FLYING LESSONS uses recent 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 airplane have little direct bearing on the possible causes of aircraft accidents—but knowing how your airplane’s systems respond can make the difference as a scenario unfolds. So apply these FLYING LESSONS to the specific 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:

Contact Tracing

It had been nearly a month since I’d flown—at least in the left seat, although I’d logged about 12 hours of “dual given” in three days of instruction during that time. The pandemic, a personal health issue that caused me to ground myself for a couple of weeks, and the usual demands of work and life have kept my total flying time down for the past several months. It had also been almost a month since my employer’s airplane, a Beech A36 Bonanza, had been in the air because of the timing of my grounding. None of this was good for me, or for the airplane, so I took an afternoon to (as I put it in a Facebook post) “blow the rust out of the engine and knock the rust off of me.”

Many pilots seem to be content to “get back into the air” with a routine, point-to-point hop or perhaps a couple of takeoffs and landings. That helps, but when I’ve been away from flying for a bit I like to “wring myself out” with a few maneuvers. My philosophy is that the tolerances evaluated by the Airman Certification Standards (ACS) or the Practical Test Standards (PTS) that precede them represent the measure of whether or not a pilot is qualified to act as pilot-in-command. If I can’t fly any of the PTS/ACS maneuvers within the tolerances required for a checkride, I’m not qualified to act as PIC. If I discover that’s the case, it’s time to practice or even schedule some dual instruction right away to get back up to those minimum standards.

Instead of simply thinking “I’ll go flying today” I instead decided: today I’ll practice steep turns both to Private and Commercial standards, short field takeoffs and landings, the Power Off 180 from the Commercial flight test (I’ll describe that in a moment), at least one go-around from short final, and power-off/approach-to-landing stalls straight ahead and “accelerated” while in a turn.

There are now several amazing, and sometimes free, ways to record and review your flights. This provides the opportunity to look back at your flight objectively to see if you were really as good (or as bad) as you thought you had been. This capability to conduct a personal flight review (a different twist on the required regulatory term) any time you like using contact tracing of your flight (another twist on a recently overused term). It’s a fantastic tool for flight instructors to use to debrief their students. You can use it to critique yourself. If you’re brave enough, you can even open the record up to peer review as I’m doing here. But mainly, I advocate using these technologies for your own personal debrief.

One good (and free) option, as least for those flying in the continental United States, is www.flightaware.com. You can get good flight track information from popular tablet-based Electronic Flight Bag (EFB) software like ForeFlight Mobile and Garmin Pilot. You can go all-out with 3D representations of flights with advanced ForeFlight options and great programs like
CloudAhoy. But if you want a free, minimalist yet three-dimensional review then Flightaware is a good entry-level option. You may need to register (free) to see flights when you are not participating in Air Traffic Control services.

**Here’s a screen shot** of the Flightaware track of my rusty-elimination exercise. I’ve annotated it for purposes of this discussion. One important feature, however, is the Replay button in the bar just above the profile view (that shows airspeed and altitude traces).

When live on Flightaware, hitting the button starts an animation of the flight at your choice of 10, 50 or 100 times actual timing. You may pause at any point in the replay to look more closely at what was happening.

See [https://flightaware.com/live/flight/N504SJ](https://flightaware.com/live/flight/N504SJ)

**Index 1:** I departed from Wichita Colonel James Jabara airport’s Runway 18, departing on a right downwind. Once clear of the pattern and with no conflicting traffic into nearby McConnell Air Force Base and the Beech Factory Airport, I climbed to 5500 feet to a practice area well clear of the Wichita airspace and its arrival and departure paths.

**Index 2:** Once level I completed clearing turns using a standard-rate bank, followed immediately by a 45° bank, 360° turn to the right that rolled immediately into a 45° bank, 360° turn to the left. My standard technique on this airplane of establishing the bank angle and then immediately adding two inches of manifold pressure to maintain airspeed as well as altitude in the turn, then reducing power two inches as roll out of the turn, served me well. I held altitude and airspeed, although since the reply is showing groundspeed and not indicated airspeed my steep turns showed as airspeed decreases, the record trying to make sense of the low ground speed while in the turns.

