For much more on flying safely see www.thomaspturner.net.

FLYING LESSONS for January 1, 2009

suggested by this week's 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.

Feel free to forward this message for the purpose of pilot education. *FLYING LESSONS* is also available in PDF through a link in the left column at www.thomaspturner.net.

FLYING LESSONS is an independent product of Mastery Flight Training, Inc.

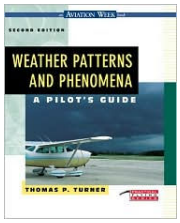
FLYING LESSONS is featured on the FAA's safety website!
See www.faasafety.gov/gslac/ALC/lib_categoryview.aspx?categoryId=21.

This week's lessons:

Anticipate changes in glide path resulting from air movement that forms when surface wind flows over obstructions, and rising and falling columns of air create up- and down-drafts over varying surface features. The effect can be enhanced near or shortly after sundown on a cool, clear night as a low-level inversion forms.

Strong winds flowing across mountain ridges can create strong turbulence or, more insidiously, intense downdrafts in smooth air. Watch for these conditions:

- Wind direction roughly perpendicular to the mountain ridge
- Wind speeds exceeding 30 knots at or near the ridge height
- A stable air mass



There's a brief description of mountain wave formation and avoidance in my *Weather Patterns and Phenomena: A Pilot's Guide* (2nd ed. 1999 McGraw-Hill Books, now out of print).

See
http://www.thomaspturner.net/Mountain%20Wave.pdf
http://search.barnesandnoble.com/booksearch/isbnInquiry.asp?userid=X71fwGRC3O&isbn=007065607X&itm=11

Despite the inference in most books, mountain waves may not always be marked by standing lenticulars, rotor clouds or mountaintop pendant clouds if the air is sufficiently dry.

Avoid mountain wave encounters by evaluating area forecasts, winds aloft forecasts, pilot reports and atmospheric stability charts for the conditions conducive to mountain wave formation. If the elements exist, alter your route of flight to be well downwind

of the high terrain (50 miles or more). If airspeed fluctuates in cruise flight (assuming a constant altitude) or uncommanded vertical rates occur (at a constant aircraft attitude), begin your escape away from the rising terrain immediately. In many cases you'll simply need to delay your trip until the winds subside to safe levels.

If you must cross a ridge, do so at an angle that permits you to dive away from terrain should you enter a strong downdraft. Once across the ridge, depart at right angles to get away from the ridge (and adverse winds) as quickly as possible. To do so safely requires you fly in VMC during daylight hours, to see and avoid terrain.

Mountain waves tend to be more intense in winter, when the jet stream is at a lower altitude. Higher-speed winds are closer to terrain in colder months; very cold air is generally stable, making mountain wave formation more likely.

Some of the strongest mountain wave activity occurs downwind of the Great Smoky Mountains in North Carolina and Virginia, and in the lee of the White Mountains in northern New England. Because these states are not usually considered "mountainous" in the same way we think about Colorado and Wyoming, for instance, pilots flying in these areas tend to be less aware of the extreme hazard of mountain wave turbulence when conditions prevail.

Before you take on the high country consider training on mountain flying with an organization like the Colorado Pilots Association. AOPA's Air Safety Foundation also has an excellent—and free—online Mountain Flying course to acquaint you with the basics before you begin your mountain-flying flight instruction.

See
www.coloradopilots.org/content_mtnfly_class.asp?menuID=24~24
http://flash.aopa.org/asf/mountainFlying/html/flash.cfm?

Certified for flight in icing conditions or not, treat the first sign of ice accumulation the same way you should treat an unexpected sounding of the stall warning horn—as a signal that you need to do something *now* to prevent additional ice accumulation, remove the ice that's already formed, and maneuver the airplane into ice-free air for the remainder of the flight.

Engine failure resulting from blocked inlet air filters is a strong possibility in icing or heavy snow showers, an oft-overlooked hazard of flying in below-freezing precipitation.

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

Debrief: Reader comments on past *FLYING LESSONS*

Regarding a recent *FLYING LESSON* about attempted aerobatics in non-aerobatic airplanes, reader and former Pan American Airways captain Lew Gage writes:

> There are many pilots that have misconceptions about what the limitations are regarding maneuvers in various airplanes. The Luscombe 8 series is a prime example. Many have the mistaken idea that it is an aerobatic airplane when in fact it is certified as the old "normal' category.

