

FLYING LESSONS for October 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.

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This week's lessons:

This may be goodbye to an old friend. An NTSB "factual" report posted this week reads:

While taxiing the tail-wheel equipped airplane after landing, the flight instructor was demonstrating to the student some taxi techniques. During the demonstration, the flight instructor inadvertently applied the brakes, and the airplane nosed over. Post-accident examination of the airplane showed the vertical stabilizer and rudder were crushed. The flight instructor reported no mechanical anomalies with the airplane prior to the accident.

N89954 was a 1946 Cessna 120, serial number 9006. I saw it "was" because it's highly likely to cost of repairing the little two-seat taildragger will be prohibitive, given the likely propeller strike (requiring an engine tear-down, inspection and repair) as well as the damage to the vertical stabilizer and rudder. Parts are still available, and it's possible someone will fix 'er up out of love more than sound economics. But it's also very possible '954 will become an organ donor.

I indirectly found the '120 on a small, country airfield while I was on a solo cross-country



prior to earning my Private certificate. A Luscombe was sitting on the ramp with a For Sale sign in its window. An older gentleman was sitting in a lawn chair in the back of an old pickup truck and told me that he owned the Luscombe, but it was a handful (foot-ful?) to fly. He had something better suited for a new pilot, he told me, back at his farm up the road.

He showed me where his unmarked farm strip lay on my Sectional chart, but I wasn't ready (or endorsed) to try that alone in the rented C152. So I got driving directions and made plans to go over the next day.

I was immediately stricken by the '120's jaunty pose, aching to leap (sedately) into the air even while standing still on the soft grass. It had non-standard paint (paint of any sort was nonstandard on Cessna 120s), good fabric on the wings, and an incongruous green nose, the reason for which was not noted anywhere in the logbooks. Someone had added an electrical system and a starter in the early 1950s, which was a requirement for me—I later learned to "prop" it, but it's far safer to be inside pulling a handle than outside pulling a prop blade.

A quick ride with the owner told me this was it, at least at that stage of my career—a single second lieutenant in the Air Force just completing his Private certificate and looking for a fun way to build time. I paid \$6000 for the airplane, not smart enough to know anything about prepurchase inspections or airplane title searches. I got lucky and never had any problem with either clear title or airworthiness.

'954 was flown up to me the week before I passed my Private checkride. Over the next seven years I put 450 hours on the little ship, flying from central Missouri to as far away as Detroit (in a memorable two-day flight with my father) and through snow showers to Bolivar, Tennessee

(just east of Memphis) to earn my CFII. I gave my wife six hours of dual instruction in the '120 before she determined arthritis in her knees meant a taildragger was not for her (but she could land it!). Every flight since the airplane was new was recorded in a booklet in the Cessna; it had been based in Los Angeles and on the east coast; it had been in flying clubs and in private hands; and it had been flown in an epic around-the-perimeter flight of the Lower 48 states not once, but twice.

But my needs and wants changed over the years, and taking the Cessna 120 on a trip was about as practical as a transcontinental trip on a moped. More importantly, the airplane was at over 5000 hours and nearly 50 years old. It was really time to pull her apart and go over everything, recover the wing if for no other reason than to see the structure underneath, overhaul the engine, replace the battery box, repaint the old girl (I told people we “took off in a flurry of paint chips”) and generally restore her for the next 50 years.

89954 didn't really meet my mission any more, and I didn't have enough money to rebuild her anyway. Many's the time since I kicked myself for not pull the wings and put her in my father-in-law's barn until I had time and money to do the job (I'm not sure I'd even be there yet). So I out her up for sale, showed her to a great aviation author (and *FLYING LESSONS* reader) and his wife in the Wichita area, and finally sold the '120 to a man in Oklahoma City. Recently I saw she had been purchased by a flying club in Arkansas, where I hope it was beautifully restored before this recent mishap. I hope I'm wrong, and '954 will fly again.

Please forgive me, readers, for being a little wistful in this week's report. NC89954 (I was always going to restore the original “NC”-number when I painted the '120) had a great run, and probably taught dozens if not hundreds of pilots what flying is all about.

