

FLYING LESSONS for June 23, 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:

Learning to land is one of the most challenging tasks of becoming a pilot. Landing requires we use everything we know about airplane control and angle of attack to get the aircraft down on speed, on target, aligned with the runway.

A successful arrival comes from mastering three variables:

- Airspeed control (more correctly, angle of attack control),
- Glidepath control, and
- Crosswind control

The key is to have the airplane in configuration (power, flaps and landing gear as appropriate), aiming for the touchdown zone (as defined by you, but generally within the first third of the landing surface unless you've specifically chosen otherwise), and aligned with the centerline (again, unless for some reason you specifically chose differently).

If you're having trouble touching down where you want, first, practice airspeed control at altitude, then move into the runway environment. If your airspeed is right but you can't judge your flare, try looking farther down the runway. I've found that watching near the far end of the runway helps me (and my students) better judge rate of descent...pull to keep the runway's end constant in the windscreen and the airplane will settle onto the pavement.

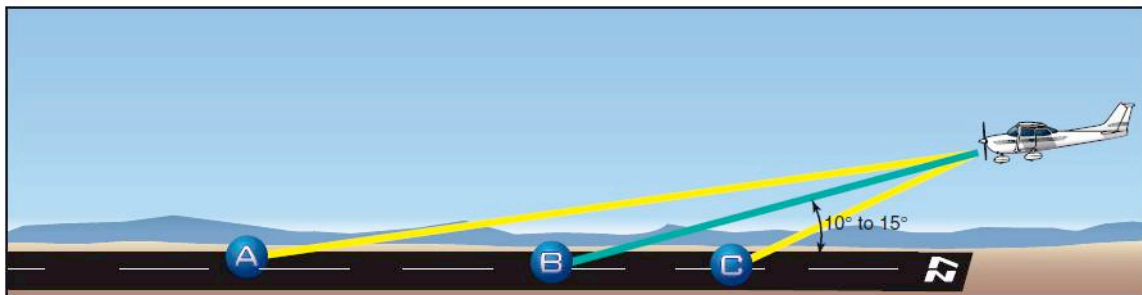


Figure 8-7. To obtain necessary visual cues, the pilot should look toward the runway at a shallow angle.
Airplane Flying Handbook

Touch down at too great a speed or too high a rate of descent and the airplane may bounce. In addition to putting strain on the landing gear, a bounce rapidly increases the wing's angle of attack even as the airplane rebounds into the air. If the airplane bounces, then, you'll need to push *forward* on the controls to avoid a stall—a very counter-intuitive thing to do just a few feet above the ground.

