

FLYING LESSONS for January 12, 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.

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This week's lessons:

We've focused a lot of words and effort in FLYING LESSONS over the years on maintaining directional control on landing. Although it doesn't have the appeal (if that's the right word) of thunderstorms or ice or low clouds and fog when discussing aviation weather hazards, the wind, especially wind during takeoff and landing, is the single largest weather hazard to non-transport-category airplanes, according to the accident record.

Most pilot training texts, and most of FLYING LESSONS' commentary as well, hones in on the stick-and-rudder skills needed to maintain runway alignment in a crosswind. That's absolutely essential, and crosswind control should be at the center of all your recurrent training and Flight Reviews (or international equivalent). But along with the rest of the industry FLYING LESSONS is remiss in presenting the single biggest factor in the success of a crosswind landing—the decision whether or not to try it in the first place.

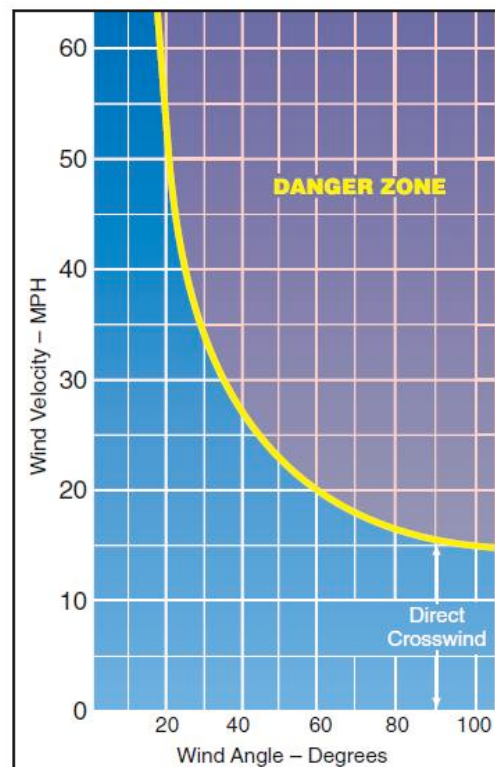
Typical primary pilot training pays some lip service to the decision about accepting a landing, but addresses the issue primarily on the basis of airplane certification criteria. I recall having to memorize the [USAF T-41A Mescalero](#)'s maximum demonstrated crosswind component (17 knots), and making my students do the same for Cessna 152s, 172 and Bellanca Super Vikings, and later, for Beech Bonanzas and Barons. And then instructors tell their students this is not a limitation, but merely a maximum *demonstrated* speed. The implication is that a "good" pilot can handle much more.

See www.nationalmuseum.af.mil/factsheets/factsheet.asp?id=403

An example is the Crosswind Danger chart from Section 8 of the FAA's [Airplane Flying Handbook](#). The chart depicts a crosswind "Danger Zone" that suggests that there's nothing to worry about if the direct crosswind component is as little as 15 knots. Although that may be true from a certification standpoint, accident history paints a different picture.

See www.faa.gov/library/manuals/aircraft/airplane_handbook/

Most LODC (Loss of Directional Control) on landing events I read about in accident reports occur, in fact, with reported surface winds reported below 10 knots. Clearly the emphasis on certification-defined maximum demonstrated crosswind components is not doing everything that can be done to teach pilots to evaluate the wisdom of attempting a crosswind landing.



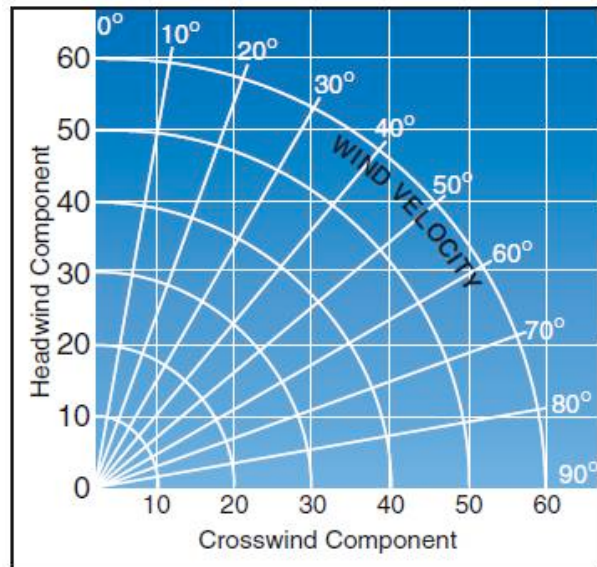
So why do we lose directional control in such relatively low surface winds? I suspect:

