DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA–2020–0093]

RIN 2127–AL34

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

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

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

SUMMARY: In accordance with the Moving Ahead for Progress in the 21st Century Act (MAP–21), this document proposes to amend Federal Motor Vehicle Safety Standard (FMVSS) No. 213, ''Child restraint systems,'' by updating the standard seat assembly on which child restraint systems (CRSs) are tested to determine their compliance with the standard's dynamic performance requirements. This NPRM proposes other amendments to modernize FMVSS No. 213, including a lessening of restrictions in some of the standard's owner registration and labeling requirements, to give manufacturers more flexibility in communicating with today's parents for the purposes of increasing owner registrations for recall notification purposes and increasing the correct use of CRSs, respectively. NHTSA is also proposing ways to streamline the Agency's use of test dummies to assess restraint performance, including simplifying the standard's compliance tests to make them more reflective of the real-world use of CRSs today. The purpose of these and other proposals is to modernize the seat assembly and other aspects of FMVSS No. 213, to help ensure the continued effectiveness of CRSs in current and future vehicles.

DATES: Comments must be received on or before January 4, 2021.

Proposed effective date: 180 days after publication of the final rule in the **Federal Register**.

Proposed compliance date: Three years following the date of publication of a final rule in the **Federal Register**, with optional early compliance permitted.

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. To be sure someone is there to help you, please call (202) 366–9332 before coming.
- *Fax:* 202–493–2251.

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

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: In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its decision-making process. DOT posts these comments, without edit, including any personal information the commenter provides, to *www.regulations.gov,* as described in the system of records notice (DOT/ALL–14 FDMS), which can be reviewed at *www.transportation.gov/privacy.* In order to facilitate comment tracking and response, the agency encourages commenters to provide their name, or the name of their organization; however, submission of names is completely optional. Whether or not commenters identify themselves, all timely comments will be fully considered.

Docket: For access to the docket to read background documents or comments received, go to *www.regulations.gov,* or the street address listed above. To be sure someone is there to help you, please call (202) 366–9322 before coming. Follow the online instructions for accessing the dockets.

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:

I. Executive Summary

Consistent with MAP–21, NHTSA proposes to amend FMVSS No. 213 to update the standard seat assembly on which child restraint systems (CRSs) are tested for compliance with the standard's dynamic performance requirements. NHTSA also proposes lessening restrictions in some of the standard's owner registration requirements to give manufacturers more flexibility to use current ways of communication for the purposes of increasing owner registrations for recall notification purposes. This NPRM proposes to lessen restrictions on the labeling requirements so manufacturers have the flexibility to provide CRS use information in statements, or a combination of statements and pictograms, in their own words at locations that they deem most effective in instructing caregivers on the correct use of the CRS. This NPRM also proposes ways to streamline the Agency's use of test dummies to assess restraint performance, including simplifying NHTSA's compliance tests to make them more reflective of the real-world use of CRSs today. In addition, NHTSA proposes amendments to FMVSS No. 213 to make the standard more design-neutral in accommodating CRSs that are designed for exclusive use on school bus seats.[1] Lastly, NHTSA requests comment on several developments in child passenger safety, including the findings of research studies that raise safety concerns associated with some types of CRSs.

a. Background

FMVSS No. 213 applies to all new child restraint systems (''CRSs'' or ''child restraints'') sold in this country. FMVSS No. 213 specifies performance requirements that must be met in a dynamic frontal sled test involving a 48 kilometer per hour (km/h) (30 mile per hour (mph)) velocity change, which is representative of a severe crash. Each child restraint is tested with an anthropomorphic test device (''ATD'' or ''test dummy'') while attached to a standardized seat assembly representative of a passenger vehicle seat (''standard seat assembly''). Currently, CRSs for infants and toddlers must meet minimum performance requirements when attached to the standard seat assembly by means of a lap belt. In addition, those CRSs must also meet those requirements in separate tests when attached by means of the lower anchorages of a child restraint anchorage system.[2] Belt-positioning (booster) seats are tested on the standard seat assembly using a lap and shoulder belt, since the booster seats are specially designed to raise the child on a platform to obtain a proper fit of the vehicle lap and shoulder belts.[3]

