DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA–2014–0123]

RIN 2127–AL20

Federal Motor Vehicle Safety Standards; Child Restraint Systems, Child Restraint Anchorage Systems; Incorporation by Reference

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT).

ACTION: Notice of proposed rulemaking (NPRM); request for comments.

SUMMARY: In accordance with NHTSA's 2011–2013 Priority Plan and the Moving Ahead for Progress in the 21st Century Act (MAP–21), this document proposes to amend Federal Motor Vehicle Safety Standard (FMVSS) No. 225, ''Child restraint anchorage systems,'' to improve the ease of use of the lower anchorages of child restraint anchorage systems and the ease of use of tether anchorages. This document also proposes changes to FMVSS No. 213, ''Child restraint systems,'' to amend labeling and other requirements to improve the ease of use of child restraint systems with a vehicle anchorage system. This NPRM proposes rulemaking on these and other requirements to increase the correct use of child restraint anchorage systems and tether anchorages, and the correct use of child restraints, with the ultimate goal of reducing injuries to restrained children in motor vehicle crashes.

DATES: Comments must be received on or before March 24, 2015.

Proposed compliance date: We propose that the compliance date for the amendments in this rulemaking action would be three years following the date of publication of the final rule in the **Federal Register**. We propose to permit optional early compliance with the amended requirements.

ADDRESSES: You may submit comments to the docket number identified in the heading of this document by any of the following methods:

- *Federal eRulemaking Portal:* Go to *http://www.regulations.gov.* Follow the online instructions for submitting comments.
- *Mail:* Docket Management Facility, M–30, U.S. Department of Transportation, West Building, Ground Floor, Rm. W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590.
- *Hand Delivery or Courier:* West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., between 9 a.m. and 5 p.m. Eastern Time, Monday through Friday, except Federal holidays.
- *Fax:* (202) 493–2251.

Regardless of how you submit your comments, please mention the docket number of this document.

You may also call the Docket at 202–366–9324.

Instructions: For detailed instructions on submitting comments and additional information on the rulemaking process, see the Public Participation heading of the Supplementary Information section of this document. Note that all comments received will be posted without change to *http://www.regulations.gov,* including any personal information provided.

Privacy Act: Please see the Privacy Act heading under Rulemaking Analyses and Notices.

FOR FURTHER INFORMATION CONTACT: For technical issues, you may call Cristina Echemendia, Office of Crashworthiness Standards (telephone: 202–366–6345) (fax: 202–493–2990). For legal issues, you may call Deirdre Fujita, Office of Chief Counsel (telephone: 202–366–2992) (fax: 202–366–3820). Address: National Highway Traffic Safety Administration, U.S. Department of Transportation, 1200 New Jersey Avenue SE., West Building, Washington, DC 20590.

SUPPLEMENTARY INFORMATION:

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I. Executive Summary

Introduction

In accordance with NHTSA's 2011–2013 Priority Plan and Subtitle E of MAP–21, this document proposes to amend FMVSS No. 225 to improve the ease of use of child restraint anchorage systems. First, we propose to amend FMVSS No. 225 to adopt requirements that would make it easier for consumers to attach child restraints to the lower anchorages of child restraint anchorage systems. The requirements would ensure that vehicle manufacturers produce lower anchorages that: (a) Have sufficient clearance around each lower anchorage for consumers to maneuver the child restraint system (CRS) connector; (b) are located such that the CRS connector can be attached to the bar using a reasonable amount of force; and, (c) are within two centimeters (cm) of the outer surface of the ''seat bight'' (the seat bight is approximately the intersection of the seat bottom cushion and seat back cushion).

Second, we propose to make tether anchorages easier to use by standardizing the configuration of the anchorage such that it is ''a rigid bar of any cross section shape,'' by prohibiting the anchorages from being placed under a vehicle seat or hidden under carpet, and by requiring them to be placed where there is enough space around the anchorage for consumers to tighten the tether strap.

Third, this document proposes to amend FMVSS No. 225 and FMVSS No. 213 to require, among other things, vehicles and CRSs to use a standardized symbol to more effectively identify the anchorages in the vehicle and the components on CRSs that attach to those anchorages.

In addition, this document requests comments on several issues relating to the usability of child restraint anchorage systems. We request comment on whether child restraint anchorage systems and/or tether anchorages should be required in more rear seating positions than currently required, including in vehicles now excluded from FMVSS No. 225. We also request comment on the merits of requiring vehicle and CRS manufacturers to use standardized terminology in users' manuals in describing components of the child restraint anchorage system and the connectors of child restraint systems, to enhance consumer education and increase correct use of child restraint anchorage systems and child restraints. Finally, test data indicate that tether anchorages are sufficiently robust to provide crash protection to virtually all children restrained in a harnessed child restraint. We request comment on the merits of consumer information that advises consumers to attach the tether when restraining a child in a harnessed child restraint, regardless of the weight of the child.

Background

In 1999, NHTSA issued FMVSS No. 225,[1] a standard that requires vehicle manufacturers to equip vehicles with child restraint anchorage systems that are standardized and independent of the vehicle seat belts. The child restraint anchorage system required by FMVSS No. 225 is a 3-point system consisting of two lower anchorages and a tether anchorage designed for attaching a child restraint system to a vehicle. Each lower anchorage consists of a six millimeter (mm) diameter straight rod, or ''bar,'' onto which a CRS connector can be attached. The two lower anchorage bars are typically located at or near the seat bight in a position where they will not be felt by seated adult occupants. The tether anchorage is a part to which a tether hook of a CRS can be attached. Standard No. 225 requires vehicles with three or more forward-facing rear seating positions to be equipped with child restraint anchorage systems at not fewer than two rear seating positions and a tether anchorage at an additional rear seating position. That third tether anchorage can be used when installing a CRS with the vehicle's seat belt. The requirements of FMVSS No. 225 were phased into new vehicles from 1999 to 2002 beginning with the tether anchorage in passenger cars in 1999, and ending with full implementation of FMVSS No. 225 for passenger cars, multipurpose passenger vehicles (MPVs), and trucks and buses[2] on September 1, 2002.

The 1999 rule also amended FMVSS No. 213 to require CRSs to be equipped with connectors that enable the CRS to attach to the vehicle's lower anchorages of the child restraint anchorage system.[3 4] A new head excursion performance requirement was added for forward-facing child restraints (other than booster seats), and to meet it, child restraints typically use a tether strap affixed to the top of the restraints. The tether strap must have a hook that is designed to attach to the tether anchorage of the child restraint anchorage system (see S5.9(b) of FMVSS No. 213).

In this NPRM we use the following term for the full vehicle system: ''Child restraint anchorage system.''[5] We use the following for the lower anchorage points of a child restraint anchorage system: ''Lower anchorage(s).'' The tether securement point is called a ''tether anchorage.'' For the CRS, we use the following terms to refer to the various parts of a child restraint that connect to the child restraint anchorage system, as appropriate: ''Child restraint system connectors (or CRS connectors),'' ''lower anchorage connector(s),'' ''tether anchorage connector,'' ''tether strap,'' and ''tether hook.''

Developments Post-1999 Final Rule

Child restraint anchorage systems meeting FMVSS No. 225, and child restraints meeting the associated requirements of FMVSS No. 213, have been successfully implemented in the fleet. Consumers who use the system generally like the system.[6] However, many consumers do not use child restraint anchorage systems because they do not know enough about the systems.[7] Many consumers also misuse the child restraint anchorage system or find aspects of it difficult to use.

In 2007, NHTSA held a public meeting on child restraint anchorage systems to see how the systems could be improved.[8] There were repeated comments at the meeting that the lower anchorages often were embedded deep into the seat bight, making it difficult for consumers to reach the lower anchorages and attach the lower anchorage connectors. There were also complaints that it was difficult to attach lower anchorage connectors to the lower anchorages because of surrounding stiff cushions or fabric/leather or the proximity of seat belt buckles.

Following the 2007 meeting, the agency identified improving the ease of use of child restraint anchorage systems as an area of significance to NHTSA. NHTSA announced in the NHTSA Vehicle Safety and Fuel Economy Rulemaking and Research Priority Plan 2011–2013 (March 2011) (''2011 Priority Plan'')[9] that the agency is addressing issues to improve the usability of child restraint anchorage systems and may initiate rulemaking on issues relating to the presence of anchorage systems in center rear seats, tether anchorage locations, weight limits of anchorages,[10] and labeling of the anchorage locations.

[1] 49 CFR 571.225.

[2] Specifically, trucks and MPVs with a gross vehicle weight rating (GVWR) of 3,855 kilograms (kg) (8,500 pounds (lb)) or less, and to buses with a GVWR of 4,536 kg (10,000 lb) or less.

[3] 49 CFR 571.213, sections S5.3.2, S5.9. Excepted from the requirement were booster seats, car beds, and harnesses.

[4] Additionally, Standard No. 213 requires all CRSs to be capable of attachment to the vehicle seat by a seat belt, even if the CRS has lower anchorage connectors.

[5] Many in the child passenger safety community refer to the child restraint anchorage system as the ''LATCH'' system, an abbreviation of the phrase ''Lower Anchors and Tethers for Children.'' The term was developed by a group of manufacturers and retailers soon after the 1999 final rule, for use in educating consumers on the availability and use of the anchorage system and for marketing purposes. ''LATCH'' has been used in various materials in the field and by NHTSA to refer to the vehicle 3-point child restraint anchorage system, but at times the term has been used to refer just to the lower two anchorages of the system, and at times it has been used to refer to the connectors of the child restraint system that attach to the lower anchorages. Also, apparently a number of consumers identify the tether anchorage solely with the ''LATCH'' system, and so mistakenly do not attach the CRS's tether strap when using the vehicle belt system to attach a child restraint. Because some ambiguity has developed with the use of the term ''LATCH,'' we generally avoid using the term ''LATCH'' in this NPRM when possible.

[6] Decina, L., et al., ''Child Restraint Use Survey: LATCH Use and Misuse,'' December 2006, (''Decina study''), DOT HS 810 679, Docket No. NHTSA–2006–26735. The Decina study is summarized in Appendix A to this preamble.

[7] Id.

[8] Docket No. NHTSA–07–26833. A summary of the public meeting can be found in Appendix B to this preamble.

[9] *http://www.nhtsa.gov/staticfiles/rulemaking/pdf/2011-2013_Vehicle_Safety-Fuel_Economy_Rulemaking-Research_Priority_Plan.pdf*

[10] The agency addressed the issue of the weight limit of the lower anchorages by a new labeling requirement that informs consumers of the load limits of the child restraint anchorage system. See 77 FR 11626, February 27, 2012; response to petition for reconsideration, 79 FR 10396, February 25, 2014. NHTSA originally designed the child restraint anchorage systems to be strong enough to withstand crash forces generated by a 29.5 kg (65 lb) mass (the mass would be from the child restraint plus the restrained child). Child restraint systems and the children for whom many of them are designed have become heavier over the years. To ensure the lower anchorages are strong enough to hold the CRS plus child in serious and severe crashes, NHTSA adopted a labeling requirement applying to child restraints which, together with the restrained child, would impose a combined weight over 29.5 kg (65 lb) on the lower anchorages. These CRSs must have a label informing consumers to use the seat belt system instead of the lower anchorages to attach the child restraint to the vehicle seat once the combined weight exceeds 29.5 kg (65 lb).

The ease of use of child restraint anchorage systems is inherently challenging because the vehicle is manufactured by one party and the child restraint is manufactured by another. The vehicle seat is designed with occupant comfort and safety in mind, along with aesthetics; child restraint compatibility can be difficult to plan for given the wide and constantly changing array of child restraints. Through usability requirements adopted in the 1999 final rule, we improved the interface between the vehicle anchorage system and the child restraint. Yet, our improvements for the vehicle side focused on standardizing the parameters of the 3-point anchorage system and specifying where the anchorage system should be positioned overall in a vehicle and relative to a ''child restraint fixture'' (CRF) test device to optimize ease of use. Although the 1999 final rule recognized the importance of having the lower anchorages visible or marked with an emblem signaling the presence and location of the anchorages, the final rule was the first undertaking by any country to establish a universal child restraint anchorage system independent of the vehicle belts. Thus, in making the first step toward standardizing a child restraint anchorage system, the agency only partially standardized the marking, and did not regulate features of the vehicle seat relating to cushion stiffness and other characteristics of the vehicle seat. For similar reasons, NHTSA refrained from standardizing CRS features that might affect compatibility, such as CRS size and mass.

New Information Improving Anchorage Systems

New information from the University of Michigan Transportation Research Institute (UMTRI) has identified characteristics of the vehicle seat that UMTRI has found to enhance the usability of child restraint anchorage systems. In April 2012, UMTRI published a study [11] titled, ''LATCH Usability in Vehicles'' (hereinafter ''LATCH Usability study''), that identified vehicle seat characteristics shown to affect the quality of child restraint installations. UMTRI found that the correct use of lower anchorages was associated with the following features:

- ''Clearance angle'' greater than 54 degrees (clearance angle relates to the clearance around a lower anchorage from interfering parts that can make it difficult to maneuver the CRS lower anchorage connector);
- ''attachment force'' of 178 Newtons (N) (40 pounds (lb)) or less (attachment force is the amount of force needed to attach a lower anchorage connector); and,
- ''anchorage depth'' (location of the anchorage within the seat bight) of less than 2 centimeters (cm).

Further, improved designs in anchorage markings have been developed by the International Standardization Organization (ISO) that can better communicate to the consumer the location and presence of the lower anchorages and tether anchorage, and further harmonize the safety standard with those of other countries.

Today's NPRM uses the information from UMTRI and ISO to propose enhancements to the usability requirements in FMVSS No. 225.

Overview of Proposal

Our ease of use improvements focus on reducing the physical effort needed to attach a child restraint to the lower anchorages and to the tether anchorage, and on improving how easily the anchorages can be correctly identified and accessed by a consumer.

Ease of Using Lower Anchorages

FMVSS No. 225's current location requirements for the lower anchorage bars intend for the bars to be accessible, but some consumers find it difficult to use the bars. We propose new requirements for the bars to improve ease of use: a minimum clearance angle of 54 degrees, a maximum attachment force of 178 N (40 lb), and a location limit of less than 2 cm within the seat bight. These are the ease of use specifications the UMTRI LATCH Usability study found to correlate with correct child restraint installation by test subjects.

Ease of Using Tether Anchorages

Standard No. 225 currently requires vehicle manufacturers to equip vehicles with a tether anchorage at three rear designated seating positions (two of these positions are also required to be equipped with lower anchorages) that enables the attachment of a standardized tether hook. The standard currently requires tether anchorages to be located in a specified zone and to be accessible without the need for any tools other than a screwdriver or coin. To improve the usability of the tether anchorage, we propose the following requirements to make it easier for consumers to recognize and reach the anchorage.

- We propose to amend FMVSS No. 225 to reduce the zone in which a tether anchorage must be located, to prevent tether anchorages from being placed deep under a vehicle seat.
- We propose to require tether anchorages to be accessible without the need for any tools and without folding the seat back or removing carpet or other vehicle components. (The tether anchorage may be covered with a cap, flap or cover, provided that the cap, flap or cover is specifically designed to be opened, moved aside or to otherwise give access to the anchorage without the use of any tools and is labeled with a specific symbol indicting the presence of the tether anchorage underneath.)
- Almost all tether anchorages are rigid metal bars, but there are a few made from flexible webbing, which confuses some consumers who are looking for a bar. We propose amending FMVSS No. 225 to require the tether anchorage to be a rigid bar.
- Some tether anchorages are too close to a structure, such as a head restraint, to allow tightening of the tether strap. We propose to specify a minimum 165 mm (6.5 in) distance from a reference point on the vehicle seat to the tether anchorage so that adequate clearance will be provided for tightening of the tether strap. We also propose amending FMVSS No. 213 to limit the length of the CRS tether hardware assembly (which consists of a tether hook and hardware to tighten and loosen the tether strap) to 165 mm (6.5 in) so that the tightening mechanism can be easily used in the newly-specified clearance space around a tether anchorage.

Enhanced Ability To Identify Anchorages

Standard No. 225 currently requires the lower anchorage bars either to be visible or the vehicle seat back marked showing the location of the bars. To improve consumers' ability to find and use lower anchorages, we propose amending FMVSS No. 225 to require motor vehicles to be marked with the ISO-developed mark near the location of each lower anchorage bar, even if the lower anchorage is visible. Similarly, we propose requiring each tether anchorage to be marked with the ISO-developed mark for tether anchorages. In addition, we propose amending FMVSS No. 213 to require the ISO mark on the lower anchorage connectors (the components on the child restraint system that attach the child restraint to the lower anchorages of a child restraint

[11] Klinich et al., ''LATCH Usability in Vehicles,'' UMTRI–2012–7, April 2012. Link: *http://deepblue.lib.umich.edu/handle/2027.42/90856.* The report was sponsored by the Insurance Institute for Highway Safety (IIHS) for developing IIHS's rating of the usability of the child restraint anchorage systems in various vehicles. See IIHS Status Report: Vol. 47 No. 3, April 12, 2012.

anchorage system) and on the tether hook.[12] We also propose to require vehicle manufacturers to provide written information (*e.g.,* in vehicle owners' manuals) explaining the meaning of the ISO lower anchorage bar and tether anchorage markings, and to require child restraint manufacturers to explain (in the CRS user's manual) the meaning of the ISO mark on the lower anchorage connectors and tether hook.

Rulemaking Goal

The 2005 Decina study [13] found that many consumers did not know what child restraint anchorage systems were, that anchorages were available in the vehicle, the importance of using the anchorages or how to use them properly. We believe that as the requirements proposed today make the anchorages more conspicuous and more clearly marked, awareness should improve. With improved awareness, more consumers will likely attempt to use the anchorage system.[14]

The Decina study found that users who attempted to use child restraint anchorage systems generally liked the systems. Drivers with experience attaching a CRS using a child restraint anchorage system and using a vehicle seat belt strongly preferred using the lower anchorages over the seat belts. Moreover, the study also found that consumers were more likely to install a CRS correctly using a child restraint anchorage system than when a seat belt was used. NHTSA believes that as consumers' awareness of child restraint anchorage systems increases, more consumers will try them and more will use them. If the systems can be made easier to use, more consumers will like and regularly use the system compared to current usage.

UMTRI's LATCH Usability study found that test subjects who correctly used the lower anchorage hardware were 3.3 times more likely to achieve a tight CRS installation than subjects who made errors using the hardware. Thus, we believe that if child restraint anchorage systems can be made easier to use correctly, more consumers will achieve a tight fit of the CRS in the vehicle. The tight fit of the CRS will lead to reduced child head and torso excursions in motor vehicle crashes, and fewer child head and torso injuries in crashes.

Estimated Costs and Benefits

The agency estimates that the proposed requirements for improved usability of child restraint anchorage systems would not result in any increase in material cost, but would entail some redesign of vehicle seat features. Approximately 79 percent of vehicles would need some redesign to meet the proposed lower anchorage usability requirements. Some tether anchorages would have to be repositioned further from the head restraint to meet the minimum strap wrap-around distance requirement. A small number of vehicles that currently have webbing loops for tether anchorages would need to be changed to have rigid anchorage bars. The agency believes that these design modification are minor and mainly concern the vehicle seat and not the vehicle structure. NHTSA is proposing a 3-year lead time for complying with a final rule, which, we believe, would provide sufficient time for vehicle manufacturers to accommodate any redesign of the vehicle seat in their normal course of manufacture without a cost increase.

For child restraints, we estimate that approximately 30 percent of forward-facing child restraints may need to have minor modification made to the tether hardware assembly to meet the 165 mm (6.5 in) maximum length requirement. We are proposing a 3-year lead time to meet the requirement.

The proposal requires all the lower anchorages and tether anchorages to be marked with the ISO mark. We estimate the cost of ISO marks for a set of lower anchorages to be $0.05 and that for the tether anchorage to be $0.025. The total incremental cost of equipping all child restraint anchorage systems with appropriate ISO marks is about $0.58 million. The proposal also requires similar ISO marks on child restraint anchorage connectors, for which the agency estimates an incremental cost of $0.74 million. The cost of changing the written instructions accompanying the vehicle or the CRS to explain the ISO markings is expected to be negligible (<<$0.01). Therefore, the total cost of the proposed rule is estimated to be $1.32 million.

We believe that the new usability requirements would improve correct (tight) installation, and increase tether use. If there were a 5 percent increase in correct installation using the lower anchors and a 5 percent increase in tether use, the agency estimates that the proposed requirements would save approximately 3 lives and prevent 6 moderate to higher severity injuries.

II. Statutory Mandate

MAP–21 (Pub. L. 112–141) incorporates Subtitle E, ''Child Safety Standards.'' Subtitle E, § 31502(a), requires that not later than 1 year after the date of enactment of the Act, the Secretary shall initiate a rulemaking proceeding to amend FMVSS No. 225 ''to improve the ease of use for lower anchorages and tethers in all rear seat seating positions if such anchorages and tethers are feasible.'' Section 31502(b)(1) of MAP–21 states that, subject to exceptions, the Secretary must issue a final rule not later than 3 years after the date of enactment of MAP–21. An exception is for an amendment to Standard No. 225 which ''does not meet the requirements and considerations set forth in subsections (a) and (b) of section 30111 of title 49, United States Code [the National Traffic and Motor Vehicle Safety Act (Vehicle Safety Act)].'' [15] [16]

The agency has interpreted § 31502(a) as directing DOT to initiate rulemaking to improve the ease of use of lower anchorages and tether anchorages currently required by FMVSS No. 225 if improved anchorages are feasible. This interpretation is based on the plain meaning of the phrase ''improve the ease of use.'' We interpret ''improve'' to mean to enhance or increase the ease of use of prevailing FMVSS No. 225 lower anchorages and tether anchorages, which, in passenger cars and small MPVs, are present ''in all rear seat seating positions.'' Our 2011 Priority Plan took this approach in focusing on improving current tether anchorage locations and labeling of anchorage locations. This NPRM satisfies the mandate by proposing requirements that would improve the ease with which

[12] NHTSA is planning to develop new simplified education and consumer information programs building on the requirements proposed in this NPRM. Education efforts and consumer information programs would be developed to teach consumers to look for the ISO-developed marks in the vehicle to locate the lower anchorages and tether anchorages in their vehicles and to ''match'' them to the ISO marks on the CRS.

[13] ''Child Restraint Use Survey: LATCH Use and Misuse,'' *supra.*

[14] Field data show that use of child restraint anchorage systems has noticeably increased since 2006. National Child Restraint Use Special Study (NCRUSS), DOT HS 811 679, *http://www-nrd.nhtsa.dot.gov/Pubs/811679.pdf,* and ''A Look Inside American Family Vehicles 2009–2010,'' Safe Kids USA (*http://www.safekids.org/assets/docs/safety-basics/safety-tips-by-risk-area/sk-car-seat-report-2011.pdf*). These data are discussed in Appendix A of this preamble.

[15] See § 31502(b)(2). That section also specifies that in such case that an amendment does not meet the requirements and considerations of § 30111(a) and (b) of title 49, United States Code, the Secretary shall submit a report to Congress describing the reasons for not prescribing such a standard. [Footnote added.]

[16] Another exception is in § 31505, which specifies that if the Secretary determines that any deadline for issuing a final rule under this Act cannot be met, the Secretary shall provide Congress with an explanation for why such deadline cannot be met and establish a new deadline for that rule. [Footnote added.]

consumers can access and use the anchorages, and improve the visibility of the anchorages so that consumers can more easily identify them as parts of a child restraint anchorage system.

Furthermore, this document also requests comment on whether additional lower anchorages and tether anchorages should be required in vehicles. We request comment on the need for, and feasibility of, additional child restraint anchorage systems and tether anchorages in rear seating positions, particularly in the third row of vehicles with three rows of seating. We also request comments on the merits and feasibility of installing lower anchorages and tether anchorages in vehicles now excluded from requirements to provide such anchorages.

Section 31502 gives us discretion in determining whether a final rule in this rulemaking is warranted. We anticipate issuing a final rule unless an amendment ''does not meet the requirements and considerations set forth in subsections (a) and (b) of section 30111 of title 49, United States Code.'' [17] The requirements and considerations of §§ 30111(a) and (b) apply to NHTSA's FMVSS rulemaking under the Vehicle Safety Act. Under § 30111(a), the Secretary is authorized to prescribe FMVSSs that are practicable, meet the need for motor vehicle safety, and are stated in objective terms. ''Motor vehicle safety'' is defined in the Vehicle Safety Act as ''the performance of a motor vehicle or motor vehicle equipment in a way that protects the public against unreasonable risk of accidents occurring because of the design, construction, or performance of a motor vehicle, and against unreasonable risk of death or injury in an accident, and includes nonoperational safety of a motor vehicle.'' Under § 30111(b) of the Vehicle Safety Act, when prescribing such standards, the Secretary must consider relevant available motor vehicle safety information, consult with appropriate agencies, consider whether a standard is reasonable, practicable, and appropriate for the particular type of motor vehicle or motor vehicle equipment for which it is prescribed, and consider the extent to which the standard will further the statutory purpose of reducing traffic accidents and deaths and injuries resulting from traffic accidents. We understand MAP–21 as directing us to determine, after initiating rulemaking, whether the changes under consideration to FMVSS No. 225 meet the requirements and considerations set forth in subsections (a) and (b) of 49 U.S.C § 30111 and are feasible. We will make a decision about a final rule after that assessment.

[17] § 31502(b)(2).

III. Efforts To Improve Vehicle/Child Restraint Compatibility and Ease of Use of Child Restraint Anchorage Systems

Following issuance of FMVSS No. 225, there have been several efforts to improve the compatibility of child restraint anchorage systems and CRSs, and the ease of using the systems.

a. ISO Rating System

ISO developed a rating system and criteria to provide child restraint and vehicle manufacturers tools for the assessment of the usability of ISOFIX [18] systems.[19] The ISO approach evaluates and rates the usability of a CRS's ISOFIX features, a vehicle's ISOFIX system, and the interaction between the two. ISO also provides consumers (parents and caregivers) with information to assist them in selecting a CRS and vehicle with ISOFIX systems that are easy to use, with the aim that the information will result in more correct installations. (More information about the ISO draft standard is in Appendix C to this preamble.)

b. SAE Guidelines

The Society of Automotive Engineers (SAE) developed a draft SAE recommended practice entitled J2893, ''Guidelines for Implementation of the Child Restraint Anchorage System in Motor Vehicles and Child Restraint Systems.'' [20] The document provides guidelines for vehicle manufacturers to consider when designing characteristics of vehicle lower and upper (tether) anchorages, and for CRS manufacturers for corresponding features of CRS lower anchorage and tether connectors, so that each product can be made more compatible with the other. SAE developed tools and procedures for evaluating the child restraint anchorage system hardware features in vehicles and on child restraints. The guidelines assess whether the child restraint fixture can attach to the lower anchorages, the force and clearance angles needed to attach to the lower anchorages, the collinearity of the lower anchorages, the marking of the anchorages with the ISO symbol, etc. (Appendix C to this preamble has more information about the SAE guidelines.)

