



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: January 2, 2004

In reply refer to: A-03-57

Honorable Marion C. Blakey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

Background

On January 8, 2003, about 0848 eastern standard time, Air Midwest flight 5481, a Raytheon (Beechcraft) 1900D, N233YV, crashed shortly after takeoff from Charlotte-Douglas International Airport, Charlotte, North Carolina. The 2 flight crewmembers and 19 passengers on board were killed and 1 person on the ground sustained minor injuries. The impact and postcrash fire destroyed the airplane.

At the accident site, the first officer's body was found still restrained in his seat, but the captain's body had been ejected and was found 4 feet in front of the cockpit, and her rotary seatbelt buckle was found unbuckled. During the investigation of this accident, an Air Midwest Beech 1900 pilot informed National Transportation Safety Board investigators that he had previously experienced the uncommanded release of a rotary seatbelt buckle when the airplane's yoke was pulled aft and struck one of the rotary buckle vanes. The Air Line Pilots Association (ALPA) reported it was aware of five similar events. (The ALPA report did not identify the type of airplanes involved.)

Pacific Scientific Company in Duarte, California, manufactures the rotary seatbelt buckles installed in the crewmember seats on the accident airplane. The rotary buckle is designed to restrain two shoulder harness fittings in the upper slots of the buckle and two lapbelt fittings on the side slots of the buckle. The buckle is equipped with a circular handle on its face with four vanes that, when rotated in either direction, depresses an internal spring and load plate that forces internal locking pawls to release the restraints.

Safety Board staff conducted postaccident ground tests on a Beech 1900D airplane during which a subject of about the same height as the captain, seated in a crewmember seat, pulled aft and rotated the yoke. The tests demonstrated that it was possible for the yoke to contact the rotary seatbelt buckle vane and release the seatbelt buckle. This scenario is consistent with

information on the accident flight's digital flight data recorder indicating maximum aft movement of the yoke and rotation to the left just before the airplane impacted the ground.¹

Previous Service Bulletin, Service Letters, and Airworthiness Directive

The problem of inadvertent unlatching of the Pacific Scientific seatbelt buckle was discovered during a flight test of a Boeing 737-400 airplane. When a British test pilot performed a maneuver requiring full aft movement of the control column, a clipboard attached to the yoke contacted the pilot's rotary seatbelt buckle and inadvertently unlatched the seatbelt and shoulder harness. Boeing and a United Kingdom Civil Aviation Authority (CAA) representative present during the flight test requested that Pacific Scientific change its design and develop a protective guard for the buckle-release mechanism. Consequently, Pacific Scientific and Boeing engineers designed a new guarded seatbelt buckle that includes a protective circular guard around the rotary vanes of the seatbelt to prevent the inadvertent release of the restraints.² See figure 1.



Figure 1. Pacific Scientific seatbelt buckles.

On July 23, 1992, Pacific Scientific issued Service Bulletin (SB) 1117032-25-02 recommending the installation of a new guarded seatbelt buckle in Boeing aircraft with Pacific Scientific restraint systems that incorporate unguarded buckles installed on the crewmember seats. Also on July 23, 1992, in conjunction with the Pacific Scientific SB, Boeing Aircraft Company issued Service Letters (SL) 737-SL-25-54 and 757-SL-25-40 calling for installation of the guarded seatbelt buckle on all Boeing 737 and 757 series airplanes with crewmember seats manufactured by Ipeco Aerospace Equipment.³

¹ The pitch control position parameter measured a maximum aft value of 19.2° at the same time that the roll control measured 18° to the left.

² According to Pacific Scientific, it produces and sells more than 4,000 of these guarded buckles a year and more than 8,000 of the unguarded buckles a year.

³ On July 6, 1994, Boeing reissued these SLs and included Boeing 747 and 767 series airplanes.

On July 10, 1993, the CAA issued Airworthiness Directive (AD) AAD 007-10-93 requiring installation of the guarded buckle on all Boeing airplanes equipped with Pacific Scientific restraint systems (Part No. 1117032) and Ipeco crewmember seats no later than March 31, 1994. The FAA has not issued a similar AD.

Discussion

A reliable restraint system is the foundation of effective occupant protection. Crewmembers could be at increased risk of injury or death in a survivable accident if their seatbelt buckle becomes inadvertently unlatched. Unguarded rotary seatbelt buckles pose an unnecessary safety risk to flight crewmembers because of the possibility that they may become unlatched when the control wheel, a clipboard attached to the control wheel, or another object contacts the buckle, which could occur as a result of maneuvering, turbulence, or an in-flight upset. The Safety Board concludes that unguarded rotary seatbelt buckles do not adequately ensure that the restraint system will remain fastened.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Identify all airplanes equipped with unguarded flight crewmember rotary seatbelt buckles and require replacement with guarded buckles that cannot be inadvertently unlatched. (A-03-57)

Chairman ENGLEMAN CONNERS, Vice Chairman ROSENKER, and Members CARMODY, GOGLIA, and HEALING concurred with this recommendation.

By: Ellen Engleman Connors
Chairman