When I bought into my Luscombe I only bought half of it, the partnership lasting about a year before I bought my partner out. He told me that he and his prior partner did "a lot of aerobatics" including snap rolls, a maneuver that is extremely stressful on the tail surfaces in particular and the entire airplane in general. I threatened to have the FAA visit him for "careless and reckless" operation if that continued.

15 years later when I completely restored the airplane and had the tail area uncovered by removing parts that were riveted in place I found the aft bulkhead that carries the vertical fin loads cracked in all areas and directions. This part, critical as it is, is not accessible during a normal annual inspection. Of course when I finished, the entire aft portion that does the hard duty was replaced with new, heavier parts. I have never gone outside the stipulated restrictions with this airplane, both before and after the restoration. I believe that had this abuse continued after I had it stopped the vertical and horizontal tail surfaces would have departed the airplane in flight.

Any airplane can be made to do aerobatics as the famous 707 roll done in front of a huge crowd in Seattle, but it takes either an extraordinary pilot or a lot of luck (or both) to get back to the ground safely, and then there may be hidden damage waiting for the next guy that flies the airplane.

Thanks, Lew. Many pilots rely on the “margin of safety” inherent to FAA certification, i.e., airframes are stressed to 150% the load factor stipulated in the type of certification (normal, utility, aerobatic, etc.). This 150% figure is called the *ultimate* load. Pilots thinking the margin above 100% protects them forget that under such rules an airplane flown up to its *limit* load (100% of certificated stress) will not, if the airplane conforms to its type certificate or an STC, incur damage. Operate above the margin (150% or more rated stress) and all bets are off—critical structure is likely to fail, perhaps catastrophically. Within the margin (above limit load but below ultimate load) permanent deformation of structure is still likely, although damage should not cause a catastrophic failure on that particular flight. The deformation will vastly accelerate airframe fatigue, however, and may make the airplane incapable of operating safely to ultimate or even limit load on future flights. I say again, fly the airplane you’re flying, within its limitations. If you want to fly aerobatics, fly a well-maintained aerobatic airplane.

Reader questions:

Q: I fly a '73 V35B with a Century III autopilot, HSI and 430W. Approach configuration is 16"MP, 2500RPM. On an ILS approach, gear down at intercept, 110mph, 550 VSI on the final segment, I have been waiting to deploy the flaps until I have the runway in sight after breakout. I take the AP off at this point as [because of the big trim change] putting down the flaps will [disengage the autopilot] anyway. My reasoning being that if I need to go missed, I won't need to milk the flaps up. Now that I am trying to gain some experience in LIFR, i.e., I am near the DA with no flaps, the [runway lights] pop into view, it gets pretty busy lining up, putting the flaps down and trimming and maintaining visual orientation especially at night on a runway with no centerline lights. It works fine, but I'm just wondering if I am going about it the right way.

A: That's certainly OK if you're well practiced at the trim changes that occur with flap movement. In practice, if conditions are LIFR and you break out at or just slightly above minimums, you might elect to land in whatever flap configuration you're flown to decision height. If the runway is served by an ILS it should be plenty long for a Bonanza if you land where the glideslope is taking you—a touchdown zone 1000 feet from the threshold or 1/3 the length of the runway, whichever is shorter.

Do you have a question? Send it to mastery.flight.training@cox.net.

A pilot's guide to weather decision-making

It's not brand-new, but it's superb: it's the *General Aviation Pilot's Guide to Preflight Weather Planning, Weather Self-Briefings, and Weather Decision Making*. Written by FAA safety honcho Susan Parsons and with input from 2008 CFI of the Year Max Trescott (both *FLYING LESSONS* readers), the *Guide* includes structured and extremely helpful strategies and checklists for making your VFR or IFR go/no-go decision before takeoff, and continually updating it in flight. It's 36 easily understood, highly illustrated and *free* government pages to keep you and your passengers informed an safe…and a must-read for all *FLYING LESSONS* readers.

