FLYING LESSONS for December 13, 2012

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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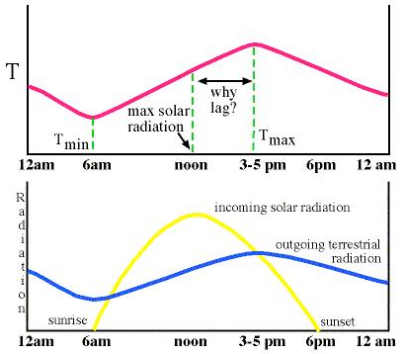
This week's lessons:

Ground fog may permit easy viewing of the ground when looking downward through a thin fog layer, but once you enter the fog and are looking forward through it, visibility becomes quite limited.

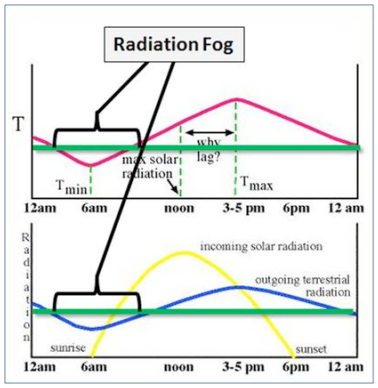
Fog is formed when the ambient air temperature cools to the point of saturation, i.e., it reaches the dew point, a measure of the amount of water vapor in the local atmosphere.

Diurnal temperature variation describes the natural rise and fall in ambient temperatures over a day's time. The actual variation depends on local factors, including the amount of solar radiation ("sunlight" in and out of the visual spectrum) hitting the surface, the reflective qualities of that surface, and the amount of water vapor present—water tends to reduce the variation between extremes of hot and cold.



(left) Typical diurnal temperature variation, showing the coolest times in the evening and around local dawn.

Plot the dew point as a green line, and you'll see that any time the curve is below the dew point line, fog is likely. Of course the dew point is never greater than the ambient temperature; water vapor in the air resists temperature decline, so the atmosphere reaches saturation and dew point reduces to coincide with any further temperature reduction.



(left) Diurnal temperature variation with dew point.

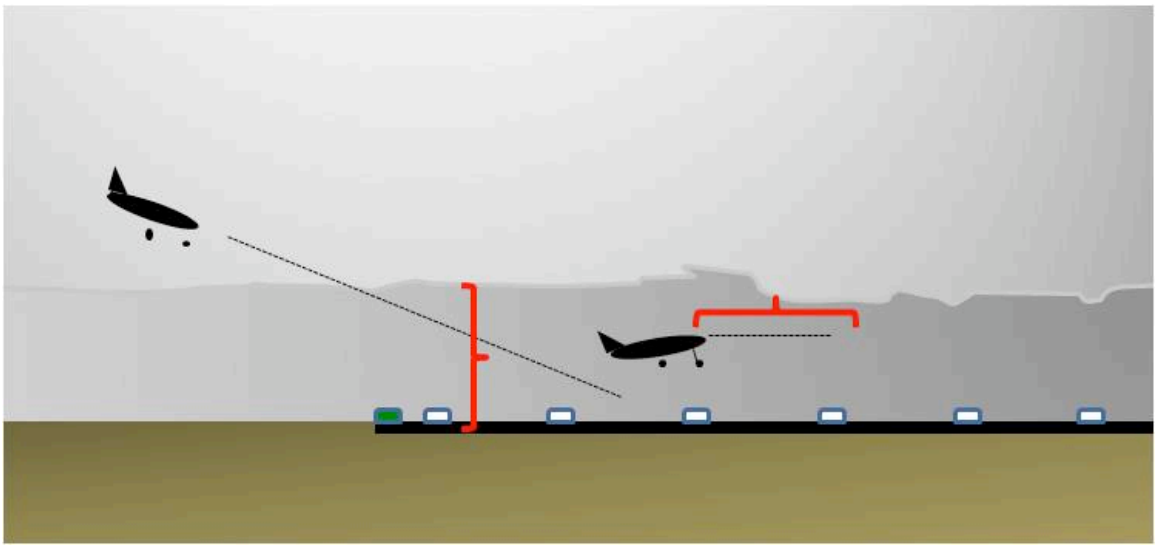
We see that the wee hours and just at and after dawn are the times when ground fog, also called radiation fog is most likely. Conditions are ripe for fog at these times if the skies are clear and winds are light.