**Index 3:** Another set of clearing turns, this time at 30° bank angle, and then I launched directly into a pair of 55° bank. When I first earned my Commercial certificate the standards called for 60° of bank. Later, while I was a newbie flight instructor, someone decided that the “±5° bank” tolerance for the maneuver would put the airplane into the “aerobatic” realm if the pilot exceeds 60°, so the completion standards’ target bank angle was changed to 55°. The ACS now calls for 50° bank ±5° for the Commercial flight test (not much steeper than the Private Pilot maneuver). I still test myself at 55° bank.
My first turn, to the left, worked great. I then thought I’d try using the angle of attack indicator (AOAI) instead of airspeed to compliment my visual turn. The resulting steep turn to the right is much smaller in diameter and, in the profile view, showed more speed variation (again, the groundspeed plot in a steep turn is inaccurate). What happened was that I inadvertently allowed airspeed to decrease and altitude to vary to the extremes of ACS tolerances. Typical light airplane AOAs have fairly large graduations in their displays, meaning the displayed angle of attack may be the same over a range of indicated airspeeds. I found, at least in this first attempt (in a while), that the AOAI does not provide as accurate a reference as the good old airspeed indicator in a steep turn. Still, it was great practice.

**Index 4:** Back to my standard technique, after more clearing turns to look for traffic I did another pair of steep turns to Commercial standards. They were pretty accurate, showing up as tight little turns on the Flightaware trace.

**Index 5:** I then descended into the nontowered pattern at Newton, Kansas. I made a full stop, short field landing then a short field takeoff, remaining in the circuit.

**Index 6:** I then tried three sequential Power Off 180 maneuvers from the Commercial Pilot test. Officially called the “Power Off 180° Accuracy Approach and Landing,” the task calls for reducing throttle to idle while on downwind beam of your selected touchdown spot, then gliding to land on or no more than 200 feet beyond that spot, on the runway centerline with no drift. It’s a great exercise of engine-out glide performance, planning and continual decision-making.

This maneuver is challenging in an airplane like the Bonanza because the glide ratio is pretty steep. With the landing gear down (a good thing except as needed in an actual emergency) and without reducing the propeller to low RPM (to reduce drag, part of the Glide configuration), it’s about impossible to complete this maneuver from a normal traffic pattern altitude. Nonetheless, I intentionally tried it the first time from pattern height (2500 feet, about 1000 AGL) to test whether using the Least Rate of Descent speed (about 83 knots in the A36) instead of Best Glide speed (roughly 110 knots) might make it possible. This was the first “plateau” and descent on the altitude and airspeed traces under Index 6. No way, it didn’t work. I did a go-around.

The second time around I tried it from 2800 feet (1300 AGL) using Best Glide speed. I was still coming up short so I did another go-around. On my third pass, from 3000 feet (1500 AGL) and using Best Glide speed, I made it easily, touching down right on my target. Good practice.

**Index 7:** Climbing out east of the airport, I cleared the skies and then completed a power off/landing configuration stall straight ahead, encountering a common phenomenon among airplanes loaded near the forward limit: I reached full up elevator before the stall break, and the airplane began mushing down at about 1100 feet per minute with the toke all of the way back and a constant indicated airspeed of about 45 knots (there’s some airspeed error at that high angle of attack). I recovered and repeated the maneuver, this time banking about 20° to the right as I approached the stall or, in this case again, full aft elevator. There was a little more of a burble but still not clean stall break; as the airplane mushed downward I used the rudders to do a bit of “falling leaf” bank control exercise, then recovered into a normal descent.

**My flight** ended with a local-standard midfield cross to a right downwind at Jabara. Another 1.6 hours in my logbook, a challenging and fun review of basic maneuvers, and a good workout for the airplane and its engine.

**But my exercise** didn’t end until I sat in the cool FBO afterward, drinking a Diet Coke and reviewing the contact trace of my flight to see what I did well, and what I’d do differently next time.

**We all need** some practice now and then. I suggest you use that time to review the basics of what you once flew to demonstrate you met the requirements for the certificates and ratings you hold. Mix it up, for example, don’t do instrument practice every time, or just traffic patterns or stalls. There’s a wide variety of tasks to choose from the various ACS.
You don’t have to hire a flight instructor to do this. In some parts of the U.S. and the world pandemic conditions may make it difficult or even impossible to get flight instruction at times.

