FLYING LESSONS for November 3, 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, expanded *FLYING LESSONS* report each week, email "subscribe" to mastery.flight.training@cox.net.

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This week's lessons:

See and avoid is the basis for all air traffic separation and collision avoidance. Even if you're flying under Instrument Flight Rules or Flight Following (if your nation has an equivalent), if you are in visual conditions, you are responsible to watch for other airplanes…and to maneuver to get out of the way.

When flying visually, whether VFR or IFR, maximum precision comes from using an integrated, or composite, scanning technique. The FAA's *Airplane Flying Handbook* calls integrated/composite flying "the use of outside references and flight instruments to establish and maintain desired flight attitudes and airplane performance." Using this technique, "the airplane's attitude is confirmed by referring to flight instruments, and its performance checked. If airplane performance, as indicated by flight instruments, indicates a need for correction, a specific amount of correction must be determined, then applied with reference to the natural horizon. The airplane's attitude and performance are then rechecked by referring to flight instruments. The pilot then maintains the corrected attitude by reference to the natural horizon." The AFH warns that, when flying in visual conditions, "no more than 10 percent of the pilot's attention should be inside the cockpit."

The concept of integrated flight is introduced to develop precision while flying primarily using outside visual references. But the technique is entirely valid (perhaps even more so) when flying to tight IFR tolerances while in Visual Meteorological Conditions (VMC), because in VMC all depends on seeing and avoiding other aircraft.

As student pilots we learned to clear for traffic before beginning practice maneuvers. The idea is that we look for airplanes all around us (including under and over our altitude) before doing any maneuver that will involve changes in heading and/or altitude—most notably, stalls, slow flight, and advanced maneuvers like chandelles and lazy eights.

In addition to maneuvering, the goal is that we will habitually scan for traffic all of the time…the only way the see-and-avoid concept can work.

But once outside the instructional environment, do we still take the time to look around for other traffic? Or has the era of moving maps and in-the-system operation lulled us into a false sense of protection?

When I first began flying in a military flight screening program, I was taught to make a brief five-degree heading change to the left every 1000 feet of climb, scan for traffic ahead and to the right, then change heading 10 degrees to the right, scan ahead and out the left side, and then return to my climb heading. The idea was to keep getting the nose out of the way to avoid climbing into something in my blind spot.

After a slight heading change left and right to scan ahead and below before beginning descent, I learned to make the shallow left-and-right scanning turns every 500 feet (assuming a 500 fpm descent), again moving the nose out of the way to peer into what would otherwise be a blind spot where other airplanes can hide.

In a high-wing airplane (I was flying a Cessna T-41A, a military C172) the technique was to "pick up" the left wing briefly to scan before making a left turn, and to raise the right wing above the horizon slightly long enough to clear the area before turning right. Failure to exercise any of these clearing techniques was failure of the maneuver in the Air Force program.

I carried these practices over into my civilian flying, reinforced by checking out in a 1946 Cessna 120 under the tutelage of a Second World War U.S. Navy primary flight instructor. But somewhere along the way, probably when I started practicing IFR, nail-the-heading flight, I lost use of the technique.

But reading about midair collisions it's becoming obvious to me that I individually and we collectively could benefit from the old-school techniques of integrated-but-visual flight, and clearing turns not only before practice instructional maneuvers, but also in our routine climbs, turns and descents.

A collision avoidance best practice would be to incorporate the brief clearing techniques I relate from my Air Force flight screening days, especially in high traffic areas such as airport traffic patterns, crowded departure and arrival routes, near ground-based navigation aids (which are still frequently used, especially in instrument procedures), and over "attractive nuisance" objects and landmarks that draw aerial sightseers. I know I'm going to make a determined effort to teach and use these techniques from now on.

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

"Always enjoy your writing. Lots of original thinking, well written."

