FLYING LESSONS for August 19, 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:

There are parts of the airplane that seem almost eternal—we think about annual inspections and engine overhauls and even items like flap motor rebuilds. Airplane owners don't seem to think about the propeller as frequently. A large, heavy, rapidly rotating mass with enormous bending stresses is bound to need periodic maintenance, however.

When a propeller fails it may lose part or all of a blade. The resulting imbalance creates incredible vibration that can rip the engine from its very mounts. The only proper action is to reduce the prop speed to minimum *right away*, then deal with the remaining vibration while you glide to a landing (or if flying a multiengine airplane, shut down the engine and attempt to feather the prop).

Prop failures most commonly result from unaddressed or improperly repaired prop nicks, scratches or gouges; propeller strikes and sudden stoppages; and corrosion, both external and internal to the propeller hub. Some corrosion is invisible until the prop is disassembled, reason enough for scheduled invasive inspections every few years.

Propellers need regular inspection, rebuild and overhaul. FAA Advisory Circular (AC) 20-37D lists recommended metal propeller servicing intervals, including inspection, "reseal"-type maintenance and propeller overhauls. Recommended intervals vary by the prop type and the level of maintenance to be performed, but inspection and repair as necessary should be performed far more frequently than the "at engine overhaul" that seems to be common. In many cases work should be done as often as every five calendar years. The AC also provides information on common prop damage and ways to effect repairs.

See http://home.anadolu.edu.tr/~mcavcar/hyo403/ac20-37d.pdf

If your retractable gear won't extend, first climb away to a safe altitude, well above obstructions, and enter a hold, orbit in a clear block of airspace, or head out on a vector or along a navigation course to give you time to troubleshoot the gear.

Don't try to cycle the gear, i.e. if it hangs up don't retract the gear and then try to extend it again. If the gear didn't go fully down it may be because a rod or strut has bent, creating more resistance than the system can electrically or hydraulically overcome. Try to retract the gear and the bent component may break completely.

Instead, use the alternate gear extension procedure to try to put the gear the rest of the way down. If that doesn't work, try to retract the gear to make a wheels-up landing.

Plan your wheels-up touchdown on the longest available runway, preferably at a tower-controlled airport so rescuers will be able to help you if needed. Unless the Pilot's Operating Handbook instructs otherwise, open a cabin door or emergency exit so you'll be able to evacuate

quickly. Flying a canopy- or gull wing door-equipped airplane? Ensure your crash axe is secure and close by so you can break your way out if the airplane ends up on its side or its back and you can't open the door. Cut the motor and turn off fuel on short final, and turn off the battery and alternator after you've made your last radio call and flap configuration change.

Touch down under control, wings level, at the lowest safe speed and vertical speed. Don't wait to get your passengers and yourself out and clear of the airplane once you've come to a stop. Protecting life and avoiding or minimizing injury are your priorities, not limiting airplane damage or protecting the salvage. Get down, get out, then get safe.

There is risk in all things, most certainly including flying. It's the person who best manages risk who enjoys the longest and most enjoyable flying life. At times we accept risks others would (or should) not, like the instrument pilot who flies over featureless terrain at night when a VFR-only pilot probably should not. Risk management is a personal exercise, and it requires frequent, honest re-evaluation of your abilities to be effective.

Single-engine flight over mountains, or dense forests, crowded cities or large bodies of water doesn't make engine failure more likely. It does, however, make the potential *consequences* of engine failure far more severe. "Always have an out" includes altering your flight path, if possible, to remain within gliding distance of emergency landing spots most or all of the time. Sometimes it means going well out of your way to fly a route with better options should the engine fail.

In this GPS-direct world it's helpful to revisit hand-on-the-sectional and look-out-the-window flying, to be ready to exercise your escape plan to a landing in the very unlikely event of a serious system failure.

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

I'm saving up to make *FLYING LESSONS* even better. Want to help? Donate through a secure Paypal button or by mailing a check to the address at www.mastery-flight-training.com. ***Thank you!***

Debrief: Readers write about recent *FLYING LESSONS*

Reader and 707 captain Syed M.Husain writes about the safety and realism of engine-out work in multiengine airplanes:

> Encounters of engine cuts in multi-engine airplanes in the airline I flew for started with my training to become a captain on Fokker F-27, a twin turbo-prop. We did not have a simulator for this airplane at that time.
>
> On the take-off roll at V1, power was taken off by retarding the power lever to the stop. You were supposed to get airborne while correcting the swing and simultaneously while monitoring, give oral commands of memory items to be carried out, such as raising the gear, maintaining V2+10 and requesting identification of the failed engine at 400 ft. One precautionary step was to always push the HP cock lever forward to the lockout position before bringing it back to open to prevent inadvertent shut down of the live engine, since the positions were: Feather--Shut off--Open--Lockout. The captain was also to keep his hand covered over the shut-off position while this was being done. We also practiced an inadvertent shut down of the live engine when two engines were operating by the First Officer while climbing out and doing the after take-off checklist. This memory item is still retained as TIFR: throttle(back)--Ignition(ignitors on)--Fuel(HP cock open)--Rotation(Start rotation). The engine used to pick up immediately since it was actually shut down. Actual single engine ILS approaches and landings were carried out, threshold landings, circling approaches were all practiced.
>
> On the B747 at Denver with United Airlines, the training was more focused as there was a CPT as well as a full flight simulator. We had one aircraft session where engine failure on take-off was practiced by retarding the power lever back at V1, 3 engine ILS approaches and 4 engine go-around with a simultaneous power cut as you applied power. All this was done in the circuit with touch and go's.

On the B707 it was the same story, the engine cuts (throttle retards) were at V1,though all this was practiced in the simulator before flight training started. I think I had actual flight training of three sessions totaling 5 hours inclusive of command check on the airplane. In fact I had a real hydraulic failure during the check and for the landing a manual gear extension was carried out with the instructor cautioning me that the gear doors were not retracted now and were hanging down. Go arounds with an engine cut as soon as power was brought up and 3 engine ILS approaches were practiced plus circling approaches and landing from an off-set position after getting visual on an ILS approach where you had to manouver and align the airplane to an imaginary point on the centerline of the extended runway.

The point being made is actual aircraft training was more in vogue at that time.

Thanks, Syed. One nice thing about turbines—almost all have a better thrust-to-weight ratio with one dead engine than the piston-powered airplanes in which most of us train.

Reader George Wilhelmsen diagnoses last week's reader story of fuel siphoning through the vents:

Re: the fuel out the vent and loss of a gallon - the reader appears to have inadvertently created a siphon. Gravity will pull the fuel out until the tank reaches a sufficient negative pressure to stop the flow.

Thank you, George. Reader Rick Garner adds:

In the 8/12 issue of Flying Lessons, regarding his fuel venting incident in the Zodiak 601XL, Gus Gillespie states: "The fuel selector in this plane has only left, right and off positions so it wasn't a case of uphill wing pressurizing downhill wing." I wouldn't be so sure Gus. The fuel selector in my 1973 Cessna 177B (Cardinal) has only LEFT, RIGHT, and BOTH positions. If the selector is left in either the LEFT or BOTH position, the fuel tanks can cross feed through the vent plumbing. On uneven ground, this will produce the exact symptoms you observed with the Zodiak. Most pilots would logically assume that any position other than BOTH would prevent cross feed, especially if there is no OFF position. To make matters worse, this is not documented in the Cardinal POH and it is not obvious when looking at the fuel system schematic. Cardinal drivers usually learn the hard way to leave the fuel selector in the RIGHT position after shutdown (ask me how I know). Keep up the great work!

Thank you, Rick. And reader Andrew Reardon writes on the *LESSONS* on controlled flight into terrain:

It would seem that this risk of CFIT might increase when two conditions coalesce: flying westbound coupled with the use of GPS and flying "direct". By way of specific example, I fly frequently from the East Coast to my home base, Cincinnati's Lunken Airport. The combination of using GPS off-airways and flying at lower altitudes when proceeding westbound (to avoid the higher prevailing winds at altitude) increases the risk of CFIT. Hence greater vigilance is required when doing so.

Thanks for your ongoing contribution to flying safety!

Thank you, Andy!

FAA Administrator Randy Babbitt (left) presents the author with the 2010 National FAA Safety Team Representative of the Year award after a long, hot day at Oshkosh, Wisconsin, July 28th.

Thanks, readers, for your support that led to this award.

From the FAA

Special Airworthiness Information Bulletin (SAIB) CE-10-33 revision 1 reminds airplane owners to inspect muffler-type heat exchangers on single-engine airplanes, and proactively replace them at 1000 hours time-in-service, to avoid the hazard of carbon monoxide poisoning. According to a study conducted by Wichita State University, in "CO-related cases where the muffler was identified as the source of the CO leakage, 92 percent had a muffler with more than 1,000 hours of service." SAIBs are not mandatory but provide guidance for avoiding a repeat of mishap history.

See http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgSAIB.nsf/(LookupSAIBs)/CE-10-33R1?OpenDocument.

