FLYING LESSONS for February 24, 2011

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:

Sleet and freezing rain are red flags for any flight planning. Both weather phenomena indicate warm air overlying colder air, and a band of altitudes where extremely heavy ice accumulation can occur in a very short period of time. A report of freezing rain or sleet at the surface tells you not to take off or, if you're approaching an airport with such a report, to divert to an ice-free alternate.

A recent clarification on the rules of aircraft certification reminds us that even "known ice" airplanes are not tested for any capability to shed ice that accumulates as a result of large, supercooled water droplets—exactly the type of precipitation that forms freezing rain and sleet.

See http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgSAIB.nsf/0/EB2E63F033AA98AD8625782200586295?OpenDocument&Highlight=ce-11-18

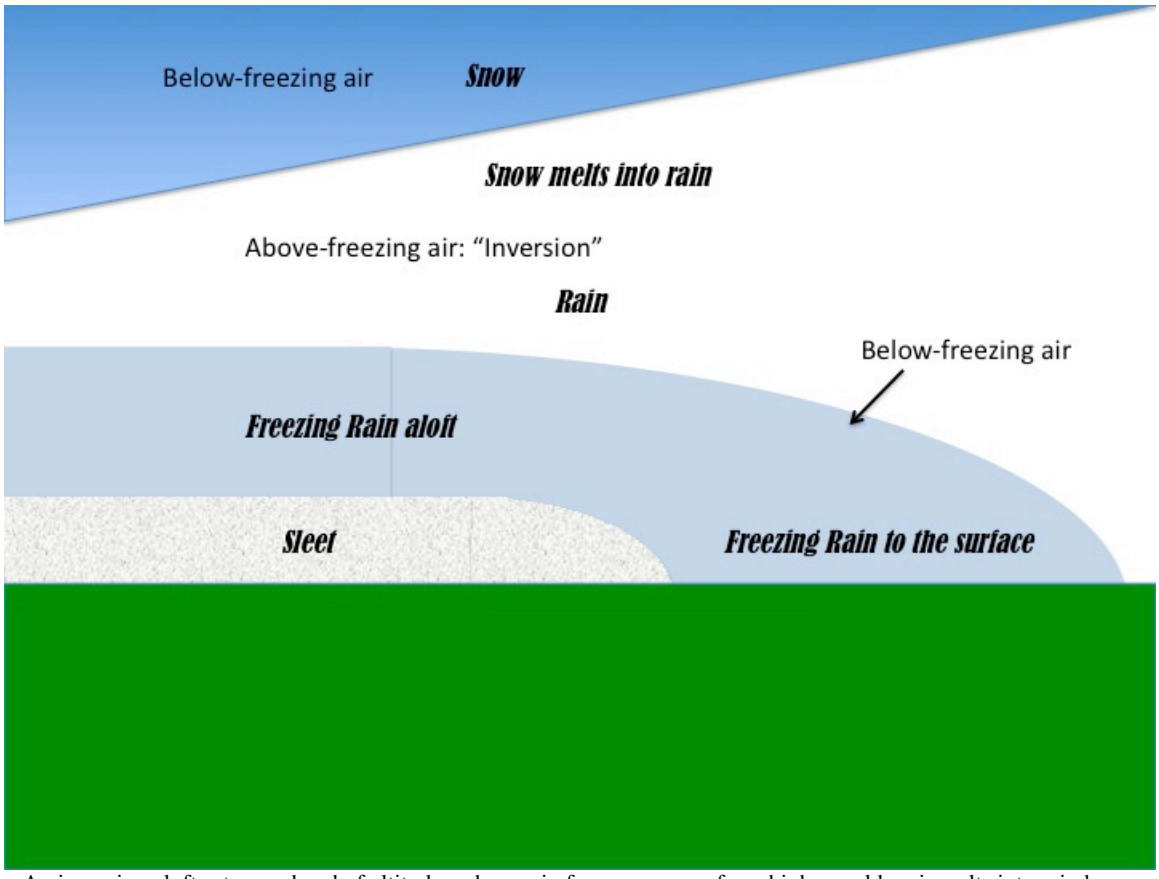
Freezing rain is the result of rain or melted snow in an inversion aloft re-freezing on contact with a below-freezing surface. A short video includes a demonstration of how rain can freeze on cold surfaces even when the air temperature is well above freezing. Recall that as air flows around airfoils and accelerates, Bernoulli's Principle tells us is cools as well (although the simplistic Private Pilot ground school explanation of lift as the sole result of Bernoulli-described air flow is significantly flawed, the effect is real, including the temperature drop). This is the cause behind carburetor icing; it's the reason ice can form on wings and tails even when the outside air temperature is as much as 5°C above freezing.

See
www.weather.com/outlook/videos/freezing-rain-explained-19235
www.av8n.com/how/htm/airfoils.html

Airfoil surfaces can cool to below freezing by cruising at below-freezing altitudes for periods of time, then descending rapidly into moisture-laden clouds. Frequently the greatest moisture content in a cloud is near its top. Pilots of turbocharged piston airplanes especially, even those with ice protection, should plan to level off for a few minutes after descending from the flight levels into the tops of thick stratus clouds if possible to give their wings and stabilizers time to warm before exposure to significant moisture.

