[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 91, 121, 125, and 135

[Docket No. 29145; Notice No. 98-2]

RIN 2120-AG43

Child Restraint Systems

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Advance notice of proposed rulemaking (ANPRM).

SUMMARY: The FAA seeks public comment on issues relating to the use of child restraint systems (CRS’s) in aircraft during all phases of flight (i.e., taxi, takeoff, landing, or any other time the seat belt sign is illuminated). Specifically, the agency seeks crash performance and ease-of-use information about existing and new automotive CRS’s, when used in aircraft, as well as the development of any other new or improved CRS's designed exclusively for aircraft use.

This advance notice of proposed rulemaking (ANPRM) responds to a recommendation made by the White House Commission on Aviation Safety and Security and is intended to gather information about the technical practicality and cost feasibility of requiring small children and infants to be restrained in CRS in aircraft. This information is needed so that the FAA can determine the best way to address the safety of children while on board aircraft. After reviewing the comments, the FAA may issue

a Notice of Proposed Rulemaking with specific regulatory proposals that respond to the Commission’s recommendations regarding the use of CRS's.

DATES: Comments must be received on or before June 18, 1998.

ADDRESSES: Comments on this notice may be delivered or mailed, in triplicate, to: Federal Aviation Administration, Office of the Chief Counsel, Attn.: Rules Docket (AGC-200), Docket No. 29145, Room 915G, 800 Independence Avenue, SW., Washington, DC 20591. Comments submitted must be marked: "Docket No. 29145." Comments may also be sent electronically to the following Internet address: 9-NPRM-CMTS@faa.dot.gov. Comments may be examined in Room 915G on weekdays, except Federal holidays, between 8:30 a.m. and 5:00 p.m.

FOR FURTHER INFORMATION CONTACT: Donell Pollard, Air Transportation Division, AFS-203, Flight Standards Service, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591, telephone (202) 267-3735.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to comment on the ANPRM by submitting such written data, views, or arguments as they may desire. Comments must identify the regulatory docket or notice

number and be submitted in triplicate to the Rules Docket address specified above.

All comments received, as well as a report summarizing each substantive public contact with FAA personnel on this rulemaking, will be filed in the docket. The docket is available for public inspection before and after the comment closing date.

All comments received on or before the closing date will be considered by the Administrator in determining whether to go forward with a proposed rulemaking. Late-filed comments will be considered to the extent practicable. Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this ANPRM must include a pre-addressed, stamped postcard with those comments on which the following statement is made: "Comments to Docket No. 29145." The postcard will be date stamped and mailed to the commenter.

Availability of ANPRM

An electronic copy of this document may be downloaded using a modem and suitable communications software from the FAA regulations section of the Fedworld electronic bulletin board service (telephone: 703-321-3339), the Federal Register's electronic bulletin board service (telephone: 202-512-1661), or the FAA Aviation Rulemaking Advisory Committee bulletin board service (telephone: 800-FAA-ARAC).

Internet users may reach the FAA's Web page at http://www.faa.gov or the Federal Register's Web page at http://www.access.gpo.gov/su_docs for access to recently published rulemaking documents.

Any person may obtain a copy of this ANPRM by submitting a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267-9680. Communications must identify the notice number or docket number of this ANPRM.

Persons interested in being placed on the mailing list for future ANPRM's and Notices of Proposed Rulemaking (NPRM's) should request from the above office a copy of Advisory Circular No. 11-2A, Notice of Proposed Rulemaking Distribution System, that describes the application procedure.

Background

On February 12, 1997, the White House Commission on Aviation Safety and Security (the Commission) issued a final report to President Clinton which included a recommendation on CRS use during flight. The following is an excerpt from the final report as it relates to CRS's:

"The FAA should revise its regulations to require that all occupants be restrained during takeoff, landing, and turbulent conditions, and that all infants and small children below the weight of 40 pounds and under the height of 40 inches be

restrained in an appropriate child restraint system, such as child safety seats, appropriate to their height and weight."