The "gotcha" of ground fog comes from the amount of fog you're peering through to see the ground, the runway, or runway lights. Looking down from above, the distance light must travel through the fog is fairly short. Especially at night, you may note a little fuzziness around runway lights, or you may not notice anything abnormal at all.

When you enter the fog and begin your flare, however, and you're looking straight through the fog, you may not be able to see more than a few runway lights ahead (if that). Visibility is quickly reduced, perhaps to near zero.

If your landing light or strobes are on the effect of suddenly entering thick fog at night can be very disorienting, possibly leading to a loss of control. Be very aware of conditions conducive for fog formation. which is especially common on calm, cool nights this time of year (in

the Northern Hemisphere). Temperature inversions (where warmer air overlies cooler air) is also most common on clear nights with calm winds in the wintertime. Inversions trap moist air, frequently reducing visibility near the ground.



(above) Entering ground fog during landing, you may not be able to see far enough ahead to land.

Best practices for night arrivals are to anticipate ground fog when landing after dark on cool, clear nights with light wind. Listen to ATIS or AWOS for a local view of weather conditions if the recording exists for your chosen airport. If the runway lights look the least bit "fuzzy" or the lights cast unusual shadows, divert to another airport to avoid the disastrous threat of severely reduced visibility near the ground.

Even better, watch the temperature/dew point trends. Avoid night flight in areas where the temperature/dew point spread (the difference between the ambient temperature and the dew point) is less than two to three degrees, when the skies are clear and winds are calm. You may not be able to detect the presence of fog until you are in your landing flare.

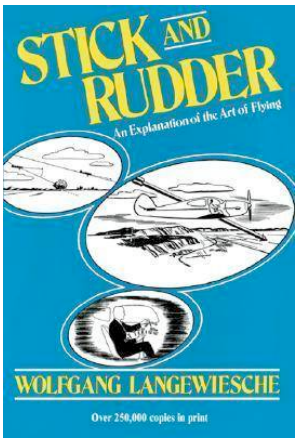
Questions? Comments? Let us know, at mastery.flight.training@cox.net

Debrief: Readers write about recent *FLYING LESSONS:*

Aerobatic and tailwheel instructor Tony Johnstone continues our discussion of *Stick and Rudder* skills:

> I'd like to add to the commentary on crosswind landings. I, too, was taught "wing down into the wind, keep it straight with the rudder". I believe this sideslip method has a number of advantages, particularly for the primary student. First of all, **establishing the slip a reasonable distance out on final (no less than 1/2**

mile) takes care of the drift correction on flare and touchdown, all you have to do is maintain the same input all the way to touchdown. (**And equally importantly, keep the AILERONS deflected into the wind throughout the rollout!**)



If you think about it, the busiest time in most flights occurs in the flare and landing, if you are trying to transition from a crab to a slip while coming over the fence you add another set of variables to the equation. My biggest concern is that you don't know how much drift you are going to get until the instant before touchdown. You can compensate for any amount of crosswind up to the forward speed of the aircraft using the crab method BUT YOU CAN'T LAND. **The only way you can determine if you are going to be able to safely land in a strong crosswind is to establish the slip on final and see if you have enough rudder available to keep the aircraft tracking down the centerline of the runway. If you run out of rudder, find another runway, period**.

