

# **FLYING LESSONS** for October 20, 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:***

**It's perhaps ironic** that in so many "landed long" accidents, the runway is far longer than needed for the airplane being flown. It may be that a pilot who flies most or all of the time from very long runways (relative to the "book" landing distance requirement) develops a type of landing complacency that, left unchecked, can contribute to an off-the-far-end runway excursion.

**Most lightplane pilots** have very little need to fly from short runways. But even if you are flying a Skyhawk or a Diamond Star or a Cirrus or a TBM or a King Air exclusively from air carrier-sized airports, it's a good idea to practice at least *as if* you need to get the airplane down in a distance as described by your Pilot's Operating Handbook.

**Why is that?** A precision, by-the-numbers approach and landing will have you flying *on speed, on glidepath, and on target* to the touchdown zone every time. More importantly, assuming you have done your homework and computed the expected landing distance, it will put you in a position to always know whether you have sufficient runway remaining to come to a stop, regardless of airplane weight or the density altitude.

**It's the sloppy pilot** who does not pay attention to landing targets, even (or especially) on more-than-adequate-length runways. Conversely, flying precisely will keep you from adding to the "landed long" statistic.

**So how should you practice** approaches and landings? First, get out the Landing checklist and the Landing Distance chart for the airplane you're going to fly. They will probably provide guidance on the airspeed to fly on final approach. Note this will be higher than the speed you'll fly in the flare; if you aim for the 50-foot or "over the fence" speed at that point in your landing and flare normally beyond that point, you'll be slowing through the appropriate speed as the wing's lift can no longer overcome the airplane's weight and the airplane settles that last couple of inches (hopefully) to the surface.

**Now that you know the speed**, put the airplane in the landing configuration (flaps and landing gear position as applicable) and find the power setting that results in a 500-600 foot per minute descent. This is a "normal" landing (we'll cover short field approaches another day). Look at the position of the airplane's nose relative to the horizon while you're on speed, in configuration to land.

**Get comfortable** with this "sight picture" at altitude—you have precious seconds to practice if you do this only on actual landings, but given enough altitude you have all the time in the world when you practice. Drill the flight condition: configuration, attitude, power, and the resulting airspeed and rate of descent. Work until this is natural for you. Then practice to keep it fresh.

**Now take that practice** to the runway environment and practice holding configuration, attitude, power and airspeed while you remain aligned with a visual approach slope indicator (VASI) or other runway glidepath guidance. Most VASIs, PAPIs, etc. are aligned to have you touch down 1000 feet from the approach end of the runway or one-third the total runway length, whichever is shorter. Practice landings until it is second nature for you to stay on target all the way to flare over the touchdown zone.

**Once you have this mastered**, try a runway without a visual glidepath indicator. Pick a touchdown zone—I like the second runway stripe, close enough to the threshold to get full use of the runway but far enough away to accommodate a slight undershoot—and practice holding speed, attitude and configuration until you can consistently flare and touch down on your runway target.

**The spot your airplane is aiming for** will appear to remain motionless in your windscreen. If you are coming up short your spot will appear to move away, or up on the windshield. If you're overshooting the spot will appear to be coming toward you, and toward disappearing under the airplane's nose.

**Of course, as you flare** and settle onto the surface you'll actually touch down a little beyond this aim point on short final. The key is that the spot that appears motionless in your windscreen should be just before the point you'll actually touch the surface.

**Now you're ready** to go back to that air carrier runway and still touch down smoothly in the touchdown zone, with minimum sink and at the slowest safe speed to minimize distance covered in the flare and on the landing roll.

**Every time you land**, aim precisely for speed, attitude, power and configuration to the touchdown zone you identify. Now, even if the airplane is heavy or the density altitude is high, you'll instinctively know what "looks and feels right," and can make minor adjustments if necessary to keep the plane on target all the way to touchdown. If conditions call for "landing long" on a long runway to accommodate some operational imperative (such as landing "on the dot" at Oshkosh), you'll know exactly what to do to touch down where you want, at the speed you need, so you won't overrun the end of the pavement.

