

# Brake Dancing, or How to Stop an L-39

## L-39 wheel brake system

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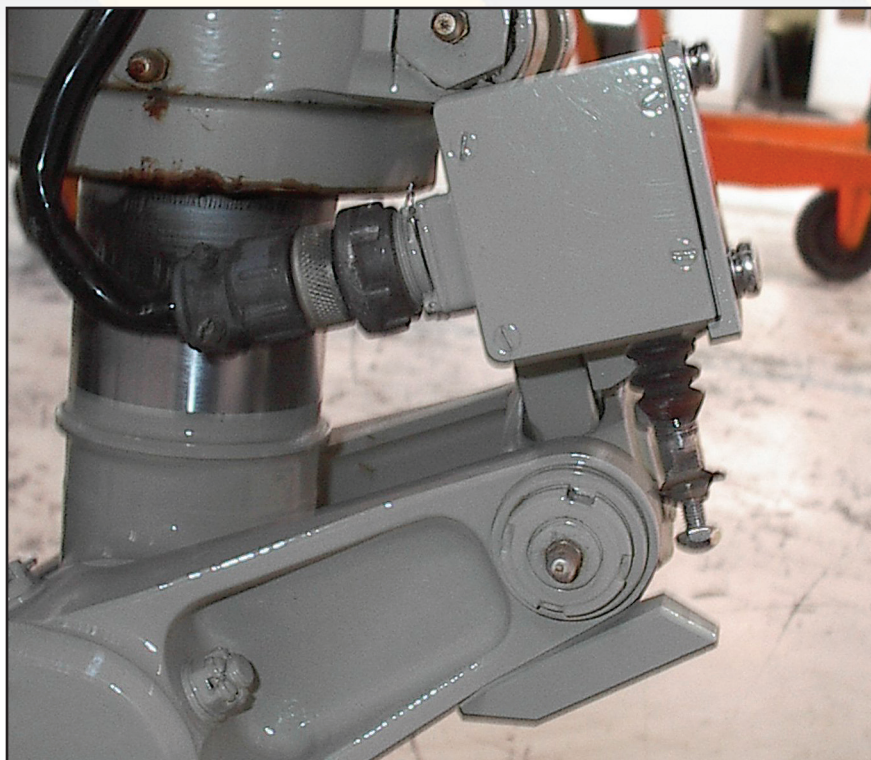
Recently, I had the unusual experience of having the main wheel brake system fail on an L-39. This happened not once but *twice* in a two-week period! Now what's the chance of that? Regardless, we were able to get both aircraft stopped with no damage except for one blown tire. Since this is a rare occurrence, I thought it might be beneficial to write an article about the L-39 wheel brake system and then discuss my recent failures.

The L-39 has a modern disc-brake system powered by the main hydraulic system. The backup is the emergency brake, powered by the emergency hydraulic system. Both systems normally operate at 135-150 kilo pascal or atmospheres (atm). [An atmosphere is approximately 14.7 psi.]

The normal brakes can be modulated to apply between 2 and 33 atm of pressure as measured on the main brake gauge. A separate gauge shows emergency pressure upon emergency application or when setting the parking brake with the emergency brake handle in the front cockpit.

A caution in the flight manual reminds us that the main hydraulic system must have a pressure of 50 atm or more; otherwise, the emergency brake system must be used. The main brake system has a 4-hertz (four cycles per second) anti-skid system that is operative up to a speed of 140 knots indicated airspeed (KIAS) plus or minus 8. Believe me when I say the main wheel brakes are exceptionally effective. I have consistently achieved stopping distances of 2,000-2,500 feet.

The emergency brake system has



The right-side view of the L-39 WOW switch.

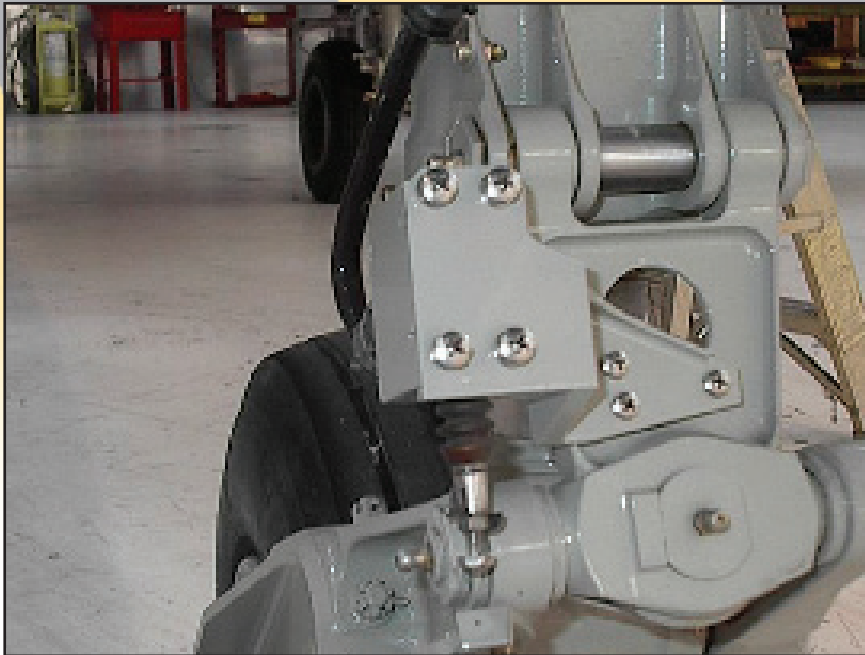
no anti-skid and no directional application. Pull the handle and both wheel brakes are applied with equal force. The only directional control the pilot has under this circumstance is aerodynamically with the rudder. There is an emergency brake handle in both cockpits. However, the one in the rear is often safety-wired. The one in the front rarely is, since the parking brake is set via this handle.

