FLYING LESSONS for September 29, 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:

The sky grows grayer, the ground beneath darker and less distinct. Visibility is decreasing and you're afraid you may lose visual contact with the ground. Suddenly the world turns white—you're in cloud, or fog, or thick precipitation. The form doesn't matter, what's important is that suddenly your visual flight rules flight has stumbled headlong into instrument meteorological conditions (IMC).

What will you do? Traditional instruction has focused on making a level, 180° turn to fly back to the clearer air you just left behind. The Aircraft Owners and Pilots Association, in fact, developed a highly successful "180° escape" flight training syllabus for VFR pilots in the 1960s, promoted and initially taught by the late Dick Ward (of Twin Bonanza fame).

More recently, instructional emphasis has turned toward initiating a climb at the first sign of inadvertently entering IMC. This guidance comes, I believe, as a result of several Controlled Flight Into Terrain (CFIT) events during attempted visual flight in IMC. The idea is to "get as much distance between yourself and the ground," then confess your predicament to Air Traffic Control and find yourself a way out.

But is this really the best idea? Climbing into the clouds virtually guarantees you'll remain in IMC longer, and will have to figure out how to let down through the murk to a landing—a bad idea if you're not IFR rated and current, or flying an airplane not equipped for instrument flight. It may put you in conflict with legitimate IFR traffic, especially if you're near a terminal area. Certainly there may be unusual circumstances when climbing is the better option. But there was nothing wrong—and a whole lot right—about executing a shallow-bank, level 180° turn. Most likely, that's the quickest way to get back into relatively clear air and make your escape.

As we've seen in our review of the Top 10 causes of fatal general aviation accidents, attempted visual flight into IMC remains one of the most common ways to die in light airplanes. Instrument-rated pilots are not immune—AOPA's Air Safety Institute reports that nearly half of all pilots involved in VFR into IMC situations hold an instrument rating. So even if you're an IFR pilot, make a level 180° turn if you unexpectedly enter instrument conditions while on a visual flight rules flight.

A suggested checklist for exiting IMC if not instrument rated, equipped and cleared:

1. **Maintain trim, power setting and airplane configuration.** The airplane should be trimmed for level flight. There's no reason to upset that trim while you extricate yourself from IMC.
2. **Engage the autopilot** if one is available. Use the Altitude Hold and Heading Hold modes.
3. **Execute a standard-rate, 180° turn** to point in the direction from whence you came, on the assumption that conditions are still better there than they are for you now. The bank angle that results in a standard-rate turn in degrees is roughly 15% of the True Air Speed in knots, i.e., at 90 knots it takes a little under 15° bank for standard rate, at 120 knots it's 18° and at 150 knots the bank angle is about 22° to result in a standard-rate, three degrees per second turn. The point is that the bank angle is very shallow, making it less likely a pilot will lose control in the turn.

If you're VFR only, or if you're instrument rated but out of currency and practice, include a couple practice 180° escape turns under the hood or with another view-limiting device in your next recurrent training or Flight Review, or with a qualified safety pilot.

Far better, of course, is to avoid entering IMC in the first place or, if you are rated and equipped, filing and flying an instrument flight plan when conditions are conducive to low visibility, low clouds and/or heavy precipitation. Your best defense is frequent weather updates, including listening to ASOS/AWOS and/or ATIS reports for airports along the way, combined with an idea of the "big weather picture" obtained before takeoff and practical weather knowledge to tell you whether actual weather you encounter supports or refutes the forecast. If conditions get worse than the VMC you expected before takeoff, divert early or get the airplane on the ground *before* you get close enough to enter IMC.

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

Debrief: Readers write about recent *FLYING LESSONS:*

Reader Lorne Sheren writes about our discussion of cockpit flows and checklists:

> I transitioned from a check (really do) list to flow a couple of years ago in my B36TC (turbocharged Beech Bonanza). I run the flow, starting with door closure, and before take off I run a quick check list designed to catch those few items which will cause injury or death (if the transponder code isn't set ATC will let you know pretty quickly). So in the 36 the pre-takeoff items are simply: controls free and correct, mixture and props forward, altimeter set, heading set and correct, instrument air checked, flaps set, fuel pump off and door closed. On applying power I scan down the engine gauges to make sure all are OK, say out loud that they are, check airspeed alive and I'm off. Using a 50-item check list just doesn't work. It causes complacency and is subject to the human tendency to see what we want to see rather than what's actually there.

Thanks, Lorne. "Pilot expectations," i.e., seeing what we want to see instead of what's really happening, is probably much more a factor in deviations and mishaps than we know. Certainly I was able to use that natural human tendency to my advantage as a simulator instructor several years ago, following scenarios that very predictably put even highly experienced pilots into situations that in later debrief they never imagined they would have entered.