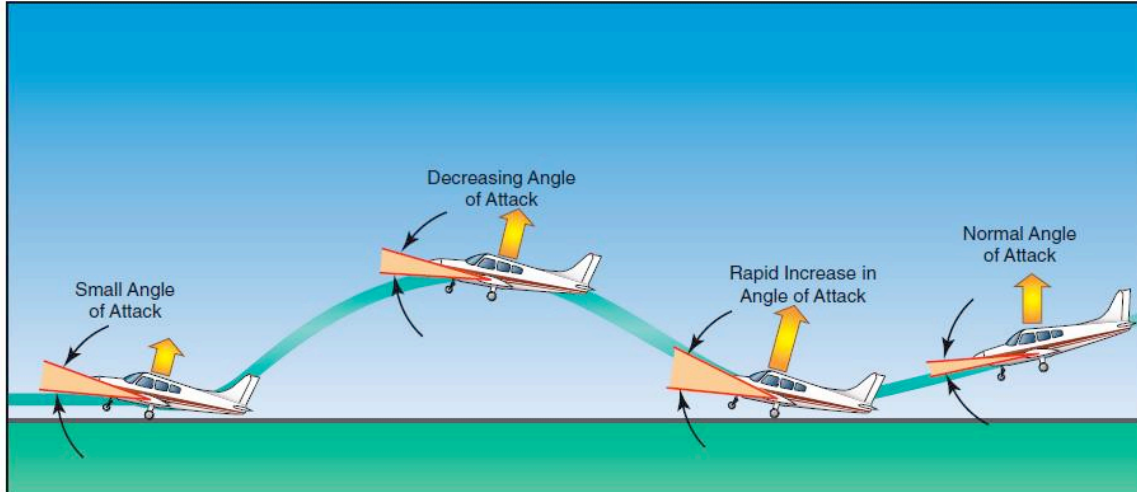


Figure 8-36. Bouncing during touchdown.
Airplane Flying Handbook

This is why a bounce recovery also requires a burst of power. Adding power increases forward motion as you reduce the angle of attack, increasing lift to prevent a second, much harder contact with the ground.

If you don't reduce angle of attack *and* catch the airplane with a little additional power, the increased angle of attack can cause a stall well above the surface. The airplane will either mush downward or nose over into the runway...either likely to cause significant damage to the aircraft.

A rule of thumb I've learned is that if after a bounce the airplane is more than five knots below reference speed to go around right away—add power, adjust attitude and fly away to try it again.

If the airplane bounces a second time, go around regardless of the airspeed. You're setting yourself up for a pilot-induced oscillation that will only make matters worse. You've probably used up too much of the landing surface to this point anyway, and may not be able to get it stopped if you do recover and make a smooth touchdown. Power up and go around, set up and do it better next time.

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



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Debrief: Readers write about recent *FLYING LESSONS*:

Last week's *LESSONS* on "[The Airshow Pass](#)" led to a lot of discussion this past week. Reader and Cessna Skymaster expert G.M. Anthon writes:

As to high speed low passes, you covered the pilot control training part of the topic quite well... as it should be the pilot who knows what he is doing.

That being said, there is another side to the story, too. Some of the accidents that occur doing this maneuver can be attributed to the aircraft's mechanical failures, i.e., stresses that the flight controls and the airframe go through doing this maneuver that are not normal, and may in fact exceed the mechanical limitations of the airframe and flight controls.

A good example of this recently was the 337 Skymaster which had been modified by extending the wings for more fuel. We all saw the effect of the wing breaking off and killing all aboard, while this pilot was showing off doing high speed passes for the family on the ground. Lucky they were videoing the flight so we know what happened... sadly.

Two possible conditions seem likely. First, the high speed pass may have induced flutter into the control surfaces. Second, the wing loading that occurred due to a "full load" (pax and fuel) [may have been a factor]. Either way, the mechanical design (aircraft manufactures specs) was to be considered exceeded.

One might check the V_g Diagram for his or her particular airplane and pay close attention to the G loading, both Negative and Positive (with respect to speed). Some push over to begin the high speed pass, causing negative G's, then go positive at the pull out down the runway, increasing the wing loading. [This occurs] at a high rate of speed which then terminates in another High G loading for the wings at the pull up, with some planes going negative once again, over the top or in diving /climbing turns.

I recently put on a seminar on about just such a problem, a requested presentation on Maneuvering speed and the limits of aircraft structural design. V_a is what its called, but now the FAA added a new Term, V_o , that needs to be checked out by all pilots and owners. [V_o is] normally shown for the aircraft in a graphical presentation chart, but one has to know what one is looking at to make a correct determination. It also explains the markings that the manufacture places on the AS indicator as a reference guide for the pilot.

May I suggest that you also cover this topic once again, concerning this kind of maneuver. As a IA/P I have recently seen a lot of control cables show signs of pre-mature failure when we check them at annuals, due to rust and corrosion inside the cable. Not properly serviced, it is not detectable by just looking at it. The outsides seem perfectly fine but the inside of the cable is a different story. It appears on some that almost 1/4 of the cable is broken inside. This could lead to a pilot thinking his plane is in great shape and could pull off the airshow stopping maneuver, as you pointed out. However, if the pilot thinks he can pull the same strength out of the control cable that the specs for the plane say, when its broken inside, he is in for a big surprise when the control cable suddenly breaks due to the higher than normal loading/flutter [if] pulling this maneuver (due to [airframe] age...and old cables)...which then causes him to lose control of the aircraft—and demise.

