



**SAIB:** CE-12-27

**Date:** April 16, 2012

**SUBJ:** Flight Compartment Equipment; Inflatable Seat Restraints

*This is information only. Recommendations aren't mandatory.*

## **Introduction**

This Special Airworthiness Information Bulletin informs you of an airworthiness concern that is relevant to all airplanes equipped with a restraint system. This includes airplanes certificated under Title 14 of the Code of Federal Regulations (14 CFR) part 23, as well as those certificated under the previous Civil Air Regulations (CAR) part 3. This information is also relevant to any special light-sport category airplanes (S-LSA), experimental light-sport airplanes (E-LSA), and experimental amateur-built airplanes.

At this time, the Federal Aviation Administration (FAA) has determined that this airworthiness concern is not an unsafe condition that would warrant airworthiness directive (AD) action under 14 CFR part 39.

## **Background**

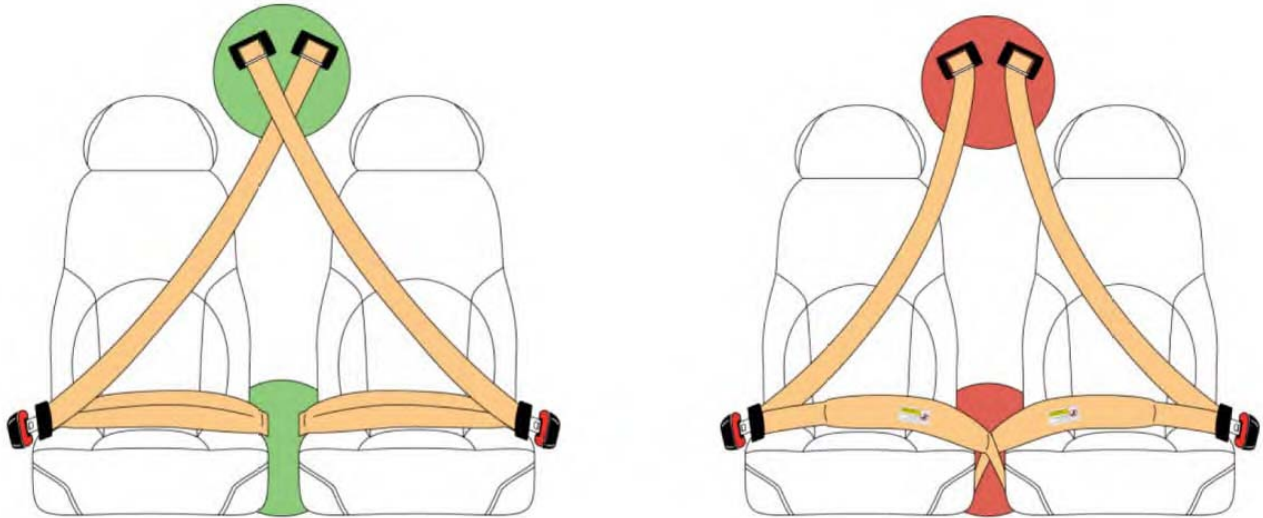
In 2011, the National Transportation Safety Board (NTSB) released a safety study titled Airbag Performance in General Aviation Restraint Systems. The study investigated the safety enhancing ability of inflatable restraint systems that, as of August 2010, are installed in nearly 18,000 seats of 7,000 general aviation (GA) airplanes. This study focused on 10 aircraft accidents, of which 7 had airbag deployments. Two of these accidents resulted in a specific recommendation from the NTSB. Although the study was focused on inflatable restraints, the resulting recommendation isn't specific to inflatables. The NTSB recommendation and the FAA's concerns apply to any type of restraint.

The first accident involved a Cessna Aircraft Company (Cessna) Model T182T airplane. The inflatable three-point restraints did not deploy for any of the three occupants. This was due to the impact direction being more downward than forward, so no deployment was expected. All three occupants survived the crash with serious to minor injuries.

However, post-crash interviews with the pilot revealed that before takeoff the front left seat passenger had incorrectly attempted to use the restraint for the right seat. The pilot, a certified flight instructor, indicated that there had been other occasions in Cessna Models 172 and 182 airplanes where his students had inadvertently used the wrong restraint.

