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Topic:

Crash Dynamics – Child Restraint Systems

Title:

Aviation Child Safety Device Performance Standards Review

Abstract:

Development of Child Restraint Systems (CRS) to meet the existing aviation performance standards, TSO-C100b and SAE AS5276/1, has proven challenging. The existing test requirements call for a combination of worst-case belt anchor location, belt tension, and seat cushion properties/dimensions that were typical at the time the specifications were written. These parameters may no longer be representative of the majority of current aircraft seats. Difficulties meeting the standards based on this configuration may be inadvertently hindering the availability of improved performance CRS's. The FAA Civil Aerospace Medical Institute (CAMI) has evaluated the test parameters to determine if revision of TSO-C100b could improve the relevancy of the tests while maintaining the same level of safety. The parameters identified for potential revision were the lap belt anchor location, seat pan dimensions, and the CRS installation procedure.

The specifications in AS5276/1 and TSO-C100b were developed to complement those in the Federal Motor Vehicle Safety Standard for Child Restraint Systems, FMVSS-213. Recent revisions to the aviation regulations to accommodate approval of innovative, aviation unique CRS's, referred to as Aviation Child Safety Devices (ACSD), removed the explicit requirement for these systems to meet FMVSS-213. This action has removed some applicable requirements that are not duplicated in the TSO. FMVSS-213 has been revised significantly since the TSO was written; therefore, CAMI reviewed the current FMVSS-213 and identified requirements that could provide a safety benefit for ACSD's. The identified requirements not duplicated in the aviation standards include: design specifications for occupant support surfaces, belt and buckle strength and durability tests, and defined occupant restraint configuration, geometry and adjustment range. The requirements that could serve as a basis for developing improvements to the existing aviation standards include: use of advanced test dummies, test dummy preparation and positioning procedures, head injury assessment procedure, and CRS installation procedures.