

# **FLYING LESSONS** for September 24, 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.

**If you wish to receive the expanded weekly *FLYING LESSONS* report emailed directly to you, email "subscribe" to [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net).**

*FLYING LESSONS* is an independent product of MASTERY FLIGHT TRAINING, INC. [www.thomaspturner.net](http://www.thomaspturner.net)

## ***This week's lessons:***

**Control difficulty may result** from a mechanical failure of part of the control system due to corrosion or use factors; control cable interference behind the instrument panel or from items improperly installed or left along control routings; maintenance/inspection errors; or failure of the pilot to remove the control gust lock.

**A "Controls...Free and Correct" check** as part of your Before Takeoff checklist may not protect against all of these causes (if the failure or interference occurs after the check), but it can detect some failure modes—so it's a vital check before every takeoff.

**Even if within the loading envelope**, if you do not apply appropriate control force at liftoff an aft center of gravity will tend to cause the airplane to pitch up early and excessively. Angle of attack and drag will increase to the point the airplane may not climb out of ground effect.

**Add an early gear retraction** in RG airplanes, when gear door transit and perhaps tire orientation to the relative wind adds even more drag, and the airplane may quickly settle back to the ground.

**When taking off with a large aft cabin payload** (assuming the center of gravity is still within limits):

- Set the trim properly in accordance with Pilot's Operating Handbook guidance;
- Ensure the aircraft attains the proper liftoff speed before letting it take off; and
- Be ready for a need for reduced back pressure compared to more forward-loaded takeoffs, and possibly the need to apply forward control pressure to resist an excessive nose-up tendency.

### **On all takeoffs:**

- Aim for the proper attitude and airspeed for initial climb (at  $V_x$ ,  $V_y$  or some other speed as conditions dictate);
- Ensure the airplane attains and maintains a positive rate of climb before changing aircraft configuration (retracting landing gear and/or flaps as appropriate), or adjusting power setting.

**Airplane handling with passengers and baggage** in the aft cabin may differ significantly from how it handles in a typical pilot-and-instructor aircraft checkout. Instructors,

include at least discussion of handling differences with different cabin loadings, if you are unable to provide actual checkout training in different c.g. configurations.

**Shoulder harnesses**, if installed, are required to be worn by everyone aboard, passengers included, for ground operation, takeoff and landing ([FAR 91.107](#) and most non-U.S. equivalents). I cannot stress enough the need for installing shoulder harnesses if you own the aircraft and they are not already installed in the aircraft—*FLYING LESSONS* has reported many serious and fatal injuries brought on by head trauma when front-seat occupants do not have (or use) shoulder harnesses in an otherwise relatively low-speed impact.

See:

<http://ecfr.gpoaccess.gov/cglt/text/text-idx?c=ecfr&sid=333e5a7c7c002b8d5dd006e264156d21&rqn=div8&view=text&node=14:2.0.1.3.10.2.4.4&idno=14>

Questions? Comments? Email me at [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net)

## DEBRIEF:

Regarding the on-going discussion of fuel-related mishaps reader Paul Zayat adds:

We had an Airbus recently with a failed fuel gauge that lied to the high side. It caused an under-fueling for the next leg, which led to a landing with minimal fuel. Moral of the story:

- 1) Don't assume what your gauges say when you landed with is what is actually in the tanks before the next departure, even if you flew it in - do a visual [check of the tanks];
- 2) Monitor fuel en-route with some simple math - fuel on board at departure minus fuel burned (fuel burn per hour for your aircraft X time) equals fuel you should have left. If your calculation does not match fuel gauges, then do some investigating and be leery, and
- 3) This is a good reason to match flight plan fuel remaining with actual fuel remaining to catch problems early and land if need be.

Thanks, Paul. It's not just inexperienced pilots who need to confirm fuel load by all means necessary before takeoff, monitor fuel burn en route and track fuel indications against planned expectations.

Retired FAA engineering test pilot and aeronautical engineer Ben Sorenson writes:

I really enjoy your flight lessons. However, your discussion about c.g. leaves out the main reason performance decreases with forward c.g. When the c.g. is forward, the tail loading increases to offset the forward moment. This tail loading increase (downward lift) requires that the wing lift more. This creates more wing and tail induced drag that must be countered. Just needed to throw in some comments.

Thanks, Ben. Good information. I was close with the discussion of increase angle of attack, but it's good to have a more precise engineering explanation. As you've seen, the issue of aft c.g. has unfortunately come up again this week.

Do you have a question or comment? Email me at [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net).

## Don't freeze up in the clouds

Cool weather is blowing in for our Northern Hemisphere readers...and it's not quite yet gone for our friends south of the equator. Before you venture into potential icing conditions, consider these online educational opportunities:

- AOPA Air Safety Foundation's [WeatherWise: Precipitation and Icing](#). Quoting AOPA's website:

Too many pilots underestimate the dangers of precipitation and icing—and an alarming number become accident statistics as a result. Take this course to learn how to recognize the hazards of

precipitation and ice, develop a strategy for avoidance, and react appropriately if you encounter unexpected conditions.

- Another AOPA ASF course, [Accident Case Study: Airframe Icing](#).

Ride along for this chilling re-creation and analysis of an accident that occurred when the pilot of a Cirrus SR22 encountered unforecast icing over the Sierra Nevada mountains.

There's a host of other airframe ice educational material available, which we'll highlight in the coming weeks. Until then, do your homework...take the free AOPA Air Safety Foundation icing courses.

See:

<http://flash.aopa.org/asf/wxwise%5Fprecip/>

<http://flash.aopa.org/asf/acs%5Fairframe%5Ficing/>

## Guest editorial

In addition to this month's regular magazine features, read my guest editorial, "Fly Casual," in this recent issue of [General Aviation News](#).

See [www.generalaviationnews.com/?p=12166#more-12166](http://www.generalaviationnews.com/?p=12166#more-12166).

## Coming events

See if you can attend this upcoming *FLYING LESSONS* presentations:

- Saturday, October 17<sup>th</sup>. Beech Aero Club BACFest, Gatlinburg, TN. Topic: "When Your Airplane is Older than You Are: Safely Flying Aging Aircraft." Contact [BAC](#) for convention registration.

See [www.beechaeroclub.org](http://www.beechaeroclub.org)

Thanks to everyone who attended my presentation "What *Really* Happens in IMC" at the General Aviation Manufacturers Association Aviation Safety Investigator (ASI) course this week in Wichita, KS. Welcome aboard to all who became new subscribers as a result.

Watch for additional *FLYING LESSONS* events later this year and in 2010. Contact [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net) if you'd like to arrange a presentation at your conference, FBO, safety meeting or flying club.

Do you have a question or comment? Email me at [mastery.flight.training@cox.net](mailto: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



*FLYING LESSONS* is ©2009 Mastery Flight Training, Inc. Copyright holder provides permission for *FLYING LESSONS* to be posted on FAASafety.gov. For more information see [www.thomaspturner.net](http://www.thomaspturner.net), or contact [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net) or your FAASafety representative.