More on checklists, from reader Guy Mangiamele:

> You have a wonderful publication; I learn a lot from it every time I read it. I have to say I am a bit at odds with the discussion this week about checklists and flows--at least regarding before-flight operations. To my mind, flows might work well for the professional pilot who is (lucky enough to be) in the cockpit every day, flying multiple legs. But for those of us who can't fly as often as we'd like, I think and find that a comprehensive checklist of to do items-- in an order that never varies--is a great memory aid and one that gets me in the rhythm and proper mental space for safe flight. On normal flights I don't check a list again from the time I leave the run-up area until I'm off the runway and cleaning up the airplane for taxi at my destination. And I do a flow of four "killer items" that were also covered earlier in the checklist as I'm about to roll onto the runway. A great discussion….

Thank you, Guy. I learn a lot from readers and from researching and writing *FLYING LESSONS* as well. I believe it was Richard Collins who wrote: "The problem with most pilots isn't that they follow bad procedures. It's that they have no procedure at all." There is no one correct way to fly an airplane, and that goes for using checklists and cockpit flows as well. Although there are

certainly “best practices” that are good especially when a pilot is new to flying or to flying a particular airplane or equipment type, some people are more list-oriented, others work better with mnemonics, and others still adapt quickly to cockpit flows. Put another way, one of the things it took me a while to learn as a CFI is that if a pilot has a technique that works, there’s no need to change it.

It sounds as though you have a well-practiced technique that works for you, and I encourage you to continue the practice. But I also encourage all pilots to consciously evaluate their performance after every flight, paying particular attention to any deviations from the flight plan (altitude excursions, loss of navigation track, etc.) and any items that were forgotten or not completely accomplished (not hitting the LOC button on a GPS before flying an ILS approach, delaying mixture leaning or missing a scheduled fuel tank selection change, forgetting to turn on the transponder before takeoff, etc.). If you start to notice a trend from flight to flight, that’s a good indication you need to add checklist use of some sort (flow, mnemonic, printed list) to your flying regimen.

Reader Michael Daughtery keeps me honest concerning last week’s *LESSONS* about an attempted visual flight into IMC. Michael writes:

> How would flight in class E be legal with the minimums discussed in the article about take off by the 51 year old pilot in IFR weather especially if you don't have an IFR rating. I'm confused. If it's class E at or below 600' it would be controlled airspace.

You’re right, Michael. This was a simple (yet critical) typographical error on my part. The airplane was in Class G (uncontrolled) airspace, where daytime VFR is legal in conditions as low as one mile visibility and clear of clouds. Thanks for prompting me to correct this error.

Reader Don Bowles discusses the same *LESSON*:

> Tom, thanks for the two *LESSONS* in today’s newsletter. The takeaways for me are: low IFR takeoffs don’t make sense regardless of equipment and particularly for a non-IFR or out of practice IFR pilots; and taxi accidents do happen! Thanks most of all for the commitment you make to safe flying!

Thank you, Don!

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 continue 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_histor.pdf

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

Reader David Heberling, a valued participant in the on-going *FLYING LESSONS* discussion of the “GA Top 10,” comments on Scenario #2 of the case histories:

> The CFI stated that he and the private pilot were practicing "engine failures". I have to assume that this was in the traffic pattern, which would require a power off approach and landing. One of the iron rules of pattern flying is “no banks over 30 degrees.” If the downwind leg is too close to the runway, it can be impossible to

adhere to that rule when turning from base to final. If a stiff crosswind is blowing from the downwind leg side of the runway, it is even harder to keep from being blown across the final approach. This CFI waited too long to add power when it looked like the engine out procedure was not going to work.

It seems that we pilots are too willing to make a bad situation work out than to admit defeat by going around and trying again. I say defeat because that is the mindset about going around especially in VFR conditions. That mindset has to change to a positive attitude in order to view the go around as the right thing to do. Sure, CFIs do not want to fly the airplane for their students, but the traffic pattern is not the place to try to finesse things. Corrective action either happens right now or the CFI will do it. The CFI should never be along just for the ride. He may not be the PIC, but he should never abdicate his duties as the professional he is supposed to be.

Thanks, David. In fact, most CFIs are logging Pilot-in-Command (PIC) time even as their students do as well (that's permitted during most flight instruction under U.S. FARs). But whether or not the CFI logs it as such, he/she is the person ultimately responsible for the safe conduct and outcome of the flight. Flight instructors don't seem to be consciously taught their safety responsibility as part of training and evaluation toward the instructor certificate. In fact, I had a long phone call from a *FLYING LESSONS* reader this week who owns a large flight school in the Chicago area, who found he had to develop a post-graduate Flight Instructor indoctrination program after he was frustrated with the lack of practical flying skills and instructional knowledge and capability in recent CFI graduates even from large aviation university programs.

As you'll see below, the U.S. Federal Aviation Administration is embarking on a complete review of pilot training. Perhaps they'll put part of their focus on the need to train and evaluate flight instructors as safety advocates and professional educators, instead of the current rules with a minimum standard of development of lesson plans and demonstrating flight maneuvers from the right seat. Many high-level FAA officials read *FLYING LESSONS*: if I may be of any help in the area of flight instructor training and evaluation (and/or type-specific and transition training) as part of the review of Part 61 and 141 rules, please let me know.

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

Flying has risks. Choose wisely.

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2010 National FAA Safety Team Representative of the Year
2008 FAA Central Region CFI of the Year