[18] ISOFIX is a system, mostly used in Europe, for the connection of child restraint systems to vehicles. The system has two vehicle rigid anchorages, two corresponding rigid attachments on the child restraint system and a means to limit the pitch rotation of the child restraint system. While the ISOFIX system is not used in the U.S., the system is very similar to the FMVSS No. 225 child restraint anchorage system and therefore, the evaluation developed by ISO is relevant to our work here.

[19] ''Road vehicles—Methods and criteria for usability evaluation of child restraint systems and their interface with vehicle anchor systems—Part 1: Vehicles and child restraint systems equipped with ISOFIX anchors and attachments,'' (November 2010).

[20] The SAE J2893 recommended practice is designated as a ''work-in-progress'' by SAE and has not been finalized.

c. NCAP Vehicle-CRS Fit Program

On February 25, 2011, NHTSA published a **Federal Register** document requesting comment on the agency's plan to establish a new consumer information program, as part of the agency's New Car Assessment Program (NCAP), to improve compatibility between vehicles and child restraint systems and the ease of using the systems. The contemplated program involves vehicle manufacturers voluntarily providing NHTSA information about which CRSs fit in specific vehicle models, and NHTSA, in turn, posting this information on the NCAP Web site for consumers to use when making purchasing decisions. This ''Vehicle-CRS Fit program,'' still under consideration by NHTSA, is described in more detail in Appendix C of this preamble.

d. UMTRI's LATCH Usability Study

1. Overview of the Study

In 2012, UMTRI published a report entitled, ''LATCH Usability in Vehicles,'' [21] describing UMTRI's study to identify characteristics of child restraint anchorage systems that make the anchorage system easier to use. The study was conducted in three phases, the objectives of which were to:

- Survey model year (MY) 2010–2011 vehicles to document characteristics of child restraint anchorage systems in the current vehicle fleet;
- Evaluate the proposed ISO 29061–1: 2010 rating system (ratings for both the vehicle and the vehicle-to-child restraint interaction), SAE draft J2893 recommended practice,[22] and NHTSA's proposed NCAP Vehicle-CRS Fit program to see if outcomes from those programs are associated with quality installations by volunteer subjects; and,
- Conduct volunteer tests for evaluating the quality of child restraint

[21] Klinich et al., *supra.* Link: *http://deepblue.lib.umich.edu/handle/2027.42/90856.* The report was sponsored by the Insurance Institute for Highway Safety (IIHS) for developing IIHS's rating of the usability of the child restraint anchorage systems in various vehicles. See IIHS Status Report: Vol. 47 No. 3, April 12, 2012. *http://www.iihs.org/sr/default.aspx.*

[22] The SAE J2893 Version 1—Draft 7 was used for the study. SAE J2893 is still under development.

installations using vehicle features as the independent measures.

In the first phase of the study, UMTRI measured the child restraint anchorage system hardware and rear seat geometry of 98 top-selling MY 2010 and 2011 vehicles. The vehicles surveyed were those often used for transporting children that also represented a wide range of different child restraint anchorage system hardware. Included in the survey were passenger cars, minivans, sports utility vehicles (SUVs), and pickup trucks. The vehicle measurements were based on procedures in the ISO draft standard and the SAE draft recommended practice, and some additional measures developed for the study, such as the depth of the lower anchorages into the seat bight.

In the second phase, UMTRI calculated the usability scores for each vehicle in the survey using the protocols in ISO 29061–1: 2010,[23] SAE draft J2893,[24] and NHTSA's February 2011 NCAP Vehicle-CRS fit program under consideration. ISO ratings of vehicle child restraint anchorage system usability ranged from 41 percent to 78 percent. UMTRI calculated the ISO vehicle/child restraint interaction scores for 20 vehicles, identifying vehicles with a range of vehicle features, and 7 child restraints. ISO vehicle/child restraint interaction scores ranged from 14 percent to 86 percent. Vehicles assessed using the SAE draft recommended practice met between 2 and all 10 of the recommendations. UMTRI evaluated the proposed NHTSA Vehicle-CRS Fit program criteria at one rear seating position (behind the driver's seat) for 12 vehicles and 7 child restraints. The 7 CRSs selected represented a variety of restraint types (rear facing infant seats, convertible seats, combination seats and belt-positioning booster seats) and child restraint anchorage connector features. Of the 24 pairings with 12 vehicles and two rear-facing convertibles, one installation met all of NHTSA's proposed vehicle-CRS fit criteria. Twenty-three (23) installations of the 24 vehicle/infant seat pairings and 45 installations of the 48 vehicle/forward-facing harness CRS pairings met all of the proposed vehicle-CRS fit criteria.

In the third phase, UMTRI conducted volunteer testing using 36 subjects, 12 vehicles, and 3 CRS models to see if outcomes from the ISO, SAE and NCAP programs are associated with quality installations (correct installations) of child restraints by the subjects. The subset of 12 vehicles was chosen to provide a variety of child restraint anchorage system hardware characteristics. The 3 CRSs selected in this phase were the Safety First Alpha Omega Elite, Chicco KeyFit, and Graco SnugRide 30.

The study considered a ''correct'' installation to meet the following criteria:

(1) Tight installation—Child restraint did not move more than 1 inch laterally or fore/aft when tested with a moderate pull/push applied at the restraint belt path.

(2) Correct use of lower anchors (if applicable)—Child restraint connectors were fully engaged with the correct vehicle hardware in the correct orientation and the CRS belt webbing connecting to the child restraint anchorages was flat.

(3) Correct use of seat belt (if applicable)—Seat belt was routed through the correct belt path, was not twisted, and was buckled and locked correctly.

(4) Correct use of tether anchorage (if applicable)—Tether hook attached to the correct vehicle hardware in the correct orientation, routed around or under the head restraint as directed by the vehicle manual, and tightened so that there was 10 mm (0.39 in) or less of slack (measured by pinching the slack and measuring the height of the loop).

(5) Correct installation angle—Installation angle was considered correct for rear-facing installations if the restraint indicator was at the correct level, and was considered correct for forward-facing installations if the recline foot was in the forward-facing position.

2. Three Seat Characteristics Were Well Correlated With Correct Use

Using a series of mixed-model logistic regression models with various lower anchorage characteristics assessed in the study, UMTRI identified three features of lower anchorages that the volunteer testing showed were well correlated to the correct installation of CRSs. These were: Clearance angle, attachment force, and anchorage depth. UMTRI stated that the odds of correct CRS installation when the child restraint anchorage system met the minimum criterion for clearance angle, attachment force, and lower anchorage depth are 5, 9, and 7 times higher, respectively. UMTRI showed that subjects were 19 times more likely to correctly install the CRS if the vehicle met all three usability criteria than if none of the criteria were met. Using multi-variate regression analysis of the volunteer data, UMTRI found that subjects who correctly used the lower anchorage hardware were 3.3 times more likely to achieve a tight CRS installation than subjects who made errors using the hardware.

A. Clearance Angle

Clearance angle refers to the clearance around a lower anchorage from parts that interfere with the ability to maneuver the CRS lower anchorage connector. The interfering parts can include part of the vehicle seat structure or excessively stiff seat cushion material. Clearance angle is measured by a tool (specified in the SAE draft J2893 recommended practice) that attaches to the lower anchorages. In UMTRI's procedure a vertical force of 66.7 N (15 lb)[25] is applied to the tool. The angle the tool achieves when that force is applied is the ''clearance angle.''

UMTRI determined the performance limits for clearance angle by analyzing the vehicle characteristics and rate of correct installation from the volunteer tests. Based on the user trial data shown in Figure 1 below, UMTRI determined that a clearance angle greater than 54 degrees will increase the likelihood of correct CRS installation.

[23] ''Road vehicles—Methods and criteria for usability evaluation of child restraint systems and their interface with vehicle anchor systems—Part 1: Vehicles and child restraint systems equipped with ISOFIX anchors and attachments,'' (November 2010).

[24] The SAE draft recommended practice does not involve a rating system; therefore, UMTRI developed a grade based on how many of the ten guidelines were met.

[25] The 6.8 kg (15 lb) force application is the same as that in the SAE J2893 protocol.

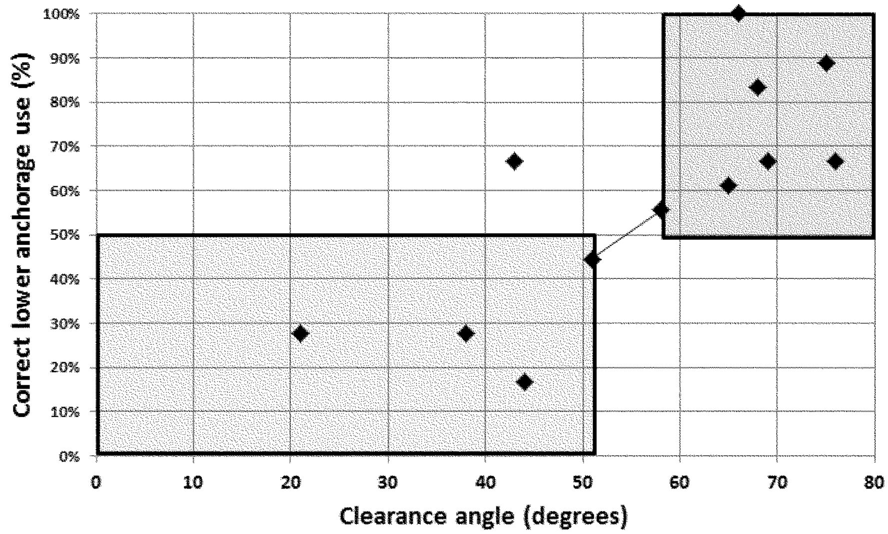

Figure 1 - Rate of correct lower anchorage use vs. clearance angle for each vehicle.

B. Attachment Force

Attachment force refers to the force needed to attach a child restraint's lower anchorage connector to a lower anchorage in a vehicle. UMTRI measured the force required to attach a CRS connector to a vehicle lower anchorage using a force gauge specified in SAE draft J2893. The tool is similar in shape and size to various CRS lower anchorage connectors in the market and to the connectors used on the Child Restraint Fixture and the Static Force Application Device 2 (SFAD2) of FMVSS No. 225. A force gauge in the tool measures the force required to fully engage the CRS connector to a lower anchorage in a vehicle. A stiff seat cushion and/or obstructions surrounding a lower anchorage may increase the attachment force.

Based on the data shown in Figure 2 below, UMTRI determined that an attachment force less than 178 N (40 lb) has a high likelihood of correct CRS installation.

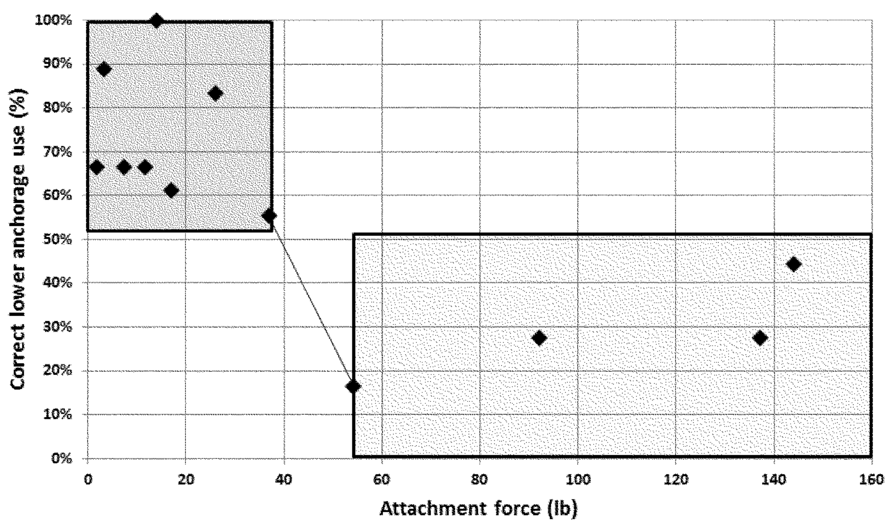

Figure 2 - Rate of correct lower anchorage use vs. attachment force for each vehicle.

C. Anchorage Depth

Anchorage depth refers to how deeply the lower anchorages are embedded in a vehicle seat (usually in the seat bight). UMTRI developed a simple tool that easily measures lower anchorage depth. The tool consists of a hook-type CRS connector which is marked every 2 cm.[26] Lower anchorages that are set deeper into the seat bight are more difficult to locate, identify, and use.

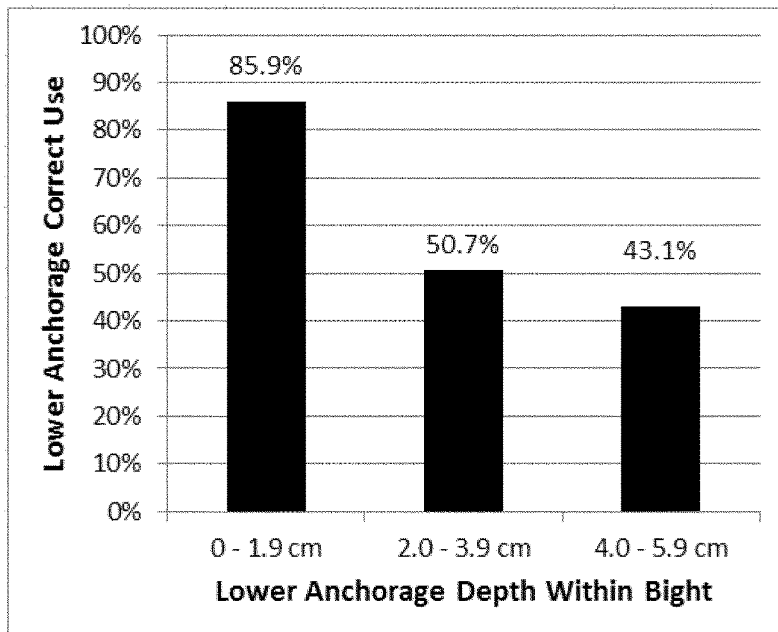

Figure 3 - Rate of correct lower anchorage use vs. lower anchorage depth within bight.

Based on the data shown in Figure 3 above, UMTRI determined that a lower anchorage depth less than 2 cm has a significantly higher rate of correct lower anchorage use than for anchorage depths greater than 2 cm.

UMTRI found that, while clearance angle, attachment force and anchorage depth are important, due to the correlation of the three factors it was not possible to truly identify their separate contributions to prediction of correct CRS installation. UMTRI believed that lower anchorage designs in vehicles should consider all three characteristics to improve rates of correct installation of child restraints.

IV. UMTRI's Assessment of the ISO, SAE, and NCAP Programs

As part of UMTRI's LATCH Usability study,[27] UMTRI evaluated vehicles using the draft ISO standard 29061–1:2010 and the derived SAE grade[28] and found no correlation between usability ratings and correct installation of child restraints in the vehicles in user trials. Results indicated that the ISO vehicle rating, the ISO vehicle/child restraint interaction rating and the derived SAE grade showed no correlation with rates of the volunteers' correct CRS installation using the lower anchorages (see Figure 4 below).

[26] UMTRI's tool was marked with different colored electrical tape at 2 cm intervals from the hook. When the tool was hooked onto the lower anchorage of the vehicle, the different colors of tape were exposed. For example, if the lower anchorage were exposed and not recessed in the seat bight at all, all colors in the hook were visible.

[27] LATCH Usability study, 2012, *supra.*

[28] SAE recommend practice is not a rating system; therefore, UMTRI developed a grade based on how many of the ten guidelines were met.

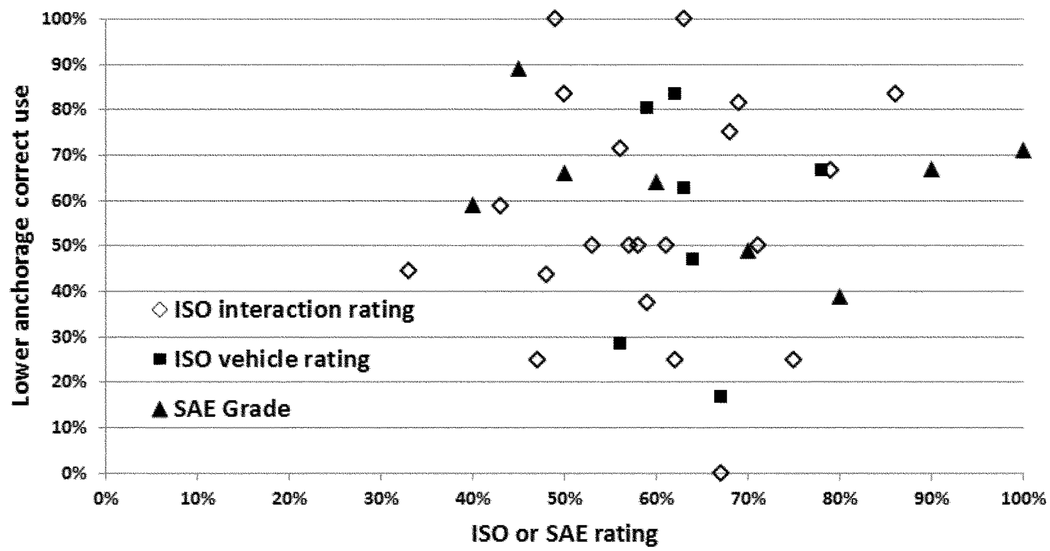

Figure 4 - Lower anchorage correct use vs. ISO and SAE rating.

UMTRI also evaluated[29] NHTSA's proposed Vehicle-CRS Fit program criteria using 12 vehicles and 7 child restraints. The user data showed that, among vehicle and child restraint combinations that would be considered compatible under the proposed criteria, only 16 percent were correctly installed by the volunteers.

V. NHTSA's Preference Is the UMTRI Approach

NHTSA has evaluated the draft ISO standard and the SAE draft recommended practice and concludes that neither approach would likely improve the usability of child restraint anchorage systems as effectively as the specifications proposed in today's NPRM. The ISO draft standard primarily rates vehicles and does not directly mandate improvements to the usability of child restraint anchorage systems. Further, as discussed above, UMTRI evaluated vehicles using the draft ISO standard 29061–1:2010 and found no correlation between usability ratings and correct installation of child restraints in the vehicles in user trials.

The draft SAE recommended practice J2893 would also be limited because it is only a guideline and does not mandate improved usability. In addition, as noted above, UMTRI evaluated the SAE derived grade from the 10 guidelines and found no correlation between the SAE derived grade and correct installation of child restraints in the vehicles in user trials.[30]

[29] Id.

[30] Id.

We believe that the amendments resulting from today's NPRM would be more effective in improving ease of use and the fit of child restraints in vehicles than NHTSA's proposed Vehicle-CRS fit program. The fit program only examines the fit of a small number of specific CRSs selected by the vehicle manufacturer for a specific vehicle model. Today's NPRM would ensure a more universal compatibility between vehicles and child restraints. The Vehicle-CRS fit program would be a voluntary program, so vehicle manufacturers have the option of not providing NHTSA any information about the fit of child restraints in their vehicles. In contrast, the changes resulting from this NPRM would be mandated and universal for all vehicles and all child restraints. The changes made to vehicle seats resulting from this rulemaking would make all child restraints easier to use and fit tightly on vehicle seats. In addition, UMTRI evaluated the NCAP Vehicle-CRS fit proposal and found that volunteers in user trials had a low rate of correctly installing CRSs even when the CRSs were ones meeting the NCAP program's ''fit'' criteria.[31]

VI. Proposal To Improve Lower Anchorage Usability

This NPRM proposes amendments to improve the three features of lower anchorages—clearance angle, attachment force, and anchorage depth—that were shown to have a positive impact on correct child restraint installations in user trials in UMTRI's LATCH Usability study. NHTSA has reviewed the UMTRI study and tentatively concludes that the features have been reasonably shown to have a significant bearing on correct installations. Also, lower anchorages meeting the proposed requirements for clearance angle, attachment force, and anchorage depth appear feasible.[32] The UMTRI procedures for measuring clearance angle and attachment force are similar to those in the draft SAE J2893 recommended practice which were developed with industry input and participation.[33] NHTSA has evaluated the procedures in 10 vehicles (MY 2005–2013) and they appear objective and repeatable. The agency made minor modifications to the measurement tools to enhance their ease of use and to further improve the repeatability of measurements.[34]

Comments to NHTSA's 2007 LATCH public meeting on child restraint anchorage system usability included many complaints about the difficulty of attaching lower anchorage connectors to lower anchorages because of interference from surrounding stiff cushions, fabric/leather or buckles. There were also observations about the difficulty of using the lower anchorages because they are often embedded in the

[31] Id.

[32] We are also proposing improved marking of child restraint anchorages and child restraint anchorage connectors to improve the ease of use of child restraint anchorage systems.

[33] We note that General Motors made the suggestion that NHTSA explore SAE's draft guidelines in its comments at the 2007 LATCH public meeting.

[34] NHTSA Technical Report, ''Evaluation of LATCH Usability Procedure,'' which is in the docket for this NPRM.

seat bight. It appears that the proposed changes would sufficiently address these problems.

We tentatively conclude that this NPRM would ultimately increase child safety. The NCRUSS [35] data show that a loose CRS installation comprises one of the five most significant mistakes consumers make in the field when installing child restraints. We wish to reduce loose CRS installations in the field since a loose installation could result in higher excursions of the child and CRS during a crash and a greater risk of injury due to the child's possible contact with vehicle interior structures, as compared to correct (tight) installations. We believe that if child restraint anchorage systems can be made easier to use correctly, then correct (tight) installations will increase.

a. Clearance Angle

Clearance angle relates to the clearance around a lower anchorage from interfering parts that can make it difficult to maneuver and attach a CRS lower anchorage connector. We believe that a clearance angle requirement would facilitate easier attachment of a CRS lower anchorage connector by preventing interference from surrounding components.

''Clearance angle'' is a criterion included in draft SAE J2893, and the tool we would use to measure the clearance angle was based on a tool developed by the SAE in draft J2893 (Version 1—Draft 7).[36] The tool, illustrated in Figure 5 below, includes a load cell with a handle to measure the applied vertical force on the tool and a potentiometer to measure the angle with respect to the horizontal achieved by the tool during the force application. In our proposed test procedure, the tool would be attached to a lower anchorage. A vertical force of 66.7 N (15 lb) is applied to the tool. The angle the tool achieves (with respect to the horizontal) when that force is applied is the ''clearance angle.'' We propose to amend FMVSS No. 225 to adopt a clearance angle requirement of not less than 54 degrees, as supported by the findings of the UMTRI LATCH Usability study. The requirement would apply to each lower anchorage in a vehicle.

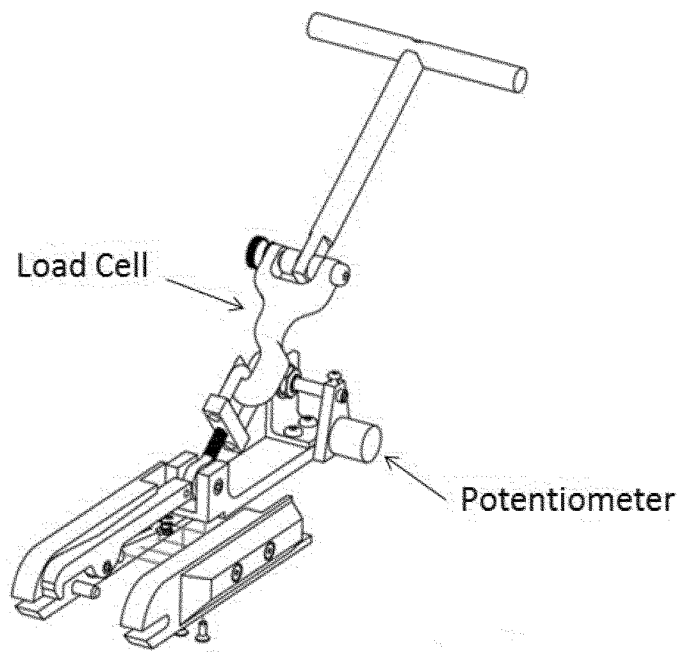

Figure 5. Clearance Angle Tool

We note that draft SAE J2893 specifies that the clearance angle should be greater than 75 degrees. We have differed from that draft specification because the UMTRI LATCH Usability study has user trial data to show that a clearance angle greater than 54 degrees is sufficient to increase the likelihood of correct CRS installation. We are not aware of similar user data to support the SAE target of 75 degrees.

Our proposed 66.7 N (15 lb) force application is the same as that in the draft SAE J2893 protocol. We believe that the force represents a low force that an adult can easily apply. A NHTSA study to determine the force that able-bodied adults could apply to open emergency exit windows found that this force ranged from 66.7 N (15 lb) to 533.7 N (120 lb) with a mean of 244.6 N (55 lb).[37]

b. Attachment Force

''Attachment force'' refers to the force needed to attach a child restraint lower anchorage connector to a lower anchorage. After considering the UMTRI LATCH Usability study, we propose to amend FMVSS No. 225 to require child restraint anchorage systems to be manufactured such that the attachment force needed to attach an attachment force tool to the lower anchorage must be less than 178 N (40 lb). UMTRI's

[35] National Child Restraint Use Special Study, *supra.*

[36] UMTRI used this measurement tool in its LATCH Usability Study and measured the applied vertical force and the resulting clearance angle using a force gauge and an inclinometer, respectively.

[37] Docket No. NHTSA–2007–28793–24.

volunteer subjects study indicates that an attachment force less than 178 N (40 lb) has a high likelihood of correct CRS installation.

The attachment force tool, illustrated in Figure 6 below, is based on the tool specified in SAE draft J2893 (Version 1 Draft 7) and which was used in the UMTRI LATCH Usability study. The end of the tool is similar in shape and size to various ''push-on'' CRS lower anchorage connectors in the market and to the connectors used on the SFAD2 of FMVSS No. 225. In order to improve the repeatability of the measurements obtained by the tool, the agency modified the tool used in the UMTRI LATCH Usability study as follows. A trigger switch was included to determine when the tool is fully engaged to a lower anchorage in a vehicle. A button load cell in a push handle was added to measure the force needed to fully engage the tool to the anchorage. Finally, a potentiometer was included to measure the approach angle of the tool with respect to the horizontal.

