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Stupid Runway!

Techniques to Avoid Joining the Crash Landing Club

A brisk crosswind (but within your aircraft's crosswind component and your personal minimums) has messed up your beautiful turn to final. The stupid runway is not in front of you as planned. It's now to the left. To realign, you bank left. Oops! Now you need to pull the nose up a hair to keep your descent rate on target. Hey … what's that funny vibration …?

And just like that, you become an accident statistic.

Nearly half of all non-commercial general aviation accidents happen during landings, go-arounds, and takeoffs, according to the *24th Joseph T. Nall Report*, the seminal yearly deep dive into general aviation accident statistics from AOPA's Air Safety Institute. The report attributes this type of crash to "poor airmanship." The National Transportation Safety Board has another label. They define this type of crash as "loss of control," a tagline that suggests they are fully preventable had the pilot stayed in control of the aircraft.

While other types of GA accidents, like controlled flight into terrain, fuel starvation, or flying from visual conditions into instrument meteorological conditions have been dropping over time, loss of control crashes remain fundamentally unchanged, and have now become the lion's share of pilot-killers. The FAA, the industry, and pilots' organizations are all focused on ways to change this. The Experimental Aircraft Association (EAA) is even offering a $25,000 cash prize for the person who comes up with the best idea for reducing loss of control accidents.

As the majority of these loss of control accidents happen during landing operations, let's talk about landings. What makes a good landing? Well, don't judge a landing by its flare. That guy who just bounced three times on touchdown might just have out-flown the gal who greased her bird onto the runway. That's because, in truth, a good landing starts on the downwind.

A landing that looks smooth, but is really an aerobatic performance of constant changes in roll, pitch, and power to stay on target and achieve a constant glide path is really just a plane crash waiting to happen. Gross changes to stay on target aren't stable, and the current playbook for safe landings is called a *stabilized approach*.

The Stabilized Approach

Long used by airline pilots, the stabilized approach is now the recommended landing technique for all airplanes. It's officially defined in the *Airplane Flying Handbook* as an approach "in which the pilot establishes and maintains a constant angle glidepath towards a predetermined point on the landing runway." But it's much more than that. It's establishing a configuration that doesn't require significant changes to power and pitch to maintain a constant glide angle and speed.

A key element of the stabilized approach is rock-steady final descent airspeed with the plane trimmed for minimum control pressures — nearly "hands off flight." (But don't you dare take your hands off during a landing!)

Of course, that's not to say that some changes of pitch and power don't occur during stabilized approaches, but they should be more like minor tweaks than corrections. In the FAA parlance, "slight

Photo by Lisa Bentson

and infrequent adjustments" should be all that's needed to maintain a stabilized approach.

The stabilized approach is built on observing visual cues outside of the cockpit. A growing runway sight picture that does not change in shape. An aiming point on the runway where you will start your flare that doesn't appear to move as you approach it. And remember that the aiming point isn't the touchdown target. Rather, it is the spot in which your plane would smack into the runway if you neglected to roundout and flare. Touchdown is downstream of the aiming point due to the float effect of flare.

The goal of all of this? Quoting again from the *Airplane Flying Handbook*, "With the approach set up in this manner, the pilot will be free to devote full attention towards outside references." More bluntly put, there's enough to concentrate on in landing that a stabilized approach removes variables and greatly increases safety.

And it's not only the FAA that champions the stabilized approach for general aviation airplanes. The tongue-twisting General Aviation Joint Steering Committee's Loss of Control Work Group, an FAA/industry collaboration whose goal is to reduce the fatal accident rate in general aviation, included stabilized approaches as a key element of changes it recommended in aeronautical decision-making education. They also focused on the stabilized approach as one of their recommended safety enhancements and urged both the FAA and the industry to "promote and emphasize the use of the stabilized approach," even going so far as recommending in 2012 that stabilized approaches be added to the practical test standards. The FAA has since adopted this recommendation in the Practical Test Standards for sport pilot and up.

Naturally, the alternative to the stabilized approach is the *unstabilized* approach, one that requires more than just "slight and infrequent adjustments." An unstabilized approach involves gross corrections and, while there might be an endorphin rush to pulling a bad landing out of the fire, the reality is that rescuing a bad approach is a near miss when it comes to loss of control. *Un*stabilized approaches also include those that feature poor drift correction on base, over or undershooting the turn to final, and flat or skidding turns — all configurations that put the plane at risk when it's low and slow.

