Runway Rejection

Accidents on go-arounds reflect poor approaches, delayed decisions, lousy control and incorrect procedures

Go-around checklists vary, but virtually all call for partial flaps while the airplane climbs above obstacles.

-by Pat Veillette

In a recent one-year period, go-arounds resulted in 127 accidents. Almost all of these involved a combination of an unstabilized approach, poor aim point and touchdown control, a delayed decision to go around, poor control of the pitch and power, forgetting to place the flaps in the correct position for the climb, failing to recognize that the airspeed had decayed below an acceptable level, and sometimes striking obstacles. The airspeed decayed enough in 7 percent of the go-around accidents that the aircraft entered an unrecoverable stall/spin.

The fact that go-arounds have such a checkered record is somewhat surprising given that it's not much more than the "go" on a touch and go, or even just a normal takeoff. The risks evolve from the fact that, although a go-around is like other takeoffs, it's different enough to throw off creatures of habit.

For starters, your margin of error in pitch control is almost zero. In a takeoff, the wheels are on the ground, so you don't have to worry about descending. In a go-around, the ground is only a few feet away so pitch is definitely a priority.

Consider the airplane's flight profile at the time of a basic go-around decision. The aircraft is flying at a slow airspeed and in a high drag configuration, with flaps and gear out. A go-around means a huge change in the power setting, possibly a large change in the pitch attitude, plus a change in the aircraft's configuration, all done more or less simultaneously while the aircraft is only a few feet above the runway.

It's very important to understand the factors that can put the aircraft into such a tight spot and to understand the early warning signs so you can take early corrective action. It's also important to know how to do the procedure correctly in your particular aircraft, which varies – sometimes significantly – between aircraft types.

Approach Execution

Nearly all of the go-around accidents started with a poorly planned approach. Properly planning and executing an approach begins with knowing the pertinent information ahead of time regarding the runway's slope, dimensions, preferred patterns and forecast winds.

This homework should begin before your preflight. During the flight, you should update the weather information so that by the time you arrive in the traffic pattern, you already have a good mental picture of how to adjust your traffic pattern for the winds. Monitor CTAF or the tower frequency as soon as practical to get a feel for how much other traffic is in the area.

Routinely flying the same normal power settings and airspeeds when turning onto downwind makes the approach more predictable. Though it's not always possible, such a routine arrival allows you to set up a predictable habit pattern for reducing the power abeam the numbers, lowering the flaps and knowing the approximate pitch picture while descending at a stable airspeed and sink rate throughout the rest of the approach. This will help you establish a good approximation of the aim point before you even turn base.

Turning base, it's vital to keep the airspeed close to the recommended airspeed. In most aircraft normal procedures call for lowering the flaps to an intermediate setting while on the base leg. The pilot needs to continually evaluate the airspeed and the relationship between desired glide path and actual glide path. In 82 percent of the go-around accidents, the pilot was both high on the extended glide path and fast on airspeed.

It's vitally important to detect errors while you still have ample time to correct them and to make corrections while the deviations are small.

"No Fault" Go-Around

If the aircraft deviates too far from an acceptable glide path or airspeed at any time during the approach, the tendency is to try to salvage the approach. That's fine when the deviations are small, but at some point they get large enough to lead the aircraft into a difficult maneuver. That's when better judgment should kick in and you should go around.

Picking that point takes experience, but as a rule of thumb if your gut offers up an "uh-oh," that's a good sign that you should make a conservative decision and try again. Air carriers have guidelines that mandate a go-around if the airplane deviates from the glide path by more than a dot width, deviates from the airspeed by more than 10 knots, if the sink rate increases more than 500 feet per minute from the target value, and several other parameters.

More than two-thirds of all go-around accidents resulted when the pilot decided too late to try again. A typical example of this occurred to the pilot of a Cessna 172. The passenger remembered the approach as "bumpy" and said the aircraft was "bouncing" in the air. The aircraft touched down about half way down the 2,900-foot runway, which didn't seem to be enough room to stop to the passenger even though the 172 has a short-field landing ground roll of less than 600 feet.

During the landing roll, the aircraft veered off the pavement and into the grass roughly 2,200 feet down the runway. The pilot then added full power and, after traveling about 350 feet in the grass, the airplane became airborne again. Shortly thereafter, the aircraft collided with low brush, followed by contact with taller trees. Needless to say, deciding to abort after departing the runway is a decision made too late.

Power

The sequence of control inputs is very important during a go-around. For example, the Pilot Operating Handbook for the Cessna 172 recommends full throttle, carb heat cold, flaps to 20 degrees, airspeed 55 KIAS, flaps to 10 degrees until obstacles are cleared, then retract flaps and climb at 60 KIAS or higher.

Each step has its own nuances. Full power is normal in most light aircraft, and that's easy enough to accomplish. But if you fly a turbocharged airplane with manual wastegates or another high-powered engine, you may need to scan inside the cockpit during your transition to make sure you don't apply excessive power. Once you are safely moving away from the runway, you can then look inside and make a few very minor adjustments to the throttle position if needed.