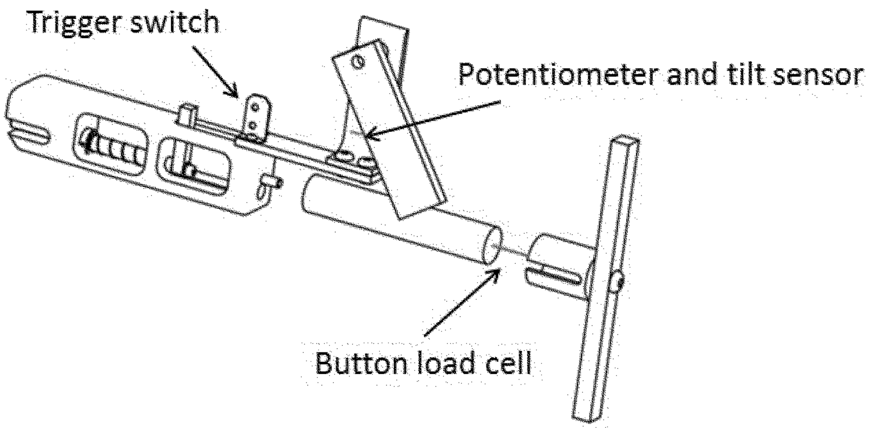

Figure 6. Attachment Force Tool

We note that draft SAE J2893 specifies that the attachment force should be less than 75 N (16.9 lb), which is more stringent than that proposed in this NPRM. We are proposing a 178 N (40 lb) limit because it is supported by the findings of UMTRI's LATCH Usability study showing the correlation of the limit with correct CRS installation. We are not aware of such data supporting the SAE limit under consideration.

There is also a slight difference between the draft SAE J2893 procedure and UMTRI's procedure regarding how the measurement is taken. The SAE draft procedure specifies that, when taking the measurement, the attachment force tool approaches the lower anchorage at an angle near zero degrees (*i.e.,* it is parallel to the seat bottom cushion surface). UMTRI found that it is not possible to attach the tool to the lower anchorages in most vehicles when it is held parallel to the seat bottom cushion. UMTRI modified the SAE protocol for measuring the attachment force such that the force is measured at the angle (from 0 to 45 degrees) to the horizontal producing the lowest force value. In addition to making it possible to attach the tool to the lower anchorages, UMTRI believed that the 0 to 45 degrees range of angles for attaching the measurement tool to the lower anchorages better represents how a parent would attach a CRS lower anchorage connector to the lower anchorages compared to the SAE method. NHTSA tentatively agrees with UMTRI's conclusions and has proposed the 0 to 45 degree range in this NPRM.

c. Anchorage Depth

Anchorage depth refers to how deeply the lower anchorages are embedded in the vehicle seat (usually in the seat bight or seat back). UMTRI's LATCH Usability study found that an anchorage depth of less than 2 cm within the seat bight is associated with a significantly higher rate of correct lower anchorage use than anchorage depths greater than or equal to 2 cm. NHTSA proposes a requirement that each lower anchorage must have an anchorage depth of less than 2 cm, as measured by a specially-designed compliance tool (the tool is illustrated in Figure 7, below). The tool incorporates a hook-type CRS connector. The distance 2 cm from the backside of a lower anchorage bar when the connector is attached to a lower anchorage is marked on the tool (as shown in Figure 8, below). In a compliance test, the tool would be attached to a lower anchorage. The 2 cm mark would have to be visible from a vertical longitudinal plane passing through the center of the bar, along a line making an upward 30 degree angle with a horizontal plane, without the technician's manipulating the seat cushions in any way.

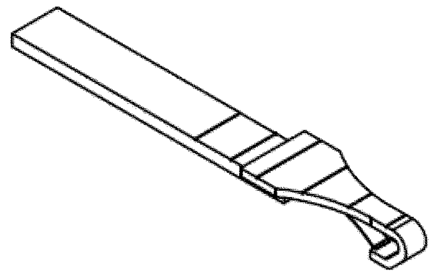

Figure 7. Anchorage Depth Tool

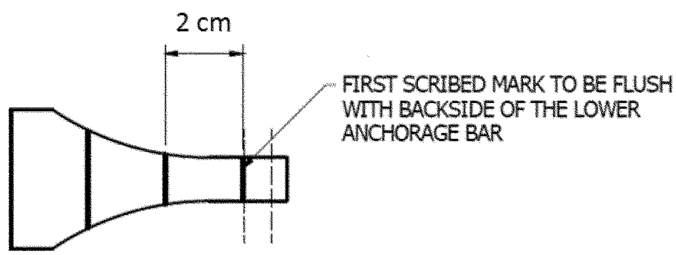

Figure 8. Depth Gauge Top View

We tentatively conclude that the proposed anchorage depth requirement would make the requirement in S9.2.2(a) of FMVSS No. 225 unnecessary, so we propose deleting S9.2.2(a). S9.2.2(a) specifies that the lower anchorages must be located less than 70 mm (2.75 in) behind the rearmost point at the bottom plane of the CRF while the CRF is pressed rearward against the seat back with a horizontal force of 100 N (22.4 lb). The purpose of S9.2.2(a) is to ensure that the lower anchorages are not deeply recessed into the seat bight. We tentatively conclude that the proposed requirement for anchorage depth takes the place of S9.2.2(a) by ensuring the lower anchorages are not deeply recessed. The proposed 2 cm (0.8 in) limit on anchorage depth would not permit lower anchorages to be as deeply recessed into the vehicle seat as permitted by S9.2.2(a). The UMTRI volunteer study showed that accessibility of the lower anchorages—and correct CRS installation—is better determined using anchorage depth than the current requirement in S9.2.2(a).

On the other hand, we have tentatively determined that S9.2.2(b) continues to be needed and should be retained even if a limit on anchorage depth is adopted. S9.2.2(b) specifies that the lower anchorages must be located more than 120 mm (4.7 in) behind the SgRP.[38] Its intent is to ensure that the lower anchorages are not so far forward so as to cause discomfort to occupants not in CRSs or pose an unreasonable risk of injury in rear impacts.

We believe the requirement in S9.2.2(b) does not conflict with the proposed anchorage depth requirement. UMTRI's survey of 98 MY 2010–2011 vehicles showed that the seat bight of the surveyed vehicles was at least 140 mm (1.5 in) from the estimated SgRP, as shown in Figure 9. (UMTRI's measurement referenced the H-point, which with regard to rear seats that do not move, is at the same location as the SgRP.) The proposed anchorage depth requirement specifies that the anchorage has to be less than 2 cm deep into the seat bight. Lower anchorages can be positioned less than 2 cm deep into the seat bight and still meet S9.2.2(b).

[38] SgRP (seating reference point) is the unique design H-point as defined in SAE Recommended Practice J1100, ''Motor Vehicle Dimensions,'' revised June1984.

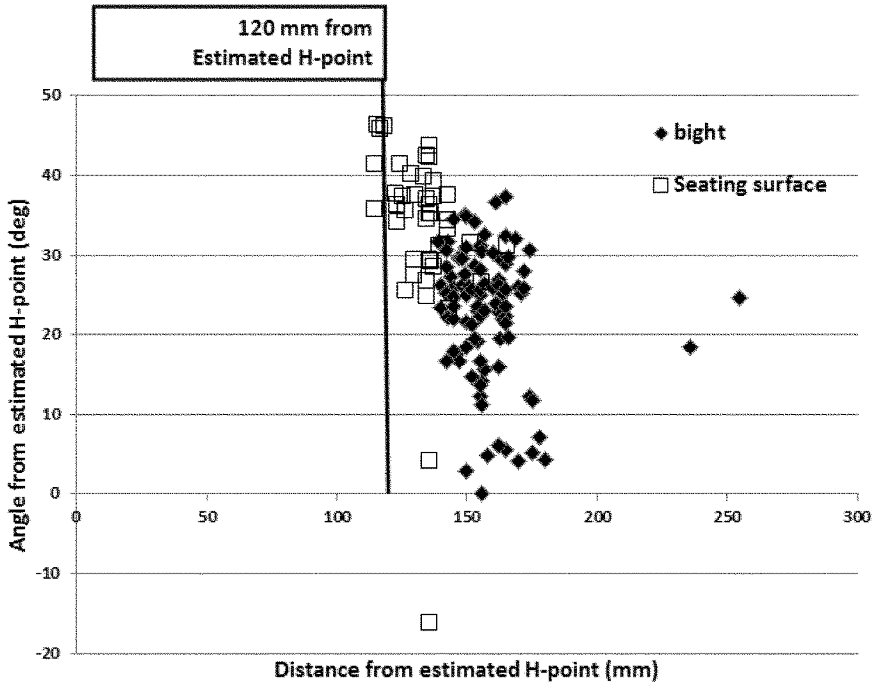

Figure 9. Distance between estimated H-point and seat bight.

d. Estimated Rate of Current Compliance

UMTRI's survey of 98 MY 2010–2011 vehicles [39] showed that 9 percent met none of the three provisions, 31 percent met one provision, 37 percent met two provisions, and 21 percent met all three provisions for lower anchorages. Ninety percent met the attachment force provision (<178 N (40 lb)), 58 percent met the clearance angle provision (>54 degrees) and 28 percent met the anchorage depth (<2 cm (0.8 in)) provision, as shown in Figure 10 below.

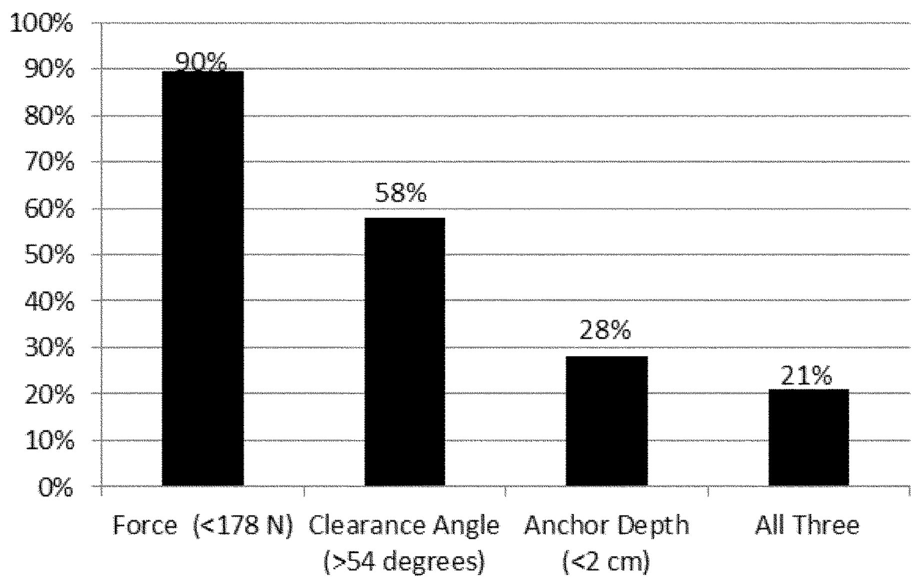

Figure 10. Percentage of vehicles meeting the proposed lower anchorage force, clearance angle and depth usability requirements.

Table 1, below, shows the percentages of vehicles within ranges of the proposed attachment force, clearance angle, and anchorage depth requirements.

[39] UMTRI LATCH Usability study, *supra.*

TABLE 1—PERCENTAGE OF VEHICLES (FROM UMTRI'S SURVEY OF 98 MY 2010–11 VEHICLES) VERSUS RANGE OF LOWER ANCHORAGE ATTACHMENT FORCE, CLEARANCE ANGLE AND DEPTH

Attachment force		Clearance angle		Anchorage depth	
<178N	89.5%	>54 degrees	58.0%	<1.9 cm	28.5%
178–311N	5.2%	44–54 degrees	23.6%	2–3.9cm	27.5%
312–645N	5.2%	35–43 degrees	10.7%	4–5.9 cm	40.8%
		20–34 degrees	7.5%	6–7.9 cm	3.0%

NHTSA's evaluation of 10 MY 2005–2013 vehicles[40] resulted in attachment force measurements at 27 lower anchorage positions, and clearance angle and lower anchorage depth measurements at 31 lower anchorage positions. The attachment force measurements were all well below 178 N (40 lb). Seventeen of 31 anchorage positions had clearance angles greater than 54 degrees, and 16 of the 31 anchorage positions had an anchorage depth less than 2 cm. Five vehicles met the proposed clearance angle criterion and 5 met the proposed anchorage depth criterion at all lower anchorage positions tested. Three of the 10 vehicles tested met all 3 proposed usability criteria for lower anchorages.

VII. Proposal To Improve Tether Anchorage Usability

FMVSS No. 225 specifies where tether anchorages may be located, but consumers are still having difficulty finding, identifying, accessing, and using the tether anchorages. Some tether anchorages have been located deep under the seat (the seat would have to be folded over to access the anchorage) or under a carpet. Some tether anchorages are located too close to the seat head restraint where there is not enough space for the CRS tether strap to be tightened. Some tether anchorage configurations are differently configured from those typically found in vehicles, *e.g.,* they consist of a webbing loop rather than a rigid bar. To improve the ease of use of tether anchorages, we propose the following requirements.[41]

a. Limit the Zone

FMVSS No. 225 specifies that tether anchorages must be located within the shaded zone shown in Figures 3 through 7 of FMVSS No. 225 for the designated seating position (DSP) for which the anchorage is installed. The allowable zone encompasses a wide area which has resulted in some tether anchorages being located where consumers have had difficulty accessing them, such as deep under the seat where folding the seat is required to reach/attach the tether anchorage. This place is the forward-most edge of the area under the vehicle seat defined by the intersection of the torso line reference plane (defined by the SAE J826 two-dimensional drafting template) and the floor pan.

We propose to amend Figures 3 through 7 of the standard to disallow tether anchorages from being placed deep under the seat. Specifically, the agency is proposing that the forward-most edge of the allowable tether anchorage zone represented by the shaded area in Figure 3 of FMVSS No. 225 be moved rearward to a position defined by the intersection of the vehicle floor with a plane that is parallel to the torso line reference plane and which passes through the rearmost point of the bottom of the seat at its centerline. We note that vehicles with tether anchorages located deep under the seat where the seat must be folded to reach the anchorages are no longer manufactured, so this change in requirements would have little or no impact on current vehicle designs. However, we tentatively believe the amendment is needed to prevent these designs from coming back into the fleet.

NHTSA evaluated vehicle fleet data to find where tether anchorages were typically located. We reviewed combined data from a NHTSA survey[42] of 24 MY 2010 vehicles and the UMTRI LATCH Usability study[43] of 98 MY 2010–2011 vehicles. The data indicate that the most common tether anchorage locations are the seat back (41 percent) and the package shelf (37 percent). Tether anchorage locations on the seat back are typical of MPVs and trucks, while the package shelf location is characteristic of passenger cars. Tether anchorages located on the back wall of the occupant compartment (8 percent) are seen only in pickup trucks. Less common tether anchorage locations are the roof (6 percent) (often found in SUVs, station wagons, and some center seats of passenger cars), the floor (4 percent) and under the seat[44] (3 percent).

In current vehicles, the tether anchorages located on the seat back and on the package shelf (the two most common locations) are mostly centered or slightly off-center from the DSP, as depicted in Figure 11 below. However, in vehicles with a cargo area or another seating row behind the seating position with the tether anchorage (such as station wagons and MPVs), and vehicles without a cargo area contiguous with the seating position (such as pickup trucks), the tether anchorage are often installed on the roof, floor, back wall or under the seat.

[40] NHTSA Technical Report, "Evaluation of LATCH Usability Procedure," which is in the docket for this NPRM.

[41] Except for the element relating to set-back of the anchorage, UMTRI's LATCH Usability study did not address ease of use of tether anchorages.

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[42] Aram, M.L., Rockwell, T., "Vehicle Rear Seat Study-Technical Report," NHTSA, 2012. A copy of the report is in the docket.

[43] *Supra.*

[44] These anchorages are accessible without folding the seat.

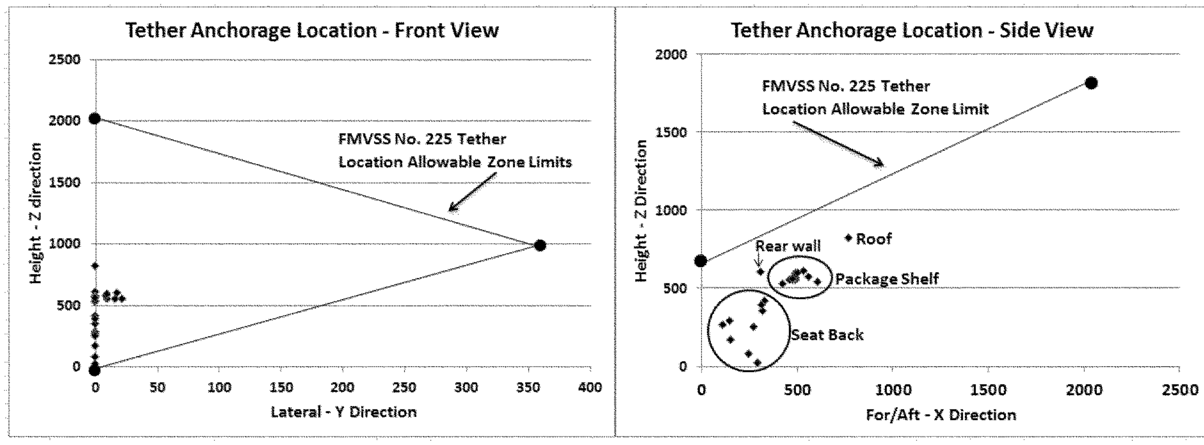

Figure 11. Location of tether anchorage in 23 vehicles.

We considered but decided against further limiting the zones in Figures 3 through 7 of FMVSS No. 225. We are mindful that, when determining tether anchorage locations, vehicle manufacturers must consider the strength of the structure to which the tether anchorage is affixed. They also have to consider the degree to which the tether anchorage—or the child restraint, when using the anchorage—interferes with ingress, egress, seating, and/or the comfort and safety of vehicle occupants. Due to these considerations, vehicle manufacturers sometimes install tether anchorages slightly off-center to a seating position, or on the roof, floor, or back wall. Thus, some flexibility is needed in locating the anchorages. Moreover, as explained below, those atypical locations do not appear to pose a safety problem.

We performed sled tests using different fore-aft and lateral tether anchorage locations and found no difference in CRS performance when the CRSs were tethered at different locations at extreme points within the allowable zone.[45] In the evaluation, we conducted a series of nine frontal impact sled tests using the FMVSS No. 213 test protocol to assess the effect of tether anchorage location on dummy kinematics and injury outcomes. One forward-facing child restraint was used with a Hybrid III 3-year-old (HIII–3C) dummy in each test configuration. The lower anchorages were spaced 280 mm (11 in) apart. The tether anchorage was positioned at various locations to replicate the vehicle seat back, roof, and package shelf above and behind the seat bight (see Table 2 below). At each of the tether anchorage configurations, the lateral position of the tether anchorage was also varied from the center to 150 mm (5.9 in) and 300 mm (11.8 in) to the right of center.

TABLE 2—TETHER ANCHORAGE LOCATIONS FROM SEAT BIGHT

[Tether anchorage locations from FMVSS No. 213 bench seat bight]

	Aft (cm)	Above (cm)
Package Shelf	650	585
Seat back	280	210
Roof	550	1070

The results showed that changing the tether anchorage location did not significantly affect the injury outcomes of the HIII–3C dummy in these tests. Overall, the head injury criterion (HIC) measured in a 36 millisecond timeframe (HIC36) ranged from 366 to 585 for the various tether anchorage locations and was significantly lower than the performance limit of 1000 (see Figure 12, below). For each of the various lateral positions of the tether anchorage on the seat back, the package shelf, and the roof, the dummy injury measures (HIC36, chest acceleration, and dummy excursions) were similar and significantly lower than the injury assessment reference values of FMVSS No. 213.

For illustration purposes, HIC36 was the only injury criterion used in the following graphs; however the full data (including chest accelerations and excursions) can be found in the docketed technical report.

[45] Amenson, T., Sullivan, L.K., ''Dynamic Evaluation of LATCH Lower Anchor Spacing Requirements and Effect of Tether Anchor Location on Tether and Lower Anchor Loads,'' NHTSA, 2013. A copy of the report is in the docket for this NPRM.

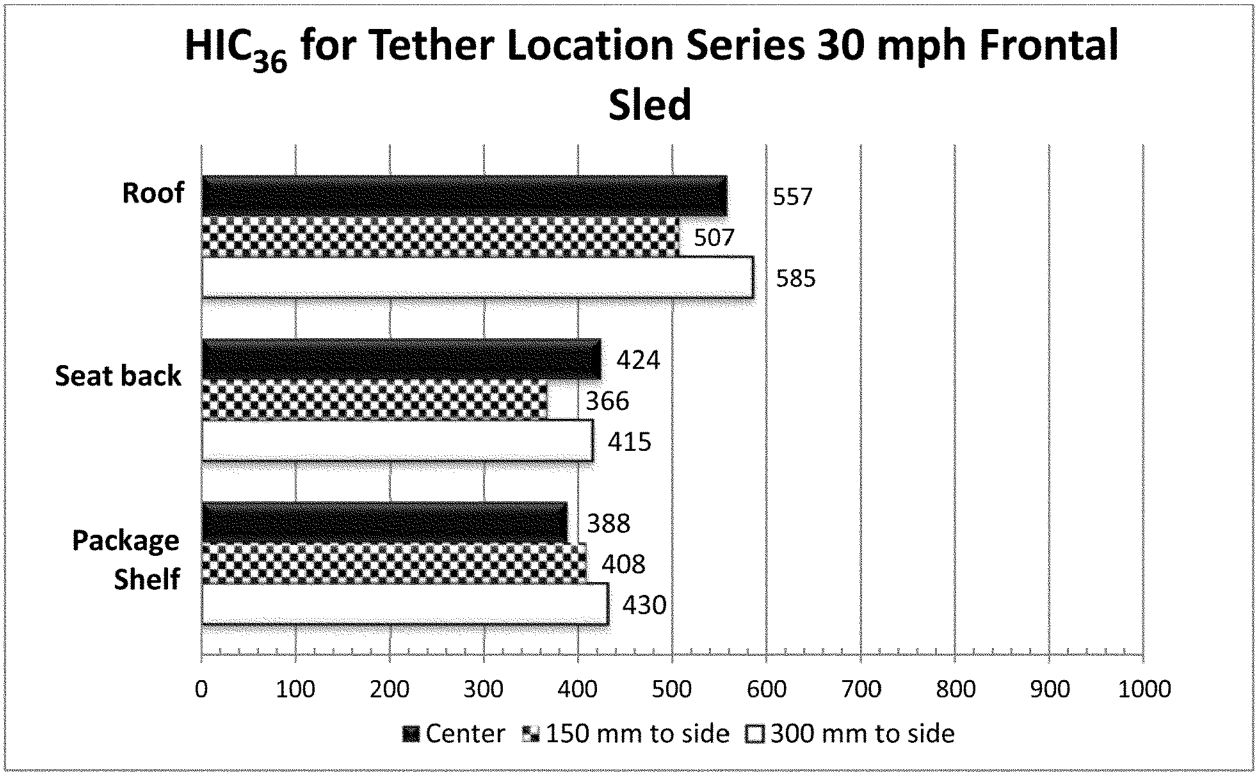

Figure 12. HIC36 measures from the HIII-3C dummy in FMVSS No. 213 sled tests with different tether anchorage locations.

The load distribution on the lower anchorages and tether anchorages vary depending on whether the tether anchorage is located on the package shelf, seat back, or roof, due to the length of the tether. However, varying the lateral location of the tether anchorage in each of these general locations (package shelf, seat back or roof), generated similar peak loads for the lower anchorages and tether anchorage despite the center or side locations of each tether anchorage site (see Figure 13, below).

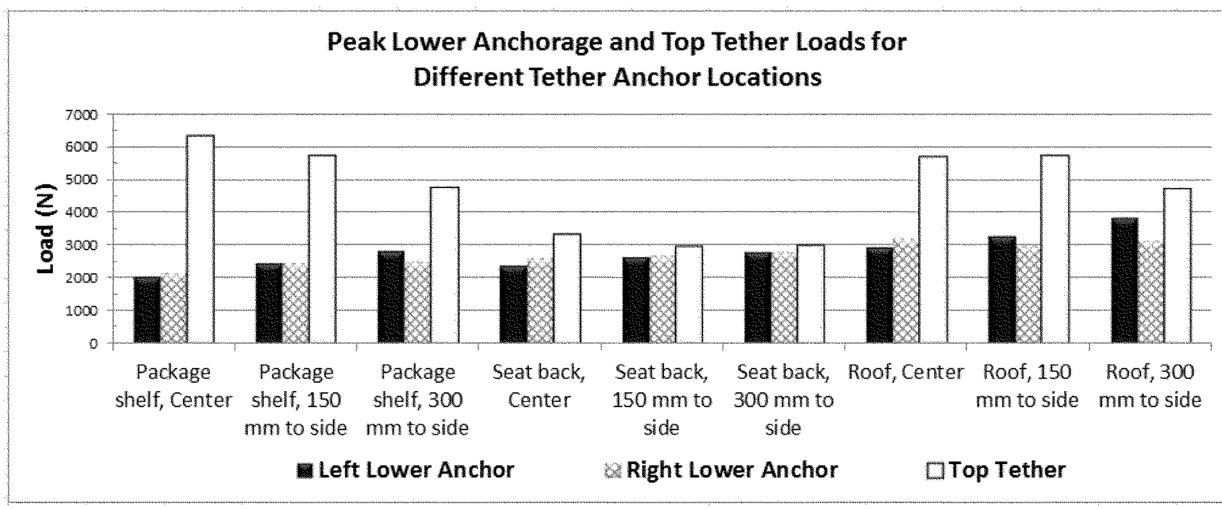

Figure 13. Lower anchorage and tether anchorage loads in tests conducted with the HIII-3C dummy in accordance with the FMVSS No. 213 protocol with different tether anchorage positions.

These results suggest that there is not an unreasonable safety risk posed by locating the tether anchorage at the lateral extreme points of the allowable zone. Thus, we tentatively conclude that retaining the zones depicted in Figures 3 to 7 of FMVSS No. 225, except to disallow the area under a vehicle seat, appropriately balances safety, ease of use, and design flexibility.

b. Anchorage Must Be Accessible

The agency proposes to require that a tether anchorage must be in a location where the anchorage is accessible without the need to remove carpet or other vehicle components to access the anchorages. However, a tether anchorage may be covered with a cap, flap or cover, provided that the cap, flap or cover is specifically designed to be opened, moved aside or otherwise provide access to the anchorage. It must also be labeled with the ISO symbol indicting the presence of the tether anchorage underneath. We also propose to require the anchorage to be accessible without the use of any tools, including the use of a screwdriver or coin.

c. Standardized Configuration

FMVSS No. 225 does not provide any material or dimensional requirements for tether anchorages, other than specifying that the tether anchorage must permit the attachment of a tether hook meeting the configuration and geometry specified in Figure 11 of Standard No. 213. Most vehicle manufacturers use a metal bar design for the tether anchorage. These metal bars vary in cross section shape; some are round and others are flat. However, a few pickup trucks and MPVs provide a webbing loop as the tether anchorage. The webbing loop is so different from the conventional metal bar design that consumers have difficulty identifying them as tether anchorages.[46] Also, in some cases, the webbing anchorages need to be retrieved from another component such as a foldable carpet flap that runs across the back seat. In certain cases, the carpet flap needs to be folded back to find the webbing tether anchorage and then the webbing needs to be pulled out with a pencil.

