FLYING LESSONS for April 28, 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.

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This week's lessons:

Your choice of equipment alone does not necessarily increase the level of safety. Most aspects of flight planning—weather minimums, range, handling near the airplane's maximum weight, etc.—are not inherently different in one type of airplane compared to another.

Take for example a crash this week in a twin-engine airplane that, horribly, took the lives of a young family of four. I hasten to note that the investigation into the specific mishap that prompts this *LESSON* has just begun, and everything is speculative at this point. The only known facts as of this writing are that the family tragically perished after the pilot flew an instrument approach to minimums, called missed approach, and began flying the published missed approach procedure. On the way to the holding fix but well away from the ground, the airplane descended into an open field and all but disintegrated on impact.

Reported weather for the approach was fairly good visibility (2.5 miles), but the bases of an overcast were slightly below the published Minimum Descent Altitude for the chosen approach. That's OK; under U.S. Part 91 (non-commercial) rules the pilot has the authority to attempt such an approach to see if conditions are better than reported by the time he/she reaches the Missed Approach Point (MAP). If the runway environment is not visible at the MAP, the pilot *continues to fly the published approach procedure*, i.e., he/she flies the missed approach segment, climbs and, in most cases, enters a holding pattern until deciding what to do next.

According to a relative of the pilot in our tragic case study, the pilot had only flown for "two or three" years. He owned a high-performance, single-engine airplane but had expressed concern about taking his family up in a "single" in poor weather conditions. So he arranged to fly a twin-engine airplane built by the same manufacturer that is very similar systemically. Perhaps the thought process was that the twin-engine airplane was "safer" in the poor weather conditions the pilot knew to expect at his destination.

Even similar aircraft can be very different, however, especially when you move from a single to a twin. Controls are in different locations. The twin by its nature is much more complex, with much more to monitor. Fuel selectors, engine controls and electrical systems will be different. Handling may be similar in some flight regimes but vastly different in others. Most notably, with today's avionics systems and autopilots, basic navigation tasks and pilot inputs may be significantly different and counter-intuitive.

In short, selecting the twin-engine airplane did not automatically increase the level of safety in the low, instrument conditions. It may well have been "safer" to have made the trip in the high-performance single in which the pilot was more experienced (assumed given that he *owned* that airplane for most of his short flying career).

The *FLYING LESSON* takeaway, then, is that relative safety is far more a function of pilot capability and familiarity with the equipment than it is an objective list of the number of engines, the avionics on board, whether the airplane has radar, lightning detection systems or ice

protection equipment, or other factors. If you're not thoroughly familiar with that specific airplane and everything that comes with it, you should fly with *higher* personal minimums than you would in the more familiar aircraft in order to maintain an equivalent level of safety (let alone increased safety).

Ultimately it's the pilot, not the aircraft, who determines the outcome of a flight…as we may have learned with another extraordinarily horrific event that, thank goodness, is still the exception to the rule in general aviation.

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Let's continue our review of the #7 killer in general aviation, attempted visual flight into Instrument Meteorological Conditions. Last week we looked at three scenarios to get our thoughts flowing, and I proposed seven questions to consider when evaluating VFR into IMC accidents.

See:
www.mastery-flight-training.com/20110421flying_lessons.pdf
www.mastery-flight-training.com/vfr_into_imc_questions.pdf

Doug Cheney also addresses the VFR into IMC issue (I've emphasized some of Doug's points):

> Regarding VFR into IMC, my two brushes with this occurred within a couple years of earning my [Private Pilot] certificate. In both cases it was the fact that **I had no experience operating in conditions that were not CAVU** ["clear air, visibility unlimited"—an archaic weather reporting abbreviation—ed.]. In the first case I missed the inflection point between "okay to be up here" and "not okay to be up here". In the other case it was a gray day and was flying above 10,000 ft with a smooth gray overcast layer a couple thousand feet above and clear below. I didn't detect a smooth gray cloud bank directly ahead of me until I started to see relative motion between parts of the gray horizon and realized what was going on. Good thing I was looking out the window at that moment.
>
> My point is that **there is a huge difference between quoting VFR regulations and being able to actually integrate them into the airborne environment**. We need to make a point of getting students into the air in relatively poor and in tricky conditions so they can gain some of that experience. Flight briefers seem to try to discourage VFR flight if there is marginal weather anywhere in the briefing area. Many pilots around here won't launch unless the local weather is great so they have no experience with detecting changes and making weather decisions while airborne. I think lack of this kind of VFR flight experience is lethal if you fly outside the local traffic pattern.
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> Reflecting upon my first encounter with near inadvertent flight into IMC I am shocked at the severe degradation of my cognitive ability as **I became task saturated working to stay out of the scud** while avoiding rising terrain and figuring out a path out of the situation. Seems incredible now but I literally wasn't able to interpret what my GPS moving map display was telling me and **it didn't occur to me to slow down**. With a couple notches of flaps the aircraft I was flying is quite happy at half the speed I was flying at! Live and learn- it all ended well, I learned a lot and came to the realization that if I desired to use aircraft for more than local joy rides on nice days it would behoove me to get an instrument rating.