But you can still use the technologies of contact tracing your flight. Choose from the free and simple to the fee-based and complex for an objective look at how you did. This lets you gauge whether you need more practice, and on what tasks, and hopefully confirms that you’re still as capable of accurately flying an airplane as you were on the day you passed a checkride. That’s the standard we all need to maintain.

Comments? Questions? Send them to mastery.flight.training@cox.net

Debrief: Readers write about recent FLYING LESSONS:

Reader John Townsley writes about last week’s Debrief about the concept of "rolling Gs":

Re: 25 June Debrief by Brian Sagi. I followed his suggestions until he wrote "Those low load factors do not allow the pilot to develop the instinctive understanding that what is turning the aircraft is really the wing (horizontal component of lift)." I agree with his assertion that the wing carries the load and in doing so it generates the LF. But absent elevator action the plane won't turn. Nor will the wing alone (absent external forces from up or down drafts that alter the wing angle of attack) result in a change in load factor.

Thanks, John. For the thorough concept of what’s happening in a turn we can go all the way back to Wolfgang Langewiesche’s Stick and Rudder. This classic tells us that turns are controlled by lift vectored away from the vertical plane. Lift is in turn created by angle of attack, itself in turn a function of indicated airspeed, power in a powered aircraft (which allows changes in IAS and therefore lift generated for a given pitch attitude) and elevator position.

You can bank the wings and the airplane will turn. If you wish to maintain altitude and/or increase the rate of turn, you can increase UP elevator, increase power (in a powered aircraft), or both. Any of these options will also increase load factor. If the rudder is not coordinated then the load factor will be different on one wing as compared to the other, which brings us back to the hazard of rolling Gs that was the subject of last week’s Debrief.

It’s all interconnected. I’ve written a series of notes and commentary on Stick and Rudder that are posted on the Mastery Flight Training home page. I still hope some day to complete my notes on all the chapters of that extraordinary book.

See:
https://www.amazon.com/Stick-Rudder-Explanation-Art-Flying/de/0070362408
https://www.aviationsafetymagazine.com/features/yanking-and-banking/
https://www.mastery-flight-training.com/

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Or send a check to Mastery Flight Training, Inc. to 247 Tiffany Street, Rose Hill, Kansas USA 67133. Thank you, generous supporters.

Watch, read, listen

Here are some great, short items you might check out this week:

AVWeb’s Paul Bertorelli is really catching his stride as an aviation safety commentator in a short, information-charged video format. This week Paul posted “Two Takeoff Accidents Analyzed” looks at “two accidents—including the crash of his own Mooney—to highlight how to recognize and avoid the most dangerous takeoff mistakes.” It’s certainly worth watching.

See https://www.avweb.com/multimedia/video-two-takeoff-accidents-analyzed/

Astronaut and emerging aviation safety icon Charlie Precourt wrote a valuable new look at the concept of turning back to the runway following an engine failure, beginning on page 34 of the May 2020 EAA Sport Aviation. You’ll need to be a member of EAA to read the digital version.


I knew him when he was “the G1000 guy.” Now Max Trescott is a well-known Cirrus instructor and host of Aviation News Talk, an ambitious weekly podcast that includes in-depth segments on flying technique and safety. Last week Mike posted a discussion of “normalization of deviance” with Red Bull racing pilot Michael Goulian (whom I’ve worked with on the VFR Mastery series at Pilot Workshops, sponsor of FLYING LESSONS Weekly). It’s available both as a podcast and as a YouTube video. Either (or both) is worth your time.


Happy Independence Day to all my U.S. readers. In these challenging times, I still believe our common dreams and goals outweigh our many differences. It’s up to us to listen as much as we speak, to reinforce why we are “United” States.

Share safer skies. Forward FLYING LESSONS to a friend

Pursue Mastery of Flight.

Thomas P. Turner, M.S. Aviation Safety
Flight Instructor Hall of Fame 2015 Inductee
2010 National FAA Safety Team Representative of the Year
2008 FAA Central Region CFI of the Year
Three-time Master CFI

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