To increase the ease of use of tether anchorages, we propose amending FMVSS No. 225 to standardize the configuration of the tether anchorage such that it is a ''rigid bar of any cross section shape.'' One of the main objectives of this NPRM is to increase the standardization of child restraint anchorage system features, because we believe doing so increases consumers' familiarity with the anchorage systems and will increase the ease of using the systems, particularly when coupled with education efforts that provide a simple and uniform message. The webbing loop design differs considerably from the appearance of a typical tether anchorage. Even if consumers become more aware of the importance of tether use, they may still fail to use a tether anchorage because they do not recognize the webbing loop as a tether anchorage. Having a standardized design for the tether anchorages such that they can be described as a ''rigid bar'' would help consumers easily recognize the anchorages in their vehicles and facilitate simplified and more effective messages in educational materials.

The agency is seeking comment on whether further standardization of the tether anchorage should be pursued to make the tether anchorage a more recognizable vehicle feature. The agency has tentatively decided not to specify dimensions for the tether anchorage, to give manufacturers some design flexibility in meeting FMVSS No. 225's strength requirements. We request comment on the issue.

d. Clearance Around the Tether Anchorage

This NPRM proposes requirements to make it easier for a consumer to attach a child restraint tether hook to a tether anchorage and tighten the tether strap. We propose to amend FMVSS No. 225 to require a 165 mm (6.5 in) minimum distance from a tether anchorage to a reference point on the vehicle DSP for which the tether anchorage is installed.

FMVSS No. 225 specifies that tether anchorages must be located within the shaded zone shown in Figures 3 to 7 of the standard for the DSP for which the anchorage is installed. The standard specifies a reference point ''W'' that is 50 mm (1.9 in) below and 50 mm (1.9 in) rearward of the shoulder reference point (R-point),[47] and a reference point ''V'' that is 350 mm (13.7 in) vertically above and 175 mm (6.8 in) horizontally back from the H-point. The standard also specifies a strap wrap-around length of 200 mm (7.8 in) from the W-point and a strap wrap-around length of 250 mm (9.8 in) from the V-point (see Figure 4 of FMVSS No. 225). Tether anchorages may be located only within the zone that is generated using both reference points and their associated strap wrap-around lengths to ensure there is sufficient distance for a tether strap and hook to be attached to the anchorage.

The UMTRI LATCH Usability study[48] found that under current FMVSS No. 225, tether anchorages can be located too close to the head restraint, top of the seat back, or the tether attachment point on a CRS, resulting in insufficient clearance space to tighten the CRS tether strap. UMTRI reviewed the ''tether hardware assembly,'' which consists of the tether hook and hardware to tighten and loosen the tether strap, on 21 child restraints made by 11 different CRS manufacturers and found the tether hardware assembly to range from 102 to 184 mm (4 to 7.2 in) in length, with 15 CRSs having tether hardware assembly lengths between 140 mm (5.5 in) and 165 mm (6.5 in). UMTRI suggests that having tether anchorages on a package shelf or behind the seat back at a distance of at least 165 mm (6.5 in) rearward or below the back of the head restraint or top of the seat back (if no head restraint is present) would provide better clearance for attaching the tether hook of a CRS and tightening the strap.

We have reviewed the UMTRI LATCH Usability study and tentatively agree that specifying a minimum 165 mm (6.5 in) distance from the tether anchorage to a reference point on the vehicle seat would improve the ease of use of tether anchorages. The clearance would allow tightening of tether straps in most vehicles without experiencing interference from other structures, such as the head restraint. The reference point on the vehicle seat, which we have designated ''SB,'' would be defined as the intersection of the plane parallel to the torso line reference plane (defined in Figure 3 of FMVSS No. 225) that passes through the rearmost point of the seat and the wrap-around line[49] from the ''V-point'' to the tether anchorage. The rearmost point of the seat includes the head restraint, if one is present. The V-point represents a low-mounted tether strap on a CRS and the W-point represents a high-mounted tether strap on a CRS. The agency believes both the V- and W-point could have been used for determining the vehicle seat reference point, SB, but we selected the V-point to define the reference point because it would encompass both low-mounted and high-mounted tether straps.

To improve compatibility between vehicles and CRSs, we also propose to amend FMVSS No. 213 to require that the tether hardware assembly (consisting of the tether hook and

[46] This issue was brought to NHTSA's attention by child passenger safety technicians who perform child restraint system checks across the country and teach/assist parents in installing CRSs properly.

[47] R-point as defined in SAE J787b.

[48] *Supra.*

[49] Strap wrap-around line is the nonlinear path traversed by a string connecting two points.

hardware to tighten and loosen the tether strap) must be no longer than 165 mm (6.5 in). We propose this limit so that all CRS tether straps will be able to be tightened given the minimum tether anchorage distance from the SB reference point.

The UMTRI LATCH Usability study found that the length of the tether hardware assembly of the 21 child restraints it reviewed ranged from 102 to 184 mm (4 to 7.2 in). UMTRI estimated that about 30 percent of CRS models might need tether hardware assembly changes to meet the 165 mm (6.5 in) limit. We do not believe limiting the length of the tether hardware assembly would be overly burdensome for CRS manufacturers, since the assembly appears to consist of simple parts. Comments are requested on this issue.

VIII. Conspicuity and Identification of Anchorages

To improve the ease with which consumers find lower anchorages and tether anchorages in the vehicle, we propose amending FMVSS No. 225 to improve conspicuity and identification of the anchorages. (In the next section, we propose complementary requirements amending FMVSS No. 213 to improve conspicuity and identification of the CRS connectors.)

a. Marking Lower Anchorages

FMVSS No. 225 (S9.5) currently requires lower anchorage bars to be visible, or the vehicle seat marked, to alert the consumer to the presence of the anchorages and to assist consumers in locating the lower anchorages. If the vehicle seat is marked, the current marking requirement is for a circle not less than 13 mm (0.51 in) in diameter, located within a specified distance from the horizontal centerline of each lower anchorage. The circle may be either solid or open, and may be with or without words, symbols or pictograms, but if a word, symbol or pictogram is used, its meaning must be explained in the vehicle's owner's manual.

Decina's 2005 survey [50] indicated that many consumers do not recognize that the lower anchorage bars are for installing child restraints or do not know that the marks indicate the presence of the lower anchorages. The survey showed that 55 percent of consumers who did not use lower anchorages to install a CRS, cited their lack of knowledge—not knowing what the anchorages were, that they were available in the vehicle, the importance of using them, or how to properly use them—as the reason for not using them.

Since currently not all lower anchorages are required to have markings, and since the marks, when provided, often differ in appearance from one vehicle model to another, current education campaigns rely on the vehicle's written instructions (typically the owner's manual) to inform the consumer of the anchorage locations. This is likely one reason for the consumers' lack of knowledge regarding the location of the lower and tether anchorages, since consumers' use of the owner's manual is low.

We propose to amend FMVSS No. 225 to require all vehicles to bear a standardized mark, developed by ISO as a voluntary standard,[51] at the location of each lower anchorage bar, regardless of whether the anchorage bar is visible. The mark shows where the bar is located and identifies the bar as a lower anchorage. The mark must be a circle not less than 13 mm (0.51 in) in diameter located as specified in S9.5(a)(3) of FMVSS No. 225. The mark is shown below in Figure 14. We also propose to require manufacturers to include an explanation of the meaning of the lower anchorages markings in written information (*e.g.,* in the vehicle owner's manual, if one is provided).

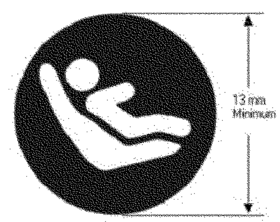

Figure 14: Proposed mark for lower anchorages

The symbol may be shown in mirror image, and the color of the symbol is at the option of the manufacturer. The symbol may be embossed.

A number of commenters to the 2007 LATCH public meeting believed that the conspicuity and identification of child restraint anchorages should be improved. They suggested adopting the ISO symbol to mark all child restraint anchorage systems in order to standardize the markings and help the caregiver identify the anchorages.[52]

We tentatively agree that adopting a standardized symbol would help. Requiring marks for all lower anchorages (regardless of whether the anchorages are visible) would improve conspicuity and identification of the anchorages. In addition, standardized anchorage marks would help in the development of a consistent and simple education message to improve awareness of child restraint anchorage systems and correct identification of the anchorages. Having the standardized markings may help the ISO symbols become a recognizable icon to consumers and may help simplify consumer information. A simplified message using the consistent marks could increase use of child restraint anchorage systems and child restraints generally, reduce installation errors, and ultimately reduce risk of injuries and fatalities.

The ISO mark has already been adopted by a majority of vehicle manufacturers. NHTSA surveyed 24 MY 2010 vehicles [53] to gather data on rear seat characteristics, and included data on the vehicles' child restraint anchorage systems, such as the locations of the systems, how they were configured, and manufacturers'

[50] "Child Restraint Use Survey: LATCH Use and Misuse," *supra.*

[51] ISO 13216–1:1999 "Road vehicles—Anchorages in vehicles and attachments to anchorages for child restraint systems."

[52] *E.g.,* in comments to the 2007 LATCH Public Meeting, GM raised the merits of an industry agreement to label all tether anchorages with an anchorage symbol and all lower anchorages with an ISO lower anchorage symbol.

[53] Aram, M.L., Rockwell, T., "Vehicle Rear Seat Study-Technical Report," NHTSA, 2012, which is in the docket for this NPRM.

recommendations for using the systems. Data on vehicles' child restraint anchorage systems in 98 top-selling MY 2010–2011 vehicles is also available from the UMTRI LATCH Usability study.[54]

NHTSA analyzed the data from the agency's survey and from the UMTRI LATCH Usability study to learn how vehicle manufacturers design and mark the lower anchorages in current vehicles. The combined survey data of 122 vehicles showed that 34 percent of the vehicles had visible lower anchorages, 17 percent had lower anchorages with some cover (slits, doors or flaps), and all other vehicles had anchorages embedded in the seat bight). Also, 18 percent of the surveyed vehicles had no marks on the lower anchorages because the anchorages were visible, 76 percent were marked with the ISO symbol, and 6 percent were marked but without the ISO symbol.

b. Marking Tether Anchorages

FMVSS No. 225 currently does not require tether anchorages to be marked with any symbol identifying them as such. We propose amending FMVSS No. 225 to require the vehicle to bear a standardized mark, also developed by ISO,[55] at the location of each tether anchorage. The purpose of the marking requirement would be to increase consumer awareness of the existence of tether anchorages and to facilitate consumer education efforts. The mark shows the location of the tether anchorage and identifies the anchorage. Either of two ISO labeling symbols may be used (see Figure 15, below). Canada Motor Vehicle Safety Standard (CMVSS) No. 210.1, ''User-friendly tether anchorages for restraint systems,'' already requires vehicles to be labeled with one of the ISO tether labeling symbols. We propose to require the tether anchorage mark to be not less than 20 mm (0.8) in height.[56]

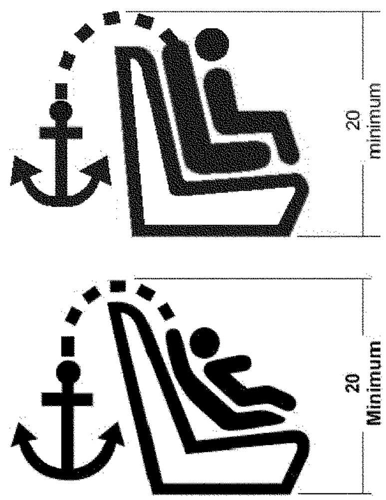

Figure 15: Proposed Marks for Tether Anchorage

The symbol may be shown in mirror image, and the coloring of the symbol is at the option of the manufacturer. The symbol may be embossed.

We propose that each tether anchorage would be marked, even if it is plainly visible. The mark would have to be centered at the middle of the tether anchorage bar. The shortest distance from the nearest edge of the mark to the center of the tether anchorage bar must be not more than 25 mm (1 in). There are no specifications for the distance of the marks from the tether anchorage in the ISO standard or in the CMVSS, but we tentatively conclude that specifying a maximum spacing to the mark is necessary to reduce confusion in identifying and locating the anchorages (discussed further below). We also propose to require manufacturers to include an explanation of the meaning of the tether anchorage markings in written information (*e.g.,* in the vehicle owner's manual, if one is provided).

We propose to permit a tether anchorage to be covered with a cap, flap or cover, but the cap, flap or cover must be specifically designed to give access to the tether anchorage. We would not permit an ordinary floor mat to cover a tether anchorage; to be permitted, the floor mat would need to be specifically designed to give access to the tether anchorage, such as by having a flap that must be moved aside to access the anchorage. Moreover, if a cap, flap or cover is covering a tether anchorage, and the cap, flap or cover is permanently attached to the vehicle, the cap, flap or cover must be marked with the centered ISO symbol to inform consumers of the presence of the tether anchorage under it. If the cap, flap or cover is not permanently attached to the vehicle, the cap, flap or cover must be marked and the tether anchorage must also be separately marked, to make sure the anchorage would be marked in case the unattached cap, flap or cover is lost.

We believe that alignment and proximity requirements are needed because some vehicles such as SUVs and station wagons have tether anchorages located in the seat back or the floor of the vehicle, along with other cargo anchorages or similar hardware. One common CRS installation error consumers commit is attaching a CRS tether hook to other cargo anchorages or hardware not designed for a tether. Since tether anchorages are not always marked with the ISO symbol or some other label identifying them as CRS tether anchorages, it is difficult for some consumers to distinguish which is the

[54] ''LATCH Usability in Vehicles,'' *supra.*

[55] ISO 13216–1:1999 ''Road vehicles—Anchorages in vehicles and attachments to anchorages for child restraint systems.'' The ISO standard specifies that the tether anchorage symbol has to appear on a cover, if a cover is used to hide the tether anchorage.

[56] This is the same dimensions for the tether anchorage markings specified in CMVSS No. 210.1.

tether anchorage. To illustrate, the MY 2012 Chevrolet Avalanche has a labeled tether anchorage, yet it is still difficult to see which structure is the tether anchorage because the symbol is on a plastic surface located laterally from the tether anchorage, and the tether anchorage is not distinguishable from other metal structures near it. To improve the ease of use of tether anchorages, we are specifying the alignment and proximity of the ISO symbol with tether anchorages so that the symbol can be easily associated with the anchorages.

NHTSA's analysis of the data from the agency and UMTRI surveys of 122 vehicles indicates that 41 percent of the vehicles had tether anchorages with no cover and 73 percent of the tether anchorages were marked with an ISO tether symbol.

IX. Conspicuity and Identification of CRS Connectors

As suggested by some commenters in response to the 2007 LATCH public meeting, the agency is also proposing to require the same ISO marks on CRS lower anchorage connectors and on tether hooks as we have proposed for the vehicle components. The required marks would be in a smaller minimum size compared to the vehicle markings. We propose that the symbol may be shown in mirror image, and the color of the symbol may be at the option of the manufacturer. The symbol may be embossed.

a. Lower Anchorage Connectors

We propose to amend FMVSS No. 213 to require an ISO mark on the lower anchorage connectors. The mark would be the same standardized symbol used on the vehicle's lower anchorages (see Figure 16). We tentatively believe that requiring CRS lower anchorage connectors to be marked with the same standardized symbol as the vehicle's lower anchorages would make consumers more aware of the existence of child restraint anchorage systems. Further, it would also facilitate consumer education efforts by simplifying education messages. Consumers could be simply told to match the marks on the lower anchorage connectors to the lower anchorage marks on the vehicle.

We are proposing that the ISO mark for the CRS lower anchorage connectors shall be at least 9 mm (0.35 in) in diameter. We propose a smaller minimum size of the mark for this mark compared to the size of the ISO mark for the vehicle lower anchorages (13 mm (.51 in)) to accommodate the smaller space available on the lower anchorage connectors for the mark. We also propose to require CRS manufacturers to include an explanation of the meaning of the lower anchorage connector markings in the CRS user's manual.

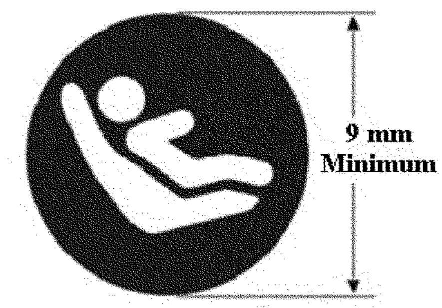

Figure 16: Proposed Mark for CRS Lower Anchorage Connectors

b. Tether Hook

We propose to amend FMVSS No. 213 to require one of the two ISO tether anchorage marks on the tether hook or the tether strap of a CRS. If the mark is on the tether strap or a tag attached to the strap, the mark must be located within one inch of the tether hardware assembly (tether hook and adjustment hardware). The two tether anchorage mark options are shown below in Figure 17. Child restraint manufacturers would have the option of using either mark. We are proposing that the ISO mark must be at least 8 mm (0.35 in) in diameter. We propose a smaller minimum size for this mark compared to the size of the ISO mark for the vehicle tether anchorage (20 mm) to accommodate the smaller space available on the tether hook and the tether strap for the mark. We also propose to require CRS manufacturers to include an explanation of the meaning of the markings in the CRS user's manual.

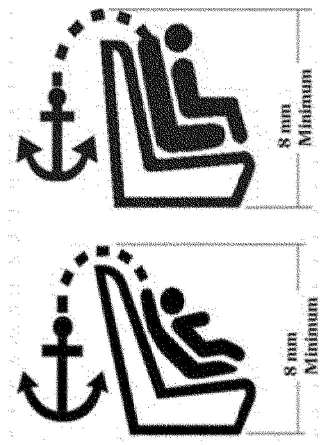

Figure 17: Proposed Mark for CRS Tether Hook

We tentatively believe that requiring a CRS tether hook or tether strap be marked with the same standardized symbol as the vehicle's tether anchorage would make consumer education more effective. It would simplify education messages to be able to tell consumers to match the mark on a CRS tether hook or strap to a tether anchorage mark in the vehicle.

X. Request for Comments

a. Center Rear Seat

FMVSS No. 225 (S4.4) requires vehicles with three or more forward-facing rear DSPs to have a child restraint anchorage system at not fewer than two rear DSPs.[57] Vehicles with three or more forward-facing rear DSPs are required to have a tether anchorage at a third forward-facing DSP. At least one tether anchorage must be in a forward-facing rear DSP other than an outboard DSP (*i.e.,* a center seat). NHTSA recognized in the March 5, 1999 final rule [58] that vehicle manufacturers would probably install the lower anchorages in the two outboard seating positions because two child restraint anchorage systems were unlikely to fit side-by-side in the rear seat. The requirement for a third tether anchorage at a center seat provides consumers the option of installing child restraints in a center DSP, where there is the vehicle's belt system and a tether anchorage.

Information from the NHTSA rear seat survey [59] of 24 MY 2010 vehicles and the UMTRI survey [60] of 98 MY 2010–2011 vehicles shows that vehicle manufacturers have mostly opted to install the two required child restraint anchorage systems in the two outboard positions of the second row and only equip the center seat, if available, with a tether anchorage. A review of the combined data from the NHTSA rear seat survey and the UMTRI survey found that of vehicles with a rear center DSP, none offered two dedicated lower anchorages in the center position.

Since the issuance of the final rule, many consumers have expressed a desire to use the rear center seating location to install a CRS using the lower anchorages. NHTSA requests comment on possible ways to address this. The Safe Kids survey [61] indicated that about a third of children in CRSs with internal harnesses (these CRSs are designed to be attached to the vehicle seat by the child restraint anchorage system or the seat belt) are installed in the rear center seat.

One approach would be to require a set of lower anchorages in the rear center seating position, instead of one or both of the child restraint anchorage systems available at the outboard positions in most current vehicle models. We request comment on the feasibility of installing a child restraint anchorage system in a rear center seating position and on whether we should require such installation. We believe there are potential limitations to the center seat, such as space, hardware and other features that could impede accommodating a set of lower anchorages in the center seat, especially if there were a set of lower anchorages in the outboard seating position(s).

In addition, we believe it is more desirable to have two usable child restraint anchorage systems available to consumers in the rear seat (in the outboard positions) rather than only one in the center. NCRUSS [62] data showed that of the 4,132 vehicles with children 9 years old or younger in the second row, 329 vehicles (8 percent) had two children in child restraints with internal harnesses in the second row: 293 vehicles (7 percent) had the two children in the outboard seating positions and 36 vehicles (0.9 percent) had the two children in adjacent seating positions, (one in an outboard seating position and one in the center seating position). Twenty vehicles (0.5 percent) of the 4,132 vehicles had the three children seated in a CRS in the second row: 8 vehicles (0.2 percent) had three children in child restraints with internal harnesses, 1 vehicle (0.025 percent) had 2 child restraints with internal harnesses and a booster seat and 11 vehicles (0.26 percent) had 2 booster seats and 1 child restraint with an internal harness.

A second approach would be to require a third set of dedicated lower anchorages in the rear center seat. Although as with the previous approach we generally believe insufficient space and potential interference with hardware and other features could impede the installation of dedicated set of lower anchorages for the center seating position in all vehicles, UMTRI studied the feasibility of lower

[57] We did not require child restraint anchorage systems in all three rear seating positions because demographics data did not show that there were a significant number of families with three or more children in child restraint systems. NHTSA also sought to minimize the cost of the rule to the extent reasonable.

[58] 64 FR 10803, March 5, 1999, FMVS No. 225 final rule.

[59] Aram, M.L., Rockwell, T. ''Vehicle Rear Seat Study-Technical Report,'' NHTSA, 2012, which is in the docket for this NPRM.

[60] LATCH Usability study, supra.

[61] A Look Inside American Family Vehicles: National Study of 79,000 car seats, 2009–2010. Safe Kids USA. September 2011.

[62] National Child Restraint Use Special Study, DOT HS 811 679, *http://www-nrd.nhtsa.dot.gov/Pubs/811679.pdf* (full report pending).

anchorages in the rear center seat[63] for 85 MY 2010–2011 vehicles. UMTRI determined that vehicles with 710 mm (27.9 in) or more distance between the centerlines of outboard lower anchorages behind the driver and front passenger seats would have sufficient space to provide three sets of usable dedicated lower anchorages in the right, center, and left seating positions in the rear row. Based on this finding, UMTRI noted that 47 of the 85 vehicles surveyed (56 percent) could include a dedicated center lower anchorage position in addition to the two outboard anchorage positions without seat belt interference.

We request comment on the feasibility of installing a dedicated child restraint anchorage system in the rear center seating position in addition to the two anchorage system in the outboard seating positions in vehicles with 710 mm (27.9 in) or more distance between the centerlines of outboard lower anchorages. We request comment on the merits of requiring such installation.

A third approach would be based on ''simulated'' child restraint anchorage systems. A ''simulated'' child restraint anchorage system in the rear center seating position consists of the inboard lower anchorages of the child restraint anchorage systems in the two outboard seating positions and the tether anchorage in the center seat. The agency's rear seat study[64] further found that of vehicles that had a rear center DSP (19 out of 24), 15.8 percent had instructions that permitted using a simulated child restraint anchorage system in the rear center seating position. Child passenger safety technicians (CPSTs)[65] recommend using a ''simulated'' child restraint anchorage system only if both the manufacturer of the child restraint and the manufacturer of the vehicle endorse using a simulated system. We are interested in learning more about how widely CRS manufacturers and vehicle manufacturers endorse use of simulated child restraint anchorage systems. We request comment on whether we should encourage, or possibly require, CRS manufacturers and vehicle manufacturers to include statements in the owner's instructions endorsing the use of simulated child restraint anchorage systems in rear center seating positions.

An issue arising with simulated child restraint anchorage systems relates to the spacing of the lower anchorages. FMVSS No. 225 requires the lower anchorages to be spaced 280 mm (11 in) apart, measured as the center-to-center distance of the lower anchorage bars. The distance between the lower anchorages is important to maintain uniformity with the spacing of rigid lower anchorage connectors on child restraints,[66] and to standardize the configuration of the lower anchorages to increase the likelihood that consumers will attach a CRS to a child restraint anchorage system and not to a part of a vehicle seat that was not intended for anchoring a child restraint. If a vehicle has the two requisite child restraint anchorage systems with the lower anchorages spaced 280 mm (11 in) apart in the outboard DSPs, the agency questions whether the simulated child restraint anchorage system could have the lower anchorages spaced more than 280 mm (11 in) apart?

We tentatively conclude that the answer is yes. This is because virtually all CRS designs in the U.S. use flexible lower anchorage connectors (as opposed to rigid), which are uniquely capable of being installed using a ''simulated'' child restraint anchorage system with varying spacing widths. A vehicle's lower anchorages would also be labeled, which would reduce the chances of the consumer attaching the child restraint lower anchorage connectors to the wrong part. Moreover, as discussed below, test data so far indicate that simulated child restraint anchorage systems perform satisfactorily from a crashworthiness point of view.

NHTSA's rear seat survey showed that the spacing of the inboard anchorages of the outboard seating positions varied from 270 to 675 mm (10.6 to 26.5 in). These included all vehicles regardless of whether a simulated child restraint anchorage system was recommended. Ford Motor Company (Ford) has endorsed in its manuals the use of simulated child restraint anchorage systems in Ford vehicles (*e.g.,* Focus, Fusion) that have lower anchorages spaced less than 500 mm (19.6 in) apart, although the consumer is instructed to also obtain approval from the child restraint manufacturer before using a simulated child restraint anchorage system. We understand that Ford makes this recommendation based on independent tests demonstrating that distances greater than 280 mm (11 in) between lower anchorages would not have adverse effects on child passenger safety.

UMTRI data also indicate that simulated child restraint anchorage systems perform satisfactorily. UMTRI conducted tests to quantify the effect of lower anchorage spacing on CRS performance. UMTRI performed a total of 15 sled tests using lower anchorage spacing of 280, 500 and 550 mm (11, 19.6 and 21.6 in) with five unspecified models of CRSs using the FMVSS No. 213 standard bench seat and test protocol. No installation issues, structural failures, or unusual dummy kinematics were observed. Wider spacing between lower anchorages (550 mm (21.6 in) compared to 280 mm (11 in)) only caused a lower anchorage peak load increase of 3–14 percent. No consistent trends or significant changes were found in seat back rotation (of rear-facing seats), peak head excursion, peak knee excursion, HIC, or chest acceleration.

