FLYING LESSONS for November 11, 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. You are pilot in command, and are ultimately responsible for the decisions you make.

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:

A wisp of smoke, a feel of heat, the smell of fire…an airborne fire is one of the most feared of aerial predicaments.

Your chances are very good, however, if you take swift and appropriate action immediately if you detect the possibility of an airborne fire.

A fire in flight is one of the few aircraft emergencies that require you memorize the checklist. Take the time to fully familiarize yourself with the Engine Fire in Flight and/or Electrical Fire in Flight checklists for the aircraft you fly. Procedures may differ from one airplane type to the next, or even within a single airplane series. Know what your Pilot's Operating Handbook (POH) or Flight Manual recommends for the Fire in Flight checklist.

The Engine Fire checklist probably consists of these items:

1. Mixture or condition lever: CUTOFF
2. Fuel selector: OFF
3. Fuel pump(s): OFF
4. Cabin: Ventilate
5. Electrical systems: OFF
6. Single-engine airplanes: Transition to Engine-Out Glide and Landing
7. Multiengine airplanes: Feather propeller or complete engine shutdown. Secure engine. Land as soon as possible

An Electrical Fire in Flight checklist will call for:

1. Battery/Batteries and Alternator(s): OFF. This will plunge you into darkness and can take out your glass avionics. It erases you from air traffic controllers' scopes by turning off your transponder. It dumps the flight plan and radio frequencies from your digital GPS; it disables autopilots and ice protection and heading slaving.
2. Cabin: Ventilate
3. Electrical switches: TURN EACH OFF individually
4. Battery/Alternator(s): ON. The GPS will have to reacquire satellites and find its position. An HSI will seeks realignment, but may read incorrectly for some time, then provide confusion until it slaves back into position.
5. Essential equipment: ON. Many POH checklists call for turning each item on until/unless

you find one that's overheating. I contend that turning on one GPS and a comm radio is enough a risk to take when you know *something* has been overheating.

6. Land as soon as possible. You don't know what damage may have been done.

Study the checklists, because specific makes/models of airplanes may have additional steps beyond these "standard" items. If your airplane's handbook does not contain an Engine Fire or Electrical Fire checklist (and surprisingly, even some very popular airplane types do not), make one of your own using guidance from another source.

There's very little that will burn continuously on an airplane except for fuel…unless the fire is left to get so hot as to combust hoses or even metal components. Swift action on your part may prevent an unrecoverable situation. Wings have failed after an engine fire burns through a wing spar, especially in twin-engine airplanes.

An emergency descent follows an in-flight fire that will not extinguish, and some physiological problems that require you enter thicker air or get the airplane on the ground as soon as possible.

Most airplanes will seek their trimmed airspeed, and will resist a nose-over descent. Instead, initiate an emergency descent by adding drag (flaps and landing gear as appropriate), reducing power, then rolling into a 45° bank. Stable airplanes will tend to enter a spiral if banked steeply; let the natural nose-down tendency cause airspeed and (importantly) vertical speed build to begin your emergency descent.

Once you have a radical descent rate, level the wings while trimming nose down to relieve pressure. The steep-bank-entry technique facilitates a very rapid, high-speed descent.

Keep airspeed in the green arc to remain structurally sound while you descend. Follow POH guidance for airspeeds and flap/landing gear configuration for an emergency descent.

Use the airplane's checklists and your best judgment to deal with fires and emergency descents. Sit in the airplane and go through the motions of the emergency checklists. Fill some of the empty minutes on a long cross-country by considering the "what if" of an engine or electrical fire, including where you'd land if faced with the hazard at that point.

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

Debrief: Readers write about recent *FLYING LESSONS*

Avionics author John Collins writes:

> In your Nov 4, 2010 *Flying Lessons*, you wrote "NOTAMs are also available via XM Radio data uplink in XM-equipped airplanes." The XM weather service provides limited NOTAM capability. The only NOTAMs that it transmits are for TFRs, so runway closures would not be available. For aircraft equipped with an ADSB UAT that can display the free weather, it does provide for the transmission of NOTAMs D/FDC, so runway or airport closures could be determined when you are within the service volume of an ADSB ground station that is within 250 NM of the airport.

