

NEW APPROACH

A practical way to **ensure** you're at the **right place, configuration and speed**

BY JAMES ALBRIGHT www.code7700

I have a confession to make. In 35 years of flying high-performance jet aircraft, I have never gone around from an unstable approach. Not ever.

It isn't that I've never had an unstable approach, it's that I grew up with the "A pro never takes it around" mantra beaten into my head and the better I got at salvaging bad situations, the wider my tolerances became.

I think I finally understand what I've been doing wrong all these years and have a way to cure what ails me. How often do you land off an approach that violates your company's stable approach criteria? Maybe I'm not the only pilot guilty of fudging the stable approach procedure.

Even before we gave it a name, we knew being stable early on approach was the best way to ensure the aircraft ends up on the near end of the runway configured to land and at the right speed. Story after story of hard landings, tail strikes and runway excursions have reinforced the need for stable approaches. Something gone awry during approach is often cited as causal for controlled and less-than-controlled flight into terrain. We all know that. So why do we pilots continue to have these problems? Maybe we need to rethink the entire concept of a stabilized approach.

Today's Stabilized Approach Procedure

Chances are your company's standard operating procedure reads something like this:

The approach to landing must be stabilized no later than 500 ft. above the runway elevation (VMC) or 1,000 ft. above the runway elevation (IMC), the "stabilized approach height." At this point the aircraft must be on centerline, on glideslope, configured to land, unless an abnormal procedure requires otherwise, and must not exceed the parameters listed below:

- ▶ One dot deviation from glideslope.
- ▶ One dot deviation from localizer.
- ▶ +10 kt., -5 kt. deviation from target speed.
- ▶ One-thousand fpm descent rate.
- ▶ A go-around must be executed if the aircraft exceeds any of these maximum deviation parameters below the stabilized approach height.

That's what I've been using for about 10 years now. Or, more accurately, that's what I've been failing to use for about 10 years now. My flight department instituted these procedures after studying one of the most puzzling examples of very good pilots flying for a very good operator but getting it all wrong: Southwest



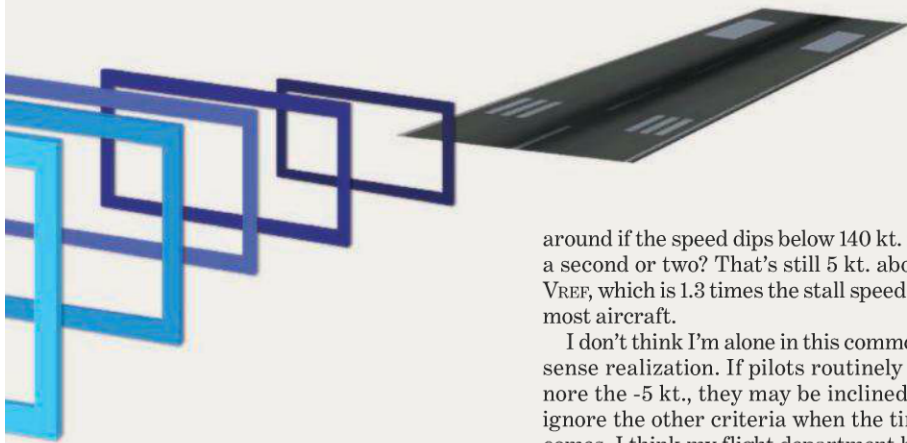
Airlines Flight 1455 landing at Burbank, Calif., on March 5, 2000.

The pilots were of the highest pedigree, two military veterans with lots of experience in type and with the operator. The airline's stabilized approach rules have become an industry standard: At 1,000 ft. above touchdown the airplane must be plus or minus a dot in localizer and glideslope displacement, no more than 1,000-ft. sink rate and target speed +10/-5 kt. The crew was backed into a corner by circumstances and failed to go around though their average sink during the last 1,000 ft. was in excess of 2,000 fpm and they touched down more than 50 kt. hot. The Boeing 737-300's tires touched pavement 3,000 ft. down the 6,032-ft.-long runway and the airplane could not be stopped in the remaining runway. Nobody was seriously hurt in the accident that followed, but the airplane was destroyed.