NHTSA's testing also found satisfactory performance when using lower anchorages spaced greater than 280 mm (11 in). A series of six frontal impact sled tests were conducted based on the FMVSS No. 213 dynamic test procedure. Six side impact sled tests were also conducted by rotating the FMVSS No. 213 seat fixture 90 degrees to the direction of impact and using the half-sine pulse and velocity that was used in NHTSA's development of a proposed side impact test procedure.[67] In the frontal impact sled tests, an all-in-one child restraint (Alpha Omega Elite) was tested in its forward-facing mode with a HIII–3C dummy, and an infant carrier (Evenflo Discovery 5) was tested in the rear-facing mode with a 12-month-old CRABI dummy. In the side impact sled tests, the same all-in-one restraint was tested in its forward-facing mode with a Q-series 3-year-old child (Q3s) dummy and a different infant carrier (Graco Infant Safe Seat Step 1) was tested in the rear-facing mode with a 12-month-old CRABI dummy. Three tests of each CRS model were performed varying the lower anchorage spacing at 280, 400 and 520 mm (11, 15.7, 20.4 in).[68] Similar to other studies, the

[63] Klinich, K.D., Manary, M.A., Orton, N.R. ''Feasibility of Center LATCH.'' This report is in the docket for this NPRM.

[64] Aram, M.L., Rockwell, T. ''Vehicle Rear Seat Study-Technical Report,'' NHTSA, 2012, which is in the docket for this NPRM.

[65] CPSTs are trained in a program conducted by Safe Kids Worldwide to conduct child safety seat checks across the country and provide parents and caregivers hands-on assistance with proper use of child restraint systems and seat belts.

[66] Rigid lower anchorage connectors are prevalent in Europe. Although they are not prevalent now in the U.S., they are permitted by FMVSS No. 213. ISO 13216 Road vehicles—Anchorages in vehicles and attachments to anchorages for child restraint systems. *http://www.iso.org/iso/home.htm.*

[67] See NPRM proposing to add a side impact test to FMVSS No. 213, 79 FR 4570, January 28, 2014.

[68] The NHTSA rear seat study showed that all the vehicles except the Toyota Tundra had lower anchorage spacing less than 520 mm (20.4 in). The lower anchorages on the Toyota Tundra Crew and Extended Cab models were spaced greater than 580 mm (22.8 in) apart. The Tundra owner's manual

Continued

results showed that increasing the lower anchorage spacing did not affect the injury measures of the dummies used in the frontal and side impact sled tests. The HIC values and head and chest accelerations were all within acceptable limits for the 3-year-old and 12-month old child dummies in 20 mph (32 km/h) side impacts and 30 mph (48 km/h) frontal impacts.

Given that there appears to be a lower need for the lower anchorages to be 280 mm (11 in) apart in a simulated child restraint anchorage system than in the required child restraint anchorage systems, and given that simulated systems appear to be performing satisfactorily in dynamic testing, should we encourage or require CRS manufacturers and vehicle manufacturers to include, in instruction manuals, statements that endorse the use of simulated child restraint anchorage systems in rear center seating positions? An advantage of CRS and vehicle manufacturers endorsing simulated child restraint anchorage systems is to provide consumers the option of installing a CRS in the center rear seat with the lower anchorages plus tether at no cost.

In examining this question, another issue to consider is whether the strength of the lower anchorages of the simulated system needs to be tested as a unit to FMVSS No. 225's strength requirements (S9.4). We tentatively conclude that the answer is no, such testing appears redundant. This is because the strength of the lower anchorages would be assessed when the requisite child restraint anchorage systems at the outboard DSPs are tested. Further, our sled tests showed that the loads of the lower anchorages do not change significantly with the different lower anchorage spacing (280, 400 and 520 mm).[69] If the agency were to test the strength of a simulated child restraint anchorage system, a new test device would have to be developed because the test device currently used in FMVSS No. 225 is made to test only lower anchorages that are spaced 280 mm (11 in) apart.

A separate, but related, issue to consider is the potential problem of users using the same lower anchorage for the attachment of two lower anchorage connectors from adjacent child restraints. We request comments on solutions to mitigate this possible misuse problem. Ford includes a warning in vehicle owner's manuals to "never attach two child safety seats to the same anchor." We request comment on whether vehicle manufacturers have received any complaints of confusion or reports of failures due to consumers installing two CRSs to the same lower anchorage. We also request comment on whether CPSTs have encountered this type of misuse in the field.

There is also the issue of whether we should limit the lateral spacing of the lower anchorages of the simulated system, to prohibit vehicle manufacturers from recommending the use of the inboard lower anchorages if the anchorages are more than a specified distance, such as 520 mm (20.4 in). NHTSA has test data indicating satisfactory performance by CRSs attached to lower anchorages spaced a maximum 520 mm (20.4 in) apart. We do not have test data assessing lower anchorages spaced more than 520 mm (20.4 in) apart.

b. Third Row

FMVSS No. 225 requires that at least one of the two required child restraint anchorage systems be installed at a second row seating position in each vehicle that has three or more rows. In the 1997 NPRM underlying the 1999 final rule establishing the standard, the agency requested comment on demographic data on the number of children typically transported in child restraints in family vehicles, to evaluate the need for additional child restraint anchorage systems in vehicles with three or more rows. The data we received did not show there were a significant number of families with three or more children in child restraints. Based on that data, NHTSA issued FMVSS No. 225 to require only two full child restraint anchorage systems in vehicles, plus the third tether anchorage.

We request comment on whether FMVSS No. 225 should require child restraint anchorage systems or tether anchorages in all rear seating positions. Would requiring child restraint anchorage systems or tether anchorages in all rear seating positions meet the need for motor vehicle safety? Would the requirement protect the public against unreasonable risk of death or injury in an accident? There were a number of comments to the 2007 LATCH public meeting expressing dissatisfaction with the number of child restraint anchorage systems that are present in the third row of vehicles. Some commenters said that consumers sometimes purchase vehicles with three or more rows to accommodate large families, but are unable to install all of the child restraints with child restraint anchorage systems because the third row does not have the systems.

NHTSA examined MY 2013 fleet data to determine the availability of child restraint anchorage systems in the third row. We estimate that 57.2 percent of vehicles with three rows have one additional seating position equipped with a child restraint anchorage system (additional to those required), 10 percent have two additional seating positions equipped with a child restraint anchorage system, and 32.7 percent do not have child restraint anchorage systems in the third row.[70] UMTRI's LATCH Usability study [71] found that 71 percent of vehicles with a third row had one or two tether anchorages in the third row (most were in addition to those required), 9 percent had 3 tether anchorages in the third row (most were in addition to those required), and 19 percent did not have a tether anchorage in the third row. In assessing the safety need for the requirement, we will consider how frequently child restraint anchorage systems are used in the third row. Recent surveys show that only about 2.4 [72] to 4.5 percent [73] of children in CRSs with internal harnesses (CRSs that would use the lower anchorages) are seated in the third row. We believe that the low use of the third row is due in part to the small number of families with multiple children in CRSs with internal harnesses.

There is also reduced space in the third row, which may make it difficult to fit most rear-facing CRSs. Information obtained from our February 25, 2011, request for comments notice [74] on the proposed NCAP Vehicle-CRS Fit program indicated that rear-facing CRSs are not likely to be used in the third row of a vehicle due to the available space. Several comments from vehicle manufacturers (Nissan, the Alliance of Automobile Manufacturers (Alliance) and the Association of Global Automakers) stated that vehicle designs present greater fit challenges for rear-facing CRSs in the third row. The groups stated that as CRSs continue to get larger and heavier and, as vehicles get smaller for fuel economy purposes, compatibility problems may become

contains no statements on use of simulated child restraint anchorage systems in the center position. NHTSA considered the spacing on the Toyota Tundra vehicles outliers in the study, and thus chose 520 mm (20.4 in) as the widest lower anchorage spacing in its testing.

[69] Amenson, T., Sullivan, L.K., "Dynamic Evaluation of LATCH Lower Anchor Spacing Requirements and Effect of Tether Anchor Location on Tether and Lower Anchor Loads."

[70] Based on 2013 vehicle production estimates submitted by vehicle manufacturers to NCAP.

[71] "LATCH Usability in Vehicles," *supra.*

[72] NCRUSS, *supra.*

[73] *Id.*

[74] Docket NHTSA–2010–0062; 76 FR 10637.

even more prevalent for the third row positions. Consumers Union (CU) also expressed that it may be unreasonable for some vehicles to be expected to fit rear-facing CRSs in the third row. CU stated that its own evaluations have shown a need to fold second row seats flat in order to install a third row rear-facing CRS since many second row seats are not adjustable fore/aft. General Motors (GM) stated that because second row seats are often not adjustable, it is often ''impractical'' to install rear-facing CRS in the third row. GM referenced data collected via Safe Kids from July 2009 through January 2011 which showed that only one percent of children arrive at CRS checkpoints in a rear-facing CRS in the third row of a vehicle. UMTRI also commented that NHTSA's NCAP Vehicle-CRS fit program should not require rear-facing CRSs to fit in all available third row positions because most parents and caregivers do not choose to install rear-facing CRSs in this row.

NHTSA requests comment on whether FMVSS No. 225 should require child restraint anchorage systems in the third row if it is not altogether feasible to use rear-facing CRSs in the third row due to reduced space in that row. Information is also requested on the likelihood of consumers placing rear-facing CRSs in the third row, even if CRSs could fit in that row. Even if rear-facing child restraints could not or would not be installed using child restraint anchorage systems in the third row of a vehicle, are child restraint anchorage systems needed in the third row for forward-facing CRSs? The lower anchorages (plus tether anchorage) have a weight limit of 29.5 kg (65 lb) combined weight (CRS + child), meaning that consumers are instructed not to use the lower anchorages to attach a child restraint when the combined weight of the CRS and child exceeds 29.5 kg (65 lb). Consider also newly revised car seat use recommendations developed by NHTSA and by the American Academy of Pediatrics (AAP)[75] recommending that children should stay in a rear-facing CRS for as long as possible, within the top height and weight limit allowed by the CRS manufacturer. Most convertible CRSs specify a maximum child weight of 15.8–18 kg (35–40 lb) in the rear-facing mode.[76] All this indicates that, for child restraint anchorage systems installed at third row seating positions, use of the lower anchorages in the third row might only be for a relatively short period for forward-facing restraints.[77] If the lower anchorages were used after a child is transitioned to a forward-facing restraint (typically when the child reaches 15.8–18 kg (35–40 lb)), they would be used only while the child weighs 14.5 to 22.6 kg (32 to 50 lb), depending on the CRS weight.

Would an amendment requiring child restraint anchorage systems or tether anchorages at some or all third row seating positions meet the requirements and considerations of § 30111(a) and (b) of the Vehicle Safety Act? Currently, for vehicles that do not have a tether anchorage at the rear center seating position in the second row, a tether anchorage is already required to be in a third row seating position. Thus, the proposed requirement would be to have a second or third tether anchorage in the third row. We also request comment on the feasibility of installing child restraint anchorage systems and tether anchorages in some or all rear seating positions in vehicles with three or more rows.

We estimate that including lower anchorages in two additional seating positions would cost $7.2 million in vehicles with a third row ($2.50 per additional lower anchorage set) and $5.2 million for tether anchorages in all third row seating positions ($1.33 per additional tether anchorage). Testing costs would increase $1,500 per additional child restraint anchorage system in each seating position for each vehicle model. We request comment on these cost estimates.

c. Vehicles Currently Excluded From FMVSS No. 225

1. We request comments on the feasibility of installing anchorages in convertibles. FMVSS No. 225 currently excludes convertibles from having to provide tether anchorages in rear seating positions. In comments to the 1997 NPRM, GM and Mitsubishi stated that vehicle manufacturers have technical problems installing tether anchorages in convertibles because the vehicles have folding roofs, a stowage area behind the seat back for the top and its mechanism, and less rear seat space. NHTSA agreed that many convertibles could have design problems, and determined that it could not at that time readily separate those convertibles from those without technical problems. All convertibles were excluded from the requirement.

Since the time FMVSS No. 225 was established, tether anchorage designs have evolved and vehicle manufacturers have had over 10 years of experience installing them to meet the standard. Among 35 convertible vehicle models with a rear seat in the 2013 vehicle fleet, ten are equipped with the full child restraint anchorage system (lower anchorages and tether anchorage) in two rear DSPs, 14 are equipped with only the lower anchorages at two rear DSPs, and 11 are not equipped with any anchorages. We propose deleting the exclusion of convertible vehicles from the requirement to provide tether anchorages. We wish to know why the technical problems that existed in 1997 could not be overcome by the knowledge gained since 1997. We request comments on the feasibility of installing tether anchorages in the second row of convertibles, and in the first row in convertibles that do not have a second row.

2. FMVSS No. 225, at S5(e), states that a vehicle—

> with a rear designated seating position for which interference with transmission and/or suspension components prevents the location of the lower bars of a child restraint anchorage system anywhere within the zone described by S9.2 or S15.1.2.2(b) such that the attitude angles of S15.1.2.2(a) could be met, is excluded from the requirement to provide a child restraint anchorage system at that position. However, except as provided elsewhere in S5 of this standard, such a vehicle must have a tether anchorage at a front passenger designated seating position.

We request comment on whether this exclusion in S5(e) of FMVSS No. 225 is still needed. Since the issuance of FMVSS No. 225, manufacturers have gained experience in designing and installing vehicle seats with lower anchorages. We believe that vehicle seats could be installed with the lower anchorages so as not to interfere with transmission and/or suspension components. We have tentatively determined there is no longer a need for S5(e) and propose deleting it.

d. Written Instructions

NHTSA requests comments on the following possible ways to enhance the instructions provided consumers about using child restraint anchorage systems.

1. Terminology

Standard No. 225 (S12) requires vehicle manufacturers to provide

[75] Policy Statement—Child Passenger Safety. Committee on Injury, Violence and Poison prevention March 21.2011) Pediatrics—Official Journal of the American Academy of Pediatrics. *http://pediatrics.aappublications.org/content/early/2011/03/21/peds.2011-0213.full.pdf+html* (last accessed June 24, 2014).

[76] This corresponds to the weight of a 50th to 80th percentile 4-year-old child.

[77] Generally lower anchorages would be used to attach a rear-facing child restraint until the child is 15.8–18.1 kg (35–40 lb), and then used for a forward-facing restraint only while the child weighs 14.5–22.6 kg (32 to 50 lb), depending on CRS weight.

written instruction for using child restraint anchorage systems and tether anchorages. Standard No. 213 (S5.6.1) specifies that child restraint systems provide printed instructions that include a step-by-step procedure for installing and securing the child restraint system in a vehicle. To improve the ease of use of child restraint anchorage systems, should the written information provided pursuant to Standards No. 225 and No. 213 use standardized terminology referring to the parts of the child restraint anchorage system and the components of the child restraint that connect the CRS to the vehicle? We request comment on whether requiring the following terms in child restraint and vehicle user's manuals would help make the instructions clearer and more uniform: ''lower anchor(s)'' and ''tether anchor'' for components of the child restraint anchorage system, and ''lower anchor attachments'' and ''tether'' for components of the CRS that are used to connect the CRS to the vehicle. A ''lower anchor attachment'' is comprised of a ''lower anchor connector'' and a ''lower anchor strap,'' (for flexible lower anchor attachments) and a ''tether'' is comprised of a ''tether hook'' and a ''tether strap.'' Would standardized terminology improve consumer education efforts and increase the likelihood that child restraints would be used correctly? [78]

2. Recommendation for Tether Anchorage Use

NHTSA has tentatively determined that consumers should be instructed to always attach the CRS tether when restraining a child in a forward-facing CRS with an internal harness. Further, we believe that the instruction is appropriate when the CRS is installed using the lower anchorages of a child restraint anchorage system [79] and when the CRS is installed using a seat belt. The instruction is simple and would increase the ease of use of tether anchorages. The agency requests comments on this issue.

If consumers were provided the simple and straightforward instruction to always attach the tether on the subject CRSs, we believe that tether use would increase, to the benefit of child passengers. In tests of a restrained dummy in forward-facing CRSs with harnesses, researchers found reduced head excursions due to tether use in frontal sled tests conducted at different speeds.[80] Field data indicate that the most common injury to children restrained in child restraints is a head injury, and the source of injury is often contact with vehicle structures in front of the child restraint, such as the vehicle front seat back.[81] We tentatively conclude that the use of tethers would reduce the magnitude of head excursions, and that reduced head excursions would result in fewer and less severe head injuries.[82]

Test data indicate that tether anchorages are extremely robust and would be reasonably able to withstand crash forces generated by virtually all restrained children in the subject CRSs. As explained below, NHTSA (a) estimated the dynamic loads that are imparted to tether anchorages in 47–56 km/h (30–35 mph) crashes; [83] (b) assessed the strength of current tether anchorages through quasi-static laboratory testing; and (c) analyzed those data to estimate the dynamic loads that current anchorages would be able to withstand. NHTSA has tentatively determined that the analysis shows that tether anchorages are sufficiently strong to warrant an instruction that they should be used with all children restrained in a forward-facing CRS with an internal harness.

Dynamic Loads

The agency estimated the loads that are imparted to tether anchorages in relatively severe crashes. We reviewed Transport Canada data of tether anchorage loads measured in 47–56 km/h (30–35 mph) full frontal rigid barrier crash tests of 20 MY 2009 and 2010 vehicle models.[84] Transport Canada placed child restraints in the outboard rear seating positions using the child restraint anchorage system (including the top tether). The program involved 28 crash tests with the HIII–6C dummy and 4 crash tests with the HIII–10C dummy. The weight of the CRSs used in the tests ranged from 5.1 kg (11.4 lb) to 11.3 kg (25.1 lb), and the combined weight of the CRS plus the 6 year-old and 10 year-old child dummies ranged from 28.1 to 42.1 kg (62 to 93 lb). The peak vehicle acceleration in these crash tests ranged from 30 g to 68 g.

In the Transport Canada tests, the total anchorage loads (sum of forces on the lower anchors and the tether anchor) ranged from 7,500 N (1,686 lb) to 20,800 N (4,676 lb) with the HIII–6C dummy, and from 13,300 N (2,990 lb) to 20,400 N (4,586 lb) with the HIII–10C dummy (see Tables A1(a) and A1(b) in the Appendix to the preamble of the February 25, 2014 final rule, 79 FR at 10414–10416). The peak measured tether loads ranged from 677 N (152 lb) to 6,951 N (1,562 lb). The tether loads were approximately 8 percent to 50 percent of the total measured anchorage loads, with an average of 29 percent of the total. There were no tether anchorage failures in any of the tests.[85]

We believe the data from the Transport Canada tests (involving 47–56 km/h (30–35 mph) full frontal rigid barrier crash tests) represent just about all crashes involving restrained children

[78] We tentatively believe that the term ''LATCH'' is not clear enough for this purpose. As explained in an earlier footnote, the term ''LATCH,'' is an acronym for ''Lower Anchors and Tethers for Children,'' which was developed by industry as a consumer-friendly term to describe the child restraint anchorage system. While the term has been beneficial, it is also associated with some ambiguity and confusion. For one thing, various vehicle and CRS manufacturers have used the term ''LATCH'' in users' manuals differently. ''LATCH'' has been used to refer to the ''lower anchors'' of a child restraint anchorage system, the full 3-point child restraint anchorage system, or to the CRS tether. Also, some consumers mistakenly associate CRS tether use only with attachment of the CRS using the lower anchorages of a child restraint anchorage system and not with a CRS attachment using the seat belt, a misconception possibly reinforced by the LATCH term.

[79] NHTSA amended FMVSS No. 213 (February 27, 2012, 77 FR 11626) (response to petition for reconsideration, February 25, 2014, 79 FR 10396) to require, among other things, a label on some CRSs, specifying the maximum child weight for using the lower anchorages to install child restraints with internal harnesses. Child weight limit = 29.5 kg (65lb) − CRS weight. The 2014 final rule provided manufacturers an option of rounding the value up to the next multiple of 2.2 kg (5 lb) using a lookup table.

[80] UMTRI Research Review—Crash Protection for Child Passengers: Rationale for Best Practice, January-March 2012, Volume 43, Number 1. *http://www.umtri.umich.edu/content/rr_43_1.pdf.*

[81] Analysis of 1993–2007 NASS–CDS data files showed that the most-common AIS 2+ injuries among children restrained in rear seats were to the head and face and the most-common contacts for AIS 2+ injuries to these children were the seat and back support. An estimated 39 percent of AIS 2+ injuries in frontal crashes to children restrained in rear seats were to the head and face with 59 percent of these injuries resulting from contact with the seat and back support in front of the seating position.

[82] We believe that tether use may particularly benefit taller children since they may experience greater head excursion than children with shorter seated height.

[83] Additionally, our analysis of 1993–2007 NASS–CDS data files indicate that 99.4 percent of crashes that involve restrained children have delta Vs less than or equal to 30 mph.

[84] Dynamic Load Measurement of Child Restraint Anchors in Frontal Vehicle Crashes Conducted by Transport Canada, See docket for this notice of proposed rulemaking. Details of the Transport Canada tests are available in Docket No. NHTSA–2014–0026.

[85] The Transport Canada tests included a 56 km/h (35 mph) frontal impact test of a Kia Forte with a Hybrid III 10 year-old child dummy restrained in Safety 1st Apex 65 CRS. The CRS was installed in the right outboard rear seat with lower and tether anchorages. The CRS weighed about 5.9 kg (13 lb). The combined weight (child+CRS) in this test was 40.8 kg (90 lb), the peak vehicle acceleration was 46 G. The total maximum anchorage loads measured in this test was 20,395 N (4,584.9 lb). The peak tether anchorage load was 7,759 N (1,744.3 lb). In that test, one of the lower anchorages failed but the tether anchorage was intact.

in the subject CRSs in the U.S. Our analysis of real world crash data indicate that 99.4 percent of crashes that involve children in CRSs have delta Vs less than or equal to 30 mph.[86] Thus, the Transport Canada data are indicative of the loads that are typically imposed on tether anchorages in virtually all crashes involving children in forward-facing CRSs with internal harnesses.

Measured Strength of Tether Anchors in the Current Fleet

We conducted quasi-static tests on child restraint anchorages in 11 MY 2006–2011 [87] vehicle models and 18 MY 2013 vehicle models [88] to assess the strength of the anchorages in the current fleet. (These vehicles were previously crash-tested, but NHTSA examined the vehicles to assess the condition of the child restraint anchorage systems to determine the suitability of the vehicles for inclusion in the quasi-static test program.) A static pull test was conducted on the tether anchors alone in three rear seating positions using a cable at loading rates similar to that specified in FMVSS No 225, but to higher loads or to anchorage failure.[89]

Among the 11 MY 2006–2011 vehicle models tested, 27 tether anchors were subjected to quasi-static loads. All the tether anchorages had strengths greater than 10,000 N (2,248 lb). Three tether anchorages were loaded to failure: Failure of the tether anchorage occurred at 11,900 N (2,675 lb) in the Ford Taurus, and 13,200 N (2,967 lb) and 14,400 N (3,237 lb) in the Toyota Yaris.

Among the 18 MY 2013 vehicle models tested, 43 tether anchors were subjected to quasi-static loads. All of the tether anchorages had strengths greater than 10,000 N (2,248 lb).[90]

Dynamic to Static Strength

Although there is no consistent and direct correlation between dynamic to static strength of anchorage systems, and although the dynamic to static strength ratio is vehicle specific, data show that child restraint anchorage systems are able to withstand higher loads dynamically than statically. In the Alliance's petition for reconsideration of the strength requirements of the 1999 final rule establishing FMVSS No. 225, the Alliance indicated that the quasi-static test load of FMVSS No. 225 simulating a high-speed impact should be approximately 50 percent of the expected dynamic load.[91] Toyota also expressed the view [92] that the tether anchorage is able to withstand greater loads dynamically than statically, and estimated the value to be 30 percent.

NHTSA has estimated the minimum dynamic loads that current anchorages would be able to withstand, given the information from the Alliance and Toyota regarding a dynamic to quasi-static load relationship and the quasi-static load data that were available from our test program. NHTSA's quasi-static anchorage load tests showed that all tether anchorages had a static strength greater than 10,000 N (2,248 lb). Applying the more conservative assumption for a dynamic to static strength ratio of 1.3, the dynamic strength of the tether anchorages is expected to be greater than 13,000 N (2,922 lb).

This estimated dynamic strength of 13,000 N (2,990 lb) is about two times the tether anchorage loads measured in Transport Canada's 47–56 km/h (30–35 mph) frontal vehicle crash tests. In those tests, the peak measured tether loads ranged from 677 N (152 lb) to 6,951 N (1,562 lb). These data suggest that tether anchorages are unlikely to fail in virtually all crashes involving children restrained in forward-facing CRSs with internal harnesses.

We have tentatively determined that the benefits of tether use for all children in the subject CRSs (regardless of child weight) outweigh the risks occurring from tether anchorage failure due to a higher combined weight and/or a higher severity crash. Thus, we believe that tethers should be attached regardless of child weight in forward-facing CRSs with internal harnesses.[93] The tether supplements the primary attachment of the CRS to the vehicle seat (the primary attachment is accomplished by the lower anchorages of the child restraint anchorage system or by the vehicle seat belt). The primary attachment of the CRS to the vehicle should never fail in a crash since its integrity is needed to avoid a catastrophic uncoupling of the CRS from the vehicle.[94] Further, child restraints are required by FMVSS No. 213 to provide basic crash protection, including head protection, when installed only by the lower anchorages of a child restraint anchorage system or a seat belt, without the tether. The tether contributes to the basic crash protection provided by CRSs by enhancing head protection. Given the data that indicate that tether anchorages are already reasonably robust to withstand crash forces, we tentatively believe that tether use should be recommended for all children in forward-facing child restraints with internal harnesses so that the enhanced head protection can be achieved.

Some CRS manufacturers are currently recommending tether use for all forward-facing child restraints with internal harnesses, regardless of the child weight.[95] Given the available information on anchorage strength and on the benefits of tether use, we tentatively believe that such an instruction should be encouraged. We request comment on the merits of an instruction to consumers to use the tether to install all forward-facing child restraints with internal harnesses.

XI. Proposed Effective Date

The agency is proposing a lead time of 3 years from date of publication of the final rule. This means that vehicles manufactured on or after the date 3 years after the date of publication of the final rule would be required to meet the ease of use requirements. In addition, child restraints manufactured on or after the date 3 years after the date of publication of the final rule would be required to meet the proposed FMVSS No. 213 requirements. We propose to permit optional early compliance with the requirements beginning 60 days after the date of publication of the final rule.

