NTSB
SAFETY ALERT
National Transportation Safety Board

★ **Flight Control Locks: Overlooking the Obvious** ★

Use Checklists to Prevent Procedural Omissions

The problem

Accidents have occurred after pilots omitted seemingly obvious procedures, such as removing flight control locks and performing flight control checks before takeoff.

- Four accidents within a 2-year span involved pilots who attempted flight in airplanes with flight control locks in place.

- Errors of omission are frequently associated with interruptions, distractions, time pressures, divided attention, and complacency about standard operating procedures (SOPs).

Related accidents

- In May 2014, a Gulfstream G-IV overran the runway during a rejected takeoff and crashed after the flight crew did not disengage the gust lock system or perform a flight control check before takeoff. All seven people on board died. The investigation found that the flight crewmembers had neglected to perform complete flight control checks before 98% of their previous 175 takeoffs in the airplane. Thus, the flight crew's omission of this check during the accident flight indicates intentional, habitual noncompliance with SOPs. During the takeoff roll, the flight crew detected the problem but delayed initiating a rejected takeoff until the accident was unavoidable. (ERA14MA271)

- In August 2013, a Cessna 172S sustained substantial damage after crashing onto the runway during takeoff with a "straight pin" installed as a control lock on the yoke. The pilot had installed the pin after an earlier flight that day. The pilot said that he performed the Before Takeoff checklist but did not check that the flight controls were free and clear for fear of having his tablet knocked off the yoke mount. (ERA13CA350)

- In August 2013, the pilot and the pilot-certificated passenger on board an Aeronca 7AC died when the airplane crashed during takeoff with the rudder gust lock installed. The control lock, which was installed over the rudder and vertical stabilizer, was about 48 inches long and constructed of about 3/4-inch tubing covered in a foam wrap. It could not be determined who was the pilot flying, but both pilots should have

noted the installation of the rudder gust lock during either a preflight inspection or a pretakeoff flight control check. (ERA13FA372)

- In May 2015, a Cessna 172M sustained substantial damage after colliding with trees during takeoff with a bolt installed as a control lock on the yoke. The pilot realized the problem at the point of rotation and attempted first to remove the bolt before he aborted the takeoff. The airplane's speed was too great for the pilot to stop the airplane before it struck the trees. (GAA15CA088)

What can pilots do?

- Pilots of all experience levels should follow SOPs and use checklists, which serve as a memory aid to help counteract human performance vulnerabilities. Do not rely on memory alone.

- Recognize that procedural omissions are also common in many other types of accidents, including those involving gear-up landings, fuel starvation, incorrect fuel pump settings, and flap misconfigurations.

- Be prepared to abort the takeoff if something does not seem right. When a pilot is confronted with a sudden, abnormal event, responses are more likely to be delayed or inappropriate. Having a plan will help reduce reaction time and can result in a safer response.

- When flying alone, read the checklist aloud and touch the applicable switch or control. Research has shown that touching an object while verbally communicating enhances the probability that an activity has been accomplished.

- Avoid using improvised control lock devices that may be inconspicuous and easily overlooked during preflight checks.

Interested in more information?

The accident reports for each accident summarized in this safety alert can be searched by accident number from the NTSB's Aviation Accident Database & Synopses web page at http://www.ntsb.gov/_layouts/ntsb.aviation/index.aspx. Each accident's public docket is available on the NTSB's Accident Dockets web page at http://dms.ntsb.gov/pubdms/.

The FAA's *Risk Management Handbook* (FAA-H-8083-2) provides in-depth discussions of risk management principles, including single-pilot resource management and strategies for the effective use of checklists—not only for the aircraft but also for assessing personal risks—in chapter 6. Other risk management strategies, such as mitigating external pressures on pilots that can lead to omitting checklist items, are discussed in chapter 3.

The FAA's *Pilot's Handbook of Aeronautical Knowledge* (FAA-H-8083-25A) discusses aeronautical decision-making and risk management in chapter 17. It provides basic tools to help pilots assess risk and manage it in a positive manner. Checklist use and proper preflight inspections are an important part of risk management and risk intervention. Both handbooks can be accessed from the FAA's website at www.faa.gov.

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