to a friend.

The "Alpha" Pilot

FLYING LESSONS is beginning an in-depth look at how we teach angle of attack, and whether AoA ("Alpha") indicators can make a difference in the stall/spin accident rate. AOPA Foundation President (and *FLYING LESSONS* reader) Bruce Landsberg is taking a close look at angle of attack indicators as well. AOPA's Air Safety Institute (ASI) has added an AoA indicator to its Piper Archer. Why hasn't the aviation industry adopted alpha indicators in light airplanes? [Read Bruce's blog.](#)

See <http://blog.aopa.org/asfblog/>.

Talking turbos

Want to spend a day focusing on the proper operation of turbocharged engines? The Cessna Pilots Association (CPA) is hosting its Continental-Powered 200-Series Turbo Charging Seminar on Saturday, February 26 at Santa Maria, California. The [syllabus](#) includes system operation, set-up and troubleshooting. More generically for operators of all types of turbo airplanes, the afternoon sessions cover high-altitude physiology, oxygen system use, and flight management to make the most of a turbocharged engine. Contact CPA for [course pricing and registration](#).

See:

www.cessna.org/courses/200turbo.html

www.cessna.org/courses/registration.html

A Fundamental Flaw

Quite literally as I was finishing the draft of last week's *FLYING LESSONS* report, outlining my plans for addressing the root causes of fatal general aviation accidents and proposing changes to the flight training syllabus to address those causes, reader Jim Herd sent me a call for pilot training reform that complements the *FLYING LESSONS* call quite well:

I think there is a serious flaw in the fundamental mechanism for primary flight training! It is the absence of any modulation in the intensity with which every topic on the syllabus is delivered. Some topics are simply more important than others, and deserve far more emphasis. Basically, what generally happens is that instructors faithfully abide by Part 91, the training curriculum, and the Practical Test Standards booklet. It is all conducted in a monotone style and each line item is checked off for each student. May I suggest this is particularly true for newly minted instructors who are basically accumulating hours for a career in aviation. Such instructors do not have the benefit of the "school of hard knocks" to pass along to their students. However, there is a very short and simple list of critical points that will kill you in a heartbeat! These items deserve far more attention than many other paragraphs in Part 91.

Of course, I am speaking of base-to-final stall-spins, taking off over-gross on a high density altitude day, Jet-A in an avgas tank, VFR into IMC, etc. Each of these is insidious, has virtually no warning, and is not aggressively emphasized in primary training. Sure, we are all taught to keep the ball centered and do a weight and balance calculation, but that's all just to pass the test, right? Student pilots often get a very different view from hangar talk, as veteran pilots speak with a cavalier attitude about flying heavy, or other antics that may arguably be safe for a fully expert pilot but can and will kill a novice! These scenarios are common enough to reach the stage of boredom when reading accident reports – so why don't we do something different to reduce occurrences and save lives?

We all know cases to prove the point. Just one would be the recent accident just off the end of the runway at Hollister, California. A 28-year-old pilot was setting off to Hawaii on a delivery mission bound for Australia. Four miles into the flight he balled it up and died! There is no NTSB finding as yet, but it seems likely that it was a stall-spin while extremely heavy with extra fuel. Did he know his stall speed at a 30 degree bank angle? And we all know the [John F.] Kennedy [Jr.] accident, where he insidiously found himself in IMC and then an "unusual attitude." I am confident his instructor had warned him about this danger, but had he truly taken him by the arms, looked him in the eye, and shock him? And by the way, why don't we stop saying "unusual attitude"? It is surely a euphemism for "it will kill you!"? (At least, for a new pilot.)

So how do we fix this?

1. Develop a short, clear and concise list of the most common ways you can die in a small aircraft due to rookie mistakes by the pilot. Include the mechanism of instant death and how insidious it can be, and call it what it is – "a death trap"!
2. A much stronger emphasis on this list throughout primary training.
3. A much stronger emphasis on this list in Part 91.
4. A much stronger emphasis on this list in primary check rides.
5. A much stronger emphasis on this list with instructor training and certification.
6. A much stronger emphasis on this list from leading instructors with a national bully pulpit – like Tom Turner [thanks, Jim—I'm trying!].
7. Peer pressure from all pilots during hangar talk.

8. Right before each pilot goes solo, how about a very stiff talking-to from the instructor? The student should be taken by both arms and looked directly in the eyes and sternly instructed to never make the following mistakes...! In fact, insist that the student can replay all of them in rote fashion, as well as describing the repercussions of non-compliance.

Powered aircraft pilots can take the lead from soaring pilots on this also. Many soaring pilots rig and de-rig their aircraft daily, so this represents a primary exposure to death and mayhem. One of my closest aviation friends died on take-off tow after not rigging his aircraft correctly. Well, soaring now has a standard practice around the world that is called [the] “critical assembly check” (CAC). There is only a handful of items with rigging a glider that will almost certainly kill you with great speed if not done correctly. “CAC” is now a mandatory process by which a second pilot confirms the critical assembly is all done correctly. At many airports a confirming signature is needed and the pilot won’t get a tow without it. It is just a practical example of dealing with the “critical few” instead of allowing them to be overwhelmed by the “trivial many”.

Who among us has not learned at least one of these lessons the hard way in our early career and was lucky to get away with it?

Thanks, Jim! This (and others in Debrief) is precisely the sort of input I meant when I said last week that I can’t do this alone, but together *FLYING LESSONS* readers can. I’ll be referring back to your outline throughout the year, and appreciate your future comments as well.

What do *you* think should be on Jim’s “rookie mistakes” list? How about a similar list for more experienced pilots? Send your ideas to mastery.flight.training@cox.net.

Share safer skies. Forward *FLYING LESSONS* to a friend.

Fly safe, and have fun!

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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