

## **FLYING LESSONS** for January 8, 2008

suggested by this week's aircraft 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.

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### ***This week's lessons:***

**Bounced landings** result from one of three conditions:

1. The pilot does not arrest descent by flaring, the airplane impacts hard and then rebounds from the surface;
2. The pilot attempts to touch down at too great an airspeed, while the wing is still developing excess lift, and the aircraft skips back into the air; or
3. The pilot relaxes elevator pressure at the point of touchdown, reducing the wing's angle of attack from a stalled condition to one that generates enough lift to put the airplane momentarily back into the air.

**There are three main hazards** with bounced landings:

1. Aircraft damage resulting from the initial impact, usually limited to blown tires or damaged landing gear components. This can also cause loss of directional control and additional damage or injury.
2. Damage to additional aircraft components as a result of "hopping" or "dropping in" on subsequent touchdowns. This often causes propeller strikes [and costly engine teardowns], more substantial landing gear damage, and in some models buckled engine compartment firewalls and other structural items.
3. Runway overrun from a bounced landing where the pilot recovers and makes a smooth, subsequent touchdown, but in a position where there is insufficient runway remaining to come to a stop.

**In pre-solo Air Force pilot screening** training we were initially required to go around any time we bounced a landing... to avoid a pilot-induced oscillation or close-to-the-ground stall, as well as to ensure we did not recover from the bounce only to run off the end of the runway afterward. Closer to our first solo we were taught to recover from a bounce by adding a little power and lowering the angle of attack, then transitioning into a flare. If we bounced a second time, however, we had no choice (under Air Force rules) but to lower the nose, power up and go around for another landing. I still adhere to this two-bounces-go-around philosophy (although I've not needed to use it for a long time).

**Airspeed control is the key** to a smooth, accurate landing. Too fast on short final can be as disastrous as too little airspeed. Focus on proper airspeed control on every landing so you'll be less likely to bounce one in.

**Astronaut Frank Borman** (a *FLYING LESSONS* reader) said "a superior pilot uses his superior judgment to avoid situations which require the use of his superior skill." Few scenarios seem as potentially fraught with hazard as night IMC in freezing temperatures on the downwind side of a large body of water, in an airplane not designed for flight in icing conditions. Yet we still read of pilots launching into exactly that.

**Turbocharger power may help evade icing to a point**, but when wing and tail aerodynamics begin to fail there's very little power can do; power itself will fade in ice as well as propeller blades become left efficient in turning power into thrust, and if the induction air filter plugs turbocharged engines may lose significant power operating on alternate air if that air is taken from the low-pressure portion of the engine compartment.

**Plan your flight**—to avoid potential icing conditions—and fly your plan. "Known ice" certified or not, treat the first appearance of airframe ice the same as you'd treat an unexpected sounding of the stall warning horn: as a signal to do something **NOW** to get yourself out of hazardous conditions.

Questions? Comments? Email me at [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net)

## **Debrief:** Reader comments on past *FLYING LESSONS*

Regarding last week's discussion of mountain flying Colorado-based instructor Bill Hale writes:

Relative to always crossing a ridge at a 45 degree angle... Even more useful advice for pilots is: Never come up to a ridge at less than cruise speed! Don't climb toward a ridge!

[There are] X's all over the Front Range for those who didn't heed this advice, [the] most famous being [a] Convair carrying the Wichita State university football team a while back. [They] ran out of altitude and airspeed near Silverthorne (elevation ~9000') trying to cross the Continental Divide at the highest point.

Californian reader Bob Butt adds:

Elsinore is a major glider area with a regular mountain wave 'surfed' by the pilots here. The jump operation used to utilize these effects to help climb before turbine aircraft usage. Recognition of the effects of even small waves is enhanced with some glider training. The skies are almost always clear so the effects of wind direction and temperature change become useful in predicting optimum soaring conditions. Maybe this sort of background or training would be useful for those not normally able to come out to Colorado.

And Nevada-based *FLYING LESSONS* reader Dave Monti called and discussed several techniques used just east of the Sierras, including making good use of the rising air on the upwind side of ridges before attempting to cross, and once out of the wave crossing the angle as quickly as possible at a 90-degree angle.

Make you realize the value of receiving expert local instruction before flying near mountains. Thanks, readers!

