



NTSB

SAFETY ALERT

National Transportation Safety Board



Check Your Restraints



Carefully follow restraint system maintenance and replacement guidance to prevent death and injuries

The problem

- General aviation aircraft restraints degrade due to age, UV exposure, and repeated use.
- Although restraints are required to be inspected annually, degradation of their capability can be difficult for aircraft owners and maintenance personnel to detect.
- Some aircraft are only equipped with lap belts and do not have shoulder harnesses, which can prevent occupants from impacting the airplane interior during a crash.

Related accidents

The NTSB has investigated several accidents in which restraint systems did not perform to their design standards because they had degraded or in which shoulder harnesses were not installed on the aircraft. Occupants often sustain serious or fatal injuries during accidents when a restraint fails or is not used, and numerous studies by the NTSB and others have shown improved survivability and decreased injuries when shoulder harnesses are installed and used in aircraft. The following accident summaries illustrate some common—and preventable—accident scenarios related to these issues:

- A commercial pilot died when his Taylorcraft F-19 airplane impacted terrain after takeoff and his shoulder harness failed. The passenger's restraint system remained intact, and she sustained serious injuries. Examination of the pilot's shoulder harness revealed features consistent with a previous overload tensile failure, which reduced the capability of the shoulder harness to provide adequate occupant protection. (NTSB accident number [ANC05FA070](#))
- A commercial pilot of an aerial application flight sustained serious injuries following a wire strike in a Piper PA-36-285 airplane. Examination of the pilot's restraints showed signs of wear and degradation, and the lap belt failed inboard of the adjustment buckle. ([CEN09LA023](#))
- A private pilot and his passenger died during a ditching following a loss of engine power in a Beech A36 airplane. The airplane was not equipped with shoulder harnesses. The cause of death for both occupants was attributed to drowning with complications due to blunt force trauma. The installation and use of shoulder harnesses would have significantly increased the occupants' chances of survival by reducing the severity of the

blunt force trauma the occupants experienced, possibly allowing them to escape. ([LAX06FA129](#))

What can pilots and aircraft owners do?

- Know the history of the restraints in your airplane. Have the restraints examined by a mechanic or the manufacturer to verify that they meet required specifications. Replace the belts if the examination deems it necessary.
- If your airplane was designed without shoulder harnesses, install them if possible.

What can maintenance technicians do?

- Understand aging restraint systems and know the signs — cut or worn edges, damaged stitching, broken threads, UV damage, and/or any excessive wearing — that indicate a restraint system does not meet its original design standards.
- Inform owners of the available options to replace restraint systems on their aircraft.
- Encourage owners of aircraft not equipped with shoulder harnesses to install them.
- Know that aircraft used for agricultural operations experience additional stresses and environmental factors that can result in increased wear over time.

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/>.

The [FAA's Policy Statement, "Methods of Approval of Retrofit Shoulder Harness Installations in Small Airplanes,"](#) provides information related to acceptable methods of approval of retrofit shoulder harness installations. This information can be accessed through the FAA's website at www.faa.gov.

"[Acceptable Methods, Techniques, and Practices—Aircraft Inspection and Repair](#)" (FAA Advisory Circular 43.13-1B) contains inspection guidance for safety belts in [chapter 9](#), section 9-46(b). This information can also be accessed through the FAA's website at www.faa.gov.

In 2011, the NTSB conducted a study titled, "[Airbag Performance: General Aviation Restraint Systems](#)." This study can be accessed through the NTSB's website at www.nts.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>.