We believe there is good cause for providing a 3-year lead time. The lead time is long enough for vehicle manufacturers to redesign the lower anchorages in their vehicles to meet the

[86] Analysis of 1993–2007 NASS–CDS data files.

[87] Valentin-Ruiz, et al. ''Quasi-static load tests to evaluate the strength of child restraint anchorage systems in MY 2006–2011 vehicles,'' NHTSA Report, December 2013. See docket for this notice of proposed rulemaking.

[88] ''Quasi-static load tests to evaluate the strength of child restraint anchorage systems in MY 2013 vehicles,'' ALPHA Technology Associates, Inc., December 2013. See docket for this notice of proposed rulemaking.

[89] A few tether anchorage load tests were conducted until failure of the anchorages. However, after an equipment failure, the tether loads were limited to 10,000 N (2,248 lb) to prevent damage to the equipment. Since the tether anchorage tests were performed after the lower anchorage tests, and because some of the vehicle seats experienced excessive seat damage and deformation during the lower anchorage tests, achieving target loads in the tether anchorage tests was not possible in some vehicles.

[90] Twenty-five tether anchors were tested to increased loads. In some tests, even though there was no anchorage failure, there was significant displacement and deformation of adjoining structures including the seat. In some cases, the target loads could not be achieved because of significant deformation of the seat structure.

[91] See 68 FR 38208, 38218; June 27, 2003.

[92] *Id.*

[93] When the combined weight of CRS+child exceeds 29.5 kg (65 lb), the CRS is to be attached by the seat belt plus tether.

[94] Thus, the combined weight of CRS+child should not exceed 29.5 kg (65 lb) on the lower anchorages.

[95] The CRS manufacturers instruct consumers to attach the CRS by the seat belt plus tether when the combined weight of CRS+child exceeds the weight limit of the child restraint anchorage system.

proposed requirements. The UMTRI LATCH Usability study survey of 98 MY 2010–2011 vehicles indicates that 79 percent will need some redesigning to comply with the new lower anchorage usability requirements, and a small percentage of vehicles that currently use webbing loops for tether anchorages will need to redesign the anchorages to rigid anchorage bars. We believe that these design modifications are minor and mainly concern the vehicle seat and not the vehicle structure. Some tether anchorages may have to be repositioned to provide the 165 mm (6.5 in) strap wrap-around distance. This modification to the tether anchorage location in some vehicles is also minor and would not require any changes to the vehicle structure.

The 1999 final rule promulgating FMVSS No. 225 provided a 3-year lead time (with a phase-in) for compliance with the lower anchorage requirements even though vehicles did not have lower anchorages. The main requirements proposed by this NPRM involve only adjustments to the positioning of lower anchorages and tether anchorages already installed pursuant to FMVSS No. 225 and some modifications to seat cushion stiffness. Therefore, the agency is proposing a 3-year lead time, with no phase-in, since we believe that the lead time is sufficient for vehicle manufacturers to reposition lower anchorages and tether anchorages, if needed, to change seat cushion characteristics, and to mark the lower anchorages and tether anchorage with the ISO signage. Three years would also be sufficient time to change the relatively few tether anchorages that are made of webbing material to rigid anchorage bars. The three years of lead time would provide sufficient time for manufacturers to change the written instructions provided with the vehicles as proposed.

We also believe that 3 years of lead time provides sufficient time for child restraint manufacturers to meet the proposed rule. Comments are requested on whether this lead time should be shortened. This NPRM proposes minor changes to the requirements applying to CRSs. The requirements are: Limiting the length of the tether hardware assembly (consisting of a tether hook and hardware to tighten and loosen the tether strap) to 165 mm (6.5 in) (UMTRI estimated that about 30 percent of CRS models might need some changes to the tether hardware assembly to meet the 165 mm (6.5 in) limit), marking the lower anchorage connectors and the tether connector (hook) with the ISO marking, and changing written instructions provided to consumers to include the defined terms and instruction on using the tether. These are minor changes that do not affect the shell or any other structure of the child restraint. We believe the marking and user's instructions amendments could be implemented in a year. Would it be worthwhile to implement some or all of the proposed changes to child restraints before the proposed changes are implemented for vehicles, particularly the marking and user's written instructions requirements? The combined data from NHTSA's survey of 24 MY 2010 vehicles and from UMTRI's LATCH Usability study indicate that, of the 122 vehicles surveyed, 76 percent of lower anchorages and 73 percent of tether anchorages were marked with the ISO symbol. Since many child restraint anchorage systems are already being marked with the ISO symbol, we tentatively conclude that it might be beneficial to have a shorter lead time to mark the CRS lower anchorage connectors and tether hook with the ISO symbol than 3 years after publication of a final rule. In that way, consumers can begin learning sooner rather than later to match the ISO symbols on CRSs with the ISO symbols in the vehicle.

XII. Regulatory Notices and Analyses

Executive Order (E.O.) 12866 (Regulatory Planning and Review), E.O. 13563, and DOT Regulatory Policies and Procedures

The agency has considered the impact of this rulemaking action under E.O. 12866, E.O. 13563, and the Department of Transportation's regulatory policies and procedures. This rulemaking was not reviewed by the Office of Management and Budget under E.O. 12866, ''Regulatory Planning and Review.'' The rulemaking action has also been determined to be not significant under the Department's regulatory policies and procedures.

The total cost of the proposed rule is estimated to be $1.32 million. The cost is primarily due to the ISO labeling requirement.

Vehicle Costs

The agency tentatively concludes that the proposed requirements for attachment force, clearance angle and anchorage depth would not add costs to the vehicle. To meet the requirements, vehicle seat designs would change, but the redesigns would involve simple modifications to the existing vehicle materials (*i.e.,* the seat cushion) and not an addition to the vehicle or a change to the vehicle structure. We estimate that vehicle seats in approximately 79 percent of vehicles would be affected, but the changes to meet the requirement would only call for steps such as cutting larger open areas in the seat foam surrounding the lower anchorage bars, or repositioning the seat cushion relative to the anchorage bars. Redesigning the vehicle seats to meet the requirements would be a one-time event, and would be so minor that the costs for the redesigns would be slight. In addition, NHTSA proposes to provide three years of lead time before manufacturers must certify their vehicles as meeting the final rule requirements. That lead time would provide sufficient time for manufacturers to minimize costs since they may incorporate designs that meet the new requirements into their regular vehicle redesign and manufacturing cycle.

The agency estimates that the cost of conducting the lower anchorage usability tests for evaluating attachment force, clearance angle, and anchorage depth would be an average of $300 per vehicle. We estimate that 560 models comprise the 16.32 million vehicles sold annually that are subject to this NPRM. The total testing cost for 560 models is $168,000. This testing cost, distributed among the 16.32 million vehicles sold annually, with an average model life of 10 years, is approximately $0.001 per vehicle.

With regard to the proposed tether anchorage requirements, some tether anchorages in existing vehicles will have to be moved further from the head restraint to meet the minimum strap wrap-around distance requirement. NHTSA has tentatively determined that such a change would not add cost to the vehicle, since new material, or substantial change to vehicle design, would not be needed. The agency estimates that the cost of conducting the tether location measurement would be approximately $50. We estimate that 560 models comprise 16.32 million vehicles sold annually, for an annual testing cost of $28,000. This testing cost, distributed among the 16.32 million vehicles sold annually, with an average model life of 10 years, is significantly less than $0.001 per vehicle. Since these testing costs per vehicle (lower anchorage usability tests and tether anchorage location test) is so small, it is not included in the overall costs of the rule).

A very small percentage of vehicles that currently have webbing loops for tether anchorages will need to make the anchorages rigid bars. It is difficult to estimate the redesign costs of these vehicles because the number of vehicles affected is very small. Comments are requested on the redesign costs and certification costs for these vehicles, and how a 3-year lead time for complying with the new requirements affects those costs.

The proposal would require all the lower anchorages and tether anchorages to be marked with the ISO signage. We estimate there are 16.32 million vehicles produced annually, with 31.9 million lower anchorage-equipped seating positions and 42.9 million tether anchorage-equipped seating positions. Our survey of 122 MY 2010–2011 vehicles indicates that 82 percent of lower anchorages and 73 percent of tether anchorages already are marked with the ISO symbol. We estimate the cost of ISO marks for a set of lower anchorages to be $0.05 and the cost of marking the tether anchorage would be $0.025. The total incremental cost to have ISO marks for all lower anchorages in the fleet is $0.29 million (= $0.05 × 0.18 × 31.9). The total incremental cost to have ISO marks for all tether anchorages in the fleet is $0.29 million (= $0.025 × 0.27 × 42.9). Therefore, the total incremental cost of labeling all child restraint anchorages with appropriate ISO marks is about $0.58 million.

The cost of changing the written instructions accompanying the vehicle is expected to be negligible (significantly less than $0.01).

Child Restraint System Costs

The proposal would require the length of the tether hardware assembly (which consists of a tether hook and a webbing tightening mechanism) of child restraint systems to be not greater than 165 mm (6.5 in). About 30 percent of forward-facing child restraints may need some minor modification to the tether hardware assembly to meet the length limit. We tentatively conclude that a 3-year lead time is sufficient for this purpose. The tether hardware assembly is a simple part that can be easily produced and attached to child restraint tethers.

The NPRM also proposes to require the ISO marks to be placed on child restraint anchorage connectors. The agency estimates that 14.9 million CRSs are sold in the U.S. annually, of which 75 percent (11.18 million infant carriers, convertibles, forward-facing only, combination, and 3-in-1 CRSs) have lower anchorage connectors and of which 48 percent (7.18 million convertibles, forward-facing only, combination, and 3-in-1 CRSs) have tethers. Applying an estimated cost of $0.05 for ISO marks on one set of lower anchorage connectors, the total cost for all applicable CRSs is $0.56 million (= $0.05 × 11.18 million). Applying an estimated cost of $0.025 for ISO marks on a tether anchorage connector, the total cost for all applicable CRSs is $0.18 million (= $0.025 × 7.18 million). Therefore, we estimate that the total cost of adding ISO marks to child restraint anchorage connectors is $0.74 million (= $0.56 million + $0.18 million).

The cost of changing the written instructions accompanying the CRS is expected to be negligible (significantly less than $0.01).

Benefits

We expect the new usability requirements would improve correct (tight) installation of CRSs, and increase tether use. Survey data indicate that the tether is used in 56 percent of child restraint installations, but is used correctly in only 39 percent of the installations.[96] The data also indicate that approximately 60 percent of child restraints are installed using the lower anchorages.[97]

Assuming a 5 percent increase in tether use, and using data on the reduction in injury measures in sled tests with and without tether use,[98] the agency estimates that the proposed changes to the tether anchorage requirements of FMVSS Nos. 213 and 225 could save 1.5 lives and prevent 4 moderate to severe injuries. Assuming a 5 percent increase in correct CRS installation due to the proposed improvements to the lower anchorage requirements, and using the reduction in injury measures in sled tests with loose and tight installations,[99] the agency estimates that the proposed usability requirements for the lower anchorages could save 1.4 lives and prevent 2.4 moderate to severe injuries. Therefore, we estimate that the proposed requirements could save about 2.9 lives and prevent 6 moderate to severe injuries per year.

The proposed rule would also streamline FMVSS No. 225 by removing outdated material, such as sections of the standard that relate to requirements that were phased in when the standard was adopted. Streamlining FMVSS No. 225, a result of retrospectively reviewing the standard, would be consistent with E.O. 13563, ''Improving Regulation and Regulatory Review'' and the plain language provisions of E.O. 12866.

Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.,* as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996) whenever an agency is required to publish a notice of proposed rulemaking or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (*i.e.,* small businesses, small organizations, and small governmental jurisdictions), unless the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities. Agencies must also provide a statement of the factual basis for this certification.

I certify that this proposed rule would not have a significant economic impact on a substantial number of small entities. NHTSA estimates there to be 29 manufacturers of child restraints, none of which are small businesses. Even if there were a small CRS manufacturer, the impacts of this proposed rule would not be significant. This NPRM proposes minor changes to the requirements applying to CRSs. The requirements are: Limiting the length of the tether hardware assembly (tether hook and tightening mechanism) to 165 mm (6.5 in) (UMTRI estimated that about 30 percent of CRS models might need some changes to the tether hardware assembly to meet the 165 mm (6.5 in) limit), marking the lower anchorage connectors and the tether hook or tether strap with the ISO marking, and changing written instructions provided to the owners to include the defined terms and instruction on using the tether. These are minor changes that do not affect the shell or any other structure of the child restraint. We believe that there would be no incremental cost due to limiting the tether hardware assembly to 165 mm (6.5 in) since the tether hardware assembly costs would not increase because of the requirement. We estimate that the cost of marking the CRS child restraint anchorage connectors would be about $0.05 per set of lower anchorage connectors and $0.03 per tether hook. Changing the written instructions

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[96] Eichelberger, A.H., Decina, L.E., Jermakian, J.S., McCartt, A.T., ''Use of top tether with forward facing child restraints: Observations and driver interviews,'' Insurance Institute for Highway Safety, April 2013.

[97] NCRUSS, DOT HS 811 679, *http://www-nrd.nhtsa.dot.gov/Pubs/811679.pdf.*

[98] Final Economic Assessment FMVSS No. 213 and 225 Child Restraint Systems and Child Restraint Anchorage Systems, 1999, Docket No. NHTSA–1998–2290, Item No. 27. Table 6b of the Final Economic Assessment shows a head injury measure for the 3-year-old child dummy of 503 when tether is used and 631 when tether is not used.

[99] Final Economic Assessment FMVSS No. 213 and 225 Child Restraint Systems and Child Restraint Anchorage Systems, 1999, Docket No. NHTSA–1998–3390, Item No. 27. Table 4 of the Final Economic Assessment shows a head injury measure for the 6-year-old child dummy of 642 for tight installation and 697 for loose installation.

accompanying CRSs would be negligible (significantly less than $0.01).

There are six small vehicle manufacturers. We believe that the proposed rule would not have a significant economic impact on these manufacturers. The vehicles produced by the small manufacturers already have to provide child restraint anchorage systems and tether anchorages meeting FMVSS No. 225, unless the vehicle is excluded from the standard. We believe that the changes proposed in this NPRM only make adjustments to the physical features of the anchorage systems, adjustments that should have a positive impact on the ease of use of the systems, but that are small in terms of affecting the overall configuration of current anchorage systems. We estimate the cost of marking the lower anchorages and the tether anchorages would only be <$0.12 approximately (depending on the number of anchorages in the vehicle) per vehicle. The cost of changing the written instructions accompanying the vehicle would be negligible (<$0.01).

Final-stage vehicle manufacturers buy incomplete vehicles and complete the vehicle. Alterers modify new vehicles. In either case, NHTSA tentatively concludes that the impacts of a final rule on such entities would not be significant. Final-stage manufacturers or alterers installing rear seats in vehicles subject to FMVSS No. 225 already have to provide child restraint anchorage systems and tether anchorages meeting FMVSS No. 225. We believe that the changes proposed in this NPRM only make small adjustments to the physical features of the anchorage systems, adjustments that should have a positive impact on the ease of use of the systems, but that are minor in terms of the impact on the configuration of current anchorage systems. We estimate the cost of marking the lower anchorages and the tether anchorages would be less than $0.12 per vehicle (depending on the number of anchorages in the vehicle). The cost of changing the written instructions accompanying the vehicle would be negligible (significantly less than $0.01 per vehicle).

National Environmental Policy Act

NHTSA has analyzed this proposed rule for the purposes of the National Environmental Policy Act and determined that it would not have any significant impact on the quality of the human environment.

Executive Order 13132 (Federalism)

NHTSA has examined today's proposed rule pursuant to Executive Order 13132 (64 FR 43255, August 10, 1999) and concluded that no additional consultation with States, local governments or their representatives is mandated beyond the rulemaking process. The agency has concluded that the rulemaking would not have sufficient federalism implications to warrant consultation with State and local officials or the preparation of a federalism summary impact statement. The proposed rule would not have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

NHTSA rules can preempt in two ways. First, the National Traffic and Motor Vehicle Safety Act contains an express preemption provision: When a motor vehicle safety standard is in effect under this chapter, a State or a political subdivision of a State may prescribe or continue in effect a standard applicable to the same aspect of performance of a motor vehicle or motor vehicle equipment only if the standard is identical to the standard prescribed under this chapter. 49 U.S.C. 30103(b)(1). It is this statutory command by Congress that preempts any non-identical State legislative and administrative law addressing the same aspect of performance.

The express preemption provision described above is subject to a savings clause under which ''[c]ompliance with a motor vehicle safety standard prescribed under this chapter does not exempt a person from liability at common law.'' 49 U.S.C. 30103(e) Pursuant to this provision, State common law tort causes of action against motor vehicle manufacturers that might otherwise be preempted by the express preemption provision are generally preserved. However, the Supreme Court has recognized the possibility, in some instances, of implied preemption of such State common law tort causes of action by virtue of NHTSA's rules, even if not expressly preempted. This second way that NHTSA rules can preempt is dependent upon there being an actual conflict between an FMVSS and the higher standard that would effectively be imposed on motor vehicle manufacturers if someone obtained a State common law tort judgment against the manufacturer, notwithstanding the manufacturer's compliance with the NHTSA standard. Because most NHTSA standards established by an FMVSS are minimum standards, a State common law tort cause of action that seeks to impose a higher standard on motor vehicle manufacturers will generally not be preempted. However, if and when such a conflict does exist—for example, when the standard at issue is both a minimum and a maximum standard—the State common law tort cause of action is impliedly preempted. See *Geier* v. *American Honda Motor Co.,* 529 U.S. 861 (2000).

Pursuant to Executive Order 13132 and 12988, NHTSA has considered whether this proposed rule could or should preempt State common law causes of action. The agency's ability to announce its conclusion regarding the preemptive effect of one of its rules reduces the likelihood that preemption will be an issue in any subsequent tort litigation. To this end, the agency has examined the nature (*e.g.,* the language and structure of the regulatory text) and objectives of today's proposed rule and finds that this proposed rule, like many NHTSA rules, would prescribe only a minimum safety standard. As such, NHTSA does not intend that this proposed rule would preempt state tort law that would effectively impose a higher standard on motor vehicle manufacturers than that established by today's proposed rule. Establishment of a higher standard by means of State tort law would not conflict with the minimum standard proposed here. Without any conflict, there could not be any implied preemption of a State common law tort cause of action.

Civil Justice Reform

With respect to the review of the promulgation of a new regulation, section 3(b) of Executive Order 12988, ''Civil Justice Reform'' (61 FR 4729, February 7, 1996) requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) Clearly specifies the preemptive effect; (2) clearly specifies the effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct, while promoting simplification and burden reduction; (4) clearly specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. This document is consistent with that requirement.

Pursuant to this Order, NHTSA notes as follows. The preemptive effect of this proposed rule is discussed above. NHTSA notes further that there is no requirement that individuals submit a petition for reconsideration or pursue other administrative proceeding before they may file suit in court.

Paperwork Reduction Act (PRA)

Under the Paperwork Reduction Act of 1995, a person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number. Before seeking OMB approval, Federal agencies must provide a 60-day public comment period and otherwise consult with members of the public and affected agencies concerning each collection of information requirement. NHTSA believes the proposed requirement to explain the meaning of the proposed standardized marks on the lower anchorage connectors and the tether hook in the CRS instruction manual would constitute a ''collection of information'' requirement for child restraint system manufacturers. We are providing a 60-day comment period on reporting burdens and other matters associated with the instruction requirement.

OMB has promulgated regulations describing what must be included in the request for comment document. Under OMB's regulation (5 CFR 1320.8(d)), an agency must ask for public comment on the following:

Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility;

The accuracy of the agency's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used;

How to enhance the quality, utility, and clarity of the information to be collected;

How to minimize the burden of the collection of information on those who are to respond, including the use of appropriate automated, electronic, mechanical, or other technological collection techniques or other forms of information technology, *e.g.* permitting electronic submission of responses.

In compliance with these requirements, NHTSA asks for public comments on the following collection of information:

Title: ''Consolidated Child Restraint System Registration, Labeling and Defect Notifications.''

OMB Control Number: 2127–0576.

Requested Expiration Date of Approval: Three years from the approval date.

Type of Request: Revision of a currently approved collection.

Affected Public: Business, Individuals and Households.

Summary of the Collection of Information: This rulemaking proposes to require CRS manufacturers to include an explanation of the meaning of the standardized markings on the lower anchorage connectors and the tether hook (if available on the CRS) in the printed instructions already provided with each new CRS. The standardized markings on the CRS lower anchor connector and tether hook would help in the development of a consistent and simple education message to improve awareness of child restraint anchorage systems and improve correct installation of child restraints.

NHTSA anticipates a change to the hour burden or costs associated with FMVSS No. 213 due to inclusion of an explanation of the meaning of the standardized markings in the CRS printed instructions. Child restraint manufacturers produce, on average, a total of approximately 4,500,000 child restraints per year. We estimate 2 seconds of additional burden per child restraint for the addition of the information on the existing instruction manual (2 sec × 4,500,000 units = 9,000,000 seconds = 2,500 hours).

Estimated Additional Annual Burden: 2,500 Hours.

Comments are invited on: Whether the proposed collection of information is necessary for the proper performance of the functions of the Department, including whether the information will have practical utility; the accuracy of the Department's estimate of the burden of the proposed information collection; ways to enhance the quality, utility and clarity of the information to be collected; and ways to minimize the burden of the collection of information on respondents, including the use of automated collection techniques or other forms of information technology.

You may submit comments (identified by the DOT Docket ID Number above) by any of the following methods: Federal eRulemaking Portal: Go to *http://www.regulations.gov*. Follow the online instructions for submitting comments. Mail: Docket Management Facility: U.S. Department of Transportation, 1200 New Jersey Avenue SE., West Building Ground Floor, Room W12–140, Washington, DC 20590–0001. Hand Delivery or Courier: West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590–0001 between 9 a.m. and 5 p.m. ET, Monday through Friday, except Federal holidays. Fax: 202–493–2251. Regardless of how you submit your comments, please provide the docket number of this document. You may call the Docket at (202) 366–9324.

Note that all comments received will be posted without change to *http://www.regulations.gov,* including any personal information provided. Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (65 FR 19477–78).

National Technology Transfer and Advancement Act

Under the National Technology Transfer and Advancement Act of 1995 (NTTAA) (Pub. L. 104–113), all Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments. Voluntary consensus standards are technical standards (*e.g.,* material specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies, such as the International Organization for Standardization (ISO) and the Society of Automotive Engineers (SAE). The NTTAA directs us to provide Congress, through OMB, explanations when we decide not to use available and applicable voluntary consensus standards.

NHTSA reviewed various procedures and requirements developed by ISO and SAE to improve the ease of use of child restraint anchorage systems. ISO developed a rating system that evaluates and rates the usability of the CRS's ISOFIX features, the vehicle's ISOFIX system, and the interaction between the two.[100] SAE developed a draft recommended practice providing guidelines to vehicle manufacturers to consider when designing characteristics of vehicle lower and upper (tether) anchorages, and to CRS manufacturers for corresponding features of CRS lower anchorage and tether connectors.[101] In our review, we determined that the ISO and SAE draft programs overall are unlikely to improve the usability of child restraint anchorage systems as effectively as today's NPRM. The ISO

[100] Draft ISO Standard 29061–1:2010, ''Road vehicles—Methods and criteria for usability evaluation of child restraint systems and their interface with vehicle anchor systems—Part 1: Vehicles and child restraint systems equipped with ISOFIX anchors and attachments,'' (November 2010).

[101] Draft SAE J2893, ''Guidelines for Implementation of the Child Restraint Anchorage System in Motor Vehicles and Child Restraint Systems.''

draft standard primarily rates the vehicles and does not directly mandate improvements to the usability of child restraint anchorage systems. Further, UMTRI evaluated vehicles using the draft ISO standard 29061–1:2010 and found no correlation between usability ratings and correct installation of child restraints in the vehicles in user trials. The draft SAE recommended practice J2893 is limited because it is a guideline and does not mandate improved usability.

However, we have tentatively determined that aspects of the ISO and SAE procedures and requirements would improve the ease of use of child restraint anchorage systems and have proposed their inclusion in this NPRM. This NPRM proposes to require the signage developed by ISO for marking lower anchorages and tether anchorages in vehicles, and lower anchorage connectors and tether hooks on CRSs. This NPRM also proposes to adopt the clearance angle and attachment force criteria developed by draft SAE Standard J2893, and proposes to use SAE-developed tools and procedures for evaluating child restraint anchorage system hardware in vehicles.

Unfunded Mandates Reform Act

Section 202 of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, requires Federal agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of more than $100 million annually (adjusted for inflation with base year of 1995). Adjusting this amount by the implicit gross domestic product price deflator for the year 2010 results in $136 million (110.993/81.606 = 1.36). This NPRM would not result in a cost of $136 million or more to either State, local, or tribal governments, in the aggregate, or the private sector. Thus, this NPRM is not subject to the requirements of sections 202 of the UMRA.

Executive Order 13609 (Promoting International Regulatory Cooperation)

The policy statement in section 1 of E.O. 13609 provides, in part:

The regulatory approaches taken by foreign governments may differ from those taken by U.S. regulatory agencies to address similar issues. In some cases, the differences between the regulatory approaches of U.S. agencies and those of their foreign counterparts might not be necessary and might impair the ability of American businesses to export and compete internationally. In meeting shared challenges involving health, safety, labor, security, environmental, and other issues, international regulatory cooperation can identify approaches that are at least as protective as those that are or would be adopted in the absence of such cooperation. International regulatory cooperation can also reduce, eliminate, or prevent unnecessary differences in regulatory requirements.

NHTSA requests public comment on the ‘‘regulatory approaches taken by foreign governments’’ concerning the subject matter of this rulemaking. In the discussion above on the NTTAA, we have noted that we have reviewed the procedures and regulations developed by ISO and SAE to increase the ease of use of child restraint anchorage systems and have used parts of those procedures in this NPRM. Comments are requested on the above policy statement and the implications it has for this rulemaking.

Regulation Identifier Number

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. You may use the RIN contained in the heading at the beginning of this document to find this action in the Unified Agenda.

Plain Language

Executive Order 12866 requires each agency to write all rules in plain language. Application of the principles of plain language includes consideration of the following questions:

• Have we organized the material to suit the public's needs?

• Are the requirements in the rule clearly stated?

• Does the rule contain technical language or jargon that isn't clear?

• Would a different format (grouping and order of sections, use of headings, paragraphing) make the rule easier to understand?

• Would more (but shorter) sections be better?

• Could we improve clarity by adding tables, lists, or diagrams?

• What else could we do to make the rule easier to understand?