--Peter Cassidy, *FLYING LESSONS* supporter

"If you ever question whether what you do [*FLYING LESSONS*, et. al] really makes a difference, let me assure you it does. You very possibly saved me and my airplane on Sunday. When I returned to KMRB, I purposely asked for a long final so that I could have time to chicken out before it was too late. Runway 26, 16 kts gusting to 26 kts from 180 degrees. Unlike others, I will always freely admit when something scares me or I've gone somewhere I should not have been. Both were true then. I had the death grip on the yoke, and stomping on the rudder pedals. The plane was clearly out flying the pilot. 'Stabilized approach' was all I was hearing in my head, which wasn't working. Then suddenly I remember reading something you wrote about 'airspeed control'" being the key. Immediately after that, I relaxed the controls and concentrated on power changes to manage and maintain the proper airspeed on the approach. The airplane was all over the place, but the 20-25 knot airspeed swings were easily managed by power. Sure enough, in the flare, pull power, and the proper airspeed caused the airplane to sit down and stay down. Thanks!!!!!"

--Woodie Diamond, *FLYING LESSONS* supporter

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Debrief: Readers write about recent *FLYING LESSONS:*

Prolific Debriefer Woodie Diamond addressed the most recent issue's suggestion of a study to compare pre- and post-regulation safety records, to see if there is any demonstrable benefit to requiring additional pilot experience and training in lieu of depending on individual pilots to take the initiative to train in excess of regulatory standards as a way to improve the fatal accident rate. Wrote Woodie:

> Inviting a comparison of accident rates before/after the required bi-annual flight review will most definitely be skewed if the number of GA aircraft operations and active pilots are not taken into account. Increased

> governmental control most definitely decrease aircraft incidents, but it dramatically decreases GA operations. We only need to look at the results of sweeping changes made in Australia by their CASA (FAA equivalent). Those changes effectively eliminated 90% of all GA activity. In addition, practically all of Europe are changing from ISA to EASA. The first migration to ISA killed 50% of GA activity in Europe, EASA will definitely slay a significant amount of the remaining. I'm currently working with 2 pilot/aircraft owners in Europe on examining the changes and effect of the unification under EASA for an information paper. I will send it to you when completed. Bottom line is, US pilots generally are not aware that their licenses are about to become worthless in Europe and will not even be honored for operating N numbered aircraft.

I replied: I greatly appreciate your continued input to *FLYING LESSONS.* If I'm making a difference it's in part because of input from readers like you! Regarding your first item: since aircraft mishaps are typically reported as a *rate* (usually per 100,000 flying hours), any scholarly before/after comparison would have this data "equalizer". Sure, the way the rate is calculated is statistically suspect (estimates for general aviation flying hours in the U.S. are just that, estimates), but assuming the same methodology is used before and after a major regulatory change then at least the assumptions are the same.

I try to steer clear of political issues in *FLYING LESSONS*. There are plenty of organizations, publications and websites that cover such things, run by people far more politically savvy than I. We have enough to work with here concentrating on the safety side of things.

But since I was the one to bring it up, I'm interested in the specific changes you're referring to that have affected Australian and European aviation. I imagine they are more related to licensure and user fees than the are an instructional requirement like the Flight Review and IPC under U.S. FAA rules. Playing the devil's advocate for a moment here also, to the best of my knowledge no U.S. citizen has ever been able to permanently base and operate a foreign-registered aircraft or fly solely on the basis of a foreign-national pilot certificate in the United States under Civil or later Federal Air Regulations (please correct me if I'm wrong). Allowance for a "flag of convenience" registration or pilot certification does not exist. Now, I'd bet there are no advantages to foreign aircraft registration or certification to U.S.-based pilots, and as I understand it there are indeed advantages to U.S. registration of aircraft and certification of pilots in other lands, especially in Europe. But just as the U.S. wants to uphold certain standards here by requiring its citizens register airplanes under our rules, and that U.S. citizen pilots (and non-U.S. pilots flying here) hold U.S. Certificates, you really can't fault other autonomous nations for wanting to set their own certification standards for their citizens and their aircraft.

But my point is simply: can it be demonstrated that a change in pilot training requirements (e.g., the Flight Review) makes a significant, positive change in accident rates? And the larger question: *FLYING LESSONS* readers as a very safety- and training-conscious exception aside, can we make any significant reduction in fatal general aviation accident rates on the basis of voluntary increases in proficiency training by the general pilot population, or would it require a mandate like revisions to Flight Review requirements?