Child restraints are highly effective in reducing the likelihood of death and injury in motor vehicle crashes. NHTSA estimates that, for children less than 1 year old, a child restraint can reduce the risk of fatality by 71 percent when used in a passenger car and by 58 percent when used in a pickup truck, van, or sport utility vehicle (SUV) (''light truck''). Child restraint effectiveness for children between the ages of 1 and 4 years old is 54 percent in passenger cars and 59 percent in light trucks.[4]

b. Overview of this NPRM and Request for Comment

The main topics discussed in this document are highlighted below. This document retrospectively reviews and proposes revisions to FMVSS No. 213 to modernize the seat assembly and remove obsolete provisions from the standard. The Agency's goal is to ensure the continued effectiveness of CRSs in current and future vehicles, thereby reducing the unreasonable risk of injury to children in motor vehicle crashes. (All references below are to subparagraphs in FMVSS No. 213 unless otherwise noted.)

1. As directed by § 31501(b) of MAP–21, NHTSA proposes to amend the standard seat assembly (S6.1.1(a)(1)(ii)) so that it more closely resembles ''a single representative motor vehicle rear seat.'' The updated seat would have a seat cushion stiffness, seat geometry, and seat belt system (a lap/shoulder belt) (3-point or Type 2 belt system) that better represents rear seats of current passenger vehicle models. Given that Type 2 belts are required to be installed in passenger vehicles today, NHTSA proposes that CRSs meet the performance requirements of the standard while attached to the seat assembly with a Type 2 belt. We propose to delete, as obsolete, the current provisions in FMVSS No. 213 requiring CRSs to meet the standard's requirements when attached to the seat assembly with a lap belt (2-point or Type 1 belt) (S5.3.2).[5]

Although features of the standard seat assembly will be updated, NHTSA believes that the differences between the updated and current seat assemblies will not significantly affect the performance of CRSs in meeting FMVSS No. 213. In developing this NPRM, NHTSA tested a wide variety of CRS designs in the market using the updated seat assembly. These CRSs had been certified by their manufacturers as meeting FMVSS No. 213's performance criteria using the current seat assembly in the standard (which is representative of designs of older vehicle seats). In the tests on the updated seat assembly, all of the CRSs also met the standard's performance requirements. These data indicate that new CRSs that will be certified as meeting FMVSS No. 213 on the new standard seat assembly will perform as well in older model year vehicles.

2. To make FMVSS No. 213 more responsive to the communication preferences and practices of today's parents and to provide greater flexibility to manufacturers in responding to those preferences, this NPRM proposes to reduce the restrictions on the content and format of the owner registration card manufacturers must provide with new CRSs for purposes of recall notifications (S5.8). Manufacturers would still be required to provide the means to register by mail, but, at their option, would be able to use modern means of outreach and information

[1] Currently, FMVSS No. 213 only permits a type of school bus ''harness.'' The proposed amendments would permit designs other than harnesses for this type of CRS.

[2] See 49 CFR 571.225.

[3] There is also a 32 km/h (20 mph) test configuration for CRSs that have a certain type of torso restraint to ensure that the CRSs provide at least a minimum level of protection when the torso restraint is misused. *See* FMVSS No. 213 S6.1.1(b)(2), ''Test Configuration II.''

[4] Traffic Safety Facts—Children 2012 Data (April 2016). *https://crashstats.nhtsa.dot.gov/Api/Public/Publication/812491.* Last accessed on Aug 6, 2018.

[5] ''Type 1'' and ''Type 2'' seat belt assemblies are defined in FMVSS No. 209, ''Seat belt assemblies.'' This NPRM would not change the current requirement that CRSs also need to meet FMVSS No. 213 requirements while attached using a child restraint anchorage system.

exchange and take advantage of the latest innovative technologies to increase owner registration rates.

