FLYING LESSONS for October 28, 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:

Failure is almost never immediate, especially when the failure is in decision-making on the part of the pilot—which is by far the majority cause of accidents. In most cases you'll have ample warning that things are going bad...the airplane will talk to you, if only you'll listen.

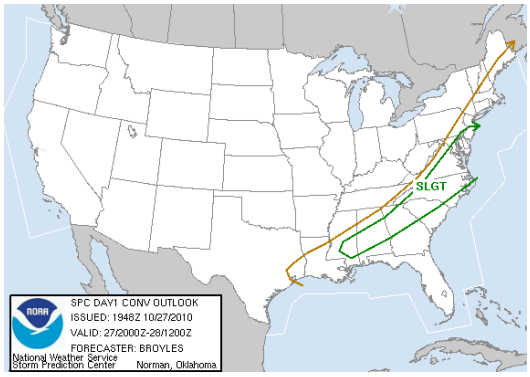
Unresolved discrepancies are one of the best warning signs. Is the indicated fuel level going down faster than you expect? Is power set, but the airplane not climbing like it should? Do you have to pull the throttle all the way to idle to get it to descend down final approach?

Use every bit of information available, even if that means tuning the old ADF or starting a timer at the Final Approach Fix. Constantly compare the information from various sources, determining whether the various data agree with each other, and if their information matches your performance expectations.

If you are receiving contradictory information in the cockpit and you do nothing about the contradiction, you are operating with an unresolved discrepancy. An ambiguous situation almost certainly will not resolve itself. Chances are it'll only get worse.

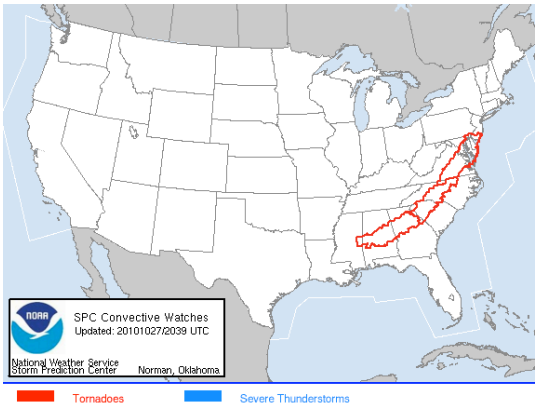
This level of "discrepancies resolved" situational awareness is the mark of a true professional. Whether you're being paid to fly, this is the level of engagement you should strive to achieve, to assure a lifetime of safe piloting. Constantly check for, and resolve, discrepancies in indications or performance.

Pay attention to weather forecasts, because the true severity of weather systems is not always reported. For instance, severe thunderstorm and tornado watches are issued by the National Storm Prediction Center, which shares information with the Aviation people and feeds forecasts into the Flight Service briefing system. Severe thunderstorm and tornado *warnings*, however, are issued by local National Weather Service offices, and don't make it into the Flight Service briefing network. In other words, you'll be told when conditions might create severe weather, but not necessarily be advised when severe weather actually forms.



Center Weather Advisories supplement the severe storms forecast. CWAs are included in preflight weather briefings, and broadcast on Center radio frequency. The CWA is an aviation warning for conditions meeting or approaching national in-flight advisory criteria (i.e., AIRMET, SIGMET, or Convective SIGMET).

Best results come from reviewing the Convective Outlook (left) and Current Convective



Watches (below) before flight, and monitoring for CWAs once en route.

Uplinked NEXRAD images help you tremendously to detect and avoid building severe weather, if you're using a true Composite weather image that shows a cross-section of the atmosphere, and not just radar reflection at the cloud bases (the so-called "base reflectivity" view). Check your NEXRAD uplink provider to learn if you're looking at a true vertical cross-section Composite view.

Whether moving up, moving down, or making a lateral shift in airplane capability, every new airplane type requires a thorough pilot checkout. Optimally this comes from spending time on the ground and in flight with an instructor or other pilot very experienced in the type. Sometimes that's not possible, and you need to develop your own education plan, using the Pilot's Operating Handbook as a teacher.