Doug's spot on with his suggestions that we do pilots (and their passengers) harm by training only in good weather conditions. A pilot's primary education really must include forays into marginal VFR conditions and cross-country flights under mid-level overcasts and/or in hazy conditions. Instrument students must get some "actual" experience with an instructor before launching into IMC alone if the goal is true safety—there are psychological aspects of being in the clouds that should not be experienced alone the first time.

Further, we must involve the student in the weather go/no-go decision from the very first *FLYING LESSON*--even (and maybe especially) for pilots pursuing Sport or Recreational Pilot privileges (or their international equivalents). Only then will pilots be prepared to ***observe*** and ***evaluate*** weather conditions before and during flight once they've passed their checkride and are turned loose on their own. Thanks, Doug!

Frequent Debriefer David Heberling offers some superb insights into the scenarios that lead to VFR into IMC. David writes (with emphasis added):

> I think that the pilot is usually VFR only, but not always. As one of your readers pointed out, it can happen to instrument rated pilots on VFR missions. Or, it could be an IR pilot out of currency. No current database and/or paper charts. Or an airplane with no current pitot/static checks. What I think drives this whole scenario is **a sense that this flight must go now, no matter what**. Why else would a pilot get a weather briefing where "VFR is not recommended" due to existing low ceilings/ and or visibility, and decide to go anyway? Maybe [he/she] promised someone they would pick them up somewhere, or it was an important business meeting or personal event. **The unwillingness to let someone else down** overrides every other consideration.
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> When pilots decide that they are going to fly anyway, or are going to continue into deteriorating conditions, they then have to decide how that will be accomplished. If they are already airborne, they know they cannot go into the clouds, so they follow the bases down to the ground. Did they plan to hit the ground (CFIT)? No, **they actually did not make much of a plan at all**. They were just reacting to existing conditions. The pilot who takes off into adverse conditions has to be in denial. Once they are airborne, they revert to reacting to existing conditions.
>
> What constitutes risky flying? If you asked these pilots this question, they would tell you what you expect to hear. **What gets them into trouble is that they expect these small GA aircraft to be all weather, adhere-to-fixed-schedule machines**. As soon as that mindset settles in, trouble will follow. Also consider this. **Risky behavior successfully completed begets more risky behavior**. There are three types of pilots. There is the pilot who tries something risky, scares himself silly but successfully completes the flight. One pilot will swear to never do that again. Another pilot will convince himself that that flight wasn't so bad and do it again. The third pilot will fail and die. At some point, that second pilot will also fail and die.

David refers to what corporate aviation safety guru and retired Air Force fighter pilot (and *FLYING LESSONS* reader) Dr. Tony Kern calls "the normalization of deviance" (some *FLYING LESSONS* readers may be exposed to Dr. Kern's translations of aviation safety concepts into the medical, firefighting and other fields). Experience tells a pilot "I've done it before and nothing bad happened," so the new risk level becomes accepted standard. If the pilot also has an attitude that he/she is "better than the average pilot" or that the mission being flown is "important" or "vital," then it's only a matter of time until he or she is flying confidently in adverse conditions that a few flights back would have seemed unacceptable even to that pilot.

See http://convergentperformance.com.

Part of this is expanding one's personal envelope to gain better utility from the airplane. That's why we need to state personal weather minimums, and adhere to them religiously—if you're practiced and good enough, your minimums may be as low as the minimums permitted by regulation for your certificate/rating, the airplane, and the environment. But you must have some objective limit to know when it's *too* bad.

AOPA Air Safety Institute statistician manager David Kenny quantifies the problem:

> Good morning, Tom. I can answer a couple of questions about VFR into IMC accidents. Looking at fixed-wing VFR-into-IMC accidents, we consistently find that about one-third have at least one instrument-rated

pilot on board. Almost a third (32%) of those in the past ten years were single-pilot flights in which the pilot was instrument-rated. However, information about the pilots' instrument currency and recency of experience is much harder to recover, particularly in the case of fatal accidents (and about five-sixths of all VFR-into-IMC accidents are fatal).

Not surprisingly, loss of control is the most common outcome in accidents involving VFR-only pilots, while instrument-rated pilots have a much better chance of staying right-side-up long enough to hit something solid.