If you have any responses to these questions, please write to us with your views.

In our proposed regulatory text for FMVSS No. 225, we have removed outdated sections and deleted obsolete language in an effort to make the standard more concise and easier to understand. We also propose to renumber some sections when multiple outdated paragraphs would be deleted, so that the standard would be easier to read. Please let us know if there are other housekeeping measures we could take to improve the plain language of the standard.

XIII. Public Participation

In developing this proposal, we tried to address the concerns of all our stakeholders. Your comments will help us improve this proposed rule. We welcome your views on all aspects of this proposed rule, but request comments on specific issues throughout this document. Your comments will be most effective if you follow the suggestions below:

—Explain your views and reasoning as clearly as possible.
—Provide solid technical and cost data to support your views.
—If you estimate potential costs, explain how you arrived at the estimate.
—Tell us which parts of the proposal you support, as well as those with which you disagree.
—Provide specific examples to illustrate your concerns.
—Offer specific alternatives.
—Refer your comments to specific sections of the proposal, such as the units or page numbers of the preamble, or the regulatory sections.
—Be sure to include the name, date, and docket number with your comments.

Your comments must be written and in English. To ensure that your comments are correctly filed in the docket, please include the docket number of this document in your comments.

Your comments must not be more than 15 pages long (49 CFR 553.21). We established this limit to encourage you to write your primary comments in a concise fashion. However, you may attach necessary additional documents to your comments. There is no limit on the length of the attachments.

Please submit your comments to the docket electronically by logging onto *http://www.regulations.gov* or by the means given in the **ADDRESSES** section at the beginning of this document.

Please note that pursuant to the Data Quality Act, in order for substantive data to be relied upon and used by the agency, it must meet the information quality standards set forth in the OMB and DOT Data Quality Act guidelines. Accordingly, we encourage you to consult the guidelines in preparing your comments. OMB's guidelines may be accessed at *http://www.whitehouse.gov/omb/fedreg/reproducible.html*.

How do I submit confidential business information?

If you wish to submit any information under a claim of confidentiality, you should submit three copies of your complete submission, including the information you claim to be confidential business information, to the Chief Counsel, NHTSA, at the address given above under **FOR FURTHER INFORMATION CONTACT**. In addition, you should submit a copy from which you have deleted the claimed confidential business information to the docket. When you send a comment containing information claimed to be confidential business information, you should include a cover letter setting forth the information specified in our confidential business information regulation. (49 CFR part 512.)

Will the agency consider late comments?

We will consider all comments that the docket receives before the close of business on the comment closing date indicated above under **DATES**. To the extent possible, we will also consider comments that the docket receives after that date. If the docket receives a comment too late for us to consider it in developing a final rule (assuming that one is issued), we will consider that comment as an informal suggestion for future rulemaking action.

How can I read the comments submitted by other people?

You may read the comments received by the docket at the address given above under **ADDRESSES**. You may also see the comments on the Internet (*http://regulations.gov*).

Please note that even after the comment closing date, we will continue to file relevant information in the docket as it becomes available. Further, some people may submit late comments. Accordingly, we recommend that you periodically check the docket for new material.

Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78).

List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles, and Tires; Incorporation by Reference.

In consideration of the foregoing, NHTSA proposes to amend 49 CFR part 571 as set forth below.

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

■ 1. The authority citation for Part 571 continues to read as follows:

Authority: 49 U.S.C. 322, 30111, 30115, 30117 and 30166; delegation of authority at 49 CFR 1.95.

■ 2. Section 571.5 is amended by adding paragraphs (k)(5) through (k)(8), to read as follows:

§ 571.5 Matter incorporated by reference.

* * * * *

(k) * * *

(5) [Reserved]

(6) Drawing Package, ''NHTSA Anchorage Depth Tool,'' dated August 19, 2013, into § 571.225.

(7) Drawing Package, ''NHTSA Attachment Force Tool,'' dated May 22, 2013, into § 571.225.

(8) Drawing Package, ''NHTSA Clearance Angle Tool,'' dated May 21, 2013, into § 571.225.

* * * * *

■ 3. Section 571.213 is amended by adding S5.6.1.12, revising S5.9(a), S5.9(b) and S5.9(c), and adding Figure 15 and Figure 16 in numerical order, to read as follows:

§ 571.213 Child restraint systems.

* * * * *

S5.6 *Printed Instructions for Proper Use.*

* * * * *

S5.6.1.12 In the case of child restraint systems marked as specified in S5.9 (a) and (b), explain that the markings identify the lower anchorage connectors and the tether anchorage connector, respectively, and that the consumer should look for corresponding marks on the vehicle child restraint anchorage system to attach the appropriate connectors of the child restraint system.

* * * * *

S5.9 *Attachment to child restraint anchorage system.*

(a) Each add-on child restraint, other than a car bed, harness and belt-positioning seat, shall have components permanently attached that enable the restraint to be securely fastened to the lower anchorages of the child restraint anchorage system specified in Standard No. 225 (§ 571.225) and depicted in Drawing Package SAS–100–1000, Standard Seat Belt Assembly with Addendum A or in Drawing Package, ''NHTSA Standard Seat Assembly; FMVSS No. 213, No. NHTSA–213–2003'' (both incorporated by reference, see § 571.5). The connectors must be attached to the add-on child restraint by use of a tool, such as a screwdriver. In the case of rear-facing child restraints with detachable bases, only the base is required to have the connectors. The connectors designed to attach the add-on child restraint to the lower anchorages of the child restraint anchorage system shall be permanently marked with the pictogram in Figure 15. The pictogram is not less than 9 mm in diameter.

(b) In the case of each child restraint system that has components for attaching the system to a tether anchorage, those components shall include a tether hook that conforms to the configuration and geometry specified in Figure 11 of this standard. The tether hook or the tether strap shall be permanently marked with either pictogram shown in Figure 16. If the mark is on the tether strap or on a tag attached to the tether strap, the mark must be located within 25 mm of the tether hardware assembly (which consists of a tether hook and a webbing tightening mechanism designed to tighten or loosen the tether strap).

(c) In the case of each child restraint system that has components, including belt webbing, for attaching to an anchorage of a child restraint anchorage system, the belt webbing shall be adjustable so that the child restraint can be tightly attached to the vehicle. The length of the tether hardware assembly, which consists of a tether hook and a mechanism designed to tighten and loosen the tether strap, shall not exceed 165 mm.

* * * * *

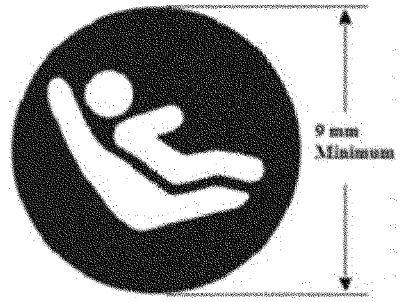


Figure 15--Lower Anchorage Connector Symbol

Notes 1. Drawing not to scale.
2. Symbol may be shown in mirror image.
3. Color of the symbol is at the option of the manufacturer.

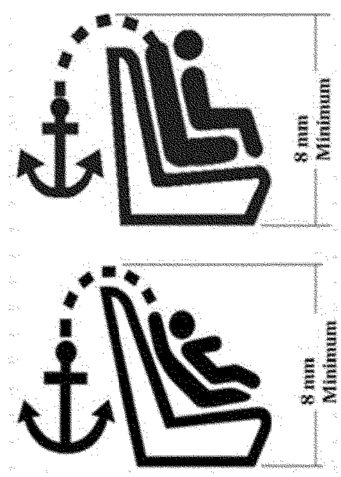


Figure 16--Tether Anchorage Connector Symbol

Notes 1. Drawing not to scale.
2. Symbol may be shown in mirror image.
3. Color of the symbol is at the option of the manufacturer.
4. Either symbol may be marked at the option of the manufacturer.

■ 4. Section 571.225 is amended by:
■ a. Revising S4.2;
■ b. Removing S4.3, S4.4 and S4.5, redesignating S4.6 as S4.3 and revising newly redesignated S4.3;
■ c. Removing S5(e);
■ d. Revising S6.1(a), S6.1(b), S6.2, and removing S6.2.1 through S6.2.2.2;
■ e. Revising S6.3 and removing S6.3.1 through S6.3.4.4;
■ e. Revising the first sentence of S8, the introductory text of S8.1, and removing and reserving S8.2;
■ f. Removing the introductory text of S9, revising S9.1.1(d) and S9.2.2(a), adding S9.2.4 and S9.2.5, and revising S9.5;
■ g. Revising S11, S12(b) and S12(c), and adding S12(d);
■ f. Removing S13 through S16.4;
■ g. Revising Figures 3, 8 and 9, removing and reserving Figures 10, 11, and 19, and adding Figures 24 through 27.

The revised and added text and figures read as follows:

§ 571.225 Child restraint anchorage systems.

* * * * *

S4.2 Vehicles shall be equipped as specified in paragraphs (a) through (c) of this paragraph, except as provided in S5.

(a) Each vehicle with three or more forward-facing rear designated seating positions shall be equipped as specified in S4.2(a)(1) and (2).

(1) Each vehicle shall be equipped with a child restraint anchorage system conforming to the requirements of S6 and S9 at not fewer than two forward-facing rear designated seating positions. At least one of the child restraint anchorage systems shall be installed at a forward-facing seating position in the second row in each vehicle that has three or more rows, if such a forward-facing seating position is available in that row.

(2) Each vehicle shall be equipped with a tether anchorage conforming to the requirements of S6 at a third forward-facing rear designated seating position. The tether anchorage of a child restraint anchorage system may count towards the third required tether anchorage. In each vehicle with a forward-facing rear designated seating position other than an outboard designated seating position, at least one tether anchorage (with or without the lower anchorages of a child restraint anchorage system) shall be at such a designated seating position.

(b) Each vehicle with not more than two forward-facing rear designated seating positions shall be equipped with a child restraint anchorage system conforming to the requirements of S6 and S9 at each forward-facing rear designated seating position.

(c) Each vehicle without any forward-facing rear designated seating position shall be equipped with a tether anchorage conforming to the requirements of S6 at each front forward-facing passenger seating position.

S4.3 *Movable seats.* (a) A vehicle that is equipped with a forward-facing rear designated seating position that can be moved such that it is capable of being used at either an outboard or non-outboard forward-facing seating position shall be considered as having a forward-facing non-outboard seating position. Such a movable seat must be equipped with a tether anchorage that meets the requirements of S6 or a child restraint anchorage system that meets the requirements of S6 and S9, if the vehicle does not have another forward-facing non-outboard seating position that is so equipped.

(b) Tether and lower anchorages shall be available for use at all times, except when the seating position for which it is installed is not available for use because the vehicle seat has been removed or converted to an alternate use such as allowing for the carrying of cargo.

* * * * *

S6.1 * * *

(a) Consist of a rigid bar of any cross section shape that permits the attachment of a tether hook (of a child restraint system) meeting the configuration and geometry specified in Figure 11 of Standard No. 213 (§ 571.213);

(b) Be accessible without the need for any tools and without folding the seat back or removing carpet or other vehicle components to access the anchorages. However, the tether anchorage may be covered with a cap, flap or cover, provided that the cap, flap or cover is specifically designed to be opened, moved aside or to otherwise give access to the anchorage and is labeled with the symbol shown in Figure 27 of this standard.

* * * * *

S6.2 *Location of the tether anchorage.*

(a)(1) Subject to S6.2(b), the part of each tether anchorage to which a tether hook attaches must be located within the shaded zone shown in Figures 3 to 7 of this standard of the designated seating position for which it is installed. The zone is defined with reference to the seating reference point (see § 571.3). (For purposes of the figures, ''H Point'' means seating reference point.) A tether anchorage may be recessed in the seat back, provided that it is not in the strap wrap-around area at the top of the vehicle seat back. For the area under the vehicle seat, the forwardmost edge of the shaded zone is defined by the intersection of the vehicle floor with a plane that is parallel to the torso line reference plane and which passes through the rearmost point of the bottom of the seat at the centerline of the seat, as shown in Figure 3.

(2) The distance of the tether anchorage from a reference point (SB) obtained by the intersection of a plane parallel to the torso line reference plane that passes through the rearmost point of the seat and the strap wrap-around line from the V-point to the tether anchorage, shall be no less than 165 mm as shown in Figure 8 of this standard. The rearmost point of the seat includes the rearmost point of the head restraint, if a head restraint is present. For adjustable head restraints, the rearmost point of the seat is determined with the head restraint positioned at its highest position. For adjustable head restraints, the strap wrap-around line from the V-point to the tether anchorage shall be routed under the head restraint and between the adjustment bars or adjacent to an adjustment bar. In vehicle seating positions with integrated head restraints or with head restraints that do not provide space under the head restraint to route a tether strap, route the strap wrap-around line from the V-point to the tether anchorage over the head restraint. In seating positions without head restraints, route the strap wrap-around line from the V-point to the tether anchorage over the seat back.

(b) In the case of a vehicle that—

(1) Has a user-ready tether anchorage for which no part of the shaded zone shown in Figures 3 to 7 of this standard of the designated seating position for which the anchorage is installed is accessible without removing a seating component of the vehicle; and

(2) Has a tether strap routing device that is—

(i) Not less than 65 mm behind the torso line for that seating position, in the case of a flexible routing device or a deployable routing device, measured horizontally and in a vertical longitudinal plane; or

(ii) Not less than 100 mm behind the torso line for that seating position, in the case of a fixed rigid routing device, measured horizontally and in a vertical longitudinal plane, the part of that anchorage that attaches to a tether hook may, at the manufacturer's option (with said option selected prior to, or at the time of, certification of the vehicle) be located outside that zone.

(iii) The measurement of the location of the flexible or deployable routing device described in S6.2(b)(2)(i) is made with SFAD 2 properly attached to the lower anchorages. A 40 mm wide nylon tether strap is routed through the routing device and attached to the tether anchorage in accordance with the written instructions required by S12 of this standard. The forwardmost contact point between the strap and the routing device must be within the stated limit when the tether strap is flat against the top surface of the SFAD and tensioned to 55 to 65 N. In seating positions without lower anchorages of a child restraint anchorage system, the SFAD 2 is held with its central lateral plane in the central vertical longitudinal plane of the seating position. The adjustable anchorage attaching bars of the SFAD 2 are replaced by spacers that end flush with the back surface of the SFAD 2.

(iv) The distance from the routing device (where the strap has completely cleared the routing device as shown in Figure 9) to the tether anchorage shall be no less than 165 mm.

S6.3 *Strength requirements for tether anchorages.*

(a) When tested in accordance with S8, the tether anchorage must not separate completely from the vehicle seat or seat anchorage or the structure of the vehicle.

(b) *Provisions for simultaneous and sequential testing.* (1) In the case of vehicle seat assemblies equipped with more than one tether anchorage, the force referred to in S6.3 may, at the agency's option, be applied simultaneously to each of those tether anchorages. However, that force may not be applied simultaneously to tether anchorages for any two adjacent seating positions whose midpoints are less than 400 mm apart, as measured in accordance with S6.3(b)(i) and (ii) and Figure 20.

(i) The midpoint of the seating position lies in the vertical longitudinal plane that is equidistant from vertical longitudinal planes through the geometric center of each of the two lower anchorages at the seating position. For those seating positions that do not provide lower anchorages, the midpoint of the seating position lies in the vertical longitudinal plane that passes through the SgRP of the seating position.

(ii) Measure the distance between the vertical longitudinal planes passing through the midpoints of the adjacent seating positions, as measured along a line perpendicular to the planes.

(2) A tether anchorage of a particular child restraint anchorage system will not be tested with the lower anchorages of that anchorage system if one or both of those lower anchorages have been previously tested under this standard.

* * * * *

S8 *Test procedures.* Each vehicle shall meet the requirements of S6.3

when tested according to the following procedures. * * *

S8.1 Apply the force specified in S6.3 as follows—

* * * * *

S8.2 [Reserved]

S9. *Requirements for the lower anchorages of the child restraint anchorage system.*

* * * * *

S9.1.1 * * *

(d) The bars must not be capable of being stowable or foldable.

* * * * *

S9.2 *Location of the lower anchorages.*

* * * * *

S9.2.2 * * *

(a) Located such that when the lower anchorage depth tool depicted in Drawing Package, ''NHTSA Lower Anchorage Depth Tool,'' dated June 2014 (incorporated by reference; see § 571.5), is attached to the anchorage bar, the 2 cm mark on the tool is visible from a vertical longitudinal plane passing through the center of the bar, along a line making an upward 30 degree angle with a horizontal plane; and

* * * * *

S9.2.4 The lower anchorages shall be located such that no more than 178 N (40 lb) of force is needed to securely attach the tool, depicted in Drawing Package, ''NHTSA Attachment Force Tool,'' dated June 2014 (incorporated by reference; see § 571.5), to an anchorage bar with the tool positioned in at least one angle from 0 degrees to 45 degrees from the horizontal using the procedure in S11(b) of this standard.

S9.2.5 The lower anchorages shall be located such that the tool depicted in Drawing Package, ''NHTSA Clearance Angle Tool,'' dated June 2014 (incorporated by reference; see § 571.5), measures a clearance angle of at least 54 degrees using the procedure in S11(c) of this standard.

* * * * *

S9.5 *Marking and conspicuity requirements.*

S9.5.1 *Requirements for lower anchorages.*

(a) Above each bar installed pursuant to S4, the vehicle shall be permanently marked with a circle that:

(1) Is not less than 13 mm in diameter;

(2) Contains the pictogram shown in Figure 24 of this standard; and

(3) Is located such that its center is on each seat back between 50 and 100 mm above or on the seat cushion 100 ±25 mm forward of the intersection of the vertical transverse and horizontal longitudinal planes intersecting at the horizontal centerline of each lower anchorage, as illustrated in Figure 22. The center of the circle must be in the vertical longitudinal plane that passes through the center of the bar (±25 mm).

(4) The circle may be on a tag.

(b) The bars may be covered by a removable cap or cover, provided that the cap or cover is permanently marked with the pictogram shown in Figure 24. If the cap or cover is permanently attached to the vehicle, the lower anchorage bars are not required to be separately marked with the pictogram. If the cap or cover is not permanently attached to the vehicle, the lower anchorage bars must also be marked with the circle meeting S9.5.1(a)(1) through (a)(3) of this standard.

S9.5.2 *Requirements for tether anchorages.*

(a) For each tether anchorage installed pursuant to S4, there shall be a permanent mark that:

(1) Consists of the pictogram shown in Figure 25 of this standard that is not less than 20 mm in diameter;

(2) The center of the circle in the longitudinal direction must be in the vertical longitudinal plane that passes through the center of the tether anchorage bar (±5 mm), as shown in Figure 26 (Front View) of this standard.

(3) The nearest edge of the mark shall be located not more than 25 mm away from the tether anchorage bar as shown in Figure 26 (Side View) of this standard.

(b) The tether anchorage bar may be covered by a cap or cover that is removable without the use of any tool, provided that the cap or cover is permanently labeled with a mark meeting the requirements of S9.5.2(a)(1). The center of the mark on the cap or cover shall be centered at the middle of the tether anchorage bar, as shown in Figure 27 of this standard. If the cap or cover is permanently attached to the vehicle, the tether anchorage is not required to be separately marked. If the cap or cover is not permanently attached to the vehicle, the tether anchorage must also be marked with the circle meeting S9.5.2(a)(1) through S9.5.2(a)(3) of this standard.

* * * * *

S11. *Test procedures.* Each vehicle shall meet the requirements of this standard when tested according to the following procedures. Where a range of values is specified, the vehicle shall be able to meet the requirements at all points within the range.

(a) *Strength requirements.*

(1) *Forward force direction.* Place SFAD 2 in the vehicle seating position and attach it to the two lower anchorages of the child restraint anchorage system. Do not attach the tether anchorage. A rearward horizontal force of 135 ±15 N is applied to the center of the lower front crossbar of SFAD 2 to press the device against the seat back as the fore-aft position of the rearward extensions of the SFAD is adjusted to remove any slack or tension. Apply a preload force of 500 N horizontally and in the vertical centerline of the SFAD 2 at point X. Increase the pull force as linearly as practicable to a full force application of 11,000 N in not less than 24 seconds and not more than 30 seconds, and maintain at an 11,000 N level for 1 second.

(2) *Lateral force direction.* Place SFAD 2 in the vehicle seating position and attach it to the two lower anchorages of the child restraint anchorage system. Do not attach the tether anchorage. A rearward force of 135 ±15 N is applied to the center of the lower front crossbar of SFAD 2 to press the device against the seat back as the fore-aft position of the rearward extensions of the SFAD is adjusted to remove any slack or tension. Apply a preload force of 500 N horizontal and perpendicular to the longitudinal centerline of the SFAD 2 at point X of the test device. Increase the pull force as linearly as practicable to a full force application of 5,000 N in not less than 24 seconds and not more than 30 seconds, and maintain at a 5,000 N level for 1 second.

(b) *Attachment force.* The seat back angle, if adjustable, is set at the manufacturer's nominal design seat back angle. Remove any lower anchorage cover if present. To measure attachment force, hold the force attachment tool perpendicularly aligned with the center of the lower anchorage. Position the tool at an angle of 0 to 45 degrees from the horizontal, and push the tool towards the lower anchorage. Measure the force needed to engage the tool to the lower anchorage.

(c) *Clearance angle.* The seat back angle, if adjustable, is set at the manufacturer's nominal design seat back angle. Remove any lower anchorage cover if present. To measure clearance angle, attach the clearance angle tool to the lower anchorage and apply a vertical force of 67 N (15 lb) to the tool. Measure the angle (with respect to the horizontal) of the tool while the force is being applied.

* * * * *

S12. *Written instructions.*

* * * * *

(b) In the case of vehicles required to be marked as specified in paragraphs S4.1, S9.5.1 and S9.5.2, explain the meaning of markings provided to locate the lower anchorages of child restraint anchorage systems and the top tether anchorages;

(c) Include instructions that provide a step-by-step procedure, including diagrams, for properly attaching a child restraint system's tether strap to the tether anchorages; and

(d) Include instructions on how to locate and access the tether anchorage and the lower anchorages.

Figures to § 571.225

* * * * *

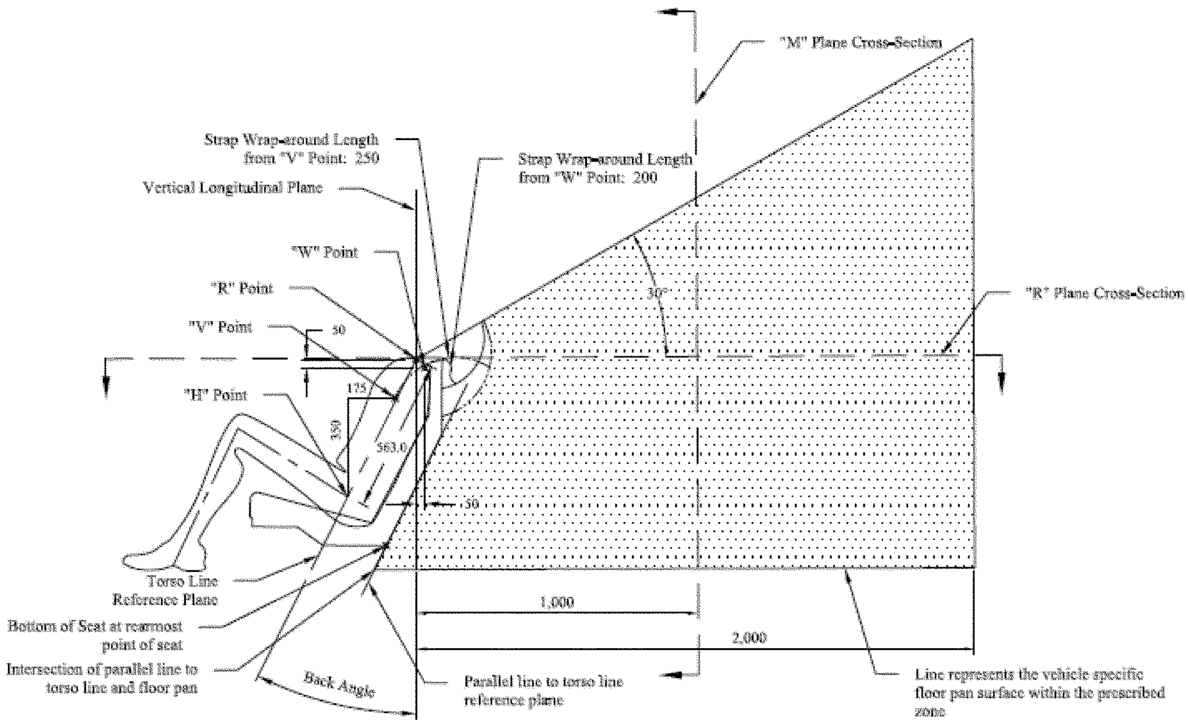
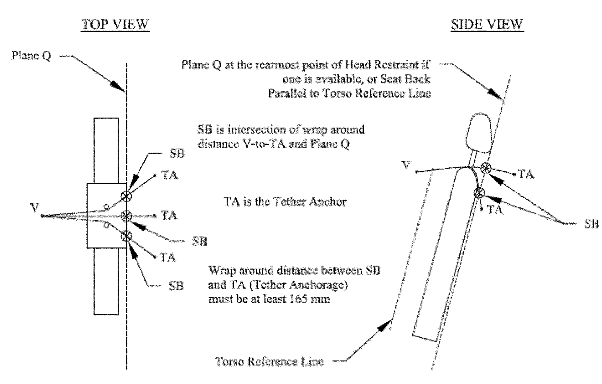


Figure 3 – Side View, User ready Tether Anchorage Location



Top View (Left) and Side View (Right) of Minimum Distance between Tether Anchorage and Point SB

Figure 8. Top view (left) and side view (right) of minimum distance between tether anchorage and point SB.

Notes: SB point is the intersection of the plane parallel to the torso line reference plane that passes through the rearmost point of the vehicle seat, and the strap wrap-around line from the V-point to the tether anchorage.

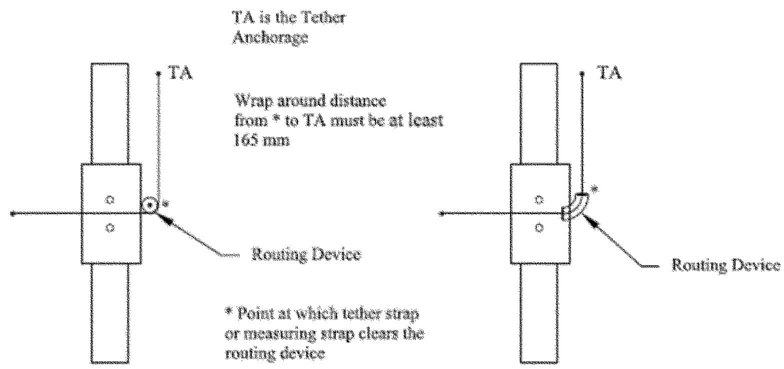


Figure 9. Top view of minimum distance between tether anchorage and routing device.