[Also], when one puts the flaps down at higher than normal speeds, this increases the stress on flap control cables—Cessna and others—leading to the control cable breaking [an] resulting in one flap down and the other flopping around in the breeze—a serious emergency that most pilots are not ready for.

Thanks again for the great articles and keep up the good work.

Excellent information, G.M. It reminds me of the old war movies when a young fighter pilot does a victory roll over the field, only to be chewed out for risking an airplane with unknown battle damage. It also sets us up for more comments that came in this week...

Reader JJ Greenway, chief instructor of the AOPA Air Safety Institute, wrote:

Airshow Pass? Not even legal, unless you're part of an airshow! Need we get into this? Only reason why you can descend below the 500 AGL or 1000 AGL altitudes specified in part 91 is to land! If you have no intention of landing, a "low pass" is a big violation of the FARs! Check some of the letters of interpretation that the FAA has issued on the topic. Practice approaches have seemed to come out on the "exempt" side. "Low passes", on the other hand seem to be considered "hot dogging."

I've struggled with that for a long time. I agree with your interpretation but the tacit approval of numerous FAA observers at fly-ins and airshows across the country (mentioned in last week's

report) tells me it is accepted procedure. Maybe it's the "bad attitude" of resignation in me, but if it's going to happen and the FAA does nothing about it, I at least want pilots to consider how to keep from killing themselves in the process. I've even seen Gulfstreams do the maneuver with the (then) FAA Administrator on board, so I'm really curious to see what the FAA policy letters say.

Likewise! Although I had a former colleague at American get "Ninety Days of Beach Time" for taking an empty B777 down the runway at 1,000' AGL at Spruce Creek [a fly-in community in Florida]. Also, a Singapore Airlines Captain who did the same (with tower's permission, nonetheless) with a new B747-400 on a delivery flight out of Paine Field (Everett, WA). He ended up taking early retirement. Both incidents, the FAA got involved. In the case of an airshow however, all this discussion is out the window.

Don't know if you have a copy of "FAR's Explained" by Kent Jackson but he touches on the topic on page 91-54. In '86, in the case Administrator v. Kunkel, 5 NTSB 1400, the Board stated that descent below the minimum altitudes specified in 91.119 was ok for reasons other than takeoff and landing but for "other approved purposes, such as touch and goes, practice missed approaches, and practice instrument approaches, that are conducted to improve a pilot's capabilities in those areas." There was no discussion of "low passes" in that ruling. However, the NTSB's omission of the topic might be relevant in that discussion. Read though this [and] you may never want to do a low pass again!

Great info. I do have that book. I know the regulatory issues exist but as I said in last week's report and this, the FAA at least tacitly approves it at airshows, sometimes doing the maneuver themselves.

John Yodice wrote a great article back in '08 that touches on the topic. Read the last paragraph where certificate action was taken against the pilot of a Gulfstream who did a low pass down a runway.

AOPA's David Kenny, who maintains ASI's safety database, chimed in as well:

"Don't do it" strikes me as easier as well as safer.

Agreed. But *if* they're going to do it...

As always, your advice was measured, well considered, and no doubt accurate. Mine was just an expression of personal opinion.

It frankly marches my own. I think the maneuver is unwarranted. Since it is going to happen, however, it should at least be done correctly.

Understood. And perhaps the rigor required to learn to do it correctly will give at least a few of your readers second thoughts.

Thanks, David, you've hot on what's likely the most important *LESSON* from this discussion. There's a high **WT factor** ("*Watch this!*") in performing the airshow pass. As I concluded last week:

Unfortunately, the airshow pass destroys a number of airplanes and kills a lot of people each year. If you must try the maneuver, make sure you've logged the training and practice that will make you and those around you safe. Otherwise, leave the airshow pass to the professionals

See:

www.mastery-flight-training.com/20110616flying_lessons.pdf

www.nts.gov/alj/O_n_O/docs/Aviation/4020.pdf

www.aopa.org/members/files/pilot/2008/pc0804.html

Thanks, gentlemen. Readers, what's *your* opinion? Tell us at mastery.flight.training@cox.net.