The other point I think can never be stressed enough is the proper use of the ailerons in a crosswind takeoff. This is a skill I see frequently neglected. **Keeping the ailerons initially fully deflected into the wind, and easing off as airflow and aileron effectiveness increases, will help to keep the aircraft tracking down the runway centerline.** There are really two phases of the takeoff which are affected by a crosswind. Initially, the wind will tend to make the aircraft weathercock into the wind, so with a left crosswind the nose will tend to turn left on starting the roll. This is particularly apparent in a tailwheel aircraft. As the airspeed increases, increasing lift moves the weight from the wheels to the wings, and the aircraft will tend to drift downwind, i.e. to the right with a left crosswind. **Keeping the ailerons into the wind will produce a horizontal lift component [that] will counteract both of these tendencies and reduce the amount of rudder needed to keep the aircraft on the centerline.** Ideally, the downwind wheel will lift first, as this happens, smoothly relax enough of the aileron deflection to keep the upwind tip from contacting the ground, and once the upwind wheel is off, transition into a wings-level crab into the wind to maintain a straight rack down the extended runway centerline.

A lot gets written about pilots forgetting to use the rudder properly. Aileron usage in crosswind conditions is also an issue which needs to be reinforced periodically!

See www.amazon.com/Wolfgang-Langewiesche/e/B000AQ3HS6

Very good, Tony. The ailerons' effect on directional control on the runway is almost a lost art in flying training. Yet with loss of directional control during takeoff and landing as one of the most common scenarios for aircraft insurance claims, if not NTSB-reportable crashes, we should all put emphasis on proper aileron positioning during all takeoffs and landings. Not only does it improve directional control and reduce the likelihood of damage and injury on the runway, focusing on proper stick-and-rudder skills in all phases of flight has the potential to reduce in-flight crashes as well.

Reader Robert Thorson chimes in about last week's *LESSONS* about airframe and engine limitations, and the lost art of reading the Pilot's Operating Handbook:

As usual a very pointed and good statement on the current culture and how it impacts flying. Writing and, in particular, reading have disappeared from our society. Today no one reads the AFM/POH or any aircraft documentation (STC, Prop logbook, etc)....they ask someone else on the field, or want to be spoon-fed by an instructor yet not pay "too much" for it.

Pretty bold statement right? Well that's where we are. **If an individual pilot does not invest in his own safety and knowledge from reliable sources the clock has started ticking**. The end result being the dismal GA accident statistics. If the substantial damage requirements for an accident today still had the actual price tag included (Inflation adjusted), as in 1960, all the gear up accidents would be accidents, along with carbon fiber wings hitting posts and expensive prop strikes. My definition of an accident is: if you can't fly the aircraft after the event and parts have to be replaced, then it's an accident. So the statistics are really not that GA has been flat over the last 12 years. They have gone up. The accident criteria have slowly changed over the years.

Our need for immediate gratification (Human Factors) is really at the heart of the problem. If a pilot does not call FSS then takes the aircraft around the pattern "to warm up the oil" or "exercise the gear" then a TFR violation may occur....certainly the water won't be displaced from the oil in the crankcase and the landing gear really doesn't need to be "exercised". All this from the local chatter overheard at a local FBO.

> Entertaining but alarming.
>
> **Flying requires constant learning from a variety of reliable sources** (AFM/RFM/POH, supplements, engine and prop manufacturers manuals and service bulletins, FAA SDRs, type clubs to mention a few) and in the current atmosphere it just doesn't happen. **Aviation surely hasn't gotten more forgivable to errors with all the increased technological complexity**.

Interesting, putting the general aviation crash rate in terms of today's popular, just-enough, just-in-time culture. Thanks, Robert. Reader Tom Allen looks at limitations another way:

> Great article. I attended a Wings presentation last evening on "Approaches that Kill". The instructor recalled a conversation with one of the chief engineers at a major aircraft manufacturer. He asked **what kind of margins are designed in [to airplane limitations]? Answer, "None**, the specs are the best result from multiple tries performed by the most experienced pilot. Specs are made to sell airplanes." His message was to **build in your own personal limitations and margins** and **don't try to fly around at the limits**.

Thank you, Tom.

"I'm just one of 1000s that enjoy your weekly FLYING LESSONS, and thought it time I contributed a little! Feel free to pass this on; perhaps more will do the same!!!!!"