The bottom line is that if small corrections can't fix the problem, your approach isn't stable. So what next?

You should abort the landing and go around.

Go-arounds

We usually think of go-arounds as a technique to avoid things that happen on the ground in front of us. Crazy things happen on short final. Examples from the author's personal experiences alone include: a tractor pulling out onto the runway from the cornfield beside it; another plane taking off on the reciprocal runway; the plane landing ahead stopping dead in the middle of the runway and staying there for no apparent reason; and a small herd of deer galloping across the numbers. Wait, do deer gallop? Maybe it was more of a loping, bounding motion. But either way, hitting one or more deer would be a violent end to an otherwise lovely flight.

We should also realize that the problem is not always with the ground; rather it's with the plane or

the plane's relationship to the ground. Sometimes the wind changes suddenly. Sometimes your stabilized approach de-stabilizes. Other times your approach is just plain ugly and salvaging it requires unstabilized maneuvers. We need to accept that the go-around is the only solution to an unstabilized (or de-stabilized) approach due to either unforeseen circumstances, or those of our own making.

Go-arounds, like landings, have a high level of accident statistics associated with them, so the skill set required to execute a smooth go-around — and the mental willingness to execute it — is a key component of the capable pilot's tool kit. The recipe, in this order, is: power, attitude, and configuration. ("PAC it in" is the memory cue.) Bring the throttle up smoothly and smartly. As speed increases, establish a climb attitude. Once the plane is climbing it's time to clean it up, raising flaps first, then the gear.

Tech to the Rescue?

Pop Quiz: What's the stall speed of your favorite airplane?

Whatever answer you just gave, it's wrong.

Sorry, but stall speed is a myth. Despite the fact that you've memorized the stall "V" speeds to impress your examiner, and the fact that colored arcs on your airspeed indictor show you what speed your plane is supposed to stall at, it's all smoke and mirrors. The April 2015 Addendum to the *Instrument Flying Handbook* says it best: "Speed by itself is not a reliable parameter to avoid a stall. An airplane can stall at any speed."

The truth is that a plane's stall speed changes with weight, bank angle, temperature, density altitude, and center of gravity — all of which vary throughout even the shortest of flights. However, the one thing that never changes is the critical angle of attack, the angle between the wing and the oncoming air at which the wing stalls. Once a wing reaches a severe enough angle, it stops flying. And so does your plane.

The problem is that there's no way to see the angle of attack by looking out the window at the wing. Cloaked in multiple layers of variables, angle of attack remains invisible to the naked eye. But luckily for us, there's a technological solution to bring it out of the shadows and into the cockpit: the Angle of Attack, or AoA Indictor. Generally mounted above the instrument panel so that it's in plain sight where your eyes should be during landing, most AoA indicators feature color-coded lights and symbols that show how near to a stall the wing is, and what direction to change pitch to lower the stall risk if it develops.

If you own an airplane, it will set you back about the cost of an annual inspection to purchase an AoA indictor and have it installed. That's quite a pinch on the wallet and can be hard to justify for some older, low-value GA aircraft. But on the other hand, it will greatly reduce the chance that your family will get to cash in on your life insurance policy. So much so, in fact, that in 2014, the FAA simplified the design approval requirements for supplemental AoA indicators. Not only was design approval simplified for indicator manufacturers, but in aircraft that don't include an AoA indictor as part of the type certificate, the FAA now allows them to be installed by a mechanic as a minor alternation. That means they can be installed in pretty much any GA plane without requiring an act of congress to do so.

Back to Where We Started

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You shrug. Live to fight another day. You smoothly apply full power, pickup speed, and start the go-around.

And just like that, you avoid becoming an accident statistic.

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Learn More

FAA InFO 14010 – Installation, Training & Use of Non-required/Supplemental AoA Based Systems for GA Airplanes
http://go.usa.gov/cnt8Q

Advisory Circular 61-98C (Flight Review Guidance), Chapter 2, page 6 – Criteria for Stabilized Approaches Conducted in GA Airplanes
http://go.usa.gov/cQ3Mm