The Federal Aviation Administration (FAA) is issuing this ANPRM to gather information to enable the agency to act upon the Commission's recommendations. This ANPRM does not propose specific regulatory changes. Rather, it requests comments, data and analyses to determine the best approach to maintaining and enhancing safety of children who are passengers in aircraft. After reviewing the comments received, the FAA may issue an NPRM proposing specific regulations. Interested persons will have the opportunity to comment on those proposed changes before a final rule is adopted.

Terminology

For the purpose of this ANPRM, the various child restraint devices are described as follows:

Booster seats: Designed for children who weigh between 30 and 60 pounds. These seats have a raised platform base on which the child sits. Some booster seats have a front shield, over which the lap belts are routed, which covers the child's abdominal area. Shield-type booster seats typically do not have a back or side shell. Depending on the model, some booster seats can be used without the front shield if a shoulder strap is available.

Forward-facing child restraint devices: Designed for children who weigh between 20 and 40 pounds. These seats have a

side and back shell and shoulder straps. The seats are installed by routing the vehicle lap belt through a path provided in the back.

Aft-facing child restraint devices: Designed for children who weigh less than 20 pounds. These seats have adjustable shoulder straps but do not have a shield over the chest or abdomen of the child. The seats typically are installed by tightening the vehicle lap belt through slots on the top side.

Vest- and harness-type child restraint devices: Designed for children who weigh between 20 and 40 pounds. These seats consist of forward-facing restraints fabricated with webbing. There is no rigid shell or platform. This type of seat attaches to the vehicle's lap belts by passing through a loop sewn on the back side of the harness.

Lap-held child restraint devices: Designed to restrain children less than two years old on the lap of an adult. These devices are commonly referred to as belly belts.

Child restraint system: The term "child restraint system" is used when referring to the child restraint device as installed in a passenger seat and secured with lap belts.

Current Regulations for Child Restraint Systems on Board Aircraft

Section 91.107 of the Code of Federal Regulations (14 CFR) stipulates that CRS's must meet certain operational requirements, while §§ 121.311, 125.211, and 135.128 set forth

how these systems may be used on board aircraft. Under current regulations, children two years old and under may be held in an adult's lap throughout the flight. Alternately, parents may opt to use an approved CRS - specifically, one certified to meet the requirements of Federal Motor Vehicle Safety Standard (FMVSS) 213, to restrain children of this age group when they travel in commercial aircraft. If parents want to ensure that their child has a seat in which to use a CRS, they typically pay a separate fare for that child. Children who are lap held are typically not charged fares by airlines.

Whether or not an air carrier charges a fare for the small child, a separate passenger seat is required for CRS use and installation. Airlines are required to accommodate the use of approved CRS's by ticket-holding small children.

The provisions for the labeling and use of CRS's in aircraft were set forth in the September 15, 1992, Miscellaneous Operational Final Rule Amendments [57 FR 42662]. These amendments were based on years of work by both the FAA and the National Highway Traffic Safety Administration (NHTSA). NHTSA's FMVSS 213, as revised under 49 CFR 571.213, contains the performance and labeling requirements for CRS's sold for use in the United States for both aircraft and automotive applications. Hundreds of models of CRS's have been manufactured and certified to this standard. Certain CRS's that meet the performance and labeling requirements of FMVSS 213 for automobile use, such as

booster seats, and vest-, and harness-type child restraint devices, are nonetheless prohibited for use in aircraft. Under current FAA regulations, children two years old or older are required to have a separate passenger seat on board aircraft.

General Discussion of Issues Regarding Child Restraint Systems

The 1994 "CAMI" Study"

In September 1994, the FAA issued a report entitled, "The Performance of Child Restraint Devices in Transport Airplane Passenger Seats" (commonly referred to as the CAMI study[1]). The research for the CAMI study involved dynamic impact tests with a variety of CRS's installed in transport airline passenger seats and subjected to the force of 16g peak longitudinal deceleration loads required under 14 CFR 25.562(b)(2).

Some of the tests were configured to represent a typical multi-row seat installation and included testing the effects of an adult occupant impact against the back of a seat in which a CRS was installed. The tests also investigated other aspects of child restraint device use in aircraft, including dimensional compatibility of CRS's with transport category aircraft passenger seats and ease of installation.