Woodie also wrote about the ongoing discussion about civilian formation flying:

> Your reader's comments on formation flying are "right on!" The formation flying program in the NEBG [North East Bonanza Group, an independent social organization] is based on safety and nothing else! Our annual formation flying clinic starts with a 2-hour ground school that everyone must attend. Doesn't matter if everyone has been through the ground school 10 times before, everyone must attend. In addition, everyone performs their first flight with a safety pilot. Doesn't matter how many hours or training experience they have, everyone that intends to fly formation solo in the program flies with a safety [pilot]. Even our most seasoned leaders of the program hot-seat the safety position with each other.

Sounds like the way to do it, Woodie. Thanks again.

Reader Bob Siegfried writes about flying precise landings, as addressed in a recent *FLYING LESSONS*:

> Just one quick comment on your approach treatise. I do not like to teach folks that the 3 degree slope is the correct one for our airplanes. I like to teach an angle of at least four or five degrees and try to get some of the approaches at six degrees or more as the normal way to land a light airplane.

> The ridiculously flat approach we shoot for an ILS or LPV was a compromise between the airlines and the military . The military really wanted two or two and a half degrees for those early jet fighters that approached at 180 knots. In the piston air carrier days, we had a lot of approaches that were four degrees or more.
>
> Using such a flat approach for an airplane that should be at 90 knots or less on final leads to over shoots. Why not teach the approach at six degrees and explain to the applicant that we will have to also learn how to make those "undesirable" flat approaches just so we can fit in with heavier and faster aircraft that need those flatter approaches.
>
> Why not teach that a steeper approach is not only less likely to lead to an overshoot, but makes it easier to hit the spot?

True, why not? It's how we make "spot" landings and short-field work. It's possible to fly accurate approaches at shallower angles as well, however, and the three-degree glidepath is the industry standard, whether we're talking about electronic glideslopes or visual glidepaths using VASIs, PAPIs or similar devices. Thanks, Bob, for reminding us we have many options, and there is almost never one "correct" way to fly an airplane.

Reader Clovis Dawson just can't get enough of *FLYING LESSONS*. He asks:

> As an interested subscriber, I have stored several emails from you to review later. It seems that the only tips I can find are the current safety features only. Do you have a method or link that I can review previous safety suggestions and tips? Thank you for your emails, they are greatly appreciated. and carefully read.

Hi, Clovis. I have plans for an online *FLYING LESSONS* archive, but as this is an after-hours volunteer publication it's one of those things that hasn't made it to the top of my to-do list yet.

I publish an abbreviated version of *FLYING LESSONS* on the FAA WINGS website, www.faasafety.gov. There's a small Flash window to the right on the WINGS home page with a link to *FLYING LESSONS* archive going way back. Feel free to look around there until I have time to expand my own website.

Thanks for your interest, and for reading *FLYING LESSONS*!

I'll address some of the many other Debrief items received on my two-week hiatus in the next issue of *FLYING* LESSONS. As always, readers, tell us what you think, at mastery.flight.training@cox.net.

The second most common cause of death in general aviation airplanes is **Loss of Control During Initial Climb**, usually right after takeoff. Take a look at these three case histories:

1. Dark departure

The pilot was hired by the airplane operator for a positioning flight. The pilot departed at night in a northerly right turn over Lake Erie from a lake shore airport. The moon and city associated with the airport were south of his flight path. The airplane was observed descending in the right hand turn and subsequently impacting the lake. An examination of the recovered wreckage revealed no preimpact anomalies, and an engine monitor recorded sensor readings consistent with both engines being at a high power until the recorded data stopped. The pilot had a history of back pain and had been regularly and recently using a potentially sedating muscle relaxant, which could cause impairment. He had heart disease identified during the autopsy that may have increased his risk of sudden cardiac death. He was also at high risk for obstructive sleep apnea, which commonly causes fatigue and cognitive impairment; however, the investigation could not conclusively identify that the pilot was impaired. The maneuvering of the aircraft and lack of outside visual references soon after takeoff made the situation conducive to spatial disorientation.

The National Transportation Safety Board determines the probable cause(s) of this accident as follows: The pilot experienced spatial disorientation during the initial climb causing him to lose control of the airplane.