1. We're not as current in crosswind landings as we think we are.
2. It doesn't take much change for a crosswind to swing around and include a tailwind component, which is even more destabilizing to many airplanes (note the *FTH* chart shows a lower "danger threshold" once the angle between the airplane's nose and the wind passes 90 degrees).
3. Some pilots may be too rushed (or more likely, too lazy) to fly to a landing into the wind when their route of flight is nearly straight in to a more convenient, if not wind-aligned, runway.
4. Others may not be assertive or confident enough to change runways when ATC assigns a runway the pilot would not choose on his/her own, or a preceding pilot uses a runway inappropriate for the winds (I see this lead to runway excursions and groundloops every year at Oshkosh, when pilots are unwilling to question landings even with strong, quartering tailwinds because "that's the direction they're landing").
5. Flight instructors are not emphasizing good crosswind technique, including proper control use and "flying" the airplane all the way to the completion of the landing roll.
6. Many pilots may not bother to consider the effect of wind as part of their arrival briefing.

How can we address these possibilities? Practice, realistic self-evaluation based, renewed emphasis on proper technique in flight instruction for pilots at all levels, and the confidence to refuse a runway when the winds do not favor its use...even if others are using it or if initially assigned by ATC. This means consciously estimating the crosswind as part of your arrival self-brief, and the willingness to request another runway or even fly to a more favorable airport, even if it means holding for some time or landing at a less convenient destination.

Make a copy of this diagram from the [Flight Training Handbook, page 8-16](#), laminate it and keep it in your airplane. **Use it** to predict the crosswind component to expect given the difference between the heading of the runway you're considering using and the reported wind (or your best estimate based on observing ground details). Compare the result to your level of crosswind currency in the airplane you're flying. If you're at (or near) your realistic comfort zone, start to look for other options. Make certain you give yourself enough fuel to divert to an airport with less wind, or wind more aligned with the runway, while preserving a safe fuel reserve.

See www.faa.gov/library/manuals/aircraft/airplane_handbook/media/aa-h-8083-3a-4of7.pdf



Funny, but tailwheel pilots seem to be concerned less about their airplane's demonstrated crosswind component, and more about their personal crosswind proficiency and currency level. I flew a tailwheel Cessna 120 early in my piloting career, and recall very consciously considering the time since my most recent crosswind practice every time I considered going out to fly. Making that self-evaluation had been drilled into me when I checked out in type. Many amateur-built and modern production airplanes have free-castering nosewheels to save weight and complexity, and as a result have many of the same "ground looping" tendencies and pilot rudder requirements as tailwheel designs. But the same

tailwheel philosophy doesn't seem to be as prevalent in high-performance homebuilt and Cirrus/Diamond circles. Perhaps all pilots need to think like a tailwheel pilot when considering their ability to handle a crosswind.

Takeoffs are optional. Landings are not. However, landing at any one location, or on any specific runway, *is* optional. Make a conscious decision to accept or reject a crosswind landing by figuring the crosswind component before accepting an approach or entering the traffic circuit.

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



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Thanks to reader Kim Caldwell, who has joined these other [generous supporters](#) who have donated financially or in-kind to help cover *FLYING LESSONS'* costs. Please support *FLYING LESSONS* at www.mastery-flight-training.com.

