



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: USE OF SHOULDER HARNESS IN
PASSENGER SEATS

Date: 8/4/86
Initiated by: AFS-820

AC No: 91-65
Change:

1. PURPOSE. This Advisory Circular (AC) provides guidance and information to pilots, passengers, and maintenance personnel regarding the crash survivability aspects of small aircraft equipped with shoulder harnesses and the hazards of modifying seats, adding appendages to seats, and storage of articles, beneath the seats. The AC also recommends inspection and maintenance of seats, lap belts and shoulder harnesses to enhance their effectivity for crash survivability.

2. BACKGROUND. On December 17, 1985, the National Transportation Safety Board (NTSB) issued safety recommendation A-85-124, recommending issuance of an advisory circular to provide information on crash survivability aspects of small aircraft. The recommendation was the result of an NTSB general aviation airplane crashworthiness project. In the project, the safety board examined 500 relatively severe general aviation airplane accidents to determine what proportion of the occupants would have benefited from the use of shoulder harnesses and energy-absorbing seats. The safety board found that 20 percent of the fatally-injured occupants in these accidents could have survived with shoulder harnesses (assuming the seat belt was fastened) and 88 percent of the seriously injured could have had significantly less severe injuries with the use of shoulder harnesses. Energy-absorbing seats could have benefited 34 percent of the seriously injured. The safety board concluded that shoulder harness use is the most effective way of reducing fatalities and serious injuries in general aviation accidents.

Incidents of turbulence and jet up-set injuries continue to be reported. Pilots should brief all passengers on the important safety benefit of keeping seat belts and shoulder harnesses fastened during all phases of flight.

3. HAZARDS OF UNAPPROVED SEAT MODIFICATIONS.

a. Any unapproved attachment or modification to seat structure may increase load factors and metal stress which could cause failure of seat structure at a lesser "G" force than exhibited for original certification.

b. Aircraft owners and maintenance personnel are cautioned not to make attachments to, or otherwise modify, seats from original certification without approval from the FAA engineering and manufacturing district office having original certification responsibility for that make and model.

c. Examples of attachments found to be unauthorized are drilling holes in seat tubing to attach fire extinguishers and drilling holes to attach approach plate book bins to seats.

4. STOWAGE OF ARTICLES.

a. Aircraft seats are designed to absorb vertical energy in a downward motion. In order to accomplish this action, the space between the seat pan and the floor is utilized to provide space for seat expansion. If hard, solid objects are stored beneath seats, the energy absorbing feature is lost and severe spinal injuries can occur to occupants.

b. Prior to flight, pilots should assure that articles are not stowed beneath seats that would restrict seat pan energy absorption or penetrate the seat in event of a high vertical velocity accident.

5. INSPECTION AND MAINTENANCE OF SEATS, LAP BELTS, AND SHOULDER HARNESSSES.

a. In addition to annual and or 100 hour inspection, the pilot should make the following inspections prior to flight:

(1) Check seat belt and shoulder harness webbing straps for tears, holes, or rotting.

(2) Check all metal hardware for corrosion, cracks, bends, loose or missing nuts and bolts, and condition of any steel cables.

b. The owner/operator should perform periodic lubrication of seat tracks and locking mechanisms to assure minimum wear and proper locking of seat track locking pins.

6. PASSENGER BRIEFING AND USE OF BRIEFING CARDS.

a. All pilots are required by FAR Section 91.14 to brief passengers prior to flight on the use and operation of seat belts and shoulder harnesses. Although only required for take off and landing, the briefing should explain the benefit of restraint during all phases of flight.

b. In addition to the briefing required by FAR Section 91.14, the pilot in command must assure that each passenger has the seat belt and shoulder harnesses fastened prior to take off and landing.

c. If passenger briefing cards are provided, they should include operating instructions for use of the shoulder harness, including a diagram of its operation.



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