FLYING LESSONS for July 7, 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.

This week's lessons:

Just one days' FAA preliminary accident reports this week includes theses items:

- "…aircraft struck a power line and crashed, the two persons on board were fatally injured…."
- "…aircraft struck a power line and force landed…."
- "…aircraft struck power lines and crashed, the three persons on board were fatally injured…."

Power lines and other overhead cables are extremely hard to see from an airplane. Minimum altitude requirements would seem to protect us from most exposure to the threat, but they're also there when we've just taken off, when we're maneuvering to land, and if there's any other reason we're operating close to the ground (legitimately or, sadly, not).

If we can't see the power lines, then we need to look at where they are *likely* to be. Generally, power lines will be routed along transportation resources. See a county road or a highway? Chances are there's a power or phone line on one side or the other or, along divided highways, sometimes between the lanes. Rivers make good power line routes, especially in rugged terrain. In forested areas, look for gaps or long, straight cuts in the trees…that's where the lines will be strung.

Watch for the poles, because you'll probably never see the lines themselves. Note that poles are often in colors that blend into the natural background.

Beware overhead lines any time your path takes you along or across a highway, a rail line, a river or a cut in the trees. Gain a little extra altitude before crossing any of these "natural" overhead lines routes. If you must plan a low-altitude flight, adhere to minimum regulatory altitude limits, and avoid "flying low" along roads, rail lines, rivers or tree cuts.

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A circling approach is a safe and useful tool for the instrument pilot. If the approach you choose is not aligned with the runway you need, you have the option of flying the approach course and, as long as you can see the airport at the Minimum Descent Altitude for a circling approach, maneuvering to line up with and land on the desired runway.

But to fly the circling maneuver you must first prepare yourself. Fully brief the circling approach before you begin, including:

- The circling MDA for the *ground speed* category you're flying, noting that if you're circling to land by definition you will probably be flying at a higher ground speed from a tailwind until you turn final.
- The direction you'll circle, either as directed by ATC (at a tower-controlled airport), as noted on the approach chart (watch for "NA" for "not authorized," such as "Circling west NA") or barring other guidance, to conform to the airport traffic pattern for that runway (which is usually set up as left- or right-hand traffic for a reason, sometimes related to obstacles that will be hard to see during a near-minimums circle).

- The point during your circle from which you'll begin your descent from circling MDA (which will vary by airport and even by runway used, but will always be the point from which you can make a "normal" descent to the touchdown zone).
- The maneuver you'll fly to align with the missed approach course, if you lose sight of the airport at any point during your circle and have to fly the missed. This will always include turning toward the runway, then resuming course guidance for the published missed.

An extraordinary pilot may be able to fly to straight-in minimums, see the runway from a point where it's too late to land straight ahead, then climb to circling minimums, remain clear of clouds, and circle to land on another runway or even all the way around the pattern (at circling MDA) to land on the original, straight-in runway. But I don't need to be on the ground at that particular airport at that particular time enough to risk such a change in plans at the very last minute, begun from so close to the ground…and you don't, either. I put this type of maneuver in the category of a superior pilot using his/her superior judgment to *avoid* having to use his/her superior flying skills.

If I have to miss an approach, I consider myself committed to the miss. Once the power comes up, I'm flying the missed approach, no matter what I see afterward. I may brief for the circling approach after I climb back to altitude and enter the hold, then come back having planned to fly the circling approach if it make sense for a second attempt at the airport.

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

Debrief: Readers write about recent *FLYING LESSONS:*

Readers, what's *your* opinion? Tell us at mastery.flight.training@cox.net.

Reader Dale Bleakney writes about last week's *LESSONS* about stalls:

> As a pilot examiner and flight instructor, I see a number of pilots who are misusing the criteria in the Practical Test Standards when it comes to stall recovery. There are number of accidents that are a direct result of pilots trying to power out of a stall in order to "minimize altitude loss" and the results can be pretty catastrophic. There are a number of accidents that can be attributed to improper stall recovery and there a number of us that are working with the flight standards community to change the training philosophy and completion expectations. We are making progress.
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> There are a number of articles that discuss that the only real way to recover from a stall (and therefore prevent a spin), is to reduce the angle of attack at first indication of a stall (buffet, shaker, pusher, roll, etc.). *Once the stall recovery occurs*, then power may be applied to minimize altitude loss.
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> Some airplanes can have a nasty secondary stall if the AOA is not reduced sufficiently after the first stall indication. The increase in load factor during the recovery from the lower angle of attack can further aggravate this. Remember that stall speed increases with load factor. It is not unusual to pull a few "g's" in recovery and 2g's increases indicated stall speed by as much as 40%.
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> The other technique that I have started to see is the overuse of ailerons when a stall roll occurs. If power is high, this can lead to an increase in adverse yaw and subsequent rapid spin entry (typically in a flatter attitude

> and higher rotation rate). I would rather see a reduction in angle of attack and the coordinated use of rudder and aileron to recover from any roll.
>
> Please let me know what your thoughts are on this.

