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COMMENTARY / STICK AND RUDDER

Getting on the Binders

Tips for avoiding brake problems

BY ROBERT N. ROSSIER

NOW AND THEN situations arise that make us think and (hopefully) recalibrate. Such a situation happened to me one day several years ago when I asked a pilot to perform a no-flap landing during a training session. Unfortunately, the pilot touched down a bit too far down the runway and a bit too fast. I had thought we had plenty of runway, but even with hard braking, I was wondering for a moment if we would make the last turnoff. It was an uncomfortable situation at best. Fortunately, the brakes did their job, and we completed the maneuver without incident. Not only did the occasion cause me to recalibrate my instructional judgment, but also it recalibrated my respect for the brakes — and those little tests we can perform to make sure we've got them when it's a matter of survival.

Modern aircraft brakes are pretty reliable. However, every now and then problems come out of the blue that leave us in the lurch. If you've ever been hurtling down the runway with braking in question, then you know that uncomfortable sinking feeling it can bring. As with many aspects of flying, several actions can be taken to minimize the potential for such an undesirable outcome.

PREFLIGHT BRAKE CHECK

The first opportunity we have to catch a brake problem is often during the preflight check of the airplane. Take a look at the pavement beneath the wheels to spot any leaking brake fluid. Any sign of leakage should be a signal for further investigation.

If the airplane doesn't have wheelpants, we should be able to inspect the brake lines, pads, and rotors. Take a careful look at the brake lines and fittings for any wear, damage, or signs of leakage. Most brake pads should be the thickness of a quarter at a minimum. If they are any thinner than that, the rivets holding the pads can start to contact the rotors, which causes gouging and other damage. Check the rotors themselves. They should be relatively shiny and smooth. While a light coating of surface rust will sometimes be seen if the aircraft has been sitting for a while, gouging, pitting, and roughness are generally signs of trouble.

Brake trouble can also show up in the cockpit. Look for a slick film of brake fluid that makes your heels slip on the floor. This is a sign of a leaking brake cylinder that needs attention. If you notice this problem, your next stop should be at the mechanic's hangar. You'll want to get this taken care of before flying.

TEST DURING TAXI

Every pilot learns the habit of having their feet on the brakes during engine start, but it's also a good idea to test them immediately after starting the taxi roll to get the feel of the brakes and the measure of the brake pedal travel. In some airplanes, the brakes can be pretty sensitive. In others, they have greater travel before engaging fully.

Another habit that some instructors encourage is testing the brakes before they're needed during a taxi. Let's say we're taxiing down a long taxiway to the end of the runway. The idea is to gently test the brakes maybe 50 yards or so before any obstacle (like another aircraft) or the turn at the end to make certain they are still functioning. If not, we have some time to react and perhaps make an evasive maneuver to avoid other aircraft and obstacles. A fellow instructor training a pilot in a light twin did exactly that and was able to avoid what could have been an expensive accident.



PRE LANDING BRAKE CHECK

Brakes don't do us a lot of good in the air, but right after touchdown they suddenly become on a whole new world of importance. Another great tip is to always make a brake check part of the prelanding check. First, just test the firmness of the brakes to make sure they feel right. It's not often that we need heavy braking right after touchdown, but if we do, it's good to know both brakes are functional. Should an aircraft suddenly taxi onto or cross the runway, or wildlife wander onto the runway, we might be called upon for some heavy braking.

THE BINDERS

Early there are times when we need the brakes, particularly on landing, so we should always be paying attention for signs of impending brake issues. Our natural senses can play a part in identifying potential problems. First is the feel of the brakes. Do they pull evenly? Do they bind properly, or do they feel spongy? They need to be pumped to work well? Do they vibrate or pulse? Spongy brakes are typically a sign of air in the brake line. When the pedal is depressed, the air in the line is compressed and causes the excessive travel.

Sometimes we can hear a brake problem. A grinding noise is a clear indicator of trouble and usually signals overly worn shoes that might be causing rotor damage. Sometimes brake pads might sometimes squeal at first but that should subside relatively quickly. Overheating the brakes can cause glazing of the brake pads, reducing friction they provide and causing the pads to squeal. Likewise, overheating can cause the brake rotor to warp, which also cause vibration and squealing when the brakes are applied. If the brakes are bad, be sure to have them inspected. In some instances, after excessive braking a pilot might notice a burning smell caused by overheated brakes. The heat from overheated brakes has been known to start fires. Overheating can be caused not only by hard braking but also by dragging the brakes or by a stuck piston in the brake caliper. Smoke coming from brakes is a clear sign of overheating and should be taken for immediate attention.

EXTENDING BRAKE LIFE

Brakes are designed to operate under a variety of conditions and extreme circumstances, but the best way to extend brake life is to avoid heavy and unnecessary braking. On landing, lay off the brakes when possible, let the aircraft slow, and use a later intersection to depart the runway.

One common mistake pilots make is unintentionally dragging their brakes. This not only causes excessive wear but can cause a serious decrease in takeoff performance. To help avoid the problem, be in the habit of keeping your heels firmly on the floor except when braking is needed.

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Another time where some pilots use brakes excessively is when turning. Especially at high speed, this can cause unnecessary wear and tear. For better results in aircraft with nose wheel steering, use brakes sparingly for turns and rely more on the nose wheel.

Braking systems for light aircraft are not overly complicated and are generally very reliable. By paying a little bit of attention on a routine basis, we can avoid problems and keep those brakes working longer. And by exercising good judgment, we can avoid many of those uncomfortable situations where we really need to get on the binders. *EAA*

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