* * * * *

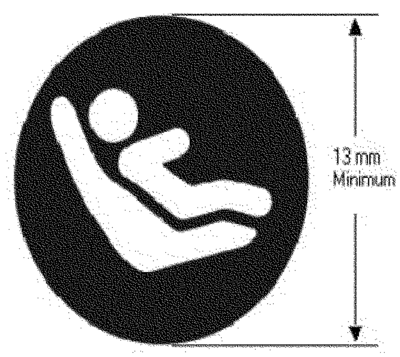


Figure 24 — Lower Anchorage Symbol

Notes: 1. Drawing not to scale.
2. Symbol may be shown in mirror image.
3. Color of the symbol at the option of the manufacturer.

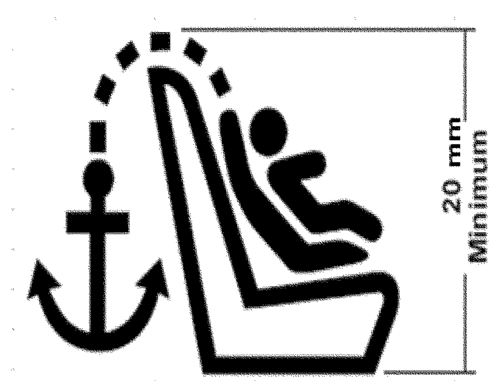


Figure 25 — Tether Anchorage Symbol

Notes: 1. Drawing not to scale.
2. Symbol may be shown in mirror image.
3. Color of the symbol at the option of the manufacturer.

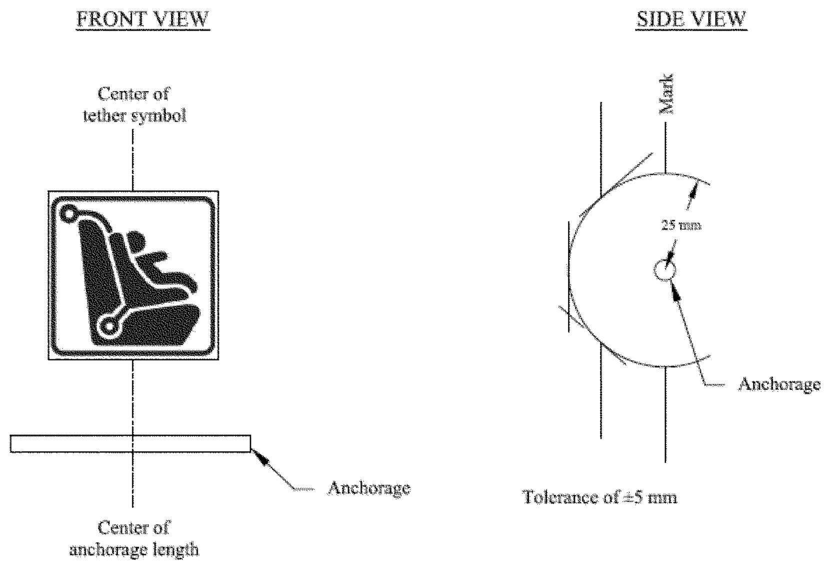


Figure 26. Tether Anchorage Marking Location (No Cover).

(Tolerance of ±5 mm)

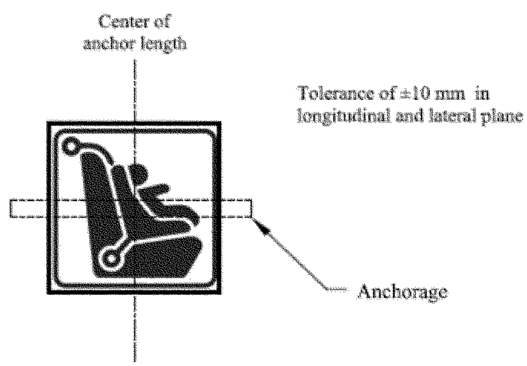


Figure 27. Tether Anchorage Marking Location on Cover

(Tolerance of ±10 mm in the Longitudinal and/or Lateral Plane.)

Note: The following Appendices will not appear in the CFR.

Appendix A: Field Studies

Decina Study—2005

Three years after FMVSS No. 225 was fully phased in and child restraints made to meet the corresponding changes in FMVSS No. 213, NHTSA conducted a survey from April to October 2005 to assess the progress made since 2002 and identify the possible needs for additional steps. See Decina et al., ''Child Restraint Use Survey: LATCH Use and Misuse,'' *supra*.). NHTSA wanted to know whether drivers of vehicles equipped with child restraint anchorage systems were using the systems to secure child restraints to the vehicle seat, and if so, whether they were properly installing the restraints. In the survey, the make/model and the type of restraint installed in each seating position were recorded for each vehicle, and the demographic characteristics and the type of child restraint system were collected for each occupant. In addition, information was gathered about the drivers' knowledge of child restraint anchorage systems, along with their opinions on how easy it was for them to use the systems. The study involved 1,121 children from birth to age 4 in child restraint systems.

Key findings of the survey were:

(a) Of the child restraints located in a seating position equipped with an upper tether anchor, 55 percent were attached to the vehicle using the upper tether.

(b) Among the 87 percent who placed the CRS at a position equipped with lower anchors, 60 percent used the lower attachments to secure the restraint to the vehicle.

(c) In 13 percent of the vehicles equipped with child restraint anchorage systems in which there was a child restraint, the restraint was placed in a seat position not equipped with lower anchors—instead, the vehicle seat belt was used to secure the restraint to the vehicle.

(d) Sixty-one (61) percent of upper tether nonusers and 55 percent of lower anchorage nonusers cited their lack of knowledge—not knowing what the anchorages were, that they were available in the vehicle, the importance of using them, or how to use them properly—as the reason for not using them.

(e) Of those drivers with experience using both lower anchorages and seat belts: (1) 81 percent of upper tether anchorage users and 74 percent of lower anchorage users said upper tether and/or lower anchorages were easy to use; and (2) 75 percent preferred the lower anchorages over seat belts.

(f) Sixty-one (61) percent of child restraints installed with child restraint anchorage systems were securely installed.

All in all, the Decina study found that consumers who have experience with the child restraint anchorage systems like them. Among consumers having knowledge of both lower anchorages and seat belt attachment, 75 percent preferred using lower anchorages. Further, the report found that child restraint anchorage systems are helping to reduce the incorrect installation of child restraints (61 percent of child restraints installed with child restraint anchorage systems were securely installed, as compared to about 40–46 percent of CRSs installed by seat belts securely installed).

However, the report also indicated that proper use of child restraint anchorage systems is not inherently evident. Many drivers do not use the anchorage system because they do not know about it or understand its purpose. There is also some confusion about where the anchorages can be found. In addition, there were differing degrees of difficulty using the anchorages depending on location and configuration of the CRS hardware.

National Child Restraint Use Special Study—2011 Data

The National Child Restraint Use Special Study (NCRUSS) is a large-scale nationally-representative survey that involves both an inspection of the child passenger's restraint system by a CPST and a detailed interview of the driver.[102] The survey collected information on drivers and their child passengers of ages 0–8 years between June and August 2011. NCRUSS data were collected at 24 primary sampling units (PSUs) across the country. The PSUs were previously established from a separate ongoing data collection effort, the National Automotive Sampling System (NASS). The PSUs are defined geographically, similar to cities or counties. The PSUs were selected to cover urban, rural, and suburban environments and are located in 17 different states.

The survey collected 4,167 observations on children under 9 years of age, of which 268 (weighted percentage = 8.5 percent) were of infant seats with a base, 142 (weighted percentage = 3.6 percent) were of convertible or all-in-one type CRSs installed in rear-facing mode and 1,983 (weighted percentage = 49.6 percent) were of convertible, combination or all-in-one type CRSs installed in forward-facing mode with harness. The remaining observations were of children in other types of restraints including booster seats, seat belts, vests, car beds, etc. The survey also found less than 2 percent of children unrestrained.

For CRSs with internal harnesses, the survey results show that 49 percent of CRSs were installed with lower anchorages, 44 percent were installed with seat belts, and 7 percent with both seat belt and lower anchorages. When the analysis was restricted to only vehicles equipped with child restraint anchorage systems, 61 percent of the CRSs were installed using the lower anchorages and 9 percent with both seat belt and lower anchorages. Decina had found that 55 percent of the harnessed CRSs observed in vehicles with child restraint anchorage systems were attached using the lower anchorages. The NCRUSS study shows a 15 percent increase in the rate of all lower anchorage installations from 2005 to 2011.

As for tether use, for forward-facing CRSs with internal harnesses,[103] tether use was 71 percent when installed with the lower anchorages and 31 percent when installed with seat belts.

Safe Kids Worldwide (Safe Kids) Data

In September 2011, Safe Kids published a study based on 79,000 observations from ''car seat check'' events and appointments that took place between October 1, 2009 and September 30, 2010.[104] Safe Kids developed a standardized checklist that it uses at car seat check events and records how the child and/or child restraint arrived at the event and how the child and/or child restraint left the event. The checklists are then scanned and entered into a database that Safe Kids manages and updates.

The study found that correct installation ranged between 39 to 61 percent for seat belt installations and between 46 to 60 percent for lower anchorage installation. Safe Kids defined correct seat belt installation as one in which the child restraint's manufacturer's instructions were followed and that is in accordance with the Child Passenger Safety Certification Program (CPSCP)[105] best practices, including seat belt routing, tightness (must not move more than 1 inch side to side or front to back when grasped by the belt path) and having a locked seat belt. Correct lower anchorage installation consisted of using the lower anchorages as instructed in both the CRS and vehicle manuals as well as following the CPSCP best practices including: Using correct hardware, using connectors in the right direction, correct identification of the designated lower anchors in the vehicle and installation tightness.

Safe Kids found a 7 percentage point difference in correct use between lower anchorage installations and seat belt installations for infant seats with base, and a 10 percentage point difference in correct use between lower anchorage installations and seat belt installations of forward-facing seats, with lower anchorage installations having the higher rates of correct use. For other rear-facing seats, seat belt installations had a 1 percentage point advantage of correct use compared to installations with lower anchorages.

As for tether use, the study found 59 percent correct tether use in forward-facing CRSs.

We also reviewed Safe Kids sample data from the first quarter of 2012 comprising 17,000 observations. The data showed that 48 percent of CRSs with internal harness were installed with the lower anchorages, 46 percent with the seat belt and 6 percent with both seat belt and lower anchorages in all vehicles (data did not distinguish whether the vehicles were equipped with child restraint anchorage systems). Overall tether usage in forward-facing CRSs with internal harness was only 29 percent. Tether use was 45 percent when the CRS was attached with lower anchorages and 15 percent when the CRS was attached with seat belt.[106]

Appendix B: Summary of 2007 Public Meeting

In response to the 2006 report by Decina et al., supra, NHTSA held a public meeting on February 8, 2007 to bring together child restraint and vehicle manufacturers, retailers, technicians, researchers, and consumer groups to discuss ways to improve child passenger safety through improving CRS designs and increasing the proper use of child restraint systems.[107] Questions were posed to the participants of the public meeting regarding child restraint anchorage system design, ease of use, and approaches to educating the public about proper use.[108] NHTSA solicited comments on design considerations for tether anchorage locations, lower anchorage accessibility, system availability in the center seating position, and design of child restraint hooks and connectors. With respect to child restraint anchorage system ease of use, NHTSA was interested in the development of more user-friendly connectors, consumer information on vehicle child restraint anchorage system hardware, and CRS and vehicle compatibility. As for consumer education, NHTSA wanted to know what types of

[102] National Child Restraint Use Special Study, DOT HS 811 679, *http://www-nrd.nhtsa.dot.gov/Pubs/811679.pdf* (Full report pending).

[103] Rear-facing seats and booster seats are not typically equipped or used with tether straps in the U.S.

[104] ''A Look Inside American Family Vehicles 2009–2010,'' Safe Kids USA (*http://www.safekids.org/assets/docs/safety-basics/safety-tips-by-risk-area/sk-car-seat-report-2011.pdf*).

[105] The National Child Passenger Safety Certification Program certifies individuals as CPSTs. NHTSA assists in developing the curriculum of the certification; the National CPS Board oversees the quality and integrity of the training and certification requirements; and Safe Kids Worldwide functions as the certifying body.

[106] The reduced tether use in the 2012 Safe Kids data compared to NHTSA's NCRUSS study could be attributed to the differences in the two observation samples. The Safe Kids observations are made at seat check stations where caregivers come to seek advice from the CPSTs on correct CRS installation. These caregivers may be novice CRS users or are unsure of the method of CRS installation. Therefore, this convenience sample of observations may be biased towards incorrect or non-ideal CRS installations. On the other hand, the NCRUSS observations are from a stratified sample representative of CRS use and installation in the United States and are designed to be bias-free.

[107] 72 FR 3103, January 24, 2007, notice of public meeting, request for comments.

[108] Id.

questions consumers had and how to spread child restraint anchorage system awareness.

The agency received comments from vehicle manufacturers, child passenger advocacy groups, researchers, and individuals. While the comments and suggestions received on child restraint anchorage system were varied, the main themes were as follows:

Lower Anchorages: There was support for improving the conspicuity, accessibility, and ease of use of the lower anchorages without compromising comfort to adult occupants, and standardizing the location of the lower anchorages.

Markings of Anchorages: There were suggestions for requiring all anchorages to be marked by the International Standards Organization (ISO) symbol regardless of anchorage visibility, requiring similar markings for the CRS connectors, and considering color coded labels to clarify the anchorage locations for each DSP.

Child restraint anchorage system for rear center seat: There was support for requiring a child restraint anchorage system in all rear center seats, or developing provisions to use the inboard anchorages of the outboard seating position for the center seat while taking into consideration the possibility of misuse when two CRSs are connected to the same anchorage.

Child restraint anchorage system for 3rd row seating positions: Some suggested requiring additional child restraint anchorage system-equipped DSPs for vehicles with three or more rows.

Consumer education: There were suggestions on using consistent terminology in education material and developing up-to-date uniform curriculum, requiring that a DVD or Web site be included in the instruction manual for CRS installation, emphasizing the use of tethers and explicitly encouraging the use of child restraint anchorage systems rather than simply listing it as an option for installation.

A more detailed summary of comments received from the 2007 public meeting regarding child restraint anchorage system ease of use is set forth below.

Lower Anchorage Usability

- Advocates for Highway Safety (Advocates), the American Academy of Pediatrics (AAP), and Safe Ride News (SRN) suggested that lower anchors be located farther forward in the seat bight to increase visibility and make installation and removal easier.
- Advocates suggested that lower anchors need to be just as accessible as seat belts. Otherwise, parents will continue to install child restraints with seat belts over the LATCH system.
- SafetyBelt Safe USA (SBS) said that it is more difficult to remove restraints from recessed anchors.
- SRN called for further research into whether hidden lower anchors are a deterrent to using the LATCH system.
- Honda was concerned that moving anchors out of the seat bight would cause occupant discomfort and would necessitate the redesign of some seats. Instead, Honda suggested that there might be a different way to clear space around anchors without moving them forward.
- General Motors (GM) suggested that NHTSA evaluate SAE's lower anchor access design guidelines.

Conspicuity and Identification of Anchors (Marking of Anchors)

- GM, Advocates, AAP, SRN, and the University of Virginia (UVA) recommended that all tethers and lower anchors, regardless of visibility, be conspicuously marked. GM suggested that the industry develop a voluntary agreement to label all tethers with an anchor symbol and all lower anchors with a baby dot symbol. The connectors on the child restraint would also be labeled with the same symbols for easy matching.
- AAP, SRN, and several CPSTs recommended that sets of lower anchors be labeled or color coded to clarify which seating position they serve, especially in the case of overlapping lower anchors.

Tether Anchorage Specifications, Location, and Accessibility

- GM and SRN supported further restriction of the tether zone to eliminate problems associated with tethers located underneath seats and to make tether anchors more accessible. It was also noted that further limitation of this zone would also ensure that child restraints with shorter tether straps would be able to reach the tether anchor.
- Honda recommended that NHTSA gain full understanding of the optimal tether locations for different vehicle configurations before further restricting the zone. It noted that tether anchor locations in many vehicles are limited due to strength requirements.
- Honda recommended that NHTSA consider the comfort, ingress/egress and excursion space of other occupants when determining acceptable tether locations.
- AAP recommended that vehicle manufacturers provide tether locations forward of seats for use with rear-facing seats.

Anchorage System for Center Seat

- GM and Honda recommended that provisions be developed for the use of inboard lower anchors from outboard seats to create a center seat full LATCH system. However, Honda noted that it does not currently encourage this type of use since these anchors often are not set 280 mm (11 in) apart, as specified in FMVSS No. 225. Honda, SBS, GM and SRN recommended that NHTSA research the range of safe distances between lower anchors in order to determine the feasibility of this type of use.
- AAP was concerned that if consumers are given the option of attaching a child seat to the inboard anchors of outboard seats, they will then attach two child restraints to the same lower anchor when installing adjacent restraints. One CPST recommended a solution of making lower anchors smaller in size to discourage parents from attempting to attach multiple restraints to a single anchor.
- Advocates, UVA, and three CPSTs suggested that all center seats be equipped with a full LATCH system.
- AAP, Advocates, and two CPSTs agreed that conflicting information is currently given to parents regarding the center seat position being the ''safest'' and the availability of full LATCH systems in the center seat. The commenters suggested that this discrepancy should be reconciled to avoid confusion when installing seats in the center position. Possible solutions suggested include a dedicated set of center seat anchors or built-in center seat child restraints.

Full LATCH for 3rd Row Seat Positions

- SRN and SBS suggested that the minimum number of full LATCH systems for a vehicle with three rows be increased. They thought that providing more LATCH systems per vehicle could reduce the number of incidences where multiple restraints are attached to a single anchor.

Consumer Education

- AAP advised against inconsistent vocabulary, recommending that NHTSA clarify certain terminology, such as ''LATCH'' referring to the entire system rather than just the lower anchorages.
- Cohort 22 and UVA suggested that either a DVD or a Web site link be included in instruction manuals to provide users an installation video that would better clarify what a ''tight fit'' means.
- Honda suggested making a tether strap routing procedure available to consumers.
- AAP believed that the importance of the tether in the LATCH system must be emphasized to consumers. SRN recommended that manuals explicitly encourage the use of LATCH rather than simply listing it as an option for installation.
- GM, Honda, SRN, and a CPST emphasized the importance of consumer education and public awareness of LATCH. SRN suggested that an up-to-date and uniform curriculum of information be developed so that the information given to parents and caregivers is consistent from all sources (*e.g.* hospitals, police, and doctors).

Appendix C: Other Usability Efforts

International Organization for Standardization (ISO)

ISO, a worldwide voluntary federation of ISO member bodies, is drafting an approach toward improving the usability of a child restraint anchorage system called ''ISOFIX.'' [109] (ISO 29061–1:2010, Road vehicles—Methods and criteria for usability evaluation of child restraint systems and their interface with vehicle anchorage systems—Part 1: Vehicles and child restraint systems equipped with ISOFIX anchorages and attachments.) The draft ISO approach uses a rating system and criteria to provide child restraint and vehicle manufacturers with a tool for the assessment of the usability of ISOFIX systems. ISO also provides consumers (parents and caregivers) with information to assist them in selecting a CRS and vehicle with ISOFIX systems that are easy to use, with the aim that the information will result in more correct installations.

The ISO approach evaluates and rates the usability of the CRS's ISOFIX features, the

[109] ISOFIX is a system, mostly used in Europe, for the connection of child restraint systems to vehicles. The system has two vehicle rigid anchorages, two corresponding rigid attachments on the child restraint system and a means to limit the pitch rotation of the child restraint system.

vehicle's ISOFIX system, and the interaction between the two. While the ISOFIX system is not used in the U.S., the system is very similar to the FMVSS No. 225 child restraint anchorage system and therefore, the evaluation developed by ISO can mostly be applied to our systems. The vehicle assessment with this methodology include the instructions on how to identify the number and location of ISOFIX-equipped seating positions, the visibility and labeling of the ISOFIX anchorages, the proximity of hardware equipment to the tether anchorage that could be mistakenly used to attach the tether, and interference between lower anchorages and seat belt equipment. The interaction between the vehicle and CRS is evaluated using the criteria listed in Table 2.

The ISOFIX systems of the CRS, vehicle, and the interaction between the two are rated using a weighted scoring system with the weights corresponding to the importance of each criterion for improving ease of use and correct installation. Each criterion is rated on a 3 point scale where a rating of good, average, and poor are given a score of 3, 1, and 0, respectively. The importance of each criterion is also rated on a 3 point scale ranging from 1 to 3, with 3 being the most important.

TABLE 2—CRITERIA ITEMS IN FORM 3 OF ISO 29061–1:2010 WITH SCORING SYSTEM

[CRS and vehicle interaction]

	Score Good, average and poor (3/1/0 points respectively)	Importance (A,B,C = 3/2/1 points respectively)
3.1.1 Using the CRS, are the prepared vehicle ISOFIX anchorages accessible during the connecting process (*i.e.*, is it possible to use them?)		
3.1.2 ISOFIX anchorages accessible during installation process?		
3.1.3 Is there clear feedback that the CRS is correctly attached to the ISOFIX anchorages?		
3.1.4 Can the ISOFIX attachments be tightened after the initial connection to the lower anchorages?		
3.1.5 Flexible attachments only: When properly installed, no hidden slack can exist in lower attachments.		
3.1.6 Is the child harness fully operable when ISOFIX is installed properly?		
3.2.1 Actions required to attach the tether to the tether anchorage?		
3.2.2 Can tether be tightened properly?		
3.2.3 Is there clear feedback that the child restraint system is correctly attached to the tether anchorage?		
3.3.1 Actions required to adjust the primary anti-rotational device to the correct position (*e.g.*, a support leg in a rearward installation)?		
3.3.2 Actions required to operate any secondary anti-rotational device(s) [*e.g.*, a rebound bar, or rebound tether(s), in a rearward installation]?		
3.4.1 CRS and base preparation: CRS Base and CRS shell ready for installation?		
3.4.2 Actions required to attach the CRS shell to base?		
3.4.3 Is there a clear feedback of correct locking of the CRS to the base?		
3.4.4 Actions required to detach CRS from base?		
3.5.1 Ease of releasing tension of tether?		
3.5.2 Actions required to detach and store the tether strap after tension has been released?		
3.5.3 Ease of releasing tension of flexible CRS attachments?		
3.5.4 Actions required to remove and store the primary anti-rotational device?		
3.5.5 Actions required to remove and store any secondary anti-rotational device(s)?		
3.5.6 Actions required to detach the attachments from the ISOFIX anchorages?		

b. Society of Automotive Engineers (SAE) Recommended Practice (Draft)

A draft SAE recommended practice entitled J2893,[110] ''Guidelines for Implementation of the Child Restraint Anchorage System in Motor Vehicles and Child Restraint Systems,'' developed by SAE's Child Restraint Systems Standards Committee, provides guidelines to vehicle manufacturers for certain characteristics of vehicle lower and upper (tether) anchorages, and to CRS manufacturers for corresponding features of CRS lower anchorage and tether connectors, so that each of their products can be made more compatible with the other. SAE developed tools and procedures for evaluating the child restraint anchorage system hardware features in vehicles and child restraints. The eleven guidelines include the following:

Can the child restraint fixture attach to the lower anchors?

Is the force to attach lower anchors less than 75 Newton (N) (16.9 pound (lb))?

Is the clearance angle as measured with a specified angle measurement tool greater than 75 degrees?

When resting unattached on the vehicle seat, is the lateral angle of the child restraint fixture less than 5 degrees?

When installed on the lower anchors, is the pitch angle of the child restraint between 5 and 20 degrees?

Does a specified collinearity tool attach to the lower anchors?

Does a specified angle measurement tool contact any rigid structure around the lower anchors?

When installed, is the distance from the Z-point on the child restraint fixture to the seat cushion less than 51 mm?

Are tether anchors marked with the ISO Symbol?

Are lower anchors marked with the ISO symbol?

If a tether router is present, does it accommodate a specified tether hardware assembly clearance tool?

c. NCAP's Pending Vehicle-CRS Fit Program

On February 25, 2011,[111] NHTSA published a request for comments on the agency's plan to adopt a new consumer information program that would be part of the agency's New Car Assessment Program (NCAP). The intent of the program is to make it easier for consumers to obtain a CRS that fits well in their vehicle. (76 FR 10637, February 25, 2011, Docket No NHTSA–2010–0062.)

NHTSA proposed the Vehicle-CRS Fit program to be a voluntary program, in which NHTSA would make available to consumers information provided by vehicle manufacturers as to the specific CRSs that fit in specific vehicle models. NHTSA developed a set of criteria to define what constitutes an acceptable ''fit'' under the program. The plan was for vehicle manufacturers to use the criteria to assess the fit of child restraints in their vehicles and determine which CRSs can be identified as fitting the vehicle. The vehicle manufacturers

[110] The SAE J2893 Version 1–Draft 7 was used for the UMTRI study. Any mention of the SAE J2893 recommendations throughout this document will refer to this draft version of the guidelines which are still under development.

[111] 76 FR 10637, February 25, 2011 request for comment, Docket No NHTSA–2010–0062. NHTSA is in the process of considering the next steps for the program.

would provide this information to NHTSA, and NHTSA in turn would post this information on the agency's NCAP Web site, *www.safercar.gov.*

The agency proposed that part of the assessment of an adequate fit would evaluate the interface of the CRS with the child restraint anchorage system. The agency proposed that the following criteria be included in evaluating the fit of a CRS in a vehicle:

Whether the tether of the CRS can be attached to the tether anchorage;

Whether the tether can be properly tightened once attached to the tether anchorage;

Whether the lower anchorage connectors on the CRS can be properly attached to the vehicle's lower anchorages;

Whether the lower anchorage connectors on the CRS can be tightened (if necessary) once connected to the lower anchorages;

Whether the seat belt buckles for adjacent seating positions are available for use by other passengers after the CRS is installed in the vehicle using the lower anchorages of a child restraint anchorage system; and

Whether the upper weight limit of the CRS is less than the upper weight limit specified for the vehicle's lower anchorages.

NHTSA envisioned that consumers would use the information on the *safecar.gov* Web site to see the CRSs that the vehicle manufacturer has said will fit a particular vehicle. As part of the program, NHTSA would conduct spot-checks of the manufacturers' information to verify that the identified CRSs do meet the fit criteria of the program.

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R. Ryan Posten,

Associate Administrator for Rulemaking.

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