Fisk Inbound #2

Flying to Oshkosh for the EAA Convention? It's a phenomenal experience... but one that requires study, practice and attention as well. Let's continue our annual look at flying into AirVenture, designed to make this a safe and fun experience. Any number of possibilities may require you to delay or divert when inbound to KOSH. Read [Fisk Inbound #2: Have a Back-up Plan](#).

See www.aero-news.net/news/featurestories.cfm?ContentBlockID=11B5B140-1161-457B-BE89-3AA633B059B8&Dynamic=1



No one wrote this week about the 6th most common cause of fatal general aviation accidents, stalls on initial climb. Take one more look before we wrap up discussion and move to the fifth most frequent reason people die in noncommercial aviation. As you [review the scenarios](#) respond to these questions:

1. List the scenario number you're addressing.
2. What factors do you think might have contributed to the initial climb stall?
3. What conditions were different from the way pilots typically practice power-on (departure) stalls?
4. How could pilots better train and practice stalls to be able to recognize and avoid these real-world scenarios?

See www.mastery-flight-training.com/top_10_number_6.pdf

Send your insights to mastery.flight.training@cox.net. I'll provide some personal thoughts on Top 10 Cause #6 in next week's *FLYING LESSONS*. I appreciate your help and insights into this coming summation and hope to have more to work with by next week. Thanks!

Toward zero errors

Reader Tom Rosen, a retired TWA captain, offers his philosophy on striving to be a great pilot. Tom writes:

In my prior life the best pilots used to try to fly each leg with ZERO mistakes. It took maybe 500 hours after checking out on the plane before it became possible. Even after a few thousand hours on the plane everybody had more flights with mistakes than ones without. Most of the mistakes were only known by the pilot and were trivial, (maybe forgetting to set the altimeter passing FL180 by a couple of hundred feet, etc.) but nevertheless they ruined the perfect game. But the game for me was always trying to fly the perfect flight.

The key is to avoid the big mistakes entirely, and to keep the little ones to a minimum. The problem is that in a single-pilot operation you have nobody to protect yourself from yourself. Mistakes are part of the things we do. If we didn't make mistakes, we wouldn't need checklists to discover them.

We may never be error free, Tom, but you're right...we need to try, and to actively catch ourselves so our errors don't escalate. This reminds me of an article I wrote some time back: "[Minor, Major and Critical Errors...and the Highly Qualified Pilot](#)."

See www.ipilot.com/learn/article.aspx?ArticleID=880

Fan mail

Reader Marty Sacks writes:

Thanks for all the time you invest to create such a useful pub. I feel that I should be paying for this!

Thanks very much, Marty. Although I might be able to charge for *FLYING LESSONS Weekly*, to date I've been publishing primarily with the support of reader donations and, at times, a corporate

sponsor (such as Avemco, which is covering most of the fixed costs this year). If you wish to donate you may do so through a secure PayPal link in the left column at www.mastery-flight-training.com.

Reader Mick White asks:

How can I subscribe to *all* the periodicals you write for? I'm aware of the *ABS Magazine* since I had a few issues many years ago. I'll sign up for it again ASAP. Now if only it were possible to get *every* back issue of all your work. There are a lot of good aviation books out there that I want to read, too.

Hi, Mick. The two periodicals I write for monthly are [ABS Magazine](#) and [Aviation Safety](#). *ABS* is the journal of the American Bonanza Society (for which I am editor-in-chief, as part of my duties as executive director of the ABS Air Safety Foundation), and *Aviation Safety* is a product of Belvoir Publications, which also publishes AVweb and several other aviation periodicals. I invite you to become a member of *ABS* at www.bonanza.org or by calling 316-945-1700. You may subscribe to *Aviation Safety* [here](#).

I occasionally write for several other publications as well. I maintain a list of [this month's periodicals](#) and [my past publications](#) on my website. This latter includes links to over 600 of my past articles and podcasts. The *iPilot Insider Series* articles require you register, free of charge, with www.ipilot.com (owned by PilotMall, www.pilotmall.com).

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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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