Sleet occurs when freezing rain is exposed to below-freezing temperatures long enough in its fall that the droplets re-freeze into little balls of ice before hitting the ground. Although sleet will bounce off airplane surfaces, and if the amount of accumulation is not too great it may not terribly affect braking action on the runway.

But by definition sleet tells you there is a band of freezing rain above it, probably several hundred feet thick and very likely to be at the altitude you'd linger while maneuvering toward the Final Approach Fix of an instrument approach.



An inversion aloft sets up a band of altitudes where rain forms, or snow from higher, colder air melts into raindrops. As the rain falls into below-freezing air, cold enough that surfaces at those altitudes are themselves below freezing, it continues to fall as liquid but will freeze on contact with those surfaces. If the band of below-freezing air is several hundred feet deep, the droplets will freeze into tiny balls of ice—sleet. Evaluate surface weather reports and your own observations aloft three-dimensionally to make well-informed launch/delay or approach/divert decisions.

Consequently reports of sleet or freezing rain are no-go items for takeoff or for beginning an approach.

If you ever find yourself in freezing rain conditions your best bet is to turn around out of the conditions and/or climb to the warmer air you know if aloft.

Beginning to see sleet fly past your windscreen? Turn around to sleet-free air, but do not climb—for by thinking three-dimensionally you know that a dangerous condition, freezing rain, is as little as just a few hundred feet above you.

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

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We're continuing our review of the ninth most common cause of fatal general aviation accidents, according to the FAA's review of NTSB data. Readers David Heberling and David Wallace have sent some extremely insightful observations on several of the fatal mishap scenarios. I'll include them in more detail in my synopsis of Cause #9 in early March, but as invitation for others to send in your thoughts here are some pearls from the Davids:

- Things change when your former student…buys his/her own airplane. I think the temptation is very high to skip a thorough preflight inspection on every flight. After all, I just flew the plane yesterday, or 2 hours ago, what have you. The problem is, pilots are pretty happy to launch into the wild blue believing that they "think" they have enough fuel. If you were to question them about it, they would be lucky to know what the fuel burn rates were for different phases of flight. "I think" is not good enough.
- I think the [requirement for a Flight Review] is well intended, but falls far short of being beneficial to reducing the accident rate. At a minimum, it should be required annually and have meaningful syllabus requirements. Much of this could be accomplished on simulators…
- Maybe automation will go a long way toward our safety goal. This means taking the human pilot out of the control loop temporarily while the automation keeps the aircraft within in its performance envelope…. Automation is coming whether we like it or not.
- It seems that once a pilot starts flying at low altitudes, they become addicted to it. The trouble is, they get away with it until they don't.
- In pilot training, from day one, we are taught the landing pattern. It's familiar and almost always results in a successful end of the flight. Even though circumstances sometimes force us to deviate from the standard pattern, we still apply the basic techniques resulting in a satisfying flight.
- If you are not sure how much fuel is in the tanks, either add more fuel before takeoff or make a fuel stop. In the air, if you are asking yourself "do I have enough," then it's time to stop and refuel.

Thank you both! Readers, help us out if you can. Randomly select one or two of the scenarios below, read the brief description, and send me your thoughts on how the pilot may have better managed the situation, or what you think were the key factors that turned personal flight into tragedy. Format isn't important, or even a thorough critique of the scenario. Just send the scenario number(s) you read and your quick-reaction thoughts, and I'll piece them together into a whole.

Scenario 1: http://www.mastery-flight-training.com/ga_fatals_9_1.pdf

Scenario 2: http://www.mastery-flight-training.com/ga_fatals_9_2.pdf

Scenario 3: http://www.mastery-flight-training.com/ga_fatals_9_3.pdf

Scenario 4: http://www.mastery-flight-training.com/ga_fatals_9_4.pdf

Scenario 5: http://www.mastery-flight-training.com/ga_fatals_9_5.pdf

Scenario 6: http://www.mastery-flight-training.com/ga_fatals_9_6.pdf

Scenario 7: http://www.mastery-flight-training.com/ga_fatals_9_7.pdf

Help *FLYING LESSONS* help reduce the rate of fatal general aviation mishaps.
www.mastery.flight.training.com.

Pilot Training Reform

I am honored to have received, and have accepted, an invitation to participate in the Securing the Future of General Aviation through Pilot Training Reform conference to be held May 4-5 in Atlanta, Georgia. I have been asked to join the panel as the industry representative on developing transition and recurrent training curricula as a result of over 20 years as a type-specific training specialist. This conference intends to address the lack of growth in general aviation, decreased student starts, increased student attrition, and the un-improving accident rate resulting from our current flight training system. Areas of concentration are Safety, Growth, Doctrine, Standards, Curricula, Educators and Industry leadership. The conference is being chaired by the Society of Aviation and Flight Educators (SAFE).

About 150 participants have reportedly registered to date. You may register to attend the symposium on the pilottrainingreform.org website.

See:
www.pilottrainingreform.org
www.pilottrainingreform.org/panelists
www.safepilots.org

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Fly safe, and have fun!

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