

## **FLYING LESSONS** for October 1, 2009

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

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

**Fuel awareness** requires you keep accurate records using several independent means. Pilots make totalizer data entry errors; ground handlers make fueling errors or sometimes forget to add fuel altogether; in many airplane types you cannot determine fuel load visually if the tanks aren't very nearly full; fuel burn may vary from flight to flight; and aircraft fuel gauges are notoriously inaccurate.

**In a two-airplane operation** with multiple pilots (i.e., lots of opportunity for confusion) I learned to track fuel load by comparing:

- A visual check of fuel levels in the tanks
- The indications on cockpit fuel gauges and wing-mounted fuel sight gauges
- The "fuel remaining" amount from an installed fuel totalizer
- The amount of fuel I personally put into the tanks, or watched being added, prior to the flight
- Fuel records, compared to the engine tach time when the fuel was added (we wrote tach time and fuel added at each refueling in a record kept in the airplane).

**If any one of these fuel status checks** differs noticeably from the others, the only means to resolve the discrepancy is to add fuel until it is at a level known to be sufficient to complete the flight with reserves.

**This operating technique is especially helpful** if the flight requires a less-than-full fuel load for weight and balance purposes or for improved performance. The crosscheck is vital if another pilot has flown the airplane last.

**Once airborne**, monitor fuel state and crosscheck expectations against actual fuel burn and progress along your route. Different power and mixture settings, or slower-than-planned ground speed, will affect your fuel reserves. Don't forget to occasionally check the trailing edge of the wing behind fuel caps and vents for any signs of fuel venting overboard in flight.

**Fuel status tracking is even more important** if you're flying an airplane with multiple fuel tanks. Many airplanes have a fuel return that may or may not go to the tank in use, creating a situation where fuel may be wasted overboard if the return-fuel tank is over-filled. Most airplanes with auxiliary fuel tanks limit their use to straight-and-level flight only. If you have to move a fuel selector, you need to actively monitor fuel state for each tank individually. *FLYING*

*LESSONS* has seen many instances when a tank was run completely dry in flight and the pilot was unable to get the engine restarted on a tank containing fuel.

**Don't be too quick** to dismiss a fuel gauge showing the fuel level is lower than you'd expect—it just may be telling the truth. You might even have to land early to double-check the fuel load if a discrepancy arises between indicated fuel level and your flight planning expectations.

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

### Coming events

Plan to attend these upcoming *FLYING LESSONS* presentations:

- **Saturday, October 17<sup>th</sup>, Gatlinburg, TN:** Beech Aero Club BACFest. Topic: "When Your Airplane is Older than You Are: Safely Flying Aging Aircraft." Contact [BAC](#) for convention registration.
- **Saturday, December 12<sup>th</sup>, Denton, TX:** *FLYING LESSONS* hosted by Aircraft Precision Maintenance. Check [here](#) for complete details.

See [www.beechaeroclub.org](http://www.beechaeroclub.org), [www.thomaspturner.net/Denton%20Dec%202009.pdf](http://www.thomaspturner.net/Denton%20Dec%202009.pdf)

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.

## DEBRIEF:

Readers comment on past *FLYING LESSONS*

Continuing the *LESSONS* above, reader George Boney writes:

A good deal of my flying resulted in topping the tanks at the end of the trip. On any trip that I was going to top the tanks, I made a bet with my right seater on how much it would take to fill the tank(s). Then I would tell the lineman to remember what the first tank took and subtract that from the total to get the second side.

What you are trying to establish: the pilot should always know how much fuel is in the tanks. This does several things:

1. It makes you monitor the fueling process. If the lineman stops filling early or the truck hiccups, you catch it because the fuel does not match what you expected.
2. If you are off in your estimate, take the difference (say 3 gallons), convert that to time at cruise (12/hr=>15 min), and think about what you would have done differently if you had 15 minutes less reserves.
3. It develops a habit doing things (thinking about what the FF says, not just that it is in the green, thinking about where the mixture control is set, ...) so you are continually estimating how much fuel are burning and how much you have in the tanks. (It made me buy a calibrated fuel stick so I would know exactly how much fuel I had at takeoff).

Great columns, thanks.

Thank you, George. That shows a very high level of fuel state awareness. If the situation warrants something other than topped-off fuel tanks your strategy also helps retain that awareness.

Recently accredited Master CFI-Aerobatics Tony Poundstone also wrote about *FLYING LESSONS*:

Concerning the "Free & Correct" [Before Takeoff] control check: I see many pilots do a right-left aileron check and then a fore-and-aft elevator check. If you don't go to "All Four Corners of the Box" with the stick or wheel, you'll never know if it's going to jam when you need to pull hard back and to the side for whatever reason. I teach a lot of aerobatics, and when I bring this up with a new student it is often the first time anybody ever told them that! If you watch the Navy guys firing off a catapult, the last thing you'll see is a full and vigorous excursion to all control limits prior to the salute-and-shoot sequence!