**Most importantly**, mastering the landing approach and disciplining yourself to do it "on target" each time will tell you instantly if you are in danger of running off the end of the runway, while there's still time to do something about it. Is your speed too high? Are you not in the landing configuration? Is your power setting too great? Is your pitch attitude wrong? Does the landing zone appear to be coming toward you and disappearing beneath the airplane's nose? If any of these is the case within about 500 feet of the ground, power up and go around before you find yourself landing long and rolling off the far end of the runway.

**Practice these skills** and you won't end up like the pilots in at least four incidents this past week.

Questions? Comments? Let us know, at [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net)



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**Debrief:** Readers write about recent *FLYING LESSONS*:

Reader Woodie Diamond adds to the discussion of night, VFR flight:

I totally agree that the current requirements of three take offs and landings before carrying passengers is insane. Night takeoffs and landings are a worthless skill when flying into a dark mountain. However, inviting further governmental regulatory involvement is also a bad idea.

The idea that an IFR rating held by someone who does not regularly operate IFR, and more specifically IMC, makes night flying safer is a fallacy. I have a 12-year-old daughter who is taking Algebra (yep, same stuff

we took in high school), and even though I had that training, it's incredibly tough for me to help her. More times than not, the answers I come up with are wrong.

The issue here is not whether flying VFR at night without an IFR rating is more risky, the issue is conducting any type of infrequent flight activity just because "legally" a pilot can. No matter what the flying activity is, CAVU VFR for example, can be very dangerous for someone who has not practiced and maintained those skills. "Legally" a pilot with a medical and flight review that has not flown for 23 months and 29 days can jump into an airplane and launch into the skies. To me, that is insane and I don't want to be around when it happens.

My personal policy is a review of any flying activity that I have not flown recently and frequently. I have spent many hours with my instructor(s), outside of the required bi-annual flight review, because I was going to fly at night, make a long x-country flight, visit an unfamiliar airport with steep approach, etc. Getting over the "I am pilot" ego, and engaging some common sense is the actual skill that all pilots need.

Thank you, Woodie. A common thread in this discussion has been "pilots should have to..." tempered by "we don't want any more regulations." I'll ask a Question of the Week bonus question, one I often ask myself and which comes up regularly in learned discussion among seasoned instructors and aviation safety advocates:

**Can we make any significant improvement in aviation safety, especially the fatal general aviation accident rate, by relying on pilots to "do the right thing" without being required to do so?**

Are there any aviation safety students out there looking for a good topic for a scholarly paper? How about:

A comparison of general aviation accident causes and fatal accident rates before and after the Federal Aviation Administration began requiring pilots to complete an instructional flight every two years (the "Biennial Flight Review"), and again with the FAR 61.56 change (off the top of my head, in 1989) that requires a minimum of one hour ground and one hour flight instruction to complete a Flight Review.

The intent would be to show whether or not there is evidence that supports a dramatic improvement in aviation safety and a reduction in accident rates and fatalities that coincides with institution of a new training regulation.

I, too, prefer that pilots voluntarily work to improve their skills and reduce the mishap rate. But the unspoken truth is that many pilots won't, unless they are forced to by either regulation or insurance requirements. A report such as requested here may help determine whether there is any identifiable benefit from increased training requirements, or if required training is an added cost without clear benefits. Maybe this research already exists. Perhaps *FLYING LESSONS* readers involved in aviation safety, training organizations and university programs will help promote this "call for papers" on a topic that may have real meaning for aviation safety.

We had several comments about last week's *LESSON* about civilian formation flying. Reader Stan Stewart writes:

Good treatise on formation flying! Your comments about the length and importance of pre-flight briefings are accurate and well taken. I have a comment regarding the sentence "The wingman, a highly experienced (and preferably, military-trained) formation pilot with a lot of recent time logged in the airplane flown, should experiment with different positions relative to the new airplane, including cross-overs and positions not normally flown in the formation." I do a lot of formation flying, am a Formation Flying, Inc. (FFI) qualified lead pilot, and I consider some of my formation flying "buddies" extraordinarily proficient, and although some have no military training, they are certainly qualified to safely perform the formation envelope experiments with a new airplane.