A Good Procedure, Often Ignored

I've often thought, if pilots of the caliber of the Southwest Flight 1455 crew can get it so wrong, what are my chances? Both pilots were aware of their company's stable approach policy, but the idea of going around never crossed their minds. I think they were good pilots working for

to Stabilized Approaches



a good company, but their stabilized approach policy wasn't up to the challenge. Like me, these pilots learned to expand the envelope and that *always* worked — until it didn't.

Most of us have been flying under those exact stabilized approach methods all these years. Perhaps we can build a better mousetrap. My flight department has become obsessed with coming up with a stabilized approach method that works better. I think we have.

Making the Criteria More Realistic: Speed

My admission to being a frequent violator of stabilized approach criteria is all due to one thing: airspeed. Ten knots is chump change most days at Teterboro Airport.

An airspeed requirement of +10/-5 kt. always struck me as a bit odd, considering just about every airplane I've flown in the last 20 years has a target speed of V_{REF} plus half the steady state wind and all of the gust factor, no less than 5 kt. and no more than 20 kt. If, for example, the wind is 10 kt. gusting to 20 and my V_{REF} is 130 knots, then my target speed is $130 + (0.5 \times 10) + 10 = 145$ kt. The wind is gusting 10 kt. and I will be seeing the airspeed jump between 135 and 155 kt., just because of the gust. Do I really have to go

around if the speed dips below 140 kt. for a second or two? That's still 5 kt. above V_{REF} , which is 1.3 times the stall speed on most aircraft.

I don't think I'm alone in this common-sense realization. If pilots routinely ignore the -5 kt., they may be inclined to ignore the other criteria when the time comes. I think my flight department has a better idea:

A target speed additive for every landing will be computed and announced: half the steady state wind and all of the gust factor, no less than 5 kt. and no more than 20 kt. This additive will be added to approach speed. The crew will go around if actual airspeed varies from the target speed by more than the announced additive when at or below stabilized approach height.

Making the Criteria Available: Azimuth

Judging your azimuth and glidepath progress during an ILS approach is easy, intuitive and works great. If only we had an ILS to every runway, that would solve everything! But we don't. Most modern aircraft provide very good ILS substitutes that should be used on every landing when available. If the runway doesn't have an ILS, it might have a good RNAV procedure. But what about a runway with none of that?

D.P. Davies, in *Handling the Big Jets*, speaks of lateral maneuvering in terms of "continuable" and "uncontinuable." Yes, this relies on your judgment, but it gives you criteria you can use. An approach is not laterally continuable if it requires more than normal maneuvering to end up in the touchdown zone of the runway in a position to safely land.

Our criteria:

A straight-in instrument approach will be used whenever available. If not available, an FMS extended centerline will be employed where feasible. The crew will go around if the aircraft is beyond one dot of center azimuth or if either pilot believes the aircraft cannot be landed in the touchdown zone using normal maneuvering once at or below stabilized approach height.