Debrief: Readers write about recent *FLYING LESSONS*:

Several readers commented about last week's *LESSONS* about the role of proper and proactive aircraft maintenance in accident avoidance. Aeronautical engineer and Continued Operational Safety consultant Marv Nuss writes:

I read your latest *FLYING LESSONS* yesterday, and KUDOs to you for your article on increased vigilance and maintenance for the older airplanes. Well done! As you know, that's been my message to owners for quite a while.

Thanks, Marv. Good to hear from you. Reader Mark Briggs writes:

As always, this week's *FLYING LESSONS* is a good read. As an AME (Canadian equivalent of an A&P) it's easy to see where aircraft owners are cutting corners, trimming maintenance costs in order to be able to afford to keep flying. I can't argue with this philosophy because it reflects basic human nature. We get into a pattern of thinking that if it hasn't broken in quite some time then it won't break for quite some time to come. Down this path of thinking lies disaster!

There's one critical maintenance cost driver your article did not really stress; it's obvious, but frequently overlooked... Don't break the airplane! All too often I see aircraft owners doing stupid things that will eventually end up costing them maintenance dollars. Little things like slamming the cockpit door eventually lead to higher maintenance costs. Instead, push the door closed gently, manually engaging the latch to avoid wear on door latch components. The same goes for any time you open the door – ALWAYS ensure the door is protected against being blown against (or past) its mechanical stop by ambient wind or prop wash. This same rule applies to engine cowlings, baggage doors, etc. It applies to flight control surfaces too – religiously apply those gust locks!

In any aircraft the landing gear is subjected to a considerable beating in normal operations. Why not take a few minutes to learn how to baby your landing gear? Start off with ensuring your tires are inflated to recommended pressures – this will not only save you money on tires and tubes but will also save your landing gear from unnecessary stresses. We know gas is expensive, but the extra minute or two taken to taxi more slowly will save far more maintenance dollars than the cost of extra taxi fuel. When landing, roll out rather than stomping on the brakes. While it's always a cool thing to make the first runway exit, letting the airplane roll to the second exit and then taking the corner at the exit slowly will save wear and tear on your landing gear (and your passengers' nerves). Last but not least, be honest with yourself. If your skills are not up to snuff you're going to be planting the airplane on the runway rather than greasing it on. It's false economy to let your skills get rusty. Fly the airplane and maintain your ability to handle it proficiently. A greaser landing will always be easier on the hardware than a carrier-style "arrival".

My last point is that many of us don't concentrate on flying "smoothly". Instead we "thrash and bash," making abrupt control inputs, quickly mashing the throttle against the firewall on takeoff, etc. All of these actions place unnecessary stress on the airframe. Go gently. **Strive to be as smooth as you can possibly be in every aspect of your flying**, from making gentle turns when taxiing to actuating electrical switches with

no more force than is necessary. A short while ago an owner handed me a knob off his transponder, saying simply, "it broke off". It was all I could do to restrain myself from saying "well, that's what you get for handling it like a gorilla!" Don't be a gorilla in your airplane - your airplane and your bank manager will thank you!

Keep up the excellent work in spreading the gospel of aviation safety!

Excellent advice from someone who regularly deals with the aftermath. Smoothness is worth more than "style points." Gentleness is also a fatigue-management strategy. The more fatigue-exposed (i.e., "old") your airplane becomes, the more important it becomes to fly it smoothly and well away from the edges of its approved envelope, so it will last longer than any of its designers likely ever envisioned.

Reader John Townsley adds:

You stated that:

"There is growing evidence in the mishap record, however, that airplane owners may be responding to the high cost of flying by deferring maintenance of their aircraft. This happens precisely as the average age of a general aviation airplane tops the 40-year point (how much extra maintenance did or will *you* start needing after age 40?). *Maintenance issues cause a fairly small percentage of airplane accidents...*"

From what I read about **one-fifth of all aircraft accidents have a maintenance root cause**. In my book, when 20% of mishaps are preordained because someone forgot to do something that should have been done to the aircraft, neglected to do something, or did something incorrect to the aircraft that is a very big deal. For this reason I believe strongly that **all pre-flights of aircraft I don't own/fly as the sole pilot should be done with a very skeptical eye**. I also believe very strongly that **pilots and aircraft owners should be active partners in maintaining the aircraft they fly**. More than once I've asked the A&P/AI working on my plane about this or that and thereby caught something that needed fixed.