In the Bonanzas 2 Oshkosh ([www.b2osh.org](http://www.b2osh.org) <<http://www.b2osh.org>> ) as well as in the California "Beech Boy" community, we do not fly formation with another pilot who has not received formal formation training (typically a 90-minute PowerPoint formation training presentation) and flown formation with a safety pilot. The training and initial flying with a safety pilot are mandatory. For example, I hosted a formation flying clinic at McClellan airport (KMCC) on Saturday, October 1, and the first thing we did, at 8 a.m., was give the

90 minute presentation, we had five new formation pilots in attendance. And B2Osh has formation training clinics all over the US, see [www.b2osh.org](http://www.b2osh.org) <<http://www.b2osh.org>> .

You did not write whether the two pilots who had a mid air collision during a formation flight had any formal training in formation flying. I have had conversations with pilots who have flown formation with no training, which startled me with the lack of safety awareness, for example, one pilot described a cross over where he flew above his lead and lost sight of his lead's airplane while crossing from one side to the other! Training for formation flying would help avoid such a dangerous maneuver.

Thanks for all your work on flying safety, I appreciate it!

Thank you, Stan. You exemplify the level of professionalism needed to safely accomplish formation flight. I agree that military formation training is not required for safe exploration of the formation-flying characteristics of individual airplane types, as long as that pilot has completed the sort of stringent training you describe. No, I do not know the qualifications of the two Amateur-Built Aircraft (ABA) pilots whose collision prompted last week's *LESSON*. I'll watch and report back if and when that information becomes available in an NTSB report.

Reader and warbird pilot Doug Jackson contributes:

Your comments are right on. Formation flying is very high risk even for those of us who do it a lot in airshows. Always show exercise extreme caution in the situations one is asked to fly in, be brutally honest who flies or not, and if it just is not right in flight, pull out and abort.

For those of us...who do formation flying in regular general aviation aircraft, one item not brought up is the removal of the "last ditch" alternative if all goes to heck and you get hit, i.e. bailing out . . . as can be done in warbird type aircraft and as seen in this years Mustang/Spad [Douglas Skyraider] midair in England . . . but cannot be done in GA aircraft with the door configuration and no parachutes. As such [civilian formation pilots require] added caution preparation, awareness, but most importantly, high levels of *recent* training and currency.

As was told to me many years ago, we're not at war and you're not going to save our country, and there is no million dollar prize for you at the end of the flight. If it isn't right that day . . . for you . . . then just don't go.

Thank you also, Doug. Aviation safety professional Robert Thorson adds:

Thanks again for a very timely subject. Formation flying has been on the increase in our area as well. There are a couple of additional pointers that I have stressed here that are important.

Military pilots have a lot of classroom instruction that emphasize positioning. How far below and to the side of the lead aircraft is appropriate. Without training pilots tend to "just fly alongside" some call it "line abreast" which is the simplest type of formation flying beside a "tail chase". The positioning protects from mid airs caused by overshoots on proper join ups and lack of directed attention when joined. This is only one subject in a large area of required knowledge for any pilot wanting to fly formation.

More importantly military trainers are very strong aircraft and have escape systems or at least a parachute. The pilots have trained for escapes and using the parachute.

Formation flying is, in today's terms, a high-risk operation. There are plenty of accredited organizations that can give pilots proper training. Go that route! Otherwise the best solution is a PC flight simulation.

Good advice, Robert. Thank you.

Frequent Debriefer Woodie Diamond, an avid civilian formation pilot and mass-flight organizer, had sent me some vital safety information the week before the in-flight collision that prompted this *FLYING LESSONS* discussion. Like Woodie, I waited until more information was available before publishing what he sent me. Although the information is very type-specific, concerning his Beech Travel Air twin, the information rings true any time dissimilar airplanes are flown in close proximity. And it emphasizes the *FLYING LESSONS* point that even minor differences in airplane type may have a major difference in the wake turbulence they generate—Beech aficionados know the Travel Air is virtually identical to the Model 55 Beech Baron, yet as Woodie and his fellow formation flying friends have learned, it presents a significantly different risk when flown in formation. Writes Woodie:

Though, as you know, I have been hesitant to broach this subject publically for fear of sounding like the little boy who cried wolf, I am glad you opened the door.