3. To improve FMVSS No. 213's labeling requirements to better instruct parents how best to use CRSs correctly, the NPRM proposes amendments to the labeling requirements (S5.5). FMVSS No. 213 currently requires manufacturers to label CRSs with information on the maximum height and weight of the children who can safely occupy the system (S5.5.2(f)). NHTSA believes there is a continued need for this ''use information'' to be permanently labeled on CRSs. However, to clarify the information, the NPRM proposes requiring that the information must be provided for each mode in which the CRS can be used (rear-facing, forward-facing, booster). Further, NHTSA proposes to lessen restrictions on the use information (S5.5, S5.6) by deleting requirements that prescribe specific wording about the height and weight ranges of children for whom the CRS is recommended and that specify that the label must be placed along other required statements in a warning label (S5.5.2(f), S5.5.2(g)(1)(i))). Instead, NHTSA proposes that, subject to the conditions listed below, manufacturers should have the flexibility to provide the use information in statements, or a combination of statements and pictograms, at visible locations that manufacturers deem most effective.

The proposed conditions are based on sound best practice recommendations developed by the child passenger safety community, or are derived from our analyses of available data and other technical information. Manufacturers would have considerable flexibility to optimize the use information they provide for their CRSs, provided that the information meets these conditions.

• Currently S5.5.2(f) requires child restraints to be labeled with the *overall* maximum and minimum height and weight ranges of the children for whom the CRS is recommended. In response to a petition for rulemaking from Evenflo and SafeRide News,[6] NHTSA proposes that, for CRSs that can be used in multiple ''modes'' depending on the height and weight of the child (rear-facing, forward-facing, booster, etc.), the use information must be stated separately for each mode. To illustrate, instead of stating that a CRS (that can be used rear-facing and forward-facing) is for use by children weighing 5 to 65 lb (2.2–29.5 kg) and with heights up to 48 inches (121.9 centimeters (cm)), the label would indicate that the CRS is for use rear-facing by children weighing 5 to 40 lb (2.2 to 18.2 kg) and with heights up to 48 inches (121.9 cm), and forward-facing by children weighing 30 to 65 lb (13.6 to 29.5 kg) and with heights up to 48 inches (121.9 cm). The proposed condition would protect children under age 1-year[7] better by providing greater assurance that they are not turned forward-facing too soon. The proposed condition would also provide better guidance to caregivers on when to graduate a child from a rear-facing CRS to a forward-facing CRS with integral internal harness (car safety seat) and to a CRS in the booster seat mode.

• Relatedly, the following condition better ensures a child under age 1 will be positioned rear-facing than forward-facing. A child under age 1 is safest transported rear-facing. In seeking to achieve that end, FMVSS No. 213 currently specifies that forward-facing CRSs can only be recommended for children with a minimum weight of 9 kg (20 lb) (S5.5.2(k)(2)). However, the 9 kg (20 lb) threshold is too low. Although NHTSA meant for that weight to be a minimum, many CRSs use a weight of only 9 kg (20 lb), stating on their labels that a child may be forward-facing starting when he or she is 20 lb. NHTSA would like to raise the standard's 20-lb threshold because it is too low to capture a sufficient population of one-year-olds, as 9 kg (20 lb) is about the weight of an average 9-month-old. To increase the number of children under age 1 who are transported rear-facing, NHTSA proposes to raise this weight threshold to 12 kg (26.5 lb), which is the weight of a 95th percentile one-year-old.[8] The Agency believes that the change to 26.5 lb would capture almost all one-year-olds and would therefore increase the number of children under age 1 transported rear-facing.

• The following condition would enhance the protection of 3- to 4-year-old children traveling in motor vehicles. While FMVSS No. 213 currently specifies that booster seats can only be recommended for children with a minimum weight of 30 lb (S5.5.2(k)(2)), NHTSA tentatively believes this minimum should be raised to 18.4 kg (40 lb). Crash data[9] show that, among 3- and 4-year-olds, the risk of non-incapacitating to fatal injury[10] increases as much as 27 percent when the child is restrained in a booster seat rather than in a car safety seat (a CRS that has an integral internal harness). An 18.4 kg (40 lb) threshold corresponds generally to the weight of a 97th percentile 3-year-old (17.7 kg (39.3 lb)) and an 85th percentile 4-year-old. NHTSA believes that if booster seats were only recommended for children weighing a minimum of 18.4 kg (40 lb), more 3- and 4-year-olds will be transported in car safety seats, where they are better protected at that young age, than in booster seats. Booster seats are and continue to be a critical type of child restraint needed to restrain children properly in vehicles.[11] Children will still transition to booster seats, but just when they are a little larger.

