



NTSB ***SAFETY ALERT***

National Transportation Safety Board

★ **Proper Use of Fiber or Nylon Self-Locking Nuts** ★

Inspecting nuts for age and condition and properly installing nuts is critical to ensuring tight connections

The problem

- Some pilots and maintenance personnel are not adequately inspecting or installing fiber or nylon self-locking nuts, which have fiber or nylon inserts incorporated into their construction to provide tight connections that will not loosen under vibration.
- Fiber or nylon self-locking nuts' ability to provide tight connections degrades with each use. They may not meet the minimum prevailing torque value, which can lead to loose connections or, eventually, liberate hardware and lead to accidents and incidents.



A new nylon insert.



An old, degraded nylon insert.

Related accidents

Sadly, the circumstances of each new accident are often remarkably similar to those of previous accidents. This suggests that some pilots and mechanics are not taking advantage of the lessons learned from such tragedies that could help them avoid making the same mistakes. The following accident summaries illustrate some common—and preventable—maintenance-related accident scenarios:

- A P-51 Mustang airplane collided with the airport ramp in the spectator box seating area following a loss of control during the National Championship Air Races. The investigation found that the trim tab attachment screws could be rotated through the nuts by hand, and the fiber inserts were visibly worn and displayed the full thread form. The degraded nuts allowed the screws to repeatedly loosen at race speeds, and, during the accident flight, led to aerodynamic flutter of the elevator trim tab and the subsequent loss of airplane control. The commercial pilot and 10 people died and about 64 people were injured. (NTSB accident number [WPR11MA454](#) and report number [AAB-12-01](#).)

- During landing, the nosewheel separated from the nose landing gear of an Ercoupe 415-C airplane. The nuts on the nosewheel bolts could be rotated by hand, and only slight resistance could be felt as the bolt entered the locking portion of the nut. The fiber inserts were visibly worn and displayed the full thread form. ([ERA13LA007](#))
- An experimental, amateur-built SeaRey airplane crashed during takeoff. The pilot stated that, all of a sudden, the airplane was upside down. The right horizontal stabilizer lock nut at the forward attachment point was missing, and the bolt that secured the right horizontal stabilizer was backed out. ([MIA08CA088](#))
- An experimental, amateur-built Air Command Elite gyrocopter collided with terrain following an in-flight separation of a control system rod. Postaccident examinations revealed that the bolt and lock nut used to attach the control rod in the cyclic system were missing. ([LAX06LA236](#))
- During a forced landing of a WSK PZL Mielec airplane, the throttle would not retard all the way, and the airplane struck a pole. The bolt that normally connected the throttle linkage clevis to the throttle arm was missing, which allowed the throttle cable to disconnect from the throttle control arm. A sister airplane was examined, revealing that a nut with a nylon insert had been installed on the clevis bolt and that it was loose enough to be removed by hand. ([SEA04TA147](#))

What can pilots and maintenance technicians do?

- Comply with instructions in your aircraft's applicable maintenance manual or Federal Aviation Administration Advisory Circular 43.13-1B, [chapter 7](#), section 4, if there is no guidance on nut reuse in the manual.
- Confirm that the specified hardware is installed correctly.
- Ensure that adequate torque is required to spin the nut on the bolt. Be aware that binding in the assembly may produce a false indication of nut effectiveness.
- Throw out a nut that can be rotated on the thread by hand.
- Ensure that sufficient thread protrusion exists.
- Do not run a tap through the fiber or nylon insert because doing so removes the locking capability of the nut.

REMEMBER: WHEN IN DOUBT, THROW IT OUT!

Interested in more information?

The reports for the accidents referenced in this safety alert are accessible by NTSB accident number from the NTSB's [Aviation Accident Database & Synopses](#) web page at www.nts.gov/aviationquery/index.aspx. Each accident's public docket is accessible from the NTSB's [Docket Management System](#) web page at <http://dms.nts.gov/pubdms/>.

AC 43.13-1B [chapter 7](#), section 4, paragraph 7-64 provides general information about nuts and specifically states when not to use nuts with fiber or nylon inserts.

[GA Maintenance Alert: Safety and Security of Components](#). This GA maintenance alert and others can be accessed from the [FAA Safety Team](#) website at www.faasafety.gov.

This NTSB safety alert and others can be accessed from the NTSB's [Safety Alerts](#) web page at <http://www.nts.gov/safety/safety-alerts/Pages/default.aspx>.