FLYING LESSONS for July 23, 2009

suggested by this week's aircraft mishap reports

FLYING LESSONS uses the past week's mishap reports as the jumping-off point 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.

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This week's lessons:

Hard landings continue to be a frequent contributor to aircraft damage, often "totaling" airplanes. A hard landing is any where the airplane impacts at a rate of descent greater than normal. Hard landings can (and do) cause:

- "Spreading" of spring-type landing gear, bouncing the airplane back into the air at a critically slow airspeed when the landing gear rebounds.
- Blown tires, frequently followed by loss of directional control
- Damage to the mounting of components and accessories in the airplane, especially heavy items with a long mounting arm such as starter motors, batteries, etc.
- Propeller strikes, in airplanes with little prop clearance.
- Overstressing the landing gear itself, with possible short- and long-term chances of failure

What causes hard landings? Hard landings result when:

- The pilot does not flare to touchdown speed before impacting the runway. Note: in many heavier, especially turbine designs, aerodynamics make it preferable to "fly the airplane on" to the runway with power in lieu of a flare. Use the procedure appropriate for the airplane you're flying.
- The pilot flies at too slow an approach speed. Landing at too low an airspeed, at a high angle of attack, may provide insufficient control authority to overcome the sink rate. The airplane then continues at a high rate of descent to the ground.
- The pilot flares too high, slowing the airplane to or near stall speed at too high a height above the runway. The airplane then sinks or stalls onto the ground. This is common at night when runway lights project a false runway plane—it looks like the surface is defined by the lights, when in fact the height of the lights themselves makes this perceived surface a foot or so above the runway.

See a hard landing developing? Chapter 8 of the *Pilot's Handbook of Aeronautical Knowledge* gives this guidance:

- Power can be used to compensate for errors in judgment. Apply power to accelerate the airplane and increase lift to reduce the sink rate and prevent a stall. This should be done while still at a high enough altitude to reestablish the correct approach airspeed and attitude.
- If you are rounding out too high, hold the pitch attitude constant until the airplane decelerates enough to again begin descending. Then resume a normal round-out. This procedure should only be used when there is adequate [or excessive] airspeed.

- If too slow and too low, EXECUTE A GO-AROUND.
- GO AROUND any time the nose must be lowered significantly [to land] or that the landing is in any other way uncertain.

I'll add to this what I learned in U.S. Air Force flight qualification training: If the airplane bounces as a result of a hard landing and you are at an airspeed and attitude above the runway from which a normal round-out may be completed (perhaps with a little burst of power), *and* if sufficient runway remains, then consider a second flare and touchdown. If the airplane is slower than it would normally be in a flare, the nose is higher than normal, or if the runway remaining is short, go around after the first bounce. Regardless, if the airplane bounces a second time, do not attempt a third touchdown—GO AROUND.

See www.faa.gov/library/manuals/aircraft/airplane_handbook/media/faa-h-8083-3a-4of7.pdf

A staple of flying retractable-gear airplanes is the GUMP check—Gas, Undercarriage, Mixture, Prop (Sometimes an S is added, for Switches, usually in airplanes where it's appropriate to turn fuel pumps on or off for landing). GUMP is designed to help a pilot easily check the proper configuration for landing.

The G for Gas is not intended, however, to mean the fuel tank selection should be changed in the traffic pattern, close to the ground. Instead, it is a *verification* that the proper tank was selected prior to entering the traffic pattern.

There are many documented cases when the pilot changed tank selection on downwind, when most are taught to complete GUMP, but the new tank is empty or the selector handle isn't put precisely into the correct position and the engine starves of fuel. So close to the ground, it may not be possible to recognize the engine failure, make the proper correction, and for the engine to respond before impact.

Before you begin descent from cruise altitude, select a tank with sufficient fuel for descent, approach, landing, and if needed a go-around or missed approach and climb back to altitude. Use GUMP to *check* landing gear, mixture and propeller control position, as appropriate, but do not *change* your fuel tank selector in the traffic pattern.

Questions? Comments? Email me at mastery.flight.training@cox.net

DEBRIEF

We had a lot of great reader comment this week. On a recent *FLYING LESSON* about the need to high-speed taxi runs as a maintenance procedure, reader Bob Siegfried reminded me that high-speed runs and hard braking are part of the recommended break-in procedure for new brake discs and pads. Thanks, Bob!

Regarding last week's discussion about the insurance implications of shop pilot qualifications Avemco president Jim Lauerman confirms that, across the entire aircraft insurance industry, "the biggest single cause of claim denials over the years is unauthorized operators."

About recent *FLYING LESSONS* on unusual attitudes recovery aircraft owner and reader Bill Caton passes along: "I learned from a good friend and jet pilot today: ALWAYS fly with your feet on the rudders. Should you hit a negative g situation you would not be able to pull your feet from the floor in an attempt at recovery."

Thanks, everyone, for the great comments and additions to *FLYING LESSONS*!

QUESTION OF THE WEEK

July Question of the Week #3

You still have a chance to win your choice of a Mastery Flight Training hat or the instructional DVD *Those Who Won't: Avoiding Gear Up and Gear Collapse Mishaps.* Just answer this Question of the Week to be included in the random drawing for July:

> **How do you get weather updates while en route? How reliable have you found the information you receive?**

Copy and paste the questions with your responses to MFTsurvey@cox.net…then come back to read the rest of *FLYING LESSONS.*

Last week we asked how you receive *FLYING LESSONS,* and how you'd *like* to receive the report. We had a great deal of reader response, and the results are interesting. Almost without exception, those who receive the full report by email want to continue to do so, and those who receive an email reminder then read the report at www.thomaspturner.net want to keep doing that. For now at least, then, we'll not change the delivery and satisfy either preference.

Several of you took the opportunity to comment about *FLYING LESSONS*. Here's what some of you said:

- Very helpful and thought provoking.
- I provide FIRC's and pilot briefings on a regular basis and find your topics to be very interesting and educational.
- I like the weekly email "reminding" me to read. Thank you for all you do.
- I really appreciate your articles and look forward to them.
- Keep up the great work. The more exposure to these items we get, the more likely they might stick in our "fragile" brains!
- The email is like an alert to remind me to read this and apply myself to safety.
- Thank you for all you do for the aviation community. It is much appreciated....and....you are making a difference.
- I learn heaps from this!
- I look forward to these emails arriving every week.
- Truly worthwhile reading.

Thanks, all, for the great feedback. Several of you also had ideas for improving *FLYING LESSONS*; I hope to respond directly to you soon.

Mastery Flight Training seminars at Oshkosh
Please join me and your fellow *FLYING LESSONS* readers for:

- *Keep it on the Runway: Mastering Directional Control* Wed., 7/29 at 2:30 pm in EAA Forum Pavilion 4.
- *The First 60 Seconds: Performance in Transition* Sat., 8/1 at 1 pm in EAA Forum Pavilion 4

See you at Oshkosh!

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

Fly safe, and have fun!

Thomas P. Turner, M.S. Aviation Safety, MCFI
2008 FAA Central Region CFI of the Year