Some findings of the CAMI study are as follows:

1. As a class of child restraint devices, shield-type booster seats, in combination with factors associated with

[1] CAMI is the FAA's Civil Aeromedical Institute. The CAMI study is assigned report number DOT/FAA/AAM-94-19 and is available

airplane passenger seats, contributed to an abdominal pressure measurement higher than in other child restraint devices and did not prevent a head impact.

2. Fundamental design characteristics of shield-type booster seats made their belt paths incompatible with aircraft seat belts.

3. Vest-and harness-type devices allowed excessive forward body excursion, resulting in the test dummy sliding off the front of the seat. Therefore, a high likelihood exists that a child's entire body could impact a seat back directly in front of it. Rebound acceleration presented further risk of injury.

4. Lap-held child restraint devices (belly belts) allowed the test dummy to make severe contact with the seat back directly in front of it, resulting in a severe head impact. There were also high abdominal loads from a combination of the forward bending motion of the adult upper torso to whom the child is attached and the aft row occupant's impact on the breakover seat back.

Based on the results of the CAMI study, the FAA and NHTSA issued a final rule on June 4, 1996, that withdrew approval for the use of booster seats and vest- and harness-type child restraint devices in aircraft during takeoff, landing, movement on the surface [61 FR 28416]. In addition, the rule emphasized the existing prohibition against the use, in all aircraft, of

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through the National Technical Information Service, Springfield, VA 22161.

lap-held child restraint devices (including belly belts). The FAA supplemented this rule with a major public education campaign that promotes the use of CRS's on board aircraft at all times. The campaign also reinforces the FAA's recommendation that small children weighing under 40 pounds are safest when in an approved CRS. The campaign includes a series of video, radio, and print public service announcements.

The 1995 Report to Congress

In addition to the CAMI study, in May 1995, the FAA submitted a final Report to Congress on CRS performance and cost effectiveness. The primary issues analyzed in this report included CRS crash performance effectiveness in otherwise survivable air carrier crashes and the possible economic impacts of requiring CRS use. As to the CRS crash performance effectiveness, further findings from the CAMI study were reported. These findings include the following:

1. Aft-facing CRS's performed well, protected the child, and could be adequately restrained with existing aircraft seat belts.

2. Booster seats performed poorly, did not prevent head impact, and could not be properly attached to the aircraft seat.

3. Six of eight forward-facing CRS's tested, when restrained with aircraft seat belts and subjected to the 16g longitudinal aircraft deceleration, failed to prevent head impact

criteria (HIC) values of more than 1,000. (HIC of 1,000 is considered the threshold for serious head impact injury in adults.) Routing the aircraft seat belt through a forward-facing CRS and buckling and unbuckling it was difficult, leading to the conclusion that some CRS's might not be easily and adequately secured to aircraft seats.

4. Changing the aircraft seat belt anchor points, i.e., moving them rearward, resulted in satisfactory performance of many forward-facing CRS's. However, changing the anchor points might be problematic with some aircraft seating configurations.

When forward-facing CRS's are subjected to a longitudinal deceleration, FAA tests have shown that they move forward before the aircraft seat belt can properly react to restrain them. There are some airplane passenger seat models that have lap-belt anchor locations that satisfactorily inhibit the forward excursion of forward-facing CRS's. However, a survey of major airlines, compiled by the FAA as part of a cooperative project with the Society of Automotive Engineers, indicates that fewer than 20 percent of passenger seats currently in service have seat belt anchor geometry that would adequately restrain forward-facing CRS's.

Additionally, under 16g dynamic impact test conditions, the typical economy airplane passenger seating configuration affords approximately 26 inches of free space forward of the seat back before head contact will occur. This distance includes the

forward elastic deflection of a nonbreakover forward row seat back. If the longitudinal excursion of a child seated in a forward-facing child restraint device exceeds this distance, it is likely the child's head would strike the forward row seat back. Comparable FMVSS 213 test requirements specify 32 inches of free space ahead.