Information for Operators (InFO) letter 10014 reminds us of a change to controller phraseology meant to help reduce the number of runway incursions at tower-controlled airports. The term "position and hold" will now be replace with "line up and wait" to comply with ICAO phraseology and, hopefully, distance the terms "*hold* short" from "taxi into position and *hold*." InFOs "contain valuable information for operators that should help them meet certain administrative, regulatory, or operational requirements with relatively low urgency or impact on safety."

See www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2010/InFO10014.pdf

Question of the Week

Thanks to all who have provided insightful answers to our four-part question that addresses the instructional approach of *FLYING LESSONS*. It's always healthy to challenge your assumptions, so let's see what readers had to say about Question #2, which is…

Do you believe flying is inherently dangerous, requiring constant study and practice to be an acceptable risk?

Here's what you said:

- I do not think of flying as inherently dangerous. There are risks involved. We must constantly study, practice, learn from others, used check lists for most critical functions (this list could go on for pages and not cover everything): what it boils down to is there is no limit to vigilance, correct decision making, constant/continual training, and on and on!
- It's as risky as you let it be. An important principle in managing risk is controlling what we can so as to reduce the relative influence of what we cannot control. For example, studying weather and its effects on our lifestyle is under our control; the weather itself is not. But, a greater understanding of weather helps us control ourselves and our flying in ways that help us reduce risk. I've heard it said that a good pilot is always learning. Applying what we learn, however, is just as important.
- No, flying is not dangerous. Crashing is dangerous!
- Yes.
- Not constant, but regular on a timely basis.
- Driving a car or taking a shower is inherently dangerous. It doesn't stop the vast majority of people from doing those things. I'm sure flying is statistically some what riskier, but how much? Stay current, avoid bad weather, and leave any macho attitudes on the ground, that should go a long way to mitigate against the riskier nature of flight.
- Absolutely- flying is inherently dangerous, if one doesn't appreciate that and actively maintain proficiency bad things are likely to happen. In my opinion, the majority of accidents attributed to "pilot error" are due to lack of planning, proficiency, or situational awareness on the part of the involved pilot. Complacency leads to sloppy flying habits which can kill you!!
- As a famous quote says, it is not inherently dangerous, just very unforgiving.
- Almost anything done by humans using technical gadgets involves risk. Those *FLYING LESSONS* issues which help to improve the skills and acumen of pilots and which help to prepare the airplane prior to takeoff are useful, as they reduce the probability of emergencies in flight. (Hardly anyone has the time to think of all those accident reports during the split second-decisions in an emergency).

- Yes. Using engineering terms, there is no “steady state” or “stable” condition for the human body while it is airborne.
- Yes.
- Flying requires constant skill and practice and in absence of these, it acquires an increase in the chance factor which can lead to a mishap. There is no room for complacency and constant mental rehearsing of the relevant SIDs and STARS, instrument let downs and taxi patterns on the ground before every flight assures a degree of safety and confidence.
- No to the first part, Yes to the second. As in my medical career, case studies and risk management are a way of life. This does not make the activity any more risky. There are elements of risk in most human endeavors.
- The risks associated with flying are not constant for all phases and types of flight. Local VFR daytime flight is substantially less risky than low IFR nighttime flight in mountainous terrain. So the challenge is to maintain proficiency for the phase and type of flight anticipated and recognize and accept that I may not be prepared or comfortable with the conditions presented for a particular flight. Personal minimums also play a part in managing risk. It gives me an opportunity to define my comfort level in the cockpit while I am outside the cockpit and not influenced by "get thereitis" and the other pressures to which we all fall victim. As an example, I am not willing to accept the extra risk associated with nighttime IFR, so I have a personal minimum that I will not plan a night flight that anticipates an instrument approach. For me, less practice is needed to stay proficient for daytime VFR. I spend most of my study and practice staying proficient for IFR operations. I had an instructor tell me once that a pilots confidence will leave him before his ability. I find this to be true for me. I practice and study to maintain my confidence that I can shoot that low approach, to reassure myself that I can still do it correctly and with the desired outcome.
- Flying is indeed dangerous. Driving a car is dangerous. Riding a horse is dangerous. The list goes on and on….however, you will find that only pilots engage in constant review and study to mitigate the risks of their activities.

Great discussion! There’s still time to chime in on these related questions, at mftsurvey@cox.net:

3. **Does *FLYING LESSONS* go too far in presenting lessons to be learned from the mishap record?**
4. **Can we accomplish the same thing (avoiding repeats of common accident causes) differently, and if so, how?**

I’ll continue featuring your answers to each of the four questions next week in *FLYING LESSONS*. 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