Consider these new-owner pilot experiences I heard about this week:

1. The new owner of a light retractable airplane was flying his airplane home and made a fuel stop at a high density altitude airport. On takeoff he attempted a short-field departure but the landing gear did not come up when commanded, and the wheels snagged a fence, leading to a crash. The pilot apparently did not know that particular airplane type has a pressure switch in the pitot tube that prevents gear retraction until the airplane has attained at least about 60 knots indicated airspeed. Using an attitude appropriate for a short-field takeoff at lower elevations (and more engine power) resulted in a low-speed, high drag configuration at a high density altitude, and indicated airspeed was too low to "clean it up" for better climb performance by retracting the landing gear.
2. A pilot and his instructor took several flights in a high-performance single, only to have the battery go dead in flight. Neither the CFI nor the new owner knew the airplane has a separate switch for the alternator; their experience was primarily in light Cessna trainers that have a single (split) toggle switch to battery and alternator that are operated as a single on-off switch. Obviously both the new owner and his instructor should have spent more time "in the books" to learn about the airplane, and followed checklists that would have prompted turning the alternator on after start. In-flight monitoring of the electrical gauges would have revealed a discrepancy that screamed for resolution as well.

Getting checked out is not some sort of admission that you're an inexperienced pilot. Consider that military and airline pilots and are almost never approved to fly more than one type of aircraft simultaneously, and that if they make the move up *or down* the line in aircraft performance or complexity that they'll have to take the same classes and fly the same training missions and checkrides as pilots primarily assigned to the type. The stereotyped pilot who can "fly anything with wings" is generally OK in the middle of the flight envelope and as long as nothing goes wrong. But it takes expert knowledge to handle the unusual, abnormal or emergency situations without ending up in an NTSB report or a "never again" experience.

It's amazing that so many pilot questions are answered in Section VII: Systems Description of a GAMA-format POH. If you're new to an airplane you should read the entire POH (and your instructor should too), but for most of your systems knowledge a studious read through Section VII will start you on your way to airplane systems mastery.

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

Debrief: Readers write about recent *FLYING LESSONS*

Robert Thorson of the FAA writes about our recent discussion of inoperative equipment and Minimum Equipment Lists:

> There are several MMELs for high powered singles but more importantly there is a generic single engine MMEL that is available at www.faa.gov . So under the (d) proviso it excludes "non-turbine powered" airplanes because an MMEL has been developed. I mention this because many pilots are under the impression that they can placard instruments themselves and go fly.

Frequent *FLYING LESSONS* debriefer and flight instructor Dave Dewhirst writes about weight and balance:

> We require a pilot to perform a weight and balance calculation for every BFR [sic] and for each initial or recurrent model specific training. We know that most pilots will not do a calculation even if there is a suspicion it is needed. Therefore, we direct the pilot toward discovery of a loading condition where either weight or CG is likely to be exceeded. The idea is the pilot will have a general knowledge of what is likely to be safe and hopefully take the time to make the computation when close to the established visual limit. For multi-engine training we have the pilot compute weight at takeoff and density altitude. The idea is to get him to see the relationship between those factors and the single engine performance he is about to see. We teach not so much what to expect when loaded outside of the limitations, as the limitations are limitations and not to be exceeded. Where we have a very long runway, we set maximum available power to what would be experienced at 7,000 ft. density altitude and demonstrate what happens to takeoff performance. With a short runway we alter power in a similar manner at altitude and ask the pilot to climb.

Dave also addresses teaching about the airplane's fuel system:

> On fuel system malfunctions or mismanagement, we teach to operate from all tanks before takeoff. For example, start engines on one set of tanks and switch to a different set of tanks for the pre-takeoff check. The pre-takeoff check includes verifying crossfeed works in both directions and transfer pumps work. A switch is made back to the correct set of tanks for takeoff, allowing a minimum of 60 seconds on the selected tanks before initiating takeoff. The pilot should find a way to feed from all tanks within the first hour of flight, just to be sure all tanks and selectors work. We like to see the pilot carry a pair of pliers in the event a fuel selector handle breaks. We also add a section to the emergency procedures on what to do if one or more tanks do not feed.