Just this week the FAASTeam sent out a maintenance tip to give pilots and maintenance techs a heads up on a serious problem. For photos that documented the problem see:

https://www.faa.gov/files/notices/2012/Jan/V35A_Pictures.pdf

I speculate the owner of that Bonanza wasn't very involved in either inspections or maintenance. The IA who finally found the problem earned a large bonus (we won't discuss the multiple Annuals where this problem was overlooked). Anyone who has flown for more than a couple of years has likely heard of equally scary near mishaps. Let's not kid ourselves. Maintenance is NOT the cause of a "fairly small percentage of airplane accidents"!

I apologize if it appeared I was minimizing the impact of maintenance-related accidents. In fact, I was trying to emphasize that mechanical mishaps are worthy of our attention although they get little press because of their relatively small numbers, and that these types of events are very often under our control as pilots and aircraft owners. That said, reader John is exactly right...a thorough knowledge of our airplane systems and operation, the level of knowledge that doesn't seem to be getting the attention it once had, is vital to making an informed go/no-go decision before and during flight.

Reader David Heberling continues the theme:

Thank you for another great subject! I have heard it said that you can tell how a pilot will treat his airplane by looking at his car. There may be some truth to that statement. If a pilot goes cheap on his car maintenance, he is most likely to go cheap on his airplane also. This is in no way an indictment of owner-performed maintenance as permitted by FAR 43 Appendix A paragraph (c). I think owner performed preventive maintenance is a great way for owners to get to know their airplane. Owner assisted annuals go even further in this kind of education. However, what I think you are talking about are the owners who hate spending money on their airplane and take shortcuts wherever possible. There must be no awareness of the risks these shortcuts expose them to. They are also looking at the costs of aircraft ownership backwards. **It is not the direct costs of flying the plane that come first (gas, oil, landing fees, hangar and tiedown fees). It is the costs associated with the mechanical working of the aircraft that comes first.** If the aircraft is not airworthy, it is grounded. **Airworthiness is not in the eye of the beholder either. It is determined by whether or not the aircraft conforms to its type certificate** [or properly installed and documented STCs--tt].

Cars do not work the same way as airplanes. An non-airworthy airplane can kill you a lot faster than a poorly maintained car can. Many car owners approach car ownership with the attitude that if it starts, it is good to go. Try that with an airplane and you will end up in situations you would rather not have to deal with. This attitude also takes a dim view of the FARs. They are looked upon as interference, not realizing that they are a set of rules (minimum rules at that) designed to keep owners from killing themselves. **One of the facts of life in owning an old airplane is that while it might have been a "scorching deal" to acquire, its care and feeding is at full retail.**

Wise words, David. Thank you.

Reader Tom Allen discusses the conflict between the desire and cost to fly, and the necessity to maintain:

Your *FLYING LESSONS* on aircraft maintenance was very interesting. I have had my plane for 16 years now. It is a 1973 model G33 Bonanza. It is a "constant care device". Since I have owned it:

- I am on Vacuum pump #4. One pump was old, 2 were fairly low time. I have about 50hrs on the current one.
- The attitude indicator [has been] rebuilt once. Failed on takeoff after entering a 300-foot ceiling.
- Engine driven fuel pump failure.
- [A type club service inspector] measured my gear transit speed at 16 seconds. My mechanic didn't take is seriously, my new mechanic did. Turns out the worm gear was worn, motor needed rebuilding. It now comes up in 9 seconds. Now I time it on takeoff regularly.

At my flying club meetings, it seems there is a constant struggle between the pilots and the owners over maintenance.

I have found, that **it is important to pick up on the clues**. Stay current and have a good mechanic that takes you seriously.

Good reminders that dispatch reliability and flight safety require inspection and maintenance vigilance, Tom. Thank you.

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Flying has risks. Choose wisely.

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



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