FLYING LESSONS for February 10, 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:

Experienced pilots will tell you the first rule when faced with an emergency is to "maintain control of the airplane"—and they'd be right. An emergency does not negate your primary responsibility of flying the airplane…in fact, this is precisely the time you need to be at your best on the stick, throttle and rudder.

But we rarely think about the *second* rule of dealing with an emergency. No, it's not "run the checklist," which is still down on your priorities list. The second rule of emergencies is to "point the airplane toward a landing area." Every second you delay in heading toward an airport or landing zone is altitude lost that you might need to get there, or speed away from better weather, land (if over water) or lower terrain if your emergency checklist actions don't resolve the problem.

Even an abnormal condition, which is an "emergency" without the urgency (such as an alternator failure, a rising oil temperature or dropping oil pressure, a window that pops open in flight, or a landing gear problem) calls for aiming the airplane in the direction you'd want to be going if the problem suddenly *becomes* a true emergency.

Concurrently, if you are able, or immediately after you have confirmed control and pointed the airplane toward recovery, you must process the emergency checklist from memory (in the event of engine failures or other can't-wait scenarios), or by reference to the printed checklist (in less time-intense situations).

This prioritization, *Maintain control, Aim in a good direction, Perform the checklist actions*, is another way of expressing a similar axiom of aviation: *Aviate, Navigate, Communicate*. Faced with an emergency or abnormal condition, continue to *aviate* through the flight controls (or an available autopilot as appropriate), *navigate* the airplane toward a recovery zone (the Second Rule of Emergencies), and *communicate* with the airplane by means of memory and printed checklists.

Surprised by an emergency or unusual situation in flight? Prioritize your actions by remembering this slant on *Aviate, Navigate, Communicate*.

Once you're headed in the right direction, don't let the abnormality distract you away from continuing to fly the airplane. Altitude, Altitude, Angle of Attack…all are intertwined with every step of an emergency procedure.

For example, I teach the memory Engine Failure in Flight steps in a multiengine airplane to be:

- Fly the plane (attitude, airspeed, heading)
- Mixture, prop, throttle all forward
- Fly the plane

- Gear up, flaps up
- Fly the plane
- Identify (the failed engine using dead foot, dead engine)
- Fly the plane
- Verify (the failed engine using throttle)
- Fly the plane
- Troubleshoot (perform the engine restart steps if time and altitude permit)
- Fly the plane
- Feather (the dead engine's propeller, if there was not time for restart or the restart attempt fails)
- Fly the plane
- Reference and perform the printed checklist

You should follow the same pattern with any emergency or abnormal procedure checklist.

If you have another pilot within reach of the controls, divide the duties so one is flying the airplane while the other is dealing with the abnormality. At the very least, assign any passenger the task of watching your altitude and direction, and looking out for obstacles or other airplanes while you deal with the scenario. Use every resource you have available to you, to fix the problem or to get the airplane on the ground.

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

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In late December *FLYING LESSONS* began an ambitious project to look at the Top 10 causes of fatal general aviation accidents as determined by the U.S. National Transportation Safety Board and reported by the Federal Aviation Administration. We vowed to look at one cause category per month, and develop lesson plans to teach avoidance of the most common deadly threats.

In February we turn to the 9th most common cause of fatal GA events, Low Altitude Maneuvering/ Loss of Control. Here are the 2008-2009 accident scenarios attributed by NTSB to this cause:

1. Prior to the flight, the aerial firefighting pilot checked weather and declined support to the TA25 wildfire, due to high winds, but accepted a mission to another wildfire, approximately 55 nautical miles east, because of its location relative to wind activity and terrain. While en route, the dispatch system informed the accident pilot that the airplane was not needed for the other wildfire, but inquired whether he could support the TA25 wildfire. Being halfway into the flight, the pilot decided he would at least check out the flight conditions at the TA25 wildfire rather than cancel the mission. The pilot performed a dry run over the area and then told the ground contact that the winds and turbulence were too strong to do a drop. The drop zone was then moved to another location at the TA25 wildfire. Gusty winds and power line hazards were reported to the accident pilot by the ground contact. Witnesses observed the airplane drop the load, then enter a vertical climb, stall, and impact terrain. Estimated winds at the time of the accident were at least 30 knots and gusting. Examination of the airframe and engine revealed no pre-impact anomalies. The flaps were found in the full-extended position, and the airplane flight manual for fire control operations recommended a flap

setting of 10 degrees. Representatives of the land management agencies reported to the NTSB that due to the local procurement arrangement for this flight, several levels of personnel typically involved in the decision making and dispatch processes for wildfires were not involved, and the airplane was not properly configured for aerial fire support.

2. The pilot had made multiple touch-and-go landings prior to the accident. Witnesses observed the airplane heading toward the runway of intended landing before making a hard right turn and subsequently nosing into the ground. One witness said he heard a "loud engine rev" before the engine "died out." Examination of the airplane revealed that the propeller was not under power when it impacted terrain. The interior of the wings, the wreckage, the vegetation, and the ground did not indicate any signs of a fuel odor or a fuel spill. An examination of the aircraft and engine failed to reveal any preimpact anomalies, which would have precluded normal operation. An FAA inspector reported it appeared that the airplane had run out of fuel and stalled on approach, causing it to enter a spin prior to impacting terrain in a near vertical attitude.