The emergency brakes are available at any time. Not so with the normal brakes. They only work once the weight-on-wheels (WOW) switch on the nose gear strut senses the aircraft is on the ground. Both of my

failure scenarios involved damaged or inoperative WOW switches.

### Main Wheel Brake Failure

The first failure happened while I was ferrying an aircraft back to Northeast Alabama Regional Airport (GAD) after the sale of the aircraft fell through. The weather was hot, so I preflighted the aircraft in the cool shade of the hangar. The aircraft was towed outside, and I flew it to GAD with my son in the rear seat. Upon landing, I discovered I had no brakes even though the gauge showed application pressure. I reverted to the emergency system and carefully



The front view of the L-39 WOW switch.

pulled the handle back to bring the aircraft to a stop on the runway.

There was no damage done to the aircraft, wheels, or tires. However, after further inspection by International Jets mechanics, the WOW switch was found bent and jammed in the in-flight position. Towing from the nose wheel had damaged the aircraft. If not towed smoothly and slowly, the trailing link nose wheel will come forward enough to jam and bend the WOW switch. That is why Aero Vodochody built tow rings on the front side of the main gear struts. A special tow bar allows you to pull from the mains but steer from the nose.

The second failure happened two weeks later while I was conducting flight training with a new customer who had just bought an L-39. We had just landed after a simulated flameout (SFO) pattern. We landed a third of the way down a 6,600-foot runway, exactly as the flight manual directs. By the time another 1,000 feet flashed by, I had felt no deceleration. I asked my student, "Do you have normal brakes?" to which he excitedly replied, "You have the aircraft?"

Oh, great! Well, I applied normal brakes to no avail. In the space of a few microseconds I considered my options. Only half the runway re-

mained now. We had enough space to do a touch-and-go, but if anything went wrong from the moment I applied max power, we definitely would be plowing the field off the end of the runway. I decided to abort

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but knew from recent experience that I would have to be both careful and quick with the emergency brakes if I was going to get the aircraft stopped on the remaining surface.

I grabbed the emergency brake handle in the back cockpit and suddenly realized it was safety-wired off. Now I would *really* have to be careful when I broke the wire to be sure I didn't get too much initial braking.

As I pulled the handle aft, the safety wire broke and my hand twitched aft even further before I could stop the reflex. I heard the left main tire squeal, and the aircraft im-

mediately settled down on the left side. I had blown the tire. I looked up, and the end of the runway was coming fast. No choice. I applied steady but increasing brake pressure as we started to drift to the left. We departed the runway about 500 feet from the end at about 20 KIAS and came to a stop about 20 feet off the side of the pavement in level grass.

Again, we happened to be at GAD. The mechanics at International Jets and I jacked the aircraft, mounted a new wheel and tire, and towed the L-39 back to the hangar. Turns out the WOW switch had a loose wire that rendered it inoperative. Thankfully all it cost us was a new tire and some adrenaline.

### Lessons Learned

Obviously there are some good lessons learned here. First and foremost, *know your systems!* Running down the runway at 100 KIAS is not the time to start asking questions. Secondly, do a thorough preflight. If the airplane is moved or serviced, make sure the last thing accomplished before climbing into the cockpit is another preflight! Lastly, make sure you keep your aircraft in as perfect mechanical shape as possible. It's amazing how your day can be ruined by the smallest or even cheapest of parts.

I've found that *many* new owners come into possession of a warbird after the previous owner has put only a minimal number of hours or given little attention to an airplane for a few years. We all know that disuse is the worst thing for an airplane. I tell all my customers to expect a number of niggling mechanical problems for the first few months. In the meantime, make sure someone knowledgeable is maintaining the bird.

Owning and flying warbirds is one of my greatest passions. It's part of what makes me so proud to live with all of our freedoms in America. Just remember that with ownership comes responsibilities, not only to us, but also to our passengers and to our loved ones. Fly safely and remember to always "check six." 