

FLYING LESSONS for May 6, 2010

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.

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:

Nose it over and pick up some "free" airspeed in descent, right? Not so fast. A common technique to initiate descent from cruise flight is to simply trim the nose down, leaving power set and accepting the increase in airspeed that results.

Lower air is often bumpier air, however, and it's quite possible you'll encounter unexpected turbulence encounters as you descend. This is most common on a hot day, with significant thermal activity, but it can also occur on colder, sunny days that spawn localized thermals, and on cool nights if you descend through the boundary of a temperature inversion. And any time surface winds exceed about 20 mph you can hit moderate or stronger gusts within a few thousand feet of the ground.

Unless you're absolutely certain the air's completely smooth below you (and who has that certainty?), a better technique is to make a small power reduction and descend at no faster than the "normal" airspeed range (top of the green arc on the airspeed indicator). This at least keeps you away from the "caution" range (the yellow arc in piston-powered airplanes) as protection against structural failure or control flutter if you hit some turbulence on the way down.

If the turbulence becomes "moderate" or stronger, immediately slow to the turbulent air penetration speed. Dr. David Rogers, retired U.S. Naval Academy aerodynamics professor (and *FLYING LESSONS* reader) [tells us](#):

Basically, we want the wing to *momentarily* stall, i.e., exceed the critical angle of attack, before it exceeds the design load limit. If the wing is stalled it produces less lift and the design limit load is not exceeded. The turbulent penetration speed, V_A , is the highest velocity at which this occurs.

Turbulent air penetration speed goes down with a reduction in airplane weight. The precise rate of speed reduction is not included in most Pilot's operating Handbooks (POHs), but for many light airplanes it may be approximated as two knots for every 100 pounds below the airplane's maximum certificated weight. [Dr. Roger's article](#) provides the precise equation.

You're headed for turbulent air. Should you slow to V_A as adjusted for weight? No. Turbulent air penetration speed is the *maximum* speed you should fly in turbulent air. Gust encounters will wiggle your airspeed needle (or shake up your airspeed vertical tape), and you need to assure that the *highest* speed in the gust encounters is below the weight-adjusted V_A .

Your target speed in a turbulence encounter, then, should be 10 to 20 knots *below* the weight-adjusted V_A to assure you will not overload the airplane.

Do not lower any flaps to slow the airplane down for turbulence. Structural limitation G-loads and therefore turbulent air penetration speeds are often much lower with flaps extended; most POHs won't give you a clue how much.

Do lower the landing gear in retractable-gear airplanes if the speed (or turbulence) might get out of hand. Extended gear increases drag, making the airplane less likely to accelerate if bounced into a nose-low attitude. It adds fixed vertical stabilizer area in the form of two or three big struts and tires. It lowers the airplane's center of gravity, a natural stability enhancement, and in many designs the extended wheels move the center of gravity forward, an additional factor in increased stability. Think how far forward a heavy nosewheel move the c.g. when extended, and the main landing gear on Cessna's retractable-gear singles and Skymasters.

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

Debrief: Readers write about recent *FLYING LESSONS*

FAA Safety Team National Outreach Manager Bryan Neville passed along a request from a reader of the www.faa.gov version of *FLYING LESSONS*: "Could do a piece in your *Flying Lessons about taildragger pilots and some tips for them?*"

In 2002 wrote a four-part series on providing a tailwheel checkout on www.ipilot.com. The series is still posted as part of [160 of my articles](#) in iPilot's "Insider Series" of flying articles. You may have to subscribe to get full access to these articles, but subscription is free and easy, and they don't inundate your e-mail box. So from the archives, here are four articles on mastering tailwheel airplanes:

[Tailwheel Checkout: What's Good For You](#)

by Thomas Turner

What's required, and how does one *teach* mastery of a "conventional gear" airplane? This weekend, I'll start checking out a friend in a tailwheel airplane... [continued»](#)

www.ipilot.com/learn/article.aspx?ArticleID=450

[Tailwheel Checkout Part 2: 'What's A Groundloop?'](#)

by Thomas Turner

Barry's grin was so wide I swear I could see it from the back seat of the Bellanca Citabria. [continued»](#)

www.ipilot.com/learn/article.aspx?ArticleID=453

[Tailwheel Checkout Part 3: The First Lesson](#)

by Thomas Turner

Barry had endured quite a bit of lecture to help prepare him for his tailwheel checkout -- eventually, though, we had to actually get into the airplane. [continued»](#)

www.ipilot.com/learn/article.aspx?ArticleID=462

[Tailwheel Checkout #4: Crosswinds, The True Test](#)

by Thomas Turner

Barry, friend and student who is working toward his tailwheel endorsement and the 10 hours of flight instruction required by insurance to fly as pilot-in-command of the Bellanca Citabria, took to rudder control and thinking ahead of the airplane pretty quickly... in calm wind conditions. [continued»](#)

www.ipilot.com/learn/article.aspx?ArticleID=467

See all 160 articles at www.ipilot.com/learn/insider.aspx?AuthorID=12.

Question of the Week

This week's question:

Do you fly multiple airplanes, or always the same one? If you fly more than one airplane, how do you prepare for the differences?

Last week's question was:

Do you go out of your way to practice more challenging flight maneuvers, like go-arounds and crosswind landings, or do you tend to train for the same middle-of-the-envelope operations on every Flight Review?

Here are your responses:

I hadn't flown the King Air in six weeks and had a planned flight on Monday. Called my MEI flying buddy and said, "I need to fly some on Sunday, can you go?" We went up and he said "What do you want to do?" My answer was, stalls, slow flight, steep turns, and engine out work.

A cold front was coming through so we had 21 kt west winds and I knew a close airport with an 18-36 runway. After the airwork above I said, "Let's run over to XYZ and do the GPS approach to 36." He said, "Why?" My reply was, because I have not shot an approach in six weeks and there's a 21 knot 90* crosswind I want to deal with. So we did.

On the way home I asked for vectors to an ILS. I voluntarily put the Foggles on and when ATC said "Cleared for the approach maintain 2,000 until established, etc." I pushed "Approach" on the autopilot and all was well. THEN, he pulled an engine (in the turn) and the race was on. I screwed it up and got so flustered that I failed to lower the gear on the approach and he called a go around (which was also practice that I needed and I told him later that we WILL do some go arounds in the near future).

What did I learn? A bunch! We talked about it on the ground. Losing an engine in IMC in a turn on an approach is a worse case scenario, but that is what I wanted. I screwed it up, but it made me sharper after it was over and the "worst case scenarios" is what I train with.

On the flight on Monday during cruise, we were over the Smokeys and I said to myself. "We just lost an engine. What to do?" I began to dial in 'nearest' on the GPS and practice talking to ATC, etc. 'What kind of distance, airport altitude, runway, etc.'" Just to relieve the boredom and also I thought good practice.

My view is that 'once a year' or even 'once every 6 months' on engine out stuff, airwork, etc. is not enough to stay sharp. But, to each his own. What do I know? I'm just a low time GA guy trying to do it right.

I try to practice crosswind landings at every good opportunity, but often have to go to a different airport to do it -- my non-towered home field has heavy traffic and a strong cultural bias towards using the runway best aligned with the wind. Perhaps because I fly a relatively low-powered airplane, I don't consider go-arounds all that challenging. I do them now and again, usually for traffic that's slow to clear the runway, and I feel strongly that whatever you fly, go-around procedures need to be automatic. If you can't go around, you're not competent to act as pilot-in-command.

My training schedule is to fly with another pilot every three months and a CFII every six months. My 1st flight with the [safety] pilot was this past Saturday. We began under the "hood" at 400' during take off; performed some basic maneuvers (power off/on stalls-steep turns-etc) and then do to the very good conditions "wind wise" crosswind landings at two small non-towered airports with single runways. Post flight evaluation: it was a good exercise; more work is scheduled!

Thanks, readers!

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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