There are some *FLYING LESSONS* that result from this report, including:

- Use brakes sparingly. Brakes are designed to slow the airplane, not to stop it—plan your taxi and control your speed so the airplane can roll to a stop safely at any point during your taxi.
- Use brakes in short taps. Like tailwheel designs, airplanes without steerable nosewheels can pivot around in a short space if you're aggressive with the brakes. Sometimes this is appropriate, on the ramp, but it should be done in taps, not firm applications. Note that when the Cirrus SR22 was new there was a rash of wheel fires from overaggressive braking, probably among pilots not used to free-castoring nose wheels.
- Instructors, remember you're there to teach, but primarily you're there to provide a safe environment in which your student can learn.

Probably most importantly, however, this reminds me that we are all caretakers of the airplanes we fly. Their numbers are limited (and in many cases, declining rapidly). Enjoy your flights and take pride in ownership, if you are able to own. But regardless of whose name is on the title, fly your airplane as if you're preserving a piece of history.

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



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Debrief: Readers write about recent *FLYING LESSONS*:

Reader Tom Stewart writes:

I really enjoy reading your weekly training information. Thank you. One of the things that always concerned me when in the pattern was at what angle of bank was I getting close to being in trouble. Especially when the controller asks you to keep it in tight.

Thank you, Tom. We learn early in our flight training to avoid banking too steeply in the traffic pattern. Usually we're taught to keep the bank angle below about 30°. Why? Most flight instructors will tell you because *increasing the bank angle makes the airplane stall at a higher indicated airspeed*. Which, in the traffic pattern, is usually wrong.

Stall speed indeed does increase with an increase in bank angle, but **only** if the pilot holds control force against a descent during the bank. The increase in stall speed comes not from the bank angle itself, but from the **increase in G-load** that results if the pilot attempts to hold altitude while banking the airplane.

Most of the time in the traffic pattern we have the nose down, so that the airplane remains in (or near) 1G flight in its descent. Bad things may happen if the bank gets too steep (more in a moment), but stalling isn't one of them. As far as stalls are concerned, for the airplane to stall at an advanced airspeed you must be increasing the G-load on the aircraft. Banking while holding altitude is just one way to make this happen.

A spiral, on the other hand, is the natural result of an excessive bank angle, left unchecked, in a stable airplane. Recall what your instructor called the "overbanking tendency," learned in the process of performing steep turns. In most airplanes, once the bank angle exceeds about 35-40 degrees, it will continue to increase unless you apply some opposite aileron. If you don't notice the overbanking tendency, or for some reason you allow the aircraft to continue overbanking, as the wing rolls away from the horizontal there's less and less vertical (to the horizon) lift holding the airplane up. Descent speed will build extremely rapidly; if this happens while you're in the traffic pattern you may not notice the rate of descent until you no longer have enough room to recover.

Quite likely, a large percentage of what we call "stall/spin" accidents in the traffic pattern, and virtually all the "impossible turn" attempts at getting back to the runway if an engine quits on takeoff are, in reality, not stalls but instead spiral-type mishaps.

Back to your question: I teach pilots to bank at around 20 degrees, no more than 30, in the traffic pattern—not because I'm trying to avoid a stall, but because excessive bank angles contribute to a rapid loss of altitude from an incipient spiral. Either way, the answer's the same: keep bank angles shallow, and don't pull back to increase g-load on the wing.

For more, see my article "[Killer Stability](#)," published on www.ipilot.com in 2001.

See www.ipilot.com/learn/article.aspx?ArticleID=296

Readers, tell us what you think, at mastery.flight.training@cox.net.



Number 3 of the Top 10 Causes of fatal general aviation accidents, according to the U.S. Federal Aviation Administration, is **stalls at low altitude**. To conclude our discussion (and hopefully, some ideas on how to change instructional and operational techniques to reduce the accident rate), please review these [selected case histories](#) from the NTSB record. Pick one (or more), identify it by case number, and send your thoughts about:

1. What might have been some of the factors contributing to the mishap?
2. What techniques might be used to mitigate those factors?

3. Looking at all the case histories as a whole, what trends exist that appear to contribute to the occurrence of this type of accident?

See www.mastery-flight-training.com/top_10_number_3_case_histories.pdf

I'll wrap up Top 10 #3 next week in *FLYING LESSONS*.

Send your thoughts to mastery.flight.training@cox.net.

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
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