FLYING LESSONS for November 15, 2018

by **Thomas P. Turner**, Mastery Flight Training, Inc.
National Flight Instructor Hall of Fame inductee

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.**

Pursue *Mastery of Flight*

This week's LESSONS:

Scenario-Based Survival

AVWeb reports, with my emphasis added:

> A report released by the U.S. Air Force points to pilot error as the primary cause of an Air National Guard WC-130 Hercules crash that killed all nine servicemembers onboard. The accident occurred on May 2, 2018, shortly after takeoff from Savannah/Hilton Head International Airport (SAV) in Savannah, Georgia. According to the USAF Accident Investigation Board report, **the pilots and crew failed to respond appropriately** when one of the aircraft's four engines lost power on the takeoff roll.
>
> In spite of the power loss, the aircraft was able to make it into the air. Almost immediately after takeoff, the problem was identified and the pilot flying made the decision to return to the airport. The investigation concluded that the aircraft was still flyable, but *a series of procedural and aircraft handling failures, compounded by confusion and uncertainty in the cockpit*, led the pilot flying to turn toward the inoperative engine at a low airspeed and higher-than-recommended bank angle. This was followed by a hard left rudder input "which *resulted in a subsequent skid below three-engine minimum controllable airspeed, a left-wing stall, and the [aircraft's] departure from controlled flight.*"
>
> The [USAF Accident Review Board] report lists several factors that contributed to the crash, including *the crew's failure to adequately prepare for emergencies, failure to reject the takeoff, improperly executed after takeoff and engine shutdown checklists and procedures*, and the failure of the maintenance crew to properly diagnose and repair engine.

See:
https://www.avweb.com/avwebflash/news/UPDATED-Nine-Killed-In-C-130-Crash-230765-1.html
https://media.defense.gov/2018/Nov/09/2002061699/-1/-1/0/180502-AMC-MUÑIZ%20AIR%20NATIONAL%20GUARD%20BASE,%20PUERTO%20RICO-WC-C130H-AIB-NARRATIVE%20REPORT.PDF

Often a system failure or other emergency (power loss, ice penetration, etc.) is only the set-up for an eventual crash. Discipline, adherence to procedures, and systems knowledge, backed up with emergency procedures and checklists, will determine the outcome when something goes terribly wrong.

We tend to think of inflight emergencies as isolated events, individual problems to be identified and solved. This is especially true for the vast majority of general aviation pilots who

receive all their instruction in actual aircraft—where it is difficult and at times even impossible to accurately and/or safely present emergency scenarios because doing so it just too risky in actual flight. Lose an engine? Establish Best Glide or "blue line" speed, as appropriate, identify where you will go, maybe glide or maneuver in that condition for a bit, then power up and recover. Electrical fire in flight? Run through the checklist (or "talk your way through the procedure", because you don't want to actually turn off electrical power), then call it good and move on to the next task.

Instead, we need to think about each abnormal or emergency condition as the *first* item in a series of actions and decisions that end with the airplane safely on the ground. Instead of dealing with a simulated problem and then moving on to the next syllabus item, think about everything you'd need to do after noting the new status through and including getting your passengers and yourself out of the airplane on the ground.

For example, that electrical fire might proceed something like this:

- Electrical smoke or fire condition identified.

- Emergency procedure: turn off alternator/generator and battery

- Panel goes dark. Some flight instruments rendered inoperative. Autopilot, if engaged, turns off. Communication and navigation go away.

- Instantaneous transition from autopilot-coupled, GPS-guided flight to hand-flown, partial panel/lost comm flight in a dark cockpit…while still dealing with electrical smoke or fire!

- Continue with the Electrical Fire checklist while hand-flying partial panel. Ventilate the cabin.

- Possible need to enter an Emergency Descent if the fire does not go out. Probable off-airport landing (possibly out of low clouds) or a lost-comm arrival to a runway. After landing and coming to a stop, evacuate the aircraft.

- If the fire goes out, turn everything off (still hand-flying partial panel), then turn on essential items and ensure nothing you restore begins to smoke or burn again.

- Reacquire situational awareness and communication. Select a suitable nearby airport. Acquire information and brief for approach and landing. Reduced-capability descent and approach (possibly in IMC).

- What if the runway environment is not visible at minimums? Do you miss the approach? Do you continue anyway, making a landing (or controlled crash) on or somewhere near the runway?

- After coming to a stop, evacuate the aircraft.