2. Going topless

According to witnesses, the pilot was observed having difficulty closing the canopy on the airplane prior to takeoff. During the takeoff climb, a witness said he saw the cockpit canopy moving and believed the pilot was pushing it up

and down about 6 to 12 inches. Another witness stated that shortly after takeoff, the engine lost power and the airplane continued straight and level. Another witness stated that she saw a plastic bag float down from the sky shortly after the airplane passed over her location. The bag contained several of the airplane's documents inside of it. The airplane then nosed down about 40 degrees and the left wing dropped as the airplane stalled and collided with the ground. A postcrash fire ensued which consumed part of the engine and the majority of the airframe, including the canopy latching system. Examination of the available wreckage did not reveal any evidence of preimpact failures or malfunctions.

The National Transportation Safety Board determines the probable cause(s) of this accident as follows: The pilot's failure to maintain aircraft control. Contributing to the accident was the pilot's distraction with the canopy during takeoff.

3. Low approach

The flight instructor said that when he arrived at the private pilot's private airstrip they both conducted a preflight inspection of the ultralight airplane. The instructor then proceeded to taxi up and down the runway before he departed on a short solo flight. During this flight, he performed basic turns and discovered that when a small amount of aileron input was applied he needed to apply a much larger input of rudder to maintain coordinated flight. After landing, the instructor informed the private pilot about the rudder/aileron relationship and that it would be too noisy for him to provide any instruction. The private pilot, who had never flown the ultralight before, still wanted to fly it around the airstrip and asked the instructor to go with him. The instructor agreed and they departed. The instructor said that when they were on downwind, the private pilot turned around and said something, but that he was unable to hear what the pilot said and that he then immediately saw a tree. Two witnesses reported seeing the airplane make a sharp left bank and nose over. One of the witnesses said the engine was running at the time. Examination of the ultralight revealed that it had sustained substantial damage to the airframe, wings and tail section. The fuel in the fuel tank had a foul odor, but the reason for the foul odor was not determined.

The National Transportation Safety Board determines the probable cause(s) of this accident as follows: The flight instructor and pilot's decision to take off with known control deficiencies with the aircraft which resulted in a loss of control.

To get the discussion started, answer a few questions about these scenarios:

1. What are the similarities between these examples?
2. What factors contributed to each fatal event?
3. Have you ever faced a similar situation in your flying?
4. What did you do that make the outcome of your experience much better than these?

Let us learn from you, at mastery.flight.training@cox.net.

As reported in AOPA's Aviation E-Brief:

Study targets pilots who use in-cockpit weather

The NASA Aviation Safety Reporting System (ASRS) and FAA are seeking feedback from pilots who have used meteorological or aeronautical information services via datalink applications for research on incidents that occurred while using that information. If you've experienced an incident using in-cockpit weather—and to become a participant in the study—submit an ASRS report. "ASRS will contact pilots who report incidents where weather data was a factor and request their voluntary participation in completing a web-based supplemental question set. All identifying information will be removed prior to any ASRS research data being provided to the FAA," the group assured pilots.

See http://asrs.arc.nasa.gov/

Pilot Training Reform follow-up

The Society of Aviation and Flight Educators (SAFE) has issued a Progress Report on the Pilot Training Reform process, carrying on the work begun last May in the Reforming Pilot Training symposium held at Atlanta, Georgia (where I was a panelist as the subject matter expert on type-specific and transition training). From the report:

> The Society…has published a progress report based on comments received from key industry and FAA stakeholders to the six proposed projects distilled from the Pilot Training Reform Symposium held earlier this year. The ten-page update summarizes the responses received from stakeholders and SAFE's analysis of those responses, and identifies additional concerns and recommendations.

For full details read the Pilot Training Reform progress report.

See:
www.safepilots.org
www.pilottrainingreform.org
www.pilottrainingreform.org/documents/SAFE_Training_Reform_Progress_Report_31Oct11.pdf

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Miscellaneous notes

Thank you to the members of the American Bonanza Society who attended my presentation, "The Psychology of Fuel Exhaustion," at the ABS Convention in Las Vegas last week (as many may know, although *FLYING LESSONS* is an independent product of Mastery Flight Training, Inc., the role that pays my bills is that of executive director of the ABS Air Safety Foundation). This presentation, by the way, is also featured in the November edition of the Pilot's Audio Update.

FLYING LESSONS is coming to Denton, Texas the first Saturday of December for the fourth straight year. Watch for more about the December 3rd Aviation Day of Choosing Wisely program in next week's report.

Read this month's articles by Thomas P. Turner.

See:
www.bonanza.org
www.avweb.com/shopping/sponsors/pau.html

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