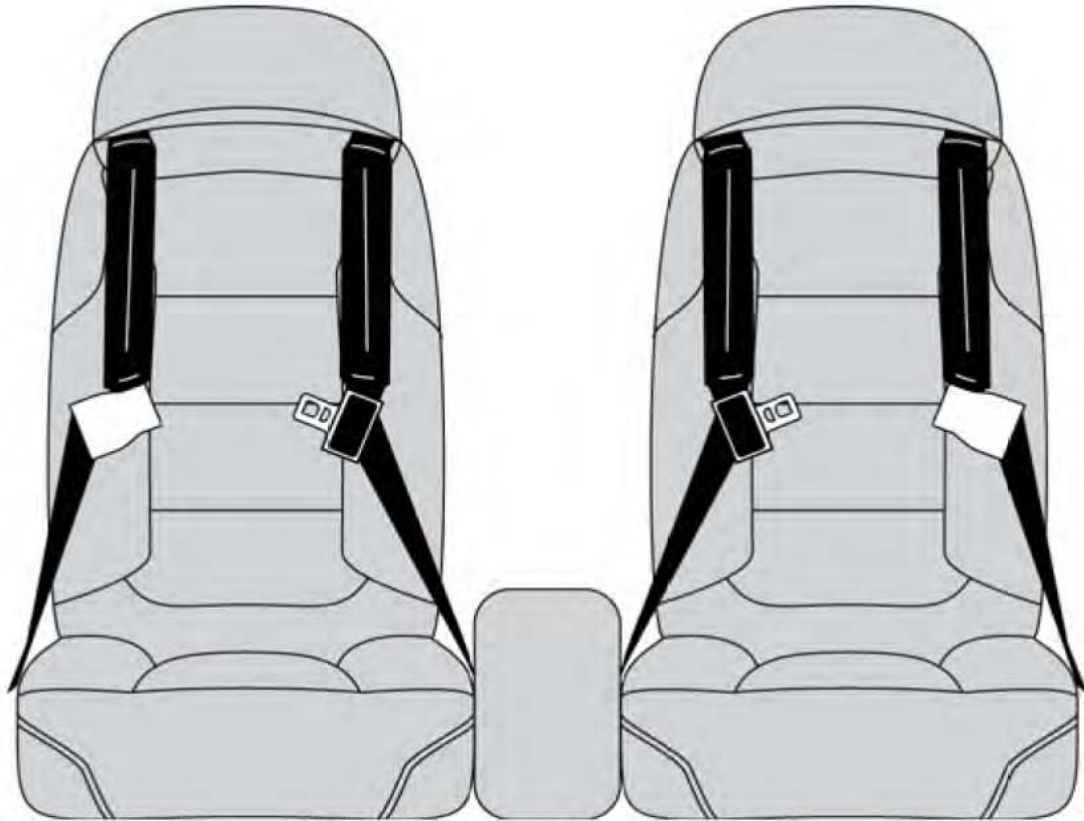
In certain Cessna-manufactured airplanes, passengers may incorrectly fasten the restraints such that the wrong airbag activates. Since the above accident, AmSafe, the inflatable restraint manufacturer, issued a supplement to the operating handbook for Cessna Models Skyhawk (172R, 172S), Skylane (182S, 182T, T182T), and Stationair (206H, T206H) airplanes to include a reference to a warning label on the lap portion of the restraint. Additionally, Cessna issued a service bulletin to owners of airbag-equipped Cessna aircraft to document the changes to the pilot's operating handbook.

Figure 1, below shows the correct (left) and incorrect (right) way to fasten the three-point inflatable restraint. For example, in the picture on the right, if an occupant in the left seat fastens the right seat restraint to his or her outboard buckle, the airbag system in the unused restraint would be active while the airbag in the buckled restraint would be inactive.