Under FMVSS 213, the aircraft test is essentially an inversion test. The performance requirement is that the child test dummy not slip out of the restraining harness in the child seat when the seat is inverted. This test is adequate for gauging automotive CRS performance in air turbulence situations, but may not be adequate for gauging whether the CRS will move relative to the aircraft seat in a forward deceleration crash mode. This finding leads to the question of whether further tests, similar to those FAA has performed, are necessary to assess the longitudinal excursion of child test dummies on forward-facing CRS's.

Although the 1995 Report contains an economic analysis, the focus of this ANPRM is on the technical aspects of CRS design and usage.

Federal Motor Vehicle Safety Standard No. 213

Prior to 1984, when the FAA Technical Standard Order (TSO) C-100 requirements were combined into FMVSS 213, there was a disparity between the number of child restraint models available

for motor vehicle use and the number available for aircraft use. The lack of child restraints for aircraft use aroused several safety concerns. One was that some families traveling by air were discouraged from taking unapproved child restraints with them, and thus did not have them available for use at their destination to protect their children while the family was driving. The other concern was that those families who nevertheless took their unapproved child restraint devices on trips had to stow the restraints in the aircraft cargo compartment, and thus were not able to use them to protect their children during the flight.

In 1984, FAA and NHTSA amended the FMVSS and TSO requirements to permit manufacturers to "self-certify" their restraints for aircraft use, provided that they meet the FMVSS 213 requirements and an additional requirement, an inversion test. (49 FR 34357; August 30, 1984). The effect of the 1984 rulemaking was to speed certification of child restraints for aircraft use, and thereby increase the availability of aircraft-certified child restraints.

However, the CAMI test results indicate that it may be prudent to assess whether the current FMVSS 213 test requirements adequately address aircraft crash conditions. Under FMVSS 213, the aircraft test is essentially an inversion test for turbulence. The performance requirement is that the child test dummy not slip out of the restraining harness in the child seat.

This is not a test to ensure that the child restraint system does not move relative to the aircraft seat.

In addition, the seat belt anchor locations and seat cushions specified in the FMVSS 213 test fixture are not representative of airplane seats. Tests of CRS's in airplane passenger seats conducted by both the FAA and NHTSA have confirmed that the longitudinal excursion of forward-facing CRS's is much greater in airplane passenger seats than when tested in the FMVSS 213 fixture. Thus, an adequate assessment of forward-facing CRS's may necessitate the use of aircraft-specific tests in addition to those required by FMVSS 213.

FAA Efforts to Develop Child Restraint Systems for Use On Board Aircraft

The FAA is investigating potential solutions to performance problems with CRS's. First, CAMI has developed and fully tested a prototype aircraft seat insert platform. The platform is inserted under the child restraint device and secured to the aircraft seat using the aircraft passenger seat belt. A different set of belts, which is part of the platform, is used to secure the child restraint device to the platform. The platform makes the child restraint device easier to install in the airplane seat and reduces the likelihood of improper installation. The platform's design goal is to provide a better

interface between a child restraint device and an aircraft passenger seat.

A second alternative is to develop an aircraft-only child restraint device that could be used in either a forward- or aft-facing configuration. Prototype models have been successfully designed, developed, and tested independently in the United States and Canada as part of a cooperative project with Transport Canada.

A third alternative is to modify a certain number of passenger seats on each airplane and install seat belts with relocated anchorage points. This could serve to improve the performance of existing child restraint devices. However, relocating anchorage points may prove impractical because: (1) structural locations at which to attach new anchorage points may not exist; and (2) passenger seat recertification may be necessary.

NHTSA NPRM: "Federal Motor Vehicle Safety Standards; Child Restraint Systems; Tether Anchorages for Child Restraint Systems; Child Restraint Anchorage System"

NHTSA has proposed revisions to FMVSS 213 to upgrade CRS performance in automotive applications (62 FR 7857; February 29, 1997). The NHTSA proposal considered two new methods of securing child restraints in vehicles, in addition to the current method of securing the restraints by using seat belts. Both methods

require the motor vehicle to have a dedicated anchorage system for child restraints. The first method consists of two latchplates positioned at the seat bight (the intersection of the seat cushion and the seat back), which would connect to two buckle mechanisms affixed to the child seat. The second method consists of rigid or semi-rigid D-rings installed at the vehicle seat bight, and matching hardware on the child seat to attach to those D-rings. Such hardware could include latches similar to those used for vehicle door and truck latches, which are attached to rigid prongs on the child seat. The FAA has expressed a concern that the rigid prongs on this type of child seat may not be compatible with aircraft seat cushions or suited for narrow aircraft seat usage.