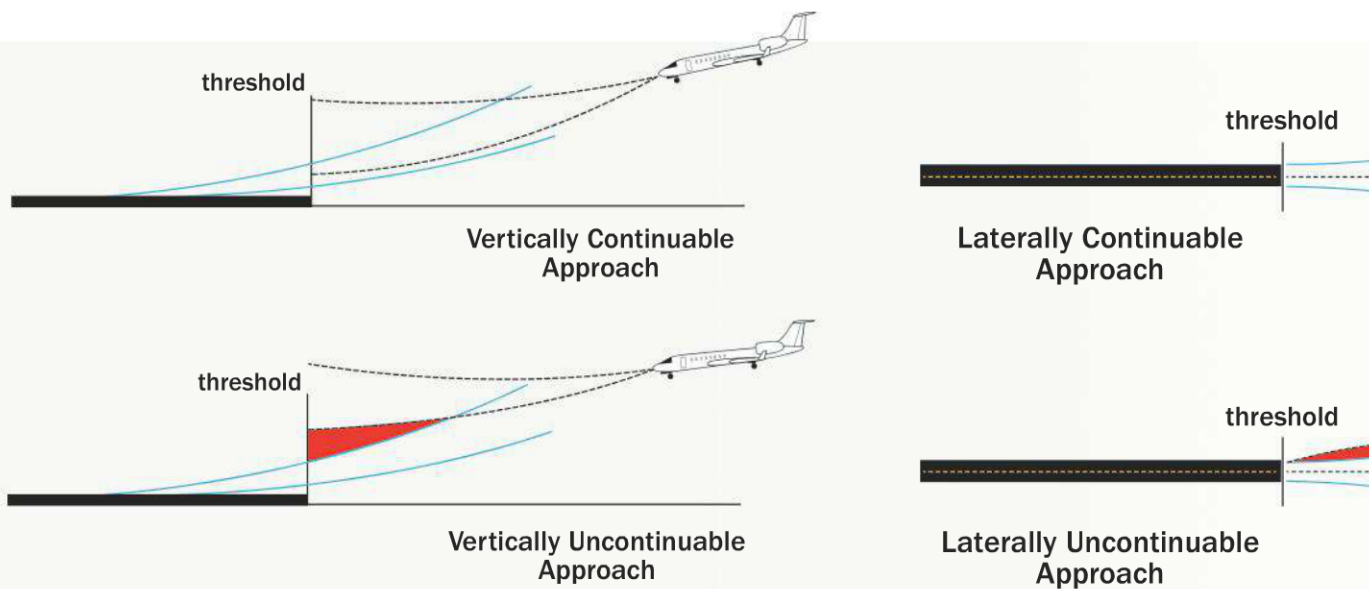
Of course this begs the question: What is normal maneuvering? I tend to think you can recognize abnormal when you see it but certainly no more than a half standard rate turn when below stable approach height.

Making the Criteria Available: Glidepath

Vertical guidance is getting better every day. If you have an ILS, an RNAV/VNAV or an LPV, you have a dot of glidepath to look at. Some FMSes allow you to draw a VNAV path based purely on GPS. But we've been judging vertical path progress long before GPS. If you have some kind of distance information, such as DME, you can judge your glidepath with simple math. Using a 3-deg. glidepath, aircraft should be 318 ft. above the ground for every nautical mile away from the runway. (That's 1 nm, or 6,076 ft., times the sine of 3 deg.) Rounding this down to 300 ft. per mile gives you a good "no lower than" altitude. Failing all that, we can once again evaluate the approach as continuable or uncontinuable.

A straight-in instrument approach will be used whenever available. If not available, an FMS extended centerline will be employed where feasible. The crew will go around if the aircraft is outside one dot of centered glidepath, below 300 ft. per nautical mile from the runway touchdown zone, or if either pilot believes the aircraft cannot be landed in the touchdown zone using normal maneuvering once at or below stabilized approach height.

Here again we wonder about "normal maneuvering" when talking about glidepath. The industry standard of no more than 1,000-fpm sink rate appears to work for most approach speeds and pressure altitudes.



Making Every Approach Stabilized, Not Just Those in IMC

Most companies divide their stabilized approach criteria into two distinct conditions: IMC and VMC. In fact, some companies throw out many of their required callouts the moment the pilot flying announces, "Visual!" But it seems most of our unstable approaches come off visual approaches, so we shouldn't be relaxing our vigilance just because we can see the pavement from a higher altitude.

Making Stabilized Approach Height an Easier Number to Remember

Under most stabilized approach methods, pilots have to add runway elevation onto the stack of numbers that matter on approach. That's one number too many for me. When you are flying an instrument approach, the MDA or DA is certainly in your thoughts. Why not adopt 1,000 ft. above minimums as your stabilized approach height? Flying a visual with no instrument backup? Then use 200 ft. above the runway and create your own DA.

