# Puttin' on the brakes

## Most GA pilots shouldn't reach for the brakes to slow down

BY DENNIS K. JOHNSON

**THE BRAKES ON SMALL AIRPLANES** have three functions: to decelerate the airplane after landing; to hold the airplane whenever it needs to be motionless; and to assist with ground maneuvers. The first may be what comes to mind for nonpilots accustomed to hard braking and roaring thrust reversers during an airliner landing, but it should be avoided by the average pilot.

On landing, pilots should use aerodynamic braking by applying extra back-pressure on the stick or yoke. Extreme caution should be used when applying brakes at any significant speed, and only when the end of the runway is quickly approaching. Never step on the brakes to make a runway exit. Applying the brakes at too high a speed could burn the tires, wear out the brakes, or result in a ground loop or swerve.

Any directional control needed during the rollout on the runway should be made by using the rudder alone. As the FAA *Airplane Flying Handbook* states, "brakes are used to correct for turns or swerves only when the rudder is inadequate. The pilot must exercise caution when applying corrective braking action because it is very easy to over-control and aggravate the situation." You don't want to overcorrect and start a pilot-induced swerve down the runway. That could end with damage to the landing gear, or even its collapse.

Crosswind landings are especially tricky. Beware to pilots who make a crosswind landing, using the proper sideslip technique, with their toes ready to press the brakes. After touchdown, there will be extra downward force on the upwind wheel because of the aileron input needed to compensate for the crosswind. If the pilot then applies the brakes evenly, the upwind wheel will brake more effectively than the downwind wheel, which could be the beginning of a nasty swerve. And, that's not including those landings when you must land on the upwind wheel alone first, before allowing the downwind wheel to make contact with the runway.

The real lesson is to make a good approach at the appropriate airspeed and on your aim point so that you never have to use the brakes. If you see the

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**PARK IT**

*Chocks are essential with no parking brake*

The excellent disc brakes on my Piper Super Cub do almost everything I need, as long as my feet can reach the pedals. There's no parking brake. I've flown to a number of airports where there's a small incline at the fuel pumps. I must park across the incline, or jump out and fetch a nearby chock before my airplane rolls away, or wave to some friendly pilot to come and chock me. It doesn't take much more than a degree or two to send your airplane downhill. This year, at my home airport, we've had two near-collisions of parked aircraft that decided to move on their own. Chock your airplane every time.

*—DKJ*

halfway point of the runway go by with your wheels still in the air, go around and try again. Don't rely on your brakes to save you.

**OFF THE BRAKES OR ON YOUR BACK**

On June 8, 2010, a runway at Ronald Reagan Washington National Airport, which serves the Washington, D.C., area, was briefly closed after a 1943 Boeing Stearman Kaydet flipped onto its back while landing. The airplane was part of a flight of eight vintage Stearman biplanes flying to Washington, D.C., to promote a new Smithsonian Institution film, *Legends of Flight*.

The NTSB accident report narrative reads: "According to the pilot, as he entered the flare to land at an airspeed of about 70 miles per hour, he planned to keep the airplane's tail in the air and roll farther down the runway to allow more room for the following airplanes in his formation. He stated that, when the wheels touched the runway, he inadvertently applied the wheel brakes via the rudder pedals, which was evident by the skid marks found on the runway.... The pilot's use of the brakes while touching

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down at high speed in this type of airplane, which has a high center of gravity and a tailwheel, caused it to flip over onto the top wing and the vertical stabilizer and rudder. Although the pilot had 875 total flight hours, including 190 hours in Stearman airplanes, he stated that he had seldom used the brakes in over 600 landings in the accident airplane. Therefore, the pilot was not familiar with the feel and effectiveness of the airplane's wheel brakes."

Each airplane in the formation carried a passenger from the news media, and *The Washington Post* reporter onboard this aircraft captured the landing and accident on video. The video, shot from the front seat of the airplane, is an excellent illustration of just how quickly an airplane can flip over its nose from an application of the brakes after touchdown.

One point from the NTSB report deserves repeating: "the pilot was not familiar with the feel and effectiveness of the airplane's wheel brakes." Pilots should carefully explore the effectiveness of the brakes on any aircraft they're operating, especially when transitioning into a new make or model. Gently test the brakes at slow taxi speeds to determine exactly how much pressure is needed, and if the brakes have a tendency to grab.

### BEFORE YOU TAKE OFF

Good brakes earn most of their salary before any flying begins. Firm application of the brakes keeps the airplane from creeping forward during the preflight engine check, and the predominant use of brakes is during taxi operations.

Differential braking in most small airplanes helps pilots make sharper turns, which is especially handy on narrow rural airport taxiways, or to turn around on a grass airstrip for takeoff. Without brakes, an airplane might need twice as much turning radius. Brakes are especially important on tailwheel airplanes that do not have a steerable tailwheel.

Good brakes are also essential to swinging your airplane around to park at a jaunty angle on the grass in front of your airport café, earning you lots of style points.

### FEET ON THE FLOOR

A good habit to develop during takeoffs and landings is to call out loud, along with your other final reminders, "Heels on the floor." This helps pilots, especially new students, remember to keep their toes on the rudder pedals and well away from the toe brakes. Keep your feet away from the brakes until you've slowed to taxi speed. This also goes for takeoff.

Your passengers' feet are just as important. In 2015, a 2013 Waco Classic Aircraft YMF-F5C ended a flight on its back on the runway on San Luis Obispo, California. The NTSB investigation revealed that the passenger had accidentally applied the brakes during the landing roll. Monday-morning pilots would say the fault wasn't the passenger's, but the pilot's failure to properly brief his passenger.

For airliners and business jets, good brakes plus thrust reversers allow landings on runways that don't have to be miles long. But for general aviation pilots, our landings should never be on a spot where the airplane doesn't have enough remaining runway to roll to a stop on its own. Don't rely on the brakes. Make a good approach, hit your aim point, and slow gently to your taxi speed. Don't let an air traffic controller or other airplane traffic pressure you to slam on the brakes. Take the time you need to safely clear the runway. You're the pilot in command; be in command of your airplane and your passengers. AOPA

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