Good info, John. Recently FAA announced that Local NOTAMs ("NOTAM L") will also be transmitted nationwide…an advance created by wideband electronic transmissions, eliminating a restriction of earlier systems.

Australian reader Rob Kerr comments on the turbulence-detection capability of spherics, specifically his StormScope:

> Hi Tom, My experience with a WX500 Stormscope is that occasional strikes showing up on the screen seem to indicate a level of atmospheric wind sheer and when you fly over these areas you more often than not get a good shaking in the plane. My theory is that colliding air masses are generating low level electrical

> discharges. In calm air I never see any strikes and turbulence. The WX 500 usually is very reliable and when it goes off something is happening.

Representatives of several avionics manufacturers are among the readers of *FLYING LESSONS*. Any "insights" into the non-thunderstorm turbulence capabilities of various types of spherics?

Jeremy Johnston, a North Carolina-based flight instructor, writes about *FLYING LESSONS'* discussion of go-arounds:

> First let me say that I thoroughly enjoy your weekly newsletter! It's always nice to hear from others who actively study the art of flying and try to understand it better.
>
> As an active CFI/MEI I did have an issue with a comment made in this week's newsletter concerning commitment to a landing. I won't disagree that a pilot should believe he can always go around, however I teach pilots to understand there will come a time when it's *safer* to land and stop than to go around. This usually means a short-field effort even on a long runway. In a light single this is academic until the wheels touch down but it does teach students to focus on flying the correct airspeed instead of flying fast and carrying extra energy. Doing so could turn a normal landing into a dangerous abnormal situation such as floating or porpoising while trying to prepare for a theoretical emergency.
>
> In a light twin this situation is considerably more serious. Flying a light twin with one engine inoperative (OEI) is an emergency scenario and we should treat it that way. While the airplane is technically flyable, it is unlikely the aircraft has *any* climb performance. Only a few light twins have positive climb performance at altitude and then mostly under favorable conditions. Turbine aircraft are certified to have "guaranteed performance," but the dirty little secret is that performance is only the most scant 100-200 FPM. If a jet can barely climb with OEI then what hope do we have?
>
> Because a light twin can't expect to climb OEI, it is unrealistic to expect a go-around involving a configuration change and acceleration at low altitude. Flap changes and accelerations will all cause loss of altitude in an aircraft that can't maintain altitude to begin with. Acceleration from Vmc back to Vyse may be impossible at low altitude. For these reasons we have to treat an OEI landing as a commitment to land. The laws of physics dictate we cannot do otherwise.
>
> One final word: yes, [some light twins] with two people and half tanks will climb OEI almost every time. But we fly like we train, and aircraft behave differently under differing weight and temperature conditions. We have to train for a realistic scenario where we are experiencing an engine out at max gross weight, on a hot day, and with a plane filled with loved ones. Will our training environment practices work in this most critical of times, or will we be risking all our lives?

Thanks, Jeremy. I mentioned the multiengine single-engine scenario as an exception in last week's report. And I agree that pilots should always be aware of their energy state and it's effect in options available—I never suggested carrying too much speed in landing to help flying a go-around in some way; the right airspeed is the "right" airspeed, and usually matches quite closely the liftoff speed of the airplane so is safe for a go-around as well. I greatly appreciate your contribution to the discussion, Jeremy, and your service as a CFI. Coincidentally I spent last weekend providing a pilot checkout in your home town. Beautiful country this time of year!

Bryan Neville, the FAA's national Safety Team Outreach Manager, adds:

> A comment about your paragraph on initiating a go-around when close to the ground. I have personally investigated accidents because the pilot forgot to add right rudder as he applied full power for the go-around, resulting in a wing tip striking the ground. Another instance where basic flying skills must be remembered and used. The pilots and passengers walked away, but the airplanes had to be carried away on a trailer!

