

The Surprise Factor

Coping with mechanical failures

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Regardless of how careful or thorough we are when it comes to aircraft maintenance, mechanical failures seem to be a fact of life. It's impossible to inspect every external and internal detail of an aircraft, so we must rely to some extent on exterior clues, preventive maintenance, and routine inspections. Unfortunately, trouble often surprises us, jumping out of nowhere when we least expect it.

Post-Maintenance Madness

A careful preflight inspection is essential to ferreting out mechanical problems that could plague us in flight. A sharp-eyed pilot of a Cessna 210 in Sheridan, Wyoming, had noticed a small pool of hydraulic fluid near the aircraft trim wheel. Recognizing the potential ramifications of even a small hydraulic leak, the pilot summoned a mechanic to investigate the cause. In short order, the mechanic had removed the seat, found the problem, resolved it, and then reinstalled the seat.

That wasn't the end of the story; the pilot was about to get a nasty surprise. When he attempted a takeoff, his seat slid to the full back position, causing his feet to leave the rudder pedals. The aircraft veered sharply left, as we might expect, and the pilot pulled back on the yoke to avoid signage on the left side of the runway. Despite this attempt, he heard a sharp crack as the aircraft struck something. Fortunately, the pilot was able to maintain control of the aircraft, and once at a

safe altitude, repositioned the seat and returned for an uneventful landing.

A post-incident inspection revealed that the aircraft had suffered a prop strike when it struck a taxiway sign. A hole was also found in the underside of the aircraft, presumably caused when it struck the sign. Most importantly, the inspection showed that the mechanic had incorrectly installed the seat, resting on top of the seat rail rather than attached to it.

We often rely on maintenance technicians to ensure the safety of our aircraft, but as this incident highlights, we need to recognize that professional maintenance personnel can sometimes make mistakes. Although the



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mechanic was found to be at fault, the lesson learned is that we should always follow up maintenance actions with an inspection of our own—just to be sure. If the pilot in this case had noticed that the seat had not been installed properly, his departure may not have been derailed.

Pilot in Command?

In today's world of sophisticated electronics, pilots must take extra precautions to ensure they understand

the operation and potential malfunction of electronics and electrical components. This can be especially true for systems such as autopilots that may attempt to take command of the aircraft “on their own.”

That may be exactly what happened when the pilot of a Cessna 172 was departing Waukesha, Wisconsin, last November. According to the pilot’s report to the investigators, the autopilot had been inadvertently engaged while taxiing to the active runway. The pilot and passenger attempted to disengage the autopilot by depressing the “A/P” button on the control panel, but apparently this attempt failed. At some point, the pilot turned off the avionics master switch to power down the autopilot and then turned the switch back on. Thinking he had the situation under control, the pilot received takeoff clearance from the tower and began his departure roll.

The aircraft hadn’t gone far when it became apparent that the pilot wasn’t entirely in control. It appeared at the time that the aircraft, or perhaps the autopilot system, had suffered some type of mechanical failure. The aircraft rotated prematurely, and the pilot struggled against unusual nose-up control forces. The aircraft

touched down again off the left side of the runway and then careened through a snow bank and onto another runway before coming to rest in a nose-down attitude. Both the pilot and his passenger survived the accident without injury.

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The post-accident inspection determined that there was no fault with the two-axis autopilot system. It was functioning correctly, was loaded with the correct software, and complied with all airworthiness directives. It was determined that the trim had been set to about eight-tenths of the full nose-up position, which would explain the powerful nose-up force experienced by the pilot. According to the National Transportation Safety Board (NTSB), the probable cause was the pilot’s failure to maintain control of the aircraft during the takeoff and to properly set the elevator trim before takeoff. The NTSB

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also cited the pilot's lack of autopilot system knowledge as a contributing factor in the accident. According to the pilot's report, he had minimal experience with autopilots and no training with the system installed in the 172.

The message here is that not all mechanical problems are indeed problems at all. Pilots must be thoroughly trained and knowledgeable with regard to their aircraft and its systems, including their proper operations and operating limitations. Anything short of that is an invitation for disaster.

A Bad Brake

Sometimes we tend to let our guard down when we're on the ground, presuming the danger is behind us once we're safely on the taxiway. That isn't always the case, and as instructors are quick to remind us, we must "fly the airplane" from startup to shutdown.

It was an October morning in 2008 when the pilot of a Van's RV-6A ran into some trouble. He had just landed at Cambridge-Dorchester Airport (CGE) in Cambridge, Maryland, after a visual flight rules flight from Eastern West Virginia Regional Airport-Shepherd Field (MRB) in Martinsburg, West Virginia. He planned to park next to an RV-8A on the ramp and was approaching the parked aircraft from the right. When the pilot stepped on the

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right brake to swing his aircraft into position, the brake completely failed. The pilot pumped the brake several times with no effect and then applied the left brake in a last ditch effort to avoid collision. The right wing of the RV-6A collided with the right wing of the RV-8A, causing the former to turn right. The -6A's prop chewed through the right horizontal stabilizer of the -8A, causing substantial damage.

Brake fluid on the ground and right brake of the -6A confirmed the brake problem, and a disassembly of the system revealed the O-ring between the main brake

cylinder and the piston had deteriorated—certainly not something anyone would have seen on a preflight inspection, unless it had already begun to leak.

We must never be complacent, even after we're safely on the ground. Pilots should always test the brakes gently—before they are needed. In other words, don't wait until you need your brakes to find out whether or not they work.

The Final Maneuver

In-flight breakups are relatively rare, but they do occur. Oftentimes these come when pilots find themselves in hazardous weather conditions and heavy turbulence. Sometimes they happen when pilots demand more from their aircraft than they should. In-flight breakups can also occur when loose control cables, excessive play, or unbalanced control surfaces conspire to cause flutter. Such may have been the case for the pilot of a vintage 1946 Ercoupe last December in Sebring, Florida.

The pilot had departed Florida's Avon Park Executive Airport (AVO) on what was likely intended to be a pleasure flight with a passenger. Despite his more than 7,000 hours of flight time and commercial and instructor certificates, the pilot found himself in a tight spot with no way out.

According to witnesses, the airplane was flying to the southwest when it made a "very slight dip" and then turned to the right. It then pulled up "severely" and started a turn to the left. One witness thought the pilot was initiating a barrel roll or slow roll, and another commented that both ailerons were "fluttering at high frequency." As the airplane continued on an upward trajectory, a shiny item appeared to be shed from the tail of the airplane. Then the plane began to disintegrate. As the airplane banked to near 90 degrees, the right wing folded back and parted company with the fuselage. Parts and paint chips fluttered to the ground like falling leaves, creating a wreckage path more than 3,000 feet long. Both the pilot and his passenger perished in the crash.

Only a preliminary report of the accident was available at the time of this writing, and no probable causes have been determined. One fact, however, remains clear. Mechanical malfunctions can and do occur, and it is only through care and vigilance that we can hope to avert the sad consequences. 

Robert N. Rossier has been flying for more than 30 years. A former aerospace engineer and flight school manager in Colorado, he spent 12 years flying for a small airline/charter service in the Northeast, serving as chief pilot and check airman. He has been writing for the aviation industry for nearly 20 years and was the recipient of a 2001 Aerospace Journalist of the Year Award.