I'm working with an Instrument Instructor candidate who in flight today used a phrase I've repeated many times before: ***"What are you doing now? What happens next? What happens after that?"*** That line of questions is often used to prepare for upcoming actions while proceeding along an instrument approach or missed approach course. Mishap history shows, however, that we should apply the same thinking to teaching, practicing and actually flying abnormal and emergency procedures.

I'm something of an old-school type where the current philosophy of Scenario-Based Training (SBT) is concerned. I wholeheartedly agree that instructors should incorporate realistic scenarios into training. Where I differ from the modern mainstream is that I think we need to hone task-based skills first, and then add scenarios to make it real.

Concert pianists don't go on stage to play a concerto without spending innumerable hours practicing scales and chords. Only when those movements happen almost without thinking do they progress to playing actual melodies and harmonies. They learn the basics, then apply that

learning to advance situations. And the good ones keep practicing the basics throughout their entire career.

Similarly, pilots need to do the same thing: master the basics, then apply them to specific situations. Done well, the pilot can then correlate what he/she has learned and practiced to an unusual situation that presents itself in flight. Every decade or so we find regulators unveiling the latest "back to basics" program, even on the air carrier level…because the basics are *that* important.

Any decent flight instructor has *always* used Scenario-Based Training…when it became appropriate to do so. Practice the basics, then apply them in scenarios. I think we're making good strides doing that in flight instruction.

Where I *don't* see it happening much, however, is in scenario-based abnormal and emergency procedures training. We're sort of stuck in the task-training level there, especially if we train exclusive in actual aircraft. We need to continue to practice and improve on our emergency skills preparedness. But I think we also need to begin taking it to the next level here as well—by thinking about, visualizing and discussing **Scenario-Based Survival**.

When you practice emergencies or study emergency checklists, approach it like that instructor instructor candidate: ask yourself not only *what you'll do now, but also what you'll do next, and what you'll do after that,* all the way to exiting or evacuating the aircraft on the ground.

Questions? Ideas? Opinions? Send them to mastery.flight.training@cox.net
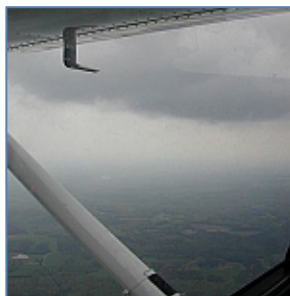
Debrief: Readers write about recent *FLYING LESSONS:*

Reader Wally Moran sent a picture that illustrates the importance of last week's *LESSON*, "[Stickler for the Centerline](#)." Thanks, Wally.

See http://www.mastery-flight-training.com/20181108-flying-lessons.pdf

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

Safety Stand-down Highlights

A Safety Stand-Down is "an organized break from work during which employees voluntarily discuss safety concerns and accident prevention." Safety stand-downs have their roots in military culture (where the participants would "stand down" from their military duties for the discussion), and at least originally were a reaction to an accident or incident. This happens to this day. The concept of a safety stand-down has morphed to become, at least in some cases, into a proactive way to address concerns and mitigations *before* an accident or incident occurs. The Bombardier Safety Stand-Down, which I was able to attend last month, began as a response to an accident also. But it has now become a proactive, forward-thinking driver of safety strategy.

I learned a great deal at this year's event. I'll be drawing from that knowledge in a lot I'll write in the coming weeks and months. For now, however, I'm merely going to quote a few of the presentations from the event. My hope is that you, readers, will respond with your thoughts about these things that were said at the 22nd Bombardier Aircraft Safety Stand-Down.

See https://safetystanddown.com/en

> "The goal is to put the NTSB out of business." – John DeLisi, Director, NTSB Office of Aviation Safety

> "If we're not perceived to be safe, nothing else we do matters." – Doug Carr, NBAA

> "How will *you* transfer what you've learned to the next generation?" – John DeLisi, Director, NTSB Office of Aviation Safety

> "There is nothing normal about excellence." – Tony Kern, Convergent Performance

> "Most of us are quite comfortable at the *Competence* level." – Tony Kern, Convergent Performance

> "Be tough with standards, and soft with people." – J.D. McHenry, Global Jet Services

> "What if we find something that presents a safety hazard? We'd have to change!" – Daniel Mollicone, Pulsar Informatics

I'm sure these sparked some ideas in you like they did in me. Let us know what, at mastery.flight.training@cox.net.

Holiday Exercise

Planning a holiday flight? Make it an exercise in professionalism and judgment. Wherever that puts you for your holidays, enjoy!

<div style="border:1px solid black">
Share safer skies. Forward *FLYING LESSONS* to a friend
</div>

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