See www.faa.gov/pilots/safety/media/ga_weather_decision_making.pdf.

Icing *Safety Alert…*

It appears not everyone's getting the message, so the National Transportation Safety Board has issued a *Safety Alert* on detecting and dealing with inflight ice accumulation. "This Safety Alert, directed to the pilot community, is intended to increase the visibility of airplane icing issues and address procedures taught regarding the accumulation of ice before activating deice boots," said NTSB Acting Chairman Mark V. Rosenker (a *FLYING LESSONS* reader). Reminders once ice begins to form include:

- Leading-edge deice boots should be activated as soon as icing is encountered, unless the aircraft flight manual or the pilot's operating handbook specifically directs not to activate them.
- If the aircraft flight manual or the pilot's operating handbook specifies to wait for an accumulation of ice before activating the deice boots, maintain extremely careful vigilance of airspeed and any unusual handling qualities.
- While icing conditions exist, continue to manually cycle the deice system unless the system has a provision for continuous operation.
- Turn off or limit the use of the autopilot in order to better "feel" changes in the handling qualities of the airplane.
- Be aware that some aircraft manufacturers maintain that waiting for the accumulation of ice is still the most effective means of shedding ice.

Pilots of airplanes equipped with TKS-based "known ice" systems should adhere to manufacturer recommendations for pre-emptive use of "anti-ice" flow rates in suspected icing conditions and full "deice" operation once ice begins to form. Same goes for anti- and de-icing use of electric and electrothermal equipment. See the Pilot's Operating Handbook (POH) or POH Supplement for using ice protection.

See http://www.ntsb.gov/alerts/SA_014.pdf

…and an NBAA response

AVWeb Biz reports the National Business Aviation Association countered that operators "should continue to base their decisions about de-icing on their experience and judgment." Ice bridging has never been implicated as the cause of an accident, and is extremely rare, and may not exist at all, the NTSB said, and delaying the use of the boots has been noted in

"numerous incidents and accidents." NBAA believes, however, that "proving the existence of ice bridging after an accident is difficult, and many documented cases resulted in successful outcomes due to the skill and professionalism of the flight crew."

See:

http://www.avweb.com/eletter/archives/bizav/1286-full.html#199480
http://www.nbaa.org/news/update/2008/update08-52.php

For piston Beech pilots

The December 31, 2008 Weekly Accident Update is now posted at www.thomaspturner.net, including these reports:

- A C33 descended into trees during a dusk landing….
- An A36 fatally crashed on approach in suspected icing conditions….
- A V35B fatally impacted a residential area….
- Two aboard a 58P died when the Baron descended into mountainous terrain….
- A C23's two occupants suffered serious injuries in a takeoff mishap….
- A B55 landed long, its occupants incurring serious injuries….
- A Beech 18 crashed when an engine failed on takeoff….
- An F33A's nose gear collapsed….
- An F33A landed gear up….
- A G35 taxied into a helicopter dolly….

For more information, commentary and analysis see the Beech Weekly Accident Update link at www.thomaspturner.net/WAU 2008.htm.

Fly safe, and have fun!

Thomas P. Turner, M.S. Aviation Safety MCFI
2008 FAA Central Region Flight Instructor of the Year

I welcome your comments and suggestions. Contact mastery.flight.training@cox.net.

If someone has forwarded this message to you and you want to have *FLYING LESSONS* sent directly to you each week, tell me. If you received this message directly (as opposed to through a digest or chat room) and wish to be removed from the *FLYING LESSONS* list, tell me.

Holder of an ATP certificate with instructor, CFII and MEI ratings and a Masters Degree in Aviation Safety, and **2008 FAA Central Region CFI of the Year**, Master CFI Thomas P. Turner has been Lead Instructor for FlightSafety International's Bonanza pilot training program at the Beechcraft factory; production test pilot for engine modifications; aviation insurance underwriter; corporate pilot and safety expert; Captain in the United States Air Force; and contract course developer for Embry-Riddle Aeronautical University. He is now the Manager of Technical Services for the American Bonanza Society. With over 3600 hours logged, including more than 2200 as an instructor, Tom writes, lectures and instructs extensively from his home at THE AIR CAPITAL--Wichita, Kansas.