Thanks, Dave. I teach operating the various fuel tanks before takeoff as well. I have my pilots do these operational checks on the ramp or in the run-up area, switching to the tank(s) to be used for takeoff prior to performing the engine run-up from the Before Takeoff checklist. Regardless of what checks were done I insist that the takeoff be done using the tanks selected while performing the engine run-up, with no tank selection changes after run-up and before takeoff—this ensures you have fuel from a source known to be able to sustain fairly high-power operation (run-up) and have not missed the tank detent by changing tanks between run-up and takeoff. I take some criticism from pilots for adding wear to the fuel selectors by operationally checking all tank positions before the first takeoff of each day, but given that multiple tanks are often part of system redundancy, and because so many pilots like to maximize range by intentionally running all but the last tank completely dry in flight (a technique I do not personally endorse), I think that any additional minor wear on the fuel selector is warranted by an increase in operational safety.

Reader Tom Rosen adds to last week's discussion of gear up landings:

> I cannot remember ever forgetting the gear during routine approaches in almost fifty years of flying. On the other hand, there have been a few times when a routine approach was interrupted for one reason or another and I caught myself at my 500' check with the gear still up, when it should have been down. Every time that has happened to me, it has been after the interruption of the normal process in the landing pattern. The moral of the story is that anytime the approach to landing deviates from the routine to the unusual, it is time to be ultra aware of what you are doing. It should be a trigger to the pilot to pay more attention to his or her landing configuration, airspeed and altitude.

Thanks, Tom. My instructional approach is to look for the situations that have historically correlated strongly with landing gear-related mishaps (LGRMs). In almost all cases these

correlations are really a set of pilot distraction scenarios. Recognize when you're distracted, and you'll be far less likely to suffer a LGRM. Thanks, Tom!

The latest from ASI

AOPA's Air Safety Institute (ASI) has released the latest in its series of Safety Quizzes. Take a few minutes to review VFR Cross-Country Planning for that next visual trip. This is but one of the many informative Safety Quizzes from AOPA's ASI.

See:
www.aopa.org/asf/asfquiz/2010/100910crosscountry/index.html
www.aopa.org/asf/asfquiz/prevquizzes.cfm

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. We've made a foray into instructor responsibility for teaching pilots about their true limitations, and those of the airplane, but ultimately it's the pilot's decision whether to dispatch, and his/her motivations will affect how he/she evaluates airworthiness of the pilot, the airplane, the environment and external pressures…the PAVE model.

See www.faa.gov/library/manuals/aviation/pilot_handbook/media/PHAK%20-%20Chapter%2017.pdf.

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

I'll tell you, however, that each of these "hazardous" attitudes is also a *necessary* trait for a successful pilot, in measured amounts. For example, we all have to have an anti-authority streak, or we'd listen to everyone who thinks we're crazy to go up in one of these "little airplanes" (that even goes for some of the jet-pilot *FLYING LESSONS* readers). We need some impulsivity to respond with appropriate, yet practiced urgency in an emergency; it takes a certain feeling of invulnerability to descend down a turbulent, cloud-obscured glideslope toward an unseen airport known to be "out there" at the other end of the magenta line. Aviator or aviatrix, we've got to be goal-oriented, get-it-done "macho" types to take on the responsibility of pilot-in-command; yet at times we need to submit to the will of others, resign ourselves to the authority of air traffic control and the writers of air regulations to fit into the larger picture and benefit from the experiences of others.

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. This week let's set The Wayback Machine to 2006 and dig up the first in a series of articles called "Bad Attitude: The Anti-Authority Pilot" for more on the good, and the bad, of this piloting trait.

See www.aero-news.net/news/featurestories.cfm?ContentBlockID=77CC38DE-5D20-4F28-A455-C21D53FCBDFF&Dynamic=1.

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