For airplanes with carburetors, it's essential to remove carb heat during a go-around. If you forget this step in the procedure, you are robbing yourself of horsepower while trying to climb out at a slow airspeed close to the ground. If you sense the aircraft isn't accelerating very well during a go-around, check the carburetor heat.

Remember that the carburetor heat enrichens the mixture in your engine, so if you add full power without moving the carb heat cold, you are trying to go-around with an excessively rich mixture. Moving the carburetor heat to the full cold position needs to be an almost automatic reaction during a go-around.

Flaps
If you, like most light plane pilots, make routine landing approaches with full flaps, you'll need to manage the flaps' drag during the go-around. Some aircraft have extensive full flap deflections that create huge amounts of drag.

The first 10-20 degrees of flaps increase the wing's lift rather markedly with only a relatively small increase in drag. As the flaps extend beyond this point, the increase in lift diminishes and the drag dramatically increases.

Beyond 30 degrees extension, flaps increase the drag by a very large amount while producing only marginal increases in lift. Nearly one third of the go-around accidents involved an attempt to go around with the flaps in the fully extended position.

Many POHs recommend retracting the flaps to a midway position in the go-around sequence. Typically it's a setting approved for takeoff, though it may not be required for takeoff. Be very careful about retracting the flaps too quickly, especially if the aircraft hasn't begun accelerating and/or climbing. When you are slow and close to the ground, retract the flaps in small increments. A sudden and complete retraction of the flaps at a very low airspeed can cause a large enough loss of lift that the airplane settles to the ground.

Note that not all airplanes need to have the flaps retracted immediately. The POH for the Beech F-33A Bonanza, for example, stipulates the following steps for a go-around: full throttle, 2700 rpm, airspeed to 70 knots until clear of obstacles, flaps up, gear up, cowl flaps open. The Beech POH leaves the flaps in the landing position until the aircraft has accelerated to a normal climb speed.

Pitch
As with any situation, the most important task a pilot must do is maintain control of the aircraft. In a recent study I published, more than half of all accidents due to distractions occurred when the pilot didn't maintain control of the aircraft.

One reason that some aircraft manufacturers recommend against trimming in the flare is that the sudden application of power in the go-around can produce a very large nose-up pitching moment. If you aren't prepared for this pitching moment, it can be very forceful.

Just as a "gee whiz" learning experience sometime, go up to a safe altitude in a practice area and simulate a landing flare, but trim away some of the control pressure. Apply power as if you were going around and hang on for the ride. You'll be amazed at the pitch change that occurs when you add the power. You will also be surprised at the force it takes to hold the nose down in a suitable climb attitude.

In most aircraft, normal procedure calls for trimming for the final approach speed and then leaving the trim alone in the flare. When you apply power for the go-around, let the aircraft accelerate a

bit, then gently rotate the nose up to the proper go-around pitch attitude as you continue to let the aircraft accelerate to the proper climb-out speed.

Don't over-rotate the nose and don't allow the nose to come up too steeply. You risk a sudden stall by doing so.

Deciding too late to go around puts the pilot in the awkward position of having to pitch up to avoid obstacles without having the airspeed to accomplish the task without stalling. That's one important reason to make the decision early, when you still have enough time to accelerate.

Obstacles

Nearly 20 percent of the go-around accident aircraft struck trees during the go-around. Fifteen percent struck rising terrain that the aircraft couldn't out-climb. Sometimes the airplane strikes obstacles because the pilot decides way too late to go around rather than overrun the runway or is trying to salvage a loss of directional control.

However, some happen because the pilot is not prepared for the airport at which the landing is attempted. Don't automatically assume that a go-around is possible at any airport you may fly to.

Many of the backcountry airstrips in the Rocky Mountains are in box canyons that are so steep that a go-around is not usually possible. Airports that are surrounded by rising terrain suffer the same disadvantages. Airports with tall trees and power lines at the end of the runway present the same problems.

In these situations, a go-around may be possible only if executed early in the landing approach. Otherwise, you may place the aircraft in a situation where it can't climb out steeply enough to avoid the obstacles.

And don't assume the only obstacles are stuck to the ground. If you are flying in congested airspace or a full traffic pattern and execute a go-around, don't assume your flight path is clear of other aircraft. An aircraft trailing behind you may have also done a go-around and lost sight of your aircraft.

It's nearly impossible to visually clear the airspace above you, and an aircraft going around has a rather poor visual sight picture of the obstacles down and in front of the nose of the airplane. If you find yourself going around because of close spacing to the aircraft in front of you in the pattern, laterally displacing your aircraft a slight amount can help avoid the risk of a mid-air collision should the preceding aircraft go around.

Go-arounds are the Rodney Dangerfields of aviation – they get no respect. In some circles a go-around is an admission of failure, despite instructors who express the opinion that a go-around shows good judgment. Don't get caught up by macho one-upsmanship.

If an approach isn't working, start over before it's too late. After all, going around the pattern again is a far better outcome than wrapping around a tree.

Pat Veillette is an aviation researcher and a pilot of transport aircraft.