Here is the fact: The [Beechcraft] 95 model Travel Air produces an unusual wake signature that is not found in the Bonanza, Debonair or Baron. The basis of this conclusion comes from six separate incidents, from six separate pilots who encountered either LOC [Loss of Control] or near LOC conditions behind my Travel Air. All of these pilots have flown, as have I, formation with other Bonanzas and Barons, never encountering such significant wake conditions [behind those externally similar aircraft]. Some of the pilots' comments:

"...immediately after rotation, I was pushed off the side of the runway even with full opposite control..."

"...I thought my autopilot had engaged and malfunctioned, forcing a full left roll even after full right input..."

"...the encounter was so immediate and violent, I had no time to react and avoid..."

"...I was helpless and only regained control after it threw me out [of formation]..."

We have another Travel Air in our group, and having flown formation with it, I can report personal experience with this phenomenon. During both cross under and section landings with the other Travel Air, I encountered an immediate full control input situation that did not provide response. Riding out, or powering out of the situation was the only solution that offered a return of control. Any LOC situation is extremely hazardous when operating in close proximity to another aircraft.

So why has this not been talked about before? Most likely it is simply a matter of numbers. There are so very few of us Travel Air drivers out there, and even fewer that regularly fly formation. Also, the phenomenon may be limited to a certain physical configuration only found in early Travel Airs. Where is it? As far as I can report, the wake is much lower than that usually encountered behind a Bonanza or Baron. Anyone who is familiar with the close trail position, or the normal cross over distance, that is where it is at. It appears to extend farther, and fall faster (depending on winds) than those behind the Bonanzas and Barons.

How do I avoid it? Those who fly formation regularly with me have found that increasing their step-down by an additional 5-10 feet, prior to cross over, clears the area. When section landing, either hold close or fade back. Ideally, remain higher and land beyond my touchdown point, but this isn't recommended because it places the wingman in a stepped up position.

Hopefully, coming forward with this information will instigate input from your experienced high-time formation fliers. For those who are interested, here are the usual questions that I have fielded:

*"What is the difference between your Travel Air and an early Baron?"* Larger engine nacelles and [a] straight tail. There may indeed be other differences such as wing tips, but those are the two that are most apparent to me.

*"Does your Travel Air have any physical alterations such as VGs [vortex generators]?"* No.

*"What is your normal formation flight configuration?"*

- Cowl flaps – Closed
- Relative flat pitch props – 2400 rpm
- Low power settings – 22-23"
- Flaps – Up
- Airspeed – 120-130 kts

Thanks for bringing this life-saving information to other pilots, Woodie. I know you have already made leaders of other formation flying groups that may include Beech Travel Airs aware of this characteristic of these airplanes. Woodie knows that I will ensure this gets notice in the appropriate type club journal as well.

The *FLYING LESSON* for us all? Regardless of the type of airplane you fly, if you're flying formation there may be unseen and hazardous wake vortices that can cause others in the formation to lose control. Any formation flight must be approached with extreme caution and, as we've said before, only after exploration of the possible wake turbulence hazard under highly controlled conditions, by an appropriately trained and experienced formation pilot.

Readers, tell us what you think, at [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net).



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The second most common cause of death in general aviation airplanes is **Loss of Control During Initial Climb**, right after takeoff. Before we go to the sample NTSB reports, let's get the discussion going with a little "guided imagery," i.e., your ideas of what situations might cause a pilot to lose control of the airplane right after takeoff. Think for a moment, then send a note with your ideas about this somewhat unlikely second highest risk of fatal mishaps. Next time we'll see if our notions of initial climb risk management mesh with the true hazards. Don't be shy; let us know what you think at [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net).

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

***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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