4. To simplify and make more realistic the Agency's compliance testing of child restraint systems with various anthropomorphic test devices (ATDs) (test dummies), this NPRM proposes the following changes.

• NHTSA proposes streamlining the Agency's selection of ATDs (test dummies) to assess CRS performance (S7). NHTSA would amend specifications for ATD selection (S7.1.2(c)) so that CRSs for children weighing 10 kg to 13.6 kg (22 to 30 lb) would be tested with just the 12-month-old child test dummy (Child Restraint Air Bag Interaction (CRABI–12MO)), and would no longer be subject to being tested with the Hybrid III 3-year-old (HIII–3YO) test dummy. This proposed change would better align the dummy used in tests of infant carriers[12] with the size and weight of children typically restrained in infant carriers.

• Similarly, NHTSA proposes amendments affecting CRSs labeled for children weighing from 13.6 kg to 18.2

[6] A copy of the May 13, 2011 petition for rulemaking is in the docket. NHTSA is granting this request; this document denies other aspects of the petition.

[7] NHTSA and the entire child passenger safety community strongly recommend that children be kept riding rear-facing at least up to the age of 1-year. Children under age 1 are safer rear-facing than forward-facing because in a crash the forces will be spread evenly across the child's back and shoulders, the strongest part of the child's body. Further, the back of the head rests against and is supported by the seating surface.

[8] A 50th percentile 1-year-old weighs 22 lb.

[9] ''Booster Seat Effectiveness Estimates Based on CDS and State Data,'' NHTSA Technical Report, DOT HS 811 338, July 2010. *http://www-nrd.nhtsa.dot.gov/Pubs/811338.pdf,* last accessed on August 8, 2018.

[10] The KABCO injury scale used is an on-the-scene police-reported measure of injury. ''K'' is killed, ''A'' is incapacitating injury, ''B'' is non-incapacitating injury and ''C'' is possible injury.

[11] NHTSA instructs that children should be restrained in a CRS for the child's age and size. From birth through adulthood, children should be restrained first using a rear-facing car seat, then a forward-facing car seat, then a booster seat, and finally, the vehicle's seat belts. *https://www.nhtsa.gov/equipment/car-seats-and-booster-seats#age-size-rec.*

[12] An infant carrier is a rear-facing CRS designed to be readily used in and outside of the vehicle. It has a carrying handle that enables caregivers to tote the CRS plus child outside of the vehicle. Some come with a base that stays inside the vehicle onto which the carrier attaches.

kg (30 to 40 lb). Currently, these CRSs are tested with the CRABI–12MO and the HIII–3YO. NHTSA tentatively believes that testing with the (22 lb) CRABI–12MO is unnecessary because the dummy is not representative of 13.6–18.2 kg (30–40 lb) children.[13] This change would make NHTSA's compliance tests more reflective of real world CRS use.

• For CRSs for children in the 18.2 kg to 29.5 kg (40 to 65 lb) weight range, NHTSA proposes to amend FMVSS No. 213 to specify testing solely with the state-of-the-art HIII–6YO child ATD. Due in part to issues relating to the HIII–6YO's performance in tests on the current (outdated) standard seat assembly, FMVSS No. 213 has provided manufacturers the option of NHTSA conducting compliance tests using the HIII–6YO or an older Hybrid II (H2) version of the test dummy (H2–6YO) (S7.1.2(d), S7.1.3). With the move to the updated seat assembly, the Agency believes the unrealistic chin-to-chest and head-to-knee contact problems seen in tests of the HIII–6YO on the current seat assembly would be eliminated. The HIII–6YO is preferred as it is a more biofidelic test device than the H2–6YO dummy, and more and more CRS manufacturers are using the HIII–6YO rather than the H2–6YO dummy. Further, phasing out of the older H2–6YO is desirable because it is becoming more difficult to obtain replacement parts for the dummy. For these reasons, NHTSA is proposing to remove the optional use of the H2–6YO dummy and, instead, to adopt a provision that NHTSA will only use the HIII–6YO in compliance tests. NHTSA proposes sufficient lead time (*e.g.,* 3 years after publication of a final rule) for the change.