Both methods under consideration by NHTSA would include a top tether anchorage strap. The tether is designed to be attached to a ring installed on either the car's backlight deck under the rear window or on the rear-seat's underside to keep the back support of the child restraint device from rotating forward on impact. The tether strap installation is not currently compatible with aircraft passenger seats.

Request for Information

The FAA is issuing this ANPRM to gather operational and technical data from air carriers, the public, manufacturers, and other interested parties to determine the best way to ensure the

safety of small children in CRS's during takeoff, landing, and in turbulent conditions while on board the aircraft. The FAA requests comments and suggestions on all issues related to the use of CRS's. The FAA will consider all comments and suggestions. The following are issues of particular concern:

1) General. The FAA requests comments regarding problems with fit, function, and performance that have been encountered with existing child restraint devices, especially installation problems in general aviation and commuter aircraft. For example, some child restraint device designs are simply too big to fit on some narrow aircraft seats, with or without an interfacing platform. FAA's finding that these dimensional mismatches can occur is based on a limited survey of larger commercial aircraft seats. Smaller, commuter aircraft seats are not included in this survey. Mismatches with the commuter and general aviation fleet of aircraft could be more prevalent.

Accordingly, FAA seeks detailed information about the dimensions of existing or possible future CRS designs regarding their ability to fit into the range of airline passenger seat sizes that are installed in commercial aircraft. The FAA also seeks information from airlines about how frequently passengers attempt to use CRS's that are too large for the aircraft seat. Airlines are asked to comment on how they handle such situations now, and how they would envision addressing such situations if CRS use was mandatory. Finally, the FAA queries whether it would

be appropriate or practical, under FMVSS 213, to establish dimensional limits for CRS's that are dual-use certified for both automotive and aircraft use.

2) Forward-facing CRS's. The FAA requests comments regarding the safety of forward-facing CRS's, especially in air carrier aircraft, including any current research data regarding forward-facing child restraint devices.

In particular, should airplane-specific tests be required, in addition to those conducted under FMVSS 213, to adequately assess the longitudinal excursion of child test dummies in forward-facing CRS's? Should child seats certified for aircraft use undergo testing in conditions representative of those found in a commercial transport airplane accident? For example, should there be a requirement for dynamic testing of a child restraint device to 16 g's when attached to an airplane seat using lap- and seat-belt anchorages representative of the belt assemblies and anchorages found in commercial transport airplanes?

3) Aft-facing CRS's. The FAA requests comments regarding problems that may be associated with aft-facing child restraint devices, including any current research data regarding aft-facing child restraint devices. Should the current dual-use certification policy continue for both aft-facing and forward-facing CRS's, or should the policy be limited to only aft-facing seats?

4) Approval of CRS's. The FAA requests comments about the advisability of having child restraint devices certified under FMVSS 213 for aircraft use. Should a separate aviation standard be developed for aircraft use? In particular, CRS manufacturers are invited to comment on whether, under a mandatory CRS-use regulation, they would choose to dual-certify their products, if (1) additional aircraft- specific tests were required, and (2) it was optional for CRS manufacturers to dual-certify their product.

5) Research on child restraint systems. The FAA requests comments about new CRS's that are being developed, relative to their appropriateness for use in both automobiles and aircraft. In addition, the FAA requests comments on devices that are being developed or that are already available that are similar to the prototype seat insert platform previously described in this notice. Specifically, the FAA would like to know if there are any problems that will preclude manufacturers from developing such devices.

Similarly, comments are sought on the potential availability, performance capabilities, and ease-of use of aircraft-only CRS designs. Further, the FAA also queries whether any design limitations and/or labeling requirements should be placed on aircraft-only CRS's.