3. Two airplanes were flying over an ocean beach at about 100 feet above the ground. The pilot of the second airplane reported that while the accident airplane was flying at his 10 o'clock position, the accident pilot radioed that he saw what he thought was a whale vertebra on the beach and that he was going take a look. The second pilot said that the accident airplane began circling over the site, and during the second 360-degree turn, the right wing stalled and the airplane descended to the ground in a nose-down attitude, colliding with the gravel-covered beach in a near-vertical attitude. A postcrash fire started immediately after impact. At the time of the accident there were strong winds, ranging between 25 and 30 knots. Examination of the airplane did not disclose any preimpact mechanical malfunction.

4. The pilot told several people that he intended to do a flyby over the model airplane flying field. Several witnesses observed it flying straight and level at less than 100 feet above the ground. The airplane pitched up, rolled right and impacted the ground vertically, heading in the opposite direction. One witness observed the airplane flying inverted when the nose pitched up, suddenly performing an “aileron roll,” then sharply rolled nose down toward the ground. The pilot did not have a previous history of aerobatic flight at low altitude. While the circumstances of the accident suggest the possibility of incapacitation, potentially due to an abnormal heart rhythm or seizure [that was not reported to FAA, but for which the pilot was taking prescription medication], the investigation was unable to determine whether the pilot became incapacitated at the time of the accident.

5. The pilot and a passenger departed on a brief aerial observation flight with the purpose of locating a bear tracking collar. The airplane was observed by multiple witnesses in multiple locations to be flying at "very low" altitudes. Most of these observations occurred when the airplane flew over several lakes in the local area. The airplane returned to the origination airport for landing about 1/2 hour after its departure. Instead of flying a normal airport traffic pattern, the pilot flew along the runway in the direction opposite of his intended landing direction, at an altitude of approximately 100 feet above the ground. He then initiated a rapid pull-up and small radius turn to complete the landing. The airplane impacted airport property in a near-vertical attitude, approximately 900 feet from the approach threshold. No evidence of any preimpact mechanical failure or malfunction was found that would have prevented the engine from developing power. Several individuals stated that the non-standard landing maneuver was not unusual for the pilot. Digital images recovered from the passenger's camera revealed that during the accident flight the airplane was operated at low altitude above the surfaces of several lakes, and that on at least one occasion the airplane's tires were in contact with the surface of a lake.

6. The pilot was performing low passes over a private ranch. The airplane was fueled the day before the accident with 17.4 gallons of fuel and had a 42-gallon fuel capacity. The pilot had commented to his wife prior to the accident that he didn't want a full fuel load for the flyover. After the pilot refueled, he flew the airplane for at least an hour that day and for an undetermined amount of time the day of the flyover. The pilot planned for and flew three low-altitude passes, ending each pass with a pull-up. During the pull-up from the third pass, the airplane was seen to roll to the left followed by a steep dive into a car parking area. The airplane turned approximately 270 degrees from the start of the pull-up until it impacted the ground. An examination of the airplane showed no evidence of aviation fuel at the accident site, in the airplane's fuel tanks, or in the engine fuel lines. The propeller and engine case damage was consistent with that of an engine not developing power at impact. The engine manual states that the engine burn rate is approximately 9.5 gallons per hour in economy cruise flight and 12.3 gallons per hour in performance cruise flight.

7. Due to adverse weather conditions, the pilot landed at a grass airstrip en route to his destination. The airport manager stated that a front was approaching the airport and that it rained all night. According to the airport manager, the pilot returned to the airport the next morning, started the airplane, and taxied to the fuel pump. The right fuel cap was missing. He drained the fuel sump repeatedly because he found water in the right tank. The airport manager gave the pilot a fuel cap for the right tank so that he could depart. Witnesses reported

seeing the airplane flying 50–60 feet above the ground with the engine sputtering and cutting in and out prior to the accident. Airplane impact damage was consistent with a steep nose-down attitude with about 80 degrees of left roll. Witnesses reported heavy cloud cover and limited visibility due to light-to-moderate fog. Observed weather near the accident site was 1/4 mile visibility in fog with an indefinite ceiling at 100 feet. The Weather Depiction Chart depicted an area of instrument-flight-rule (IFR) conditions along and behind the cold front. The accident site was located in an area of IFR conditions, with the departure and planned destination airports under visual flight rules (VFR) conditions. The pilot was not instrument rated, and the airplane was not equipped for IFR flight. The inspection of the engine and airframe revealed no preimpact anomalies.

Readers: Here's where I need your help. For any or all of the seven mishaps:

A. Suggest Aeronautical Decision Making (ADM) factors and "decision points" that presented themselves prior to the accident, and the information the pilot might have had with which to make go/no-go decisions;

B. List the Stick and Rudder Training (START) skills that could have helped the pilot avoid, and ultimately, escape the likely threats;

C. Recommend specific *FLYING LESSONS* we can learn from each tragic experience, to incorporate in checkride-preparation and recurrent flight training so we can noticeably reduce the fatal general aviation accident rate; and

D. Propose a lesson plan for each *FLYING LESSON* you identify.

I warned you I was going to need ***your*** help to make a difference! Do your part by emailing your ADM/START observations and recommendations to mastery.flight.training@cox.net. Identify your responses by the accident number (1 through 7). I'll compile, edit (as necessary) and publish your responses (anonymously on request). And I'll add my thoughts from the exercise as well. By the end of February we should have a series of recommended additions and modifications to the traditional way of training pilots…changes that may be our best hope of reducing the rate of fatal accidents.

What's your opinion? Tell us at mastery.flight.training@cox.net.

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

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