• Increasing numbers of CRSs are sold for use rear-facing with older children. To facilitate the Agency's compliance testing of the restraints, NHTSA proposes a procedure for positioning the 3-year-old child test dummy's legs when the dummy is rear-facing. The procedure involves placing the dummy's legs up against the seat back and removing the dummy's knee joint stops, which allows the legs to extend at the knee in the sled test and not brace the legs against the seat back. The proposed procedure is already used by some commercial test labs and CRS manufacturers to assess the suitability of rear-facing CRSs for older children.

[13] If the CRS were also labeled as suitable for use by children weighing less than 13.6 kg (30 lb), then the CRS would be subject to testing with the CRABI–12MO.

5. NHTSA proposes amendments to FMVSS No. 213 to accommodate different types of CRSs that are designed for exclusive use on school bus seats. These restraints are designed to install on school bus seats by way of straps wrapped around the school bus seat back or the seat back and seat pan (seat back mount or seat back and seat pan mounts). Currently FMVSS No. 213 permits a type of school bus ''harness'' (*see* S5.3.1(b) and S5.6.1.11). To permit restraints other than harnesses, the proposed amendments would include a new design-neutral definition for this type of CRS. This NPRM proposes specific requirements for the CRSs, including a warning label and instructions that indicate that the CRS must only be used on school bus seats.

Estimated Benefits and Costs

The proposal has the potential to provide safety benefits with, at most, minimal incremental costs.

Updating Sled Assembly and Testing With Type 2 Belts

The proposed updates to the sled test and testing with Type 2 belts would better align the performance of CRSs in compliance tests to that in real world crashes. NHTSA believes there would be benefits from making the FMVSS No. 213 test more representative of real world crashes, but quantification of the associated benefits/costs is not possible at this time due to a lack of data to make such an assessment.

There would only be de minimus costs involved in changing the standard seat assembly used by NHTSA to assess CRS compliance. Manufacturers are not required to use the standard seat assembly, but as a practical matter they usually choose to do so, to test their CRSs as similarly as possible to the tests conducted by NHTSA. The one-time cost of the updated standard seat assembly sled buck is about $8,000. Whether a manufacturer chooses to build the assembly itself or uses one at an independent test facility, cost impacts are minimal when distributed among the hundreds of thousands of CRSs that would be sold by each manufacturer.

NHTSA estimates that there would be little or no increased costs to child restraints to meet FMVSS No. 213's requirements when tested on the new sled assembly. The Agency's test data of representative CRSs in the fleet showed that virtually all CRSs met the standard's requirements when tested on the new sled assembly.

Registration Program

The proposed changes to the registration card would provide flexibility to manufacturers in how they communicate with consumers and would likely help improve registration rates and recall completion rates. However, NHTSA cannot quantify the benefits at this time. The Agency estimates there would be no costs associated with the proposed changes. The proposed changes to the registration program would lessen restrictions and would be optional for manufacturers to implement. While the changes could affect the collection of information pursuant to the Paperwork Reduction Act (discussed later in this preamble), there would be no additional material cost associated with the proposed changes to the registration card. Manufacturers could use the same card and just change the wording on them.

Labeling

The Agency believes that the proposed updates to the labeling requirements would benefit safety by reducing the premature graduation of children from rear-facing CRSs to forward-facing CRSs, and from forward-facing CRSs to booster seats. The Agency estimates potentially 0.7 to 2.3 lives would be saved and 1.0 to 3.5 moderate-to-critical severity injuries would be prevented annually by raising the manufacturer-recommended minimum child weight for the use of forward-facing CRSs from 9 kg (20 lb) to 12 kg (26.5 lb). NHTSA also estimates potentially 1.2 to 4 lives would be saved and 1.6 to 5.2 moderate-to-critical injuries would be prevented by raising the manufacturer-recommended minimum child weight for use of booster seats from 13.6 kg (30 lb) to 18.2 kg (40 lb).[14]