6) Changing anchor point locations for aircraft passenger seat belts. CAMI data indicate that changes to the location of the anchor points for passenger seat belts would greatly enhance

the performance of existing child restraint devices. The FAA requests information on the technical and operational feasibility of changing these anchor points on a few passenger seats on existing aircraft as well as on aircraft seats manufactured in the future. Information is also requested on the feasibility of equipping some aircraft seats with a top tether anchorage, such as on the underside of the seat.

7) Evacuation of aircraft with children in child restraint systems. The FAA requests data on the effect of child restraint systems on passenger egress times.

8) Mandatory use of child restraint systems for children under 40 inches and under 40 pounds. The FAA requests comments regarding the safety consequences of requiring all children under 40 inches and under 40 pounds to be in an appropriate CRS. What effect would such a requirement likely have relative to injuries sustained in both aircraft crashes and air turbulence conditions? Also, the FAA requests data on the effect of height and weight on the efficacy of both current and future automotive CRS's, as well as aircraft-only CRS's. In particular, the FAA would like to know whether CRS's should be mandatory where the passenger is: (1) both under 40 inches and under 40 pounds; or (2) either under 40 inches or under 40 pounds. Current FAA regulations do not require the use of restraint systems designed specifically for children; for example, a two-year-old child, regardless of size and weight may be restrained in either a CRS or a passenger seat

belt, and a child under two years of age may be lap held. In addition, the FAA is seeking data regarding how many children travel by aircraft that are under: (1) two years of age; or (2) 40 inches and 40 pounds. The FAA is seeking comment regarding an air carrier's ability to enforce the weight and height requirements for CRS usage.

9) Providing child restraint systems on aircraft. The FAA requests comments regarding the effects of requiring air carriers to supply appropriate CRS's. For example, how would air carriers ensure that appropriate CRS's were available for flights?

10) Impacts on small businesses. The FAA requests comments regarding the effects of mandatory CRS use, including supplying CRS's, on small air carriers.

11) Using a dedicated method for aircraft applications. The FAA requests comments about the appropriateness of incorporating a dedicated child restraint anchorage system, such as those being considered by NHTSA (62 FR 7857), into current aircraft fleets.

12) Current practices. The FAA requests data and comments on the current practice of allowing an adult to hold a child two years of age or younger on his or her lap while seated in a forward or rear-facing seat. Estimates of the number of small children and infants that travel in this manner are especially sought.

13) Additional rear facing seats. The FAA is requesting data and comments regarding the impact of requiring air carriers to supply rear-facing seats on aircraft. Some have suggested that requiring a limited number of rear-facing seats would enhance the safety of child passengers.

14) Children per flight requiring child restraint seats. The FAA requests comment on the number of children that require CRS's, both on an average and on a peak basis.

15) Other solutions. The FAA requests comments about other possible solutions to ensure that small children are properly restrained while on board aircraft.

Regulatory Process Matters

Economic Impact

The Regulatory Flexibility Act of 1980 requires Federal agencies to consider the extent that proposed rules may have "a significant economic impact on a substantial number of small entities." Although the FAA is unable, at this time, to determine the likely costs of imposing regulations requiring small children to be restrained in CRS's in aircraft, following a review of the comments submitted to this ANPRM, the FAA will determine what the potential costs and benefits of the various rulemaking options are.

Likewise, at this preliminary stage, it is not yet possible to determine whether there will be a significant economic impact to a substantial number of small entities or what the paperwork burden,

if any, might be. These regulatory matters will be addressed at the time of publication of any NPRM on the subject.

Significance

This preliminary rulemaking is considered a “significant regulatory action” under Executive Order 12866 and, therefore, has been reviewed by the Office of Management and Budget. This preliminary rulemaking is also considered significant under the regulatory policies and procedures of the of the Department of Transportation (44 FR 11034; February 2, 1979) because of considerable public interest. In addition, any NPRM subsequently developed based on comments to this ANPRM may be considered significant.

Issued in Washington, DC, on February 11, 1998

Ava L. Mims,
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