## Reader questions: A *FLYING LESSONS* reader writes:

**Q:** I have encountered a pilot who routinely does a barrel roll with his A36 Bonanza. When I told him that the Bonanza is not certified for acrobatic maneuvers, he answered me that it's only a 1 G maneuver and there is no issue. He is an experienced acrobatic pilot and I wasn't sure how to answer him. He thinks he knows better because he's very accomplished as an acrobatic pilot and I'm not. I think he's dangerous.

**A:** Although a well-trained pilot flying a perfect barrel roll would indeed complete the maneuver without exceeding 1G, most general aviation airplanes (including the A36 Bonanza) are not approved to fly the maneuver. Let's look at this from several angles:

### The legal argument

The A36 Bonanza Pilot's Operating Handbook prohibits acrobatic flight. From the Limitations section: "No acrobatic maneuvers are approved except those listed below...Chandelle, Steep Turn, Lazy Eight." FAR 91.303 defines aerobatic flight as "an intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration, not necessary for normal flight." In practice "aerobatic" is generally accepted to mean any maneuver including more than 60° bank angle (such as a barrel roll). This interpretation is supported by the Commercial Pilot Practical Test Standards steep turn bank angle of  $55^\circ \pm 5^\circ$ , avoiding any bank angle beyond 60° at the maximum. Regardless of whether the 60° "rule" is valid, it is clear a barrel roll meets the definition of aerobatic flight, and it is prohibited by the aircraft's Limitations.

### The human factors argument

The pilot-in-question's actions reflect an attitude of "the rules don't apply to me." Although he may indeed be extremely disciplined and will never violate *any* other rule of law or safety, history doesn't support that. More likely a pilot who intentionally exceeds rules or limitations will eventually get overly comfortable—or bored—and will fly further and further outside the boundaries. Further, violating one rule commonly means other rules are busted as well. Does the same pilot also descend below minimums on an instrument approach or load the airplane beyond its maximum gross weight because he feels he is *better* than the pilots bound by these restrictions?

### The responsibility argument

Pilots naturally look up to more experienced pilots. Although each of us is entirely responsible for our decisions and actions (one of the great attractions of personal flight), we also all thrive on the tales of war heroes and airshow pilots. We admire them and try to fly like them. Consider the case of a Baron that crashes while the pilot attempted aerobatics, committing vehicular homicide against four passengers as he took his own life:

A friend of the pilot stated the pilot was in his shop...before he departed...on a fishing trip in his Beech 58. The friend informed the pilot, "That he thought he was stupid and not to do anything in the airplane that would get him hurt." The pilot stated, "I think I can roll this airplane." The friend stated, "The pilot had been at Sun N' Fun in Lakeland, Florida, during the week and had observed a performer rolling a Beech 18, and the deceased pilot just kept the rolling issue in his head." The friend stated the accident pilot had flown with a retired airline pilot who owns a Beech 55, and the retired airline pilot had rolled the airplane with the deceased pilot as a passenger. Another friend of the deceased pilot stated he was in the right front seat of the airplane...a return flight from Sun N' Fun in Lakeland, Florida, with two other passengers in the back seats. They departed Lakeland, Florida, and the pilot climbed to an initial cruising altitude of 9,500 feet. A short time later, the pilot stated, "I want to try something." The pilot rolled the airplane to the left side, and then back to the right side with the autopilot off and stated, "I believe it's possible to roll this airplane."

See [http://www.nts.gov/ntsb/brief.asp?ev\\_id=20070427X00463&key=1](http://www.nts.gov/ntsb/brief.asp?ev_id=20070427X00463&key=1)

The sad fact is the accident pilot was trying to emulate a professional pilot who flies a dissimilar airplane from the same manufacturer in airshow routine (although that airplane is modified for airshow aerobatics), and an airline captain he respected who flew aerobatics in a similar aircraft.

Will the legal, the human factors or the responsibility argument keep the anti-authority pilot from barrel-rolling his Bonanza? Probably not. But we have to try. Each of us is the "high-time pilot" to others; we share a responsibility to fly within the safe and legal limits of our airplane to do our part to perpetuate the population of general aviation pilots and the airplanes they fly.

Do you have a question? Send it to [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net).

***Fly safe, and have fun!***

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2008 FAA Central Region CFI of the Year



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