In a few cases, the airplanes were clearly not equipped for instrument flight, but most have at least the standard attitude instruments and some navigational equipment. Less than 7% involved homebuilts. Single-engine retracts were somewhat overrepresented; they made up about a quarter of the airplanes involved in VFR-into-IMC accidents and a little less than 20% of all accident airplanes (excluding homebuilts) during the same period. About one-eighth of the VFR-into-IMC accidents took place in twins, about the same as their share of all accidents. Less than three percent were turbine-powered; accidents in turbine aircraft in IMC are much more likely to result from deficient instrument flying by appropriately rated pilots operating on active IFR flight plans.

Thanks as always, David. It shows that regardless of our experience or the type of airplane we fly, we are not completely immune.

Here's the IFR pilot's trap: In my experience the typical IFR pilot has lost much of his/her knowledge and appreciation for visibility and cloud-clearance requirements for VFR flight. Put into the position of a VFR flight, he/she may quickly scan the sky in the immediate departure area and say it looks "good enough." After all, "I'm instrument rated. If I encounter IMC I'll just sneak in." This is especially prevalent on short hops and "positioning flights," when the pilot is moving the airplane from one location to another to begin a mission at another airport (example: a short Part 91 hop to pick up passengers for a Part 135 charter flight—which carries an historically high risk of accident). It can also result when a pilot chooses VFR flight as a risk management tool—"I'll stay below the clouds because of the threat of ice" or "I'll remain beneath the bases to avoid thunderstorms"—but does not plan the altitudes and routes to fly, and escape routes and alternates, with the same level of diligence he or she would use when planning an IFR flight.

Knowing and adhering to the legal limits, honestly evaluating your currency and proficiency, thoroughly planning visual flights, and assessing conditions before and continually during flight are what will keep you from an inadvertent VFR encounter with instrument meteorological conditions.

Let's look at three more VFR into IMC scenarios from the NTSB record:

1) The non-instrument-rated private pilot and passenger were commuting to work in the dark, following a familiar route of flight. The single-engine, fixed gear airplane was not equipped to fly in instrument weather conditions and there was no evidence found indicating the pilot had obtained a weather briefing or filed a flight plan. One witness described light rain falling at the departure airfield 30 minutes before the airplane departed. A second witness, who was driving along the airplane's intended route of flight, saw the airplane depart the airfield and described the weather deteriorating from light rain to snow as she drove towards the accident site. She indicated that heavy snow was falling when she saw the accident site and notified authorities. Ethanol was detected in a postmortem urine specimen (at 0.191 mg/dL), and in two separate postmortem blood specimens from the pilot (at 0.075 and 0.092 mg/dL), consistent with impairment from the effects of alcohol at the time of the accident. No witnesses to the pilot's behavior the night prior to the accident could be found.

2) The pilot departed for a short local flight while visual meteorological conditions existed in the immediate vicinity of the departure airport. He proceeded to climb to the northeast, through a mountain pass, and then to the south, paralleling the shore of a frozen, snow-covered reservoir. The flight continued for about 20 miles. Analysis of radar and recorded GPS data showed that the airplane then experienced large fluctuations in ground speed while still on the same approximate track. Shortly thereafter, the airplane began a 180-degree left turn and collided with the reservoir surface. GPS data, airplane instrumentation, and ground scars indicated that the airplane was in a descending left turn when it struck the ground. Post accident examination of the engine and airframe revealed no obvious anomalies that would have precluded normal operation. Mountain obscuration and occasional precipitation were forecast for the area of the accident flight. Additionally, weather observation stations and local pilot reports indicated that moderate snow showers were in the vicinity of the site at the time of the accident. The white surface of the frozen lake, in conjunction with

the snow and limited visibility, would have provided the pilot limited external visual references, and as such could have resulted in him becoming spatially disoriented or affected by a visual illusion. The pilot's logbooks revealed that he had a history of flying in marginal weather conditions, and had performed multiple Special VFR takeoffs and landings. The pilot did not possess an instrument rating.

3) The non-instrument-rated pilot was on a visual flight rules flight when he contacted air traffic control and stated that he was "in the thick of the weather." Air traffic control subsequently observed the airplane on radar at 1,500 feet, circling, before being lost off of radar. A witness reported that it was raining heavily when he noticed an airplane spinning out of the clouds toward the ground. The recorded weather near the accident site about the time of the accident included: winds from 020 degrees at 7 knots, visibility of 7 miles in light rain, with a ceiling of 300 feet broken, 2,500 feet broken, 7,000 feet overcast. There were no records of any communication with a flight service station or entries made in DUATS prior to pilot's flight. Examination of the aircraft structure, flight controls, systems, and engine showed no evidence of pre-crash failure or malfunction.

What situations or pressures might have lulled these pilots into tragedy? Using the seven questions as a starting point, send your ideas on avoiding Top 10 Cause #7 to mastery.flight.training@cox.net.

See www.mastery-flight-training.com/vfr_into_imc_questions.pdf

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Fly safe, and have fun!

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2010 National FAA Safety Team Representative of the Year
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