- Richard Benson, Bend Oregon

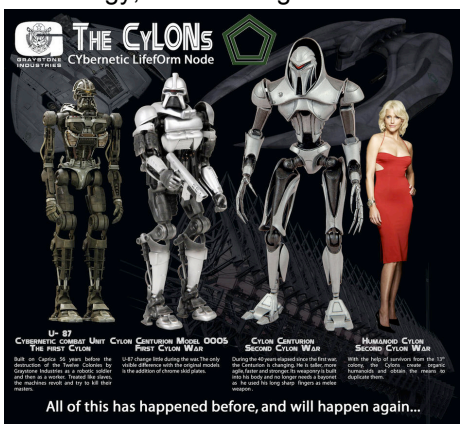
How much technology is too much?

Prolific aviation author and blogger Scott Spangler is the latest to ask the question so many have voiced: is our cockpit technology benefiting aviation safety, or overloading pilots with information and lulling us into a complacency that will eventually turn to bite us? Scott's Jetwhine website opines on "Has Technology Killed the Art of Flying?" He writes:

> Technology can be a wonderful tool, but seduced by its reliable perfections, too often people, not just pilots, surrender their responsibilities to it. And therein lies the problem. Mastery of the aviation arts relies more on how pilots think, how they combine information from every available information source and bodily sense, than it does the control inputs derived from this metaphysical process. **Technology is only as "smart" as the people who programmed it. It tells us what to think, not how to think**.

See www.jetwhine.com/2012/12/has-technology-killed-the-art-of-flying/

An excellent example of the potential for greatly improved safety as a result of cockpit technology, and the trap it can lull us into, was addressed in an NTSB Safety Alert last summer. In Safety Alert 017, NTSB warns about delay times in NEXRAD cockpit uplinks. *Understand* the technology, its advantages and its limitations and you can more safely avoid thunderstorms (and the real threat, turbulence). Accept the uplinked images at face value, however, and to paraphrase Spangler, you're letting the machine tell you how to think. The availability of cockpit weather data, even airborne weather radar, does not improve our airplanes' aerodynamics, or make them capable of sustaining thunderstorm gust loads.



So cockpit technology is going to rise up in revolt, right? Will our technological creations, built to serve us and make us safer pilots, ultimately destroy our flying skills and undermine our ability to safely pilot airplanes? *Only if we let them*. **Use advanced avionics, autopilots and informational equipment to reinforce our flying and**

judgment skills, to *stay within the limitations,* and not to try to fly to the edges of the envelope, and we *will* be better aeronautical risk managers. We will remain the masters of our creations.

For example, NEXRAD uplinks give us the ability to more confidently *avoid* thunderstorm weather hazards by the 20 miles' separation a century of aviation experience has revealed to be prudent. **Instead of trying to use imprecise storm cell location information to try to "pick your way through," use it to stay the proper distance away**. Read more about *that* in my article, "The Most Terrifying Threat," in the January 2013 issue of *Twin & Turbine* magazine.

See:
www.ntsb.gov/doclib/safetyalerts/SA_017.pdf
www.twinandturbine.com

Question of the Week

What makes a good instructor? Another reader responds:

> Great question! I have found the instructors I learned the most from we're ones that could communicate in normal tones rather than condescending, ego-driven manners. The concept of "breaking the ice" and becoming comfortable may be a style preference based on the personality of the student, but I've found the more comfortable I am with the instructor the greater the absorption of information. This is not the time for the instructor to show how good he or she is...or is not. My initial instructor soloed me in 4 hours so he could leave to take a new job as an airline pilot. It took me many more hours to develop any level of confidence. Thus, **a good instructor is one that takes time to listen and learn how the student absorbs information best**.

Communication and presentation skills, and the ability to flexibly change instructional style to meet the needs of the student, seem to be the overriding skill set necessary to be a good instructor, according to readers who have responded to date. Although those skills may result from experience, having thousands of flying hours, or time in military airplanes or commercial jet aircraft (or even any specific age) have not yet appeared in any readers' responses to this query.

Readers, what do *you* think? **What are the qualities that make the best instructor you know, the best?** Send your comments and observations to mastery.flight.training@cox.net.

Share safer skies. Forward *FLYING LESSONS* to a friend.

Personal Aviation: Freedom. Choices. Responsibility.

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