I have the same discussion with all my Bonanza/Baron checkout clients--and it's usually the first time they heard of it too. In a yoke-type airplane it's all the way over (left, with the yoke fully forward), all the way back (still holding full left aileron), all the way over (to the right, while stick is full aft), all the way forward (while holding the aileron full right), then back to neutral. In most airplanes on the ground the yoke stays fully forward against the stops when released. Thanks, Tony, and congratulations on your accreditation.

## Cockpit Technology Surprises

NASA's newest Aviation Safety Reporting System *Callback* newsletter warns:

As more General Aviation aircraft are equipped with autopilots, GPS, and glass cockpit displays, ASRS is also hearing more about pilots' "learning curve" with technology that has long been standard in air carrier cockpits. GA pilots increasingly experience equipment-related altitude busts, track deviations, and other incidents. This month we present both GA and air carrier reports that demonstrate the need for pilots to:

- Understand how advanced systems execute commands before using these systems in flight.
- Monitor the airplane's flight path when ATC issues clearance changes that require re-programming.
- Resist the urge to extensively troubleshoot automation that is not working as expected.

Read this vital guidance at [http://asrs.arc.nasa.gov/publications/callback/cb\\_356.html](http://asrs.arc.nasa.gov/publications/callback/cb_356.html)

## What does this mean?

Recently I polled *FLYING LESSONS* readers and found that the economy has curtailed your flying somewhat—you're training as often as before, according to responses to the poll, but you're flying less. AOPA reports [100LL sales dropped 14%](#) in 2008 versus 2007, supporting this contention. "Numbers for center and tower operations are the lowest they've been in ten years," according to AOPA. What, then, does this [report from the NTSB](#) mean?

Aviation deaths increased slightly from 550 to 572 [in 2008, compared to the previous year]. Nearly 87 percent of aviation fatalities occurred in general aviation accidents (495), which was almost unchanged from the previous year (496).

We're flying less, but the number of general aviation deaths remains constant. What does that tell us?

See

[www.aopa.org/whatsnew/trend.html](http://www.aopa.org/whatsnew/trend.html)

[www.nts.gov/Pressrel/2009/090929.html](http://www.nts.gov/Pressrel/2009/090929.html)

**A page worth reading:** "[Faulty Pilot Thinking](#)" by Ralph Butcher, in the October 2009 *AOPA Flight Training* magazine. [http://flighttraining.aopa.org/ft\\_magazine/fullstory.cfm?id=8453&issue\\_title=October%202009](http://flighttraining.aopa.org/ft_magazine/fullstory.cfm?id=8453&issue_title=October%202009)

# Ice Season

Icing season is coming...or depending on where you are, it may already be here. South-of-the-equator readers may still have a few weeks—or more—of icing hazard. Last week *FLYING LESSONS* suggested review of some ice training available from the Aircraft Owners and Pilots Association's Air Safety Foundation. Did you do your homework?

Continuing our ice-avoidance review, this week *FLYING LESSONS* recommends these free educational opportunities from NASA:

## [A Pilot's Guide to In-Flight Icing](#)

With an operational focus, this course provides tools pilots can use to deal with in-flight icing. Learn about:

- Types and intensity of icing by type of weather system
- Aerodynamic effects of different type of icing
- Why freezing rain does *not* necessarily mean ice-free air aloft
- The icing conditions that *aren't* included in "known ice" certification

## [A Pilot's Guide to Ground Icing](#)

A course primarily intended for pilots who make their own operational de-icing and anti-icing decisions.

See:

[http://aircrafticing.grc.nasa.gov/courses\\_inflight.html](http://aircrafticing.grc.nasa.gov/courses_inflight.html)

[http://aircrafticing.grc.nasa.gov/courses\\_ground.html](http://aircrafticing.grc.nasa.gov/courses_ground.html)

So...there's your homework assignment for this week.

## QUESTION OF THE WEEK

### October Question of the Week #1

This week's question comes from a *FLYING LESSONS* reader who asks:

**Have you ever had a "near accident" as a result of GPS or other navigation system programming? What did you learn from the experience?**

Win your choice of a Mastery Flight Training hat or the instructional DVD [Those Who Won't: Avoiding Gear Up and Gear Collapse Mishaps](#). Answer this Question of the Week to be included in the random drawing for September. Copy and paste the questions with your response to [MFTsurvey@cox.net](mailto:MFTsurvey@cox.net)...then come back to read the rest of *FLYING LESSONS*.

Thanks, readers, for your suggested Questions of the Week. Keep 'em coming.

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



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