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Topic:

Occupant Protection – Child Safety

Title: Child Restraint System Certification Requirements Summary

Abstract

The FAA encourages the use of Child Restraint Systems (CRS) on aircraft. Currently there are several means by which child restraints can be approved for use on aircraft. The approved devices fall into two categories: devices meeting auto safety standards, and those meeting aviation standards. An aviation-specific standard (TSO-C100c) was developed to address performance issues exhibited by devices meeting automotive standards when used in some aircraft seats. TSO-C100c addressed fitment and occupant excursion issues by setting overall size limitations and by using an aviation relevant seat configuration for dynamic tests. The TSO also incorporates the automotive CRS requirements that are relevant to the aviation environment. While the TSO can be used to directly evaluate conventional (shell type) child restraints, it also serves to establish a baseline level of safety against which the performance of proposed Aviation Child Safety Devices (ACSD) are compared. An ASCD is a CRS that is only approved for aviation use.

The TSO-C100c requirements can be grouped into two categories: performance criteria and design requirements. Performance criteria are used to evaluate those injury risks that can be assessed by injury criteria, such as the head injury criteria (HIC) and chest acceleration limits, or a test result, such as head excursion limits, support surface angle limits, belt durability, and belt strength. Design requirements are imposed to control injury risks that cannot be fully assessed using current test technology or injury criteria. These include requirements such as minimum support surface areas, uniform support (i.e. no protrusions), belt geometry, and belt adjustment range.

Since ACSD designs may not incorporate all specific design requirements called for in the TSO, it is important when developing the project specific certification requirements to ensure that the intent of each design requirement is addressed. This can be challenging since, in some cases, design requirements are levied because there is no practical way to foresee and evaluate all of the possible injury risks that could be present if that design feature is eliminated.

This presentation will summarize the safety benefits provided by the TSO-C100c performance and design requirements.