FLYING LESSONS for December 10, 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 free, expanded *FLYING LESSONS* report each week, email "subscribe" to mastery.flight.training@cox.net.

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This week's lessons:

As a simulator instructor I put hundreds of piston single-engine and twin pilots through a series of decision-making scenarios. Among pilots who chose or were forced to divert in cruise, I saw some very consistent patterns in their selection of en-route alternate airports. Most pilots I saw, when faced with choosing a diversionary airport, picked one of these three options:

- **The departure airport.** Whether from familiarity or a sense that it'll be more convenient to go back to the point of origin, many pilots seem to want to return to the departure airport if the flight has progressed less than roughly half an hour or so.
- **The original destination.** Pilots by nature are a goal-oriented lot. We revel in overcoming a problem, and lionize those who get to destination regardless of the odds—or especially, by overcoming them. In my experience many pilots will press on toward a destination an hour or more away, even when partial panel, or with one propeller feathered, or if picking up a load of ice (all simulated, of course).
- **The closest airport directly beneath or ahead of the airplane.** Another common pattern is selecting the nearest airport almost directly along the route of flight. The "direct-to" feature of GPS and many LORAN navigators is a tremendous aid to making an emergency alternate decision, when you have no choice but to land *now*. But it might suggest we pick the closest option, not necessarily the best.

Often there's another choice. In one of my "favorite" simulator-based decision-making scenarios was a flight from Wichita to Kansas City, about an hour's duration in the aircraft being emulated. Once the client was established in cruise I'd present an abnormal condition—an alternator out light in single-engine airplanes, slowly rising oil temperature on one engine in twins—while at the same time the airplane began to pick up some unforecast ice. Wichita, the departure airport, was rapidly headed toward low IFR with increasing surface winds, and Kansas City was still 45 minutes away. Newton and Emporia, Kansas were both just above minimums but almost directly along the route of flight. Almost everyone picked one of those three options. Available for the asking was weather at Salina, Kansas, about 90° off courseline but only about 15 minutes away—scattered clouds and rapidly clearing, with surface winds right down the 12,300-foot runway. But in four years of presenting this scenario almost *no one* asked for or listened to weather off the original course, or chose Salina as the best option for an alternate.

You have choices—lots of them. Think about your flight not as a line from point to point, but instead as a moving circle centered on your airplane, the radius of which equals your remaining range (adjusted as necessary for winds aloft). If you need to change plans en route, investigate conditions everywhere within that circle before making your choice.

Asymmetric flap extension may be one of the most difficult conditions to identify, especially in a high-workload environment. If the systems of your airplane permit, retract flaps or match flap extension to remove the asymmetry.

In single-engine airplanes pilots will naturally roll in aileron and apply rudder to counter the asymmetry. As long as control authority is adequate the flight should arrive safely. Find the longest available runway with the lowest possible crosswind, and keep your speed up to touchdown to retain control.

But in twins we are spring-loaded to equate uncommanded roll and yaw to a failed engine. An extended flap behind an engine creates tremendous lift, especially if the failure occurs at a high power setting like takeoff or a go-around/missed approach.

Let's say the right flap is down and the left flap is up. Added lift from the right flap rolls the airplane to the left. As a well-trained multiengine pilot when the asymmetry first occurs you apply right rudder and aileron to prevent the roll—just like you are trained to do in case of an engine failure. Using the "dead foot, dead engine" technique you "identify" the left engine as failed because you're stomping hard on the right rudder. And if you act quickly you feather the left propeller…which removes the power holding the left wing up against the extended right flap, and the airplane rolls uncontrollably to the left even as you hold rudder and aileron to the right.

Even at critical points of the flight like takeoff and climbout, if you detect an engine failure, control pitch, roll and yaw as trained. This gives you a brief but necessary moment to confirm the engine failure. "Identity" with the dead-foot technique, then "verify" with the throttle. Pull the "dead engine" throttle sharply aft—if there is *any* change in the amount of rudder/aileron input needed to stay on heading then you have not verified, but instead have *refuted* that the identified engine is dead.

Scan the EGTs—a failed engine's exhaust gas temperature will drop precipitously. If temps are still on target the engine has not failed, and something else is causing the problem…something like an asymmetrical flaps extension. Aim for the longest available runway that's most closely aligned with the wind.

Landing is the action of combining speed, power, airplane configuration and descent in appropriate proportions. Your airplane will behave the same regardless of what the instruments say. If the airspeed indicator fails, use your experience combining configuration, power and glidepath control to net the appropriate airspeed. With a clean airframe losing an airspeed indicator should be a minor event.

If the airframe is iced up and the ice blocks the pitot tube, however, it will take all your experience to get safely on the ground. Like in other emergencies (and landing with a coat of airframe ice *is* an emergency), aim for the longest available runway most closely aligned with the wind. Limit flap extension to avoid a tailplane stall, and work the power back in small amounts while maintaining a normal-looking descent angle.

If controls begin to get sloppy or you feel the first burble of a stall, add an inch of manifold pressure or a hundred rpm or so while holding the same pitch attitude, and use that as your final approach speed and configuration. Carry power and attitude until the wheels touch down—this technique will likely cause you to use a lot of runway, but that's the cost of safely arriving from an icing emergency.

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

This week! *FLYING LESSONS* comes to North Texas

Saturday, December 12th, Denton, TX: *FLYING LESSONS* is hosted by Aircraft Precision Maintenance, Inc. The day-long program includes:

- Running out of fuel: Lessons from three case studies
- Keep it on the runway: The lost art of directional control
- A pilot's guide to aviation insurance
- Those who won't: Avoiding gear up and gear-collapse mishaps
- What *really* happens in IMC

Check here for complete details. Contact Aircraft Precision Maintenance at 940-765-7975 or Wesley@apmtx.com to enroll.

See www.thomaspturner.net/Denton%20Dec%202009.pdf

Watch for additional *FLYING LESSONS* events in 2010. Contact 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*

Some time back *FLYING LESSONS* discussed how Air Traffic Control commonly will not provide an in-flight IFR clearance until the airplane has reached Minimum Vectoring Altitude (MVA). Veteran controller and *FLYING LESSONS* reader Norm Scroggins has been following up on the FAA's policy, and this week checks back in:

> Pilots do not have to be at Radar Minimum Vectoring Altitude to Receive IFR service. FAA Air Traffic Procedure/Regulations are still applicable to non-radar handling of IFR Flights.
>
> I [stress] pilot responsibility [for] maintaining appropriate terrain and obstacle separation within a non-radar environment EVEN WHERE established in the airway structure at or above airway [minimum] altitudes. In other words, ensure [you are] at or above MSA.
>
> Non-radar situations still exist throughout the Air Traffic Control System.....worldwide. Air Traffic Control's primary function is to provide separation of your [IFR or participating VFR] flight from other controlled traffic. [If you are advised by ATC] that you must be at MVA before receiving a clearance. If such occurs, please provide details/date/time/location through [Mastery Flight Training] and I'll be glad to discuss the matter with FAA.

Thanks, Norm. In summary, IFR clearances should be available in all controlled airspace, even if below MVA. Terrain clearance below MVA is the pilot's responsibility unless the aircraft is established on a published IFR departure, en route or arrival procedure.

Do you have a question or comment? Email me at mastery.flight.training@cox.net.

Fly safe, and have fun!

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2008 FAA Central Region CFI of the Year