Thanks, Bryan. *How* to conduct a go-around will be the subject of a later *FLYING LESSONS* discussion.

Regular *FLYING LESSONS* debriefer Dave Rogers writes:

> G'day Tom. That first paragraph in [last] week's *Flying Lessons* leaves an incorrect impression. For example, if you are landing at an airport with a high density altitude with gear and flaps extended there may be NO point during the landing at which a go around can be effected. You might want to refresh yourself on the result for the article on Altitude Effects Part 2 on the Technical Flying page at http://www.nar-associates.com/. Look particularly at Figure 3.

Hi, Dave. I'd think that if it's possible to take off from an airport, it'd be possible to do a go-around, especially since the go-around would be at a lighter weight than the subsequent takeoff. A one-way airport, such as in a canyon, is an exception I've already cited in last week's discussion.

I suppose you might be arriving in the heat of the day but planning to depart at much cooler temperatures. If the departure was marginal at the cooler temperature the arrival might not permit a go-around. Is that what you meant?

> Yes, that is one possibility. But, let's turn this around. Suppose you arrived during the cool of the day and then attempted to depart during the heat of the day after refueling the tip tanks.
>
> The point is that the gross weight increases seriously degrade rate of climb for either takeoff, landing or a go around. A go around is particularly problematic because you have additional drag producing devices hanging out. For example, a takeoff is normally performed cowl flaps open and gear extended. However, a go around is, at least initiated, with cowl flaps open, gear extended AND flaps extended.
>
> At some airports, under certain conditions, if you attempt a landing you are committed to that landing. You will not be able to go around.

Perhaps there are a few more scenarios that would prevent a go-around besides those I mentioned in the initial discussion. I think they are all the exception, that in almost all cases a go-around is possible up to and even after the time the main gear touches the runway. That said, I'm always glad when a *FLYING LESSONS* topic prompts discussion…because that means it's making people think about *why* they would or would not do something under normal and unusual circumstances. That's what *FLYING LESSONS* is all about.

Comments? Write us at mastery.flight.training@cox.net.

Attitude Flying

For the past few weeks *FLYING LESSONS* has been discussing pilot expectations for the utility of their airplanes, expectations that are sometimes unrealistic, and not at all apparent to newer pilots coming into the fold. Much is made of the "five hazardous pilot attitudes" as they affect risk evaluation. These attitudes are:

- The anti-authority pilot
- The impulsive pilot
- The invulnerable pilot
- The macho pilot
- The resigned pilot

Each of these "hazardous" attitudes is also a *necessary* trait for a successful pilot, in measured amounts. It's when we let one or more of these "natural" pilot attitudes to dominate our thinking that we find ourselves in trouble, making safety-of-flight decisions through subjective eyes. We've focused on the anti-authority pilot, who feels that the rules simply don't apply to him (or her) and the impulsive pilot, who acts without regard for the consequences of that action. This week let's set look at another of my articles from 2006, the third in the series: "Bad Attitude: The Invulnerable Pilot."

See:
www.aero-news.net/news/featurestories.cfm?ContentBlockID=77CC38DE-5D20-4F28-A455-C21D53FCBDFF&Dynamic=1
www.aero-news.net/news/featurestories.cfm?ContentBlockID=F1E272C4-2B29-4BBD-8155-F6C4FFD6BB63&Dynamic=1
www.aero-news.net/news/featurestories.cfm?ContentBlockID=6628A24A-D797-485A-92EB-256318D39AC9&Dynamic=1

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From the Feds

NASA's *Callback #370* covers actual incidents where SRM (Single-pilot Resource Management), CRM (Crew Resource Management) or MRM (Maintenance Resource Management) played a role in the success (or failure) of a safe flight. It's worth a read.

See http://asrs.arc.nasa.gov/docs/cb/cb_370.pdf

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