The proposed changes to the labeling requirements would have minimal or no cost impacts, as mostly they are deregulatory. Manufacturers would be given the flexibility to provide required information in statements or a combination of statements and pictograms at locations that they deem most effective. Manufacturers may provide the recommended child weight and height ranges for the use of CRSs in a specific installation mode on existing voluntary labels by simply changing the minimum child weight limit values. Since no additional information would be required on the labels by this NPRM, the size of the label would not need to be increased. Thus, there would be minimal or no additional cost for the

[14] The details of the benefits analysis are provided in the Appendix to this preamble.

label. There would also be no decrease in sales of forward-facing car safety seats or of booster seats as a result of the proposal to raise the minimum child weight limit values for forward-facing CRSs and booster seats. Most forward-facing CRSs cover a wide child weight range, so the labeling changes would only affect how consumers use the products and not the sale of them. For example, consumers would still purchase forward-facing car safety seats but would wait to use them until the child is at least 1. They would still purchase convertible [15] CRSs, but will delay turning the child forward-facing until the child is at least 1. Consumers would still purchase booster seats, but would use them when the child reaches 18.2 kg (40 lb) rather than 13.6 kg (30 lb).

ATDs

The proposed updates in how ATDs are used in the sled test for assessing CRS performance better accords with current CRS designs and best practices for transporting child passengers compared to the current specifications in FMVSS No. 213. NHTSA cannot quantify the possible safety benefits at this time.

Manufacturers are not required to test their CRSs the way NHTSA tests child restraints in a compliance test. Assuming manufacturers choose to conduct the tests specified in FMVSS No. 213 to make their certifications of compliance, NHTSA believes there would be no cost increases associated with the proposals. Some of the proposed changes lessen testing burdens by reducing the extent of testing with ATDs. For example, the NPRM proposes that CRSs for children weighing 10 kg to 13.6 kg (22 to 30 lb) would no longer be subject to testing with the HIII–3YO dummy. NHTSA estimates a reduction in testing cost of $540,000 for the current number of infant carrier models in the market. Also, CRS for children weighing 13.6–18.2 kg (30–40 lb) would no longer be tested with the CRABI–12MO. The proposed positioning procedure for the legs of the HIII–3YO dummy in rear-facing CRSs is unlikely to have cost implications because the procedure is similar, if not identical, to that currently used by manufacturers.

NHTSA believes there would only be minimal costs associated with NHTSA's testing CRSs solely with the HIII–6YO dummy rather than the H2–6YO dummy. This is because there would be little or no design changes needed for the CRSs due to this proposed update since nearly all the CRSs tested with the HIII–6YO in the proposed standard seat assembly complied with all the FMVSS No. 213 requirements.[16] NHTSA's testing also showed that CRSs that currently comply with FMVSS No. 213 using the H2–6YO dummy also met all the performance requirements in the standard when tested using the HIII–6YO dummy in the proposed standard seat assembly. In addition, manufacturers increasingly are certifying at least some of their CRS models for older children using the HIII–6YO dummy rather than the H2–6YO and so most manufacturers already have access to the HIII–6YO dummy and would not need to purchase the dummy as a result of this proposed update.

We believe a lead time of three years is sufficient for redesigning CRSs that may need modifications to comply with the proposed updates to ATD selection for the sled test because most CRSs would need minor or no modifications to meet the proposed requirements. Further, a 3-year time frame aligns with the typical design cycle for CRSs, so any change needed to meet the requirements could be accommodated in the manufacturers' normal refinement or refreshing of their designs. We note also that manufacturers have the option of not changing CRS designs in some instances, and may instead change the weight of the children for whom the CRS is recommended. Narrowing the population of children for whom the CRS is recommended in many instances would reduce the number of ATDs NHTSA would use in its compliance tests of the CRS.

School Bus Child Restraint Systems

The proposed changes to include in FMVSS No. 213 a new type of CRS manufactured for exclusive use on school bus seats would allow the sale of these products. The agency estimates there would be no cost impacts associated with the proposed changes because currently available products covered by the new definition of a school bus CRS already meet the proposed requirements. The benefits of the proposed changes are associated with