One-thousand feet above minimums works for every situation except two: circling approaches and visual approach patterns. For those we adopt 500 ft. above the runway.

The approach should be stabilized no

later than 1,000 ft. above MDA or DA on every straight-in approach, IMC or VMC. All straight-in visual approaches will be backed up by an instrument approach; if no instrument approaches are available, an extended centerline will be used with a self-imposed DA of 200 ft. above the runway. The approach should be stabilized no later than 500 ft. above the runway on every circling approach or any visual traffic pattern.

Making the Stabilized Approach Unforgettable

Everything we've done so far has been to make the criteria more realistic and applicable to just about every situation. We should be less inclined to salvage an approach when we know the criteria are realistic, and we should be able to fit our criteria into every approach type. But we still have to remember to evaluate the approach against those criteria. As the crew of Southwest Flight 1455 discovered, when your hands are full and the chips are down, you are unlikely to remember a few paragraphs in your company operations manual.

You probably already have a 1,000- or 500-ft. above minimums callout. I encourage you to adopt 1,000 ft. and to add the word "stable" when you can, "go around" when you can't. If you make the "stable" callout on every approach when things are going well, you are more likely to remember the "go around" callout when they aren't.

A New Way to Look at Stabilized Approaches

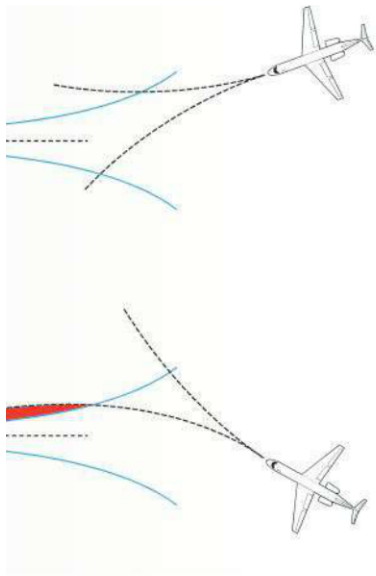
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► **Speed.** *A target speed additive for every landing will be computed and announced: half the steady state wind and all of the gust factor, no less than 5 kt. and no more than 20 kt. The crew will go around if actual airspeed varies from the target speed by more than the announced additive when at or below stabilized approach height.*

► **Azimuth.** *The crew will go around if the aircraft is beyond one dot of center azimuth or if either pilot believes the aircraft cannot be landed in the touchdown zone using normal maneuvering once at or below stabilized approach height.*

► **Glidepath.** *The crew will go around if the aircraft is outside one dot of centered glidepath, below 300 ft. per nautical mile from the runway or if either pilot believes the aircraft cannot be landed in the touchdown zone using normal maneuvering once at or below stabilized approach height.*

► **Sink Rate.** *The crew will go around if the aircraft's vertical velocity exceeds 1,000 fpm once at or below stabilized approach height. Pilots will call out*



stabilized approach height — 1,000 ft. above minimums or 500 ft. above the runway — and either “stable” or “go around.”



Post-Flight Critique

Finally, we’ve added a post-flight briefing requirement to discuss the stable approach. We end each flight by saying, “What’s the DEAL?” We discuss the flight’s (D)eparture, (E)n Route, (A)rrival and any (L)ogbook items. Hokey? Maybe. But the idea of a stabilized approach has become so ingrained with us, it has become a matter of pride to get the needles wired so we can say “stable.” After each flight when we debrief the arrival, we always talk about the stability of the approach.

A Better Mousetrap?

Think back to your first job flying jets and the techniques you came to rely on to make things safe. How many of those techniques survived and how many more have been added? Flying airplanes is easier today than ever. Managing the cockpit and getting your airplane from Point A to Point B in increasingly crowded skies? Not so much.

I think you’ll find this new stabilized approach method worth a try. I am betting you will find yourself trying harder to arrive at stabilized approach height with everything wired, and if the day ever comes, you will call “go around” when needed. **B&CA**

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