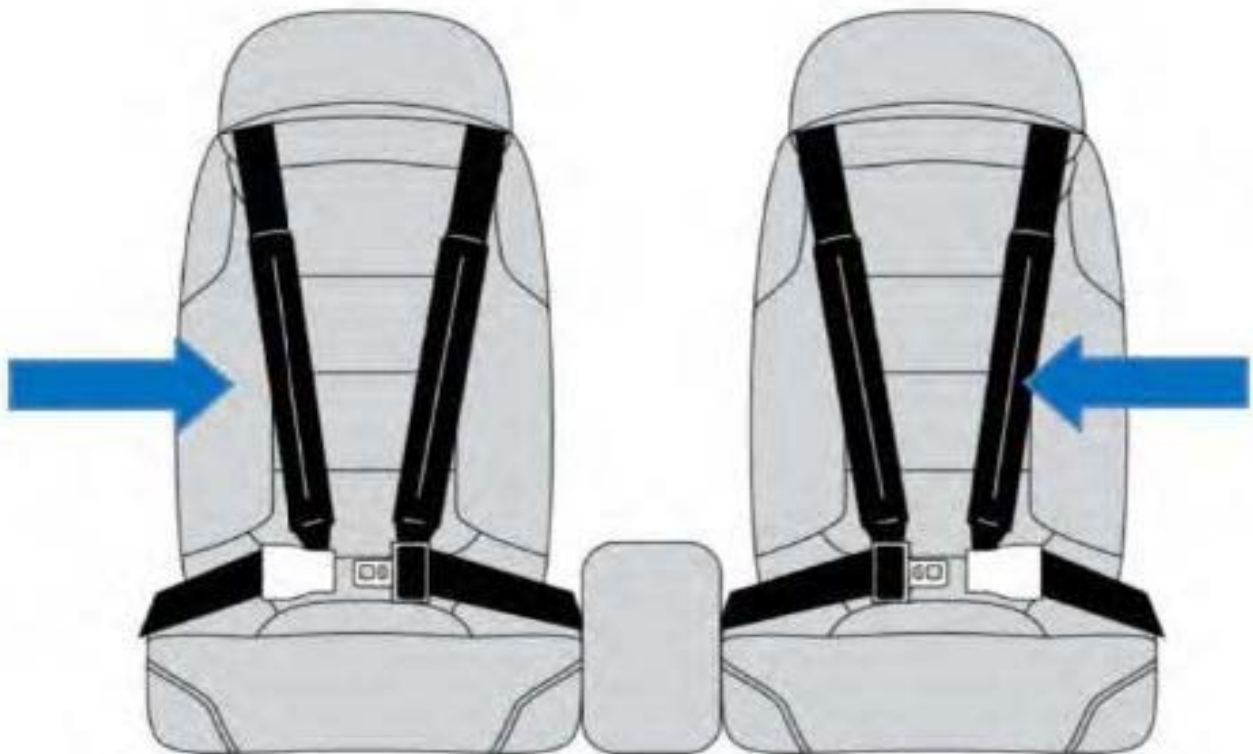


**Figure 1 – Three-Point Restraint - Correct (left) & Incorrect (right)**

The second accident involved a Cirrus Design Corporation (Cirrus) Model SR-22 airplane with four-point inflatable restraints as shown in Figure 2 below. Figure 2 shows how the belts hang in the relaxed and unfastened condition with the buckles resting high above a proper latched and secured position that would be low and tight across the occupant’s hips. In the accident, all four occupants survived, but three of the four occupants appear to have incorrectly fastened the restraint such that the buckle rested on the chest, on or just below the sternum, as shown by the arrows on Figure 3. Figure 3 shows the proper position of the buckle, low and tight across the hips. One occupant stated that they always wore the restraint in this fashion, with the buckle positioned over the chest area. The bruising on the chest of the occupants was likely due to the incorrectly positioned buckle. Also, some of the facial injuries were likely due to the closer proximity of the occupants face to the rapidly deploying airbag, a result of incorrect positioning of the restraint system. The Cirrus SR-22 pilot’s operating handbook gives correct and specific instructions on proper fastening of the restraint system, which includes “...the lap buckle centered and tightened around the hips.”



**Figure 2 – 4 Point Restraint - Relaxed position**



**Figure 3 – Four-Point Restraint – Proper Buckle Position Low and Tight on Hips – Arrow Indicates IMPROPER Buckle Position Over Chest Area**

## **Recommendations**

The FAA recommends that the pilot and passengers assure they use the airplane seat restraints properly. Inflatable restraints aren't in any way unsafe. On the contrary, they provide additional life saving benefits. However, if any restraint is not properly used, then its life saving benefits may not be realized. This applies to both conventional and inflatable restraints.

The FAA wants to clarify that when operating an aircraft under Title 14 Code of Federal Regulations (CFR), part 91, §91.107(a)(1) and (2) (see below), it is the pilot in command's responsibility to ensure that all passengers are instructed on the proper use of the seat restraint system and to fasten them prior to take off.

*Sec. 91.107*

*Use of safety belts, shoulder harnesses, and child restraint systems.*

*(a) Unless otherwise authorized by the Administrator--*

*(1) No pilot may take off a U.S.-registered civil aircraft (except a free balloon that incorporates a basket or gondola, or an airship type certificated before November 2, 1987) unless the pilot in command of that aircraft ensures that each person on board is briefed on how to fasten and unfasten that person's safety belt and, if installed, shoulder harness.*

*(2) No pilot may cause to be moved on the surface, take off, or land a U.S.-registered civil aircraft (except a free balloon that incorporates a basket or gondola, or an airship type certificated before November 2, 1987) unless the pilot in command of that aircraft ensures that each person on board has been notified to fasten his or her safety belt and, if installed, his or her shoulder harness.*

There are clear instructions in the pilot's operating handbook, which is available to the pilot in command, on the proper use of these systems.

### **For Further Information Contact**

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