Thanks, Dale. Excellent point that G-load may increase during an aggressive stall recovery even with wings level, increasing the angle of attack (and therefore stall speed) and driving the airplane toward a (nasty, as you say) secondary stall. Light training airplanes have very little thrust at most practice altitudes to "power out" of a stall, so new pilots are usually taught to push the nose down—not "lower the attitude to a flying angle of attack," but to push the nose down, below the horizon. As pilots move up to more powerful airplanes, angle of attack may be emphasized less and power more for the recovery. And if the pilot ignores angle of attack completely, then a secondary stall (or failure to recover from the first stall) is likely.

I teach that the stall occurs just a degree or two above the angle of attack we use to get maximum lift from the wing. Therefore, on stall recovery the proper reaction is to reduce AoA to "get back into the flying range" then, as you say, add power once the stall is broken. As a result of your email I'll remember to emphasize more clearly that it is AoA, not power, that gets even a high-powered airplane out of a stall. And I'll certainly incorporate your comment about G-load in stall recoveries. Thanks!

Regarding ailerons, you're right, we see a lot of aileron use in stall recoveries, when in fact moving the ailerons may make matters much worse in some airplane types. My most recent Flight Review was conducted by *FLYING LESSONS* reader and Beechcraft Pilot Proficiency Program president Kent Ewing, and he had to remind me to keep the ailerons neutral on my first practice stall in the Beech A36 that session. It's a powerful instinct to counter a bank change with aileron. But you're right, it can aggravate the stall. Close to a decade ago(!) I was a consultant to a major aviation university, writing the piston-airplane ground and flight syllabi for an ab initio course (one of those 10-months-to-the-right-seat-of-a-Regional Jet programs). The majority of the consultants on the project were airline pilots, and I recall they specifically wanted me to include stall recoveries *using aileron* in the piston airplane courses. Must be a swept-wing thing, I found out, but I advised that this was, well, not advisable in most piston airplanes. I then evaluated the Diamond DA-40 in the training role (it was selected by this university) and, while flying with a company pilot, I asked about aileron use in stall recoveries. He wasn't sure, so I purposely made a *small* aileron input during a power-off stall (with the rudder ball centered), and found the airplane had a very decided tendency to depart from the straight-ahead recovery.

The take-away? At least in some aircraft aileron use in stalls is potentially hazardous. So it's a good idea to keep the ailerons neutral in stalls in any airplane you fly, unless you have written guidance to the contrary from the manufacturer. Maybe in swept-wing jets it's OK to use ailerons in the recovery (jet pilots, let us learn from you), but not for anything I fly.

See www.bppp.org

Reader Radek Wyrzykowski asked me to invite *FLYING LESSONS Weekly* readers to volunteer articles for the free IMC Weekend Edition e-newsletter. "We are looking for content articles and also are trying to let all pilots know that this free publication is available," he writes. IMC Weekend is published by the IMC Club International, a loose affiliation of pilots and instructors who share information and tips about instrument flying. Contact Radek at radek@imcclubs.org if you have something to share (beyond your contributions to *FLYING LESSONS*, of course).

See www.imcclubs.org

Fisk Inbound #5

Flying to Oshkosh for the EAA's AirVenture convention and exhibition? You're running out of time to hone the flying skills you'll need to make a safe arrival. This week read Fisk Inbound #5: Train Your Passenger…to be a *observer*, a working member of your arrival crew.

See www.aero-news.net/news/featurestories.cfm?ContentBlockID=232F926C-88EE-450D-B5B1-098AB96F0F74&Dynamic=1

The fifth most common cause of fatal general aviation aircraft, according to the U.S. Federal Aviation Administration, is Controlled Flight Into Terrain in Cruise Flight. Before we outline the FAA's sample scenarios, I'd like to get the conversation going by asking readers to suggest the situations you think lead to en route Controlled Flight Into Terrain (CFIT). Send your thoughts to mastery.flight.training@cox.net.

Frequent Debriefer David Heberling has a lot of insightful observations about last week's wrap-up of the sixth most common cause of fatal general aviation accidents, stalls on initial climb. David writes:

> Wonderful observations on your part. When I wrote my [earlier] response, I did not see where there might be enough shift in the C.G. [center of gravity] to be a problem. I guess the successful first take off clouded my thinking. Your mention of the change in C.G. with fuel usage made me think of my own airplane, a V35B Bonanza. It too exhibits an aft moving C.G. as fuel is used. In fact, the shape of the back of the C.G. envelope above about 3000 lbs conforms to the weight of the fuel being burned off. One of the first things I did after I bought my airplane [was] to build a spreadsheet of all the weight and balance parameters and four typical loadings based on how I would use the airplane. There is also a section for inputting actual weights of passengers, bags, and fuel load. In addition, I downloaded an Excel app that shows the loading in pictorial terms. It shows the loading envelope, the empty weight has a symbol, as does the T.O weight, and landing weight. At a glance, you can see the whole story and know you do not have to worry about it.
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> [Like many airplanes], the [later] 35 model Bonanzas [are] notorious for difficulty in keeping the C.G. within the aft limit. I do that by keeping the fuel tanks full. This has the added feature of keeping the fuel cells wet, which prolongs cell life. Despite all of this, my eyes were opened the first time I loaded the airplane up with my wife, daughter, and myself. I was used to flying it with just myself in the airplane. So, the first take off was a whole different animal. I normally let the airplane fly itself off the runway. But, in this case, the nose wanted to pitch up too soon. So, I had to push the nose down and wait for normal take off speed. It was a long time coming (I am sure it was only a few seconds longer, but it seems like an eternity), and when I finally got into the air, it took even longer to accelerate to Vx and the climb rate was reduced from what I was used to. In addition, pitch forces were much lighter than I was used to. I was surprised that I was surprised at the performance of a heavily aft loaded airplane.
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> Even if you know in your head that these things are going to happen, the feeling and behavior of the airplane is so much different from what you are used to. Now, I know what to expect and it is no surprise anymore. It does require discipline and patience to make the airplane perform its best under those conditions. I remember thinking that this is a vital training issue. As you said, most training occurs under more benign conditions. How many Instructors have loaded up the airplanes they teach in? If the Instructor has never flown under those conditions, how can we expect the Instructor to do that to his/her students?
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> I wonder if the accident investigation [in scenario #1] looked at where the trim was set. Did the pilot forget to reset the trim from the landing setting? This could explain the porpoising observed by the witness. An aft C.G. can also induce that reaction from the pilot. How many Instructors purposely have their students do a take off still trimmed for the landing? The surprise factor in this scenario is huge. Or it could be a runaway trim like you experienced. The solution is the same. The fact is, it needs to be practiced.
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> What do all of these scenarios have in common? They occur close to the ground. Where do we practice stalls? At least 3000 feet AGL. "Ground rush" is only readily apparent 1000 feet AGL and lower. Nothing quite grabs your attention like the ground coming at you fast. Yet, most students never get their first exposure to ground rush with an instructor who knows what he is doing. I do not know if simulators have the fidelity to try some of these scenarios and present realistic ground rush. I know that when I was instructing, the only simulator I was exposed to was a Link Trainer. So, the only place to introduce students to these concepts was in the airplane. Either I was incredibly stupid, or I had great faith in my own abilities that I did low altitude stalls with select students at 1000 feet AGL. It was the first time I had seen absolute fear on the faces of my students. I helped them get past that fear and start thinking. Many of them wanted to pull that control wheel back as hard as they could. I would not let them do that (I am a big guy) and showed them the way to live.
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> Was I being foolish? A dare devil? They all learned how to recover from a low altitude stall on their own. It did not take very many tries before the light went on and they realized that reducing the angle of attack is the only way to recover from a low altitude stall. It does not seem like high altitude stall recovery knowledge transfers that well to low altitude ones. The ones we practice are too formulaic.

> I also think that the old saw, "an airplane stalls at any speed and any attitude" does little to inform the new student pilot. I can see where someone might think that the airplane will stall on them at anytime. This simply is not true. The traffic pattern is the usual scene of the crime, not while cruising, climbing at Vy to altitude, nor in the cruise descent. Why is this? We are maneuvering in the traffic pattern in reference to a strip of asphalt on the ground. Where in the pattern is the stall/spin most likely? The base turn to final. Nobody likes to overshoot the final. The mistake here is to steepen the bank to keep that from happening or to get back to the final approach course. The other area of the pattern that gets stall/spin accidents is the initial climb after lift off. This is not a maneuvering problem, but one of attitude control. This is obviously where the pilot in scenario #1 had his problem.
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> We just had an accident here at KRJD a few months ago turning from base to final. It was an Instructor and two CFI students getting ready for their checkride in a [Piper] Cherokee Arrow. They made a steep turn from base to final and developed a high sink rate. The left wing contacted the ground short of the runway and the airplane cartwheeled to a stop. Remarkably, everyone survived, but with severe injuries.
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> Where was the Instructor during this whole scenario? The issue of intervention needs attention. I do not know what they are teaching CFIs anymore. I would think that survival would be at the top of the list. There is an art to letting the student make enough of a mistake to learn from it, but not letting them make enough of a mistake to die from it.
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> I am sorry this is so long. I just have a lot to say on the subject.

No need to apologize, David. You've articulated much of what we've discussed from personal experience…one of the real benefits of Debriefings in *FLYING LESSONS*. You discuss training in stalls with the trim set in the landing condition. Many years ago I wrote an article called "Trimmed Stalls" about that very thing—and the term has made it into the FAA's lexicon, as "Elevator Trim Stalls" in Chapter 4 of the Airplane Flying Handbook.

See:
www.ipilot.com/learn/article.aspx?ArticleID=840
www.faa.gov/library/manuals/aircraft/airplane_handbook/media/faa-h-8083-3a-3of7.pdf

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

Flying has risks. Choose wisely.

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
