FLYING LESSONS **for March 17, 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, much-expanded *FLYING LESSONS* report each week, email "subscribe" to mastery.flight.training@cox.net.

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This week's lessons:

Coming up short of the runway…will a little power get you back on glidepath at the proper airspeed in time to clear obstacles and make it to the touchdown zone? ***Landing long,*** with insufficient runway remaining to come to a comfortable stop? ***Too fast,*** threatening a bounce that could lead to a pilot-induced oscillation, a hard landing or a runway excursion? Or have you ***already bounced*** once and are not in a position to recover to regain the flare? ***Or too slow,*** with too great a sink rate and the likelihood of slamming down hard, possibly damaging the aircraft?

Then power, pitch, positive rate, then flaps and (as applicable) landing gear to streamline for the climb. Go around, then set up to get it right next time.

But beware the tendency to lose speed on the go-around. This past week has seen several reports of a "stall on the go-around"—loss of control, and descent into the ground, after the angle of attack increases and airspeed decays during the initial part of a balked landing, or go-around.

Why would AoA increase and speed decrease with an *increase* in power? It's all about trim. A stable airplane (and most airplanes, even amateur-builts, are at least reasonably stable in pitch) will attempt to seek the indicated airspeed for which it is trimmed. On final approach, in landing configuration and slowing down, the natural tendency is to trim off the pitch pressures as the airplane slows. Although the final tug to flare for landing should be done by hand, it's likely the airplane is trimmed for a speed not too much above stall if you have been trimming all the way to crossing the threshold.

This is especially common in airplanes with electric pitch trim (because it's easy to be nudging the trim switch with your thumb all the way through landing). And it's the norm in an airplane that is flown by autopilot down to the just before landing.

So now you're trimmed for a slow speed. When you advance power for the go-around the airplane will pitch to remain on that speed…except that as airflow increases over the elevator (from propeller blast) the airplane will "think" it is flying faster than trimmed, so it will pitch up *even more* to try to slow to the trimmed airspeed.

If you don't resist this pitch up the angle of attack will increase, getting you closer to a stall. Aggravate angle of attack by retracting too much flap too quickly, or add drag by putting retractable landing gear up before you've stabilized on climb speed, and lift generation can drop rapidly, making a "stall on the go-around" a very real hazard.

It may actually take a significant *push* on the controls to prevent an excessive pitch-up with power application on a go-around. If you've not practiced enough to make this push-to-hold-attitude instinctive you may be tempted to pull even more…after all, you want to go *up* on a go-around, don't you?

Practice a couple simulated go-arounds at a safe altitude until you know the control force requirement by heart. Try it at different airplane loadings—don't take passengers, who generally don't like being test ballast during stalls and near-stalls—but carry a qualified flight instructor and secure enough weight in the back of the airplane to simulate the typically aft-c.g. condition (within the envelope) of a full load.

Practice missed approaches from a no-flap or partial-flap configuration and approach speed at the Missed Approach Point don't cut it for practicing this skill. You need to be able to go around from the speed and configuration you'd experience during your flare.

On your next Flight Review or equivalent, brief your instructor you'd like him/her to call for a go-around without warning when over the numbers on one or more of your landings. If you can't power up, pitch up, get a positive rate of climb and transition to go-around climb speed without getting below that speed in the process, then practice again until you can.

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

We have been focusing on the 10 most common causes of fatal general aviation mishaps according to the U.S. Federal Aviation Administration. This month we turn our attention to Top 10 Cause #8: Loss of Control En Route/During Cruise.

To begin, review the following summaries of some of the accidents that make up this category of accident (although some don't seem to fit the categoty title, I'm sticking with the FAA's breakdown to conform with any similar studies). Then, after some thought, send in your observations on the circumstances that may underlie each cause, your ideas for *FLYING LESSONS* that teach techniques for avoiding similar mishaps, and proposed amendments to checkride preparation and recurrent training lesson plans to get these *LESSONS* to the pilot who need them most. Be sure to identify the scenario number in each of your comments.

Reader David Herberling writes about Scenario #3:

The pilot was receiving instruction toward a multiengine rating. The syllabus for the flight included introduction to engine failures on takeoff and initial climb and approaches and landings with an inoperative engine. The airplane was observed climbing at slow rate of speed after takeoff. When the airplane reached 600 to 800 feet AGL it began a left turn, consistent with a return to the airport, followed by a nose-down descent into trees. Examination of the wreckage did not reveal evidence of any preimpact malfunctions. The CFI had accumulated about 111 hours of total multiengine flight experience, all in the same make and model as the accident airplane. He received his CFI rating about 3 weeks prior to the accident and had accumulated about 60 hours of multiengine flight experience as a CFI.

I have no idea how much total time the CFI had, but 3 weeks as a CFI seems awfully green to me. No CFI has fully discovered how far to let a student go before intervening in only 3 weeks. Yes, we all tend to fly like we were taught, even down to particular flying style of our CFI. In my own multi-engine training, all engine failures were simulated by bringing the affected engine throttle to idle. Instead of feathering the prop, we increased thrust to simulate that also [employing the common "zero thrust" configuration—tt]. If any problems developed, all simulation went out the window and power was restored by advancing the throttle.

It is obvious that this CFI did not know when to intervene. This seems to be a common problem in accidents involving a student and CFI. Maybe this issue is not covered enough in CFI/ME courses. It all comes down to safety and survival. A single engine failure in a twin-engine aircraft can kill you faster than anything else out there. You have to be at the top of your game to successfully come out of that scenario alive. That goes double for the CFI/ME who is teaching others the nuances of flying twins.

If the student cannot hold a heading after the engine failure, then you practice that at a safe altitude until [he] can. If holding blue line [Vyse, the best single-engine climb speed] is a problem, same thing, practice at altitude until proficient. Now, I realize that when simulating an engine failure during a real take-off for the first time, this is a new and novel situation for the student. The ground is right there, rushing by. It takes a painfully long time to accelerate to blue line. There is no speeding up the process. Any attempts to cheat can result in disaster. The CFI has to know exactly what he wants the student to do, and how much slop, if any, he is willing to accept.

Speed is critical in a maneuver such as this. Without attaining [and maintaining] Vyse, the only place you are going is straight ahead in a[n un]controlled crash. Given the description of the accident, it looks like they never attained blue line. As they slowed down, they would lose directional control when they got below Vmc. That is probably why the airplane turned. If that is not the case and instead the student was merely a little on the slow side, lowering the nose is not a good idea to gain speed. It will take too long. A CFI can accept a speed that is a little fast. However, being a little slow is not acceptable.

Aerobatics instructor Tony Johnstone writes about scenario #1, where an aircraft was seen to perform a “snap roll” on final approach at the completion of a Flight Review:

If the aircraft was equipped with some type of flight data recording device, presumably it was a newer glass-cockpit machine (the type was not specified in the scenario. I don't know of any of these airplanes that have aerobatic capability or certification.

If they truly meant to roll the airplane on the way home, that upsets me on a whole range of levels. Firstly, I don't know who was flying the airplane at the time. If it was the CFI trying to impress his student with his aerobatic prowess (“Watch This!”), or the pilot doing the flight review, the roll should never have been allowed to start. Sometimes you just need to say no, don't do that.

Once the roll was initiated, it is pretty obvious it was botched. If it was [indeed] a snap in a non-aerobatic airplane, the maneuver would be truly of the test-pilot variety. If in fact, it was an attempt at a slow or aileron roll, the commonest thing that I have observed in 9 years of teaching aerobatics is a significant loss of altitude during the early attempts, due to failure to get the nose rising during the first half of the roll, and dishing out of the second half. It is not uncommon for a student to lose 500' on their first attempt.

Either way, this was a truly dumb thing to do, even more so at low altitude, and the unfortunate outcome was highly predictable (and reproducible, but not by those two, unfortunately). The lesson here is:

1. Don't do aerobatics in non-aerobatic airplanes.
2. Don't do aerobatics at low level.
3. Don't do aerobatics if you haven't had proper aerobatic training.

By the way, if item 3 has been accomplished, items 1 & 2 will not be an issue…as [the pilot] won't have any inclination to do them!!!

Thank you both for your insights. Readers, here are some additional scenario synopses for your comments:

Scenario #4

During IFR flight at 11,000 feet, the pilot's last transmission confirmed his altimeter setting. Shortly thereafter, radar data indicated the airplane started a descending right-hand turn. The final radar return was at 9,700 feet. The airplane wreckage was located about 1 mile west of the final radar return, at a terrain elevation of 3,830 feet. The debris field was consistent with an in-flight breakup, with airplane wreckage distributed over a distance of 0.5 miles. A broken to overcast ceiling existed between 5,000 to 6,000 feet with tops to 14,000 feet. Cloud top temperatures was -1 to -3 degrees C between 11,000 and 12,000 feet. The location of the last radar return was immediately downwind of Mt. Rainier and the sounding wind profile indicated favorable conditions for mountain wave formation. Digital photos of Mt. Rainier taken a few minutes before the accident were recovered from a camera onboard the airplane. The images depict clouds surrounding Mt. Rainier and that the airplane was operating immediately above a broken-to-overcast layer in VMC. The radar track combined with weather radar imagery and satellite imagery indicated that the airplane was in IMC at the time it entered the descending turn and dropped below the radar floor. Flight performance data recovered from cockpit instrumentation indicate that 5 minutes prior to the accident the airplane experienced continuous turbulence ranging from 0.77 to 1.5 vertical g's, consistent with a mountain wave encounter. During the last few seconds of flight the airplane was oriented 88.6 degrees nose down, 113 degrees angle of bank, and 290 knots. Upon exiting the bottom of the cloud layer, at 6,135 MSL, the airplane experienced a rapid onset of g's that exceeded the strength of the airplane. The sudden onset of g-load is constant with the pilot's attempt to recover from the rapid descent and unusual attitude.

Scenario #5
A witness reported she she saw the two-engine airplane flying low over her house. The airplane flew with "the left wing up and the right wing down," the engines sounded like they were "running at full power," and the airplane was "descending very fast." As she watched the airplane clear trees and disappear from view in a heavily wooded area. Examination of the airplane revealed no evidence of preimpact mechanical failure or malfunction. The pilot did not hold a current FAA medical certificate and had been hospitalized for congestive heart failure several months prior to the accident. The pilot's cardiologist stated the decedent should not have been flying with his medical condition.

Continue the discussion of Top 10 Cause #8 with your comments and ideas at mastery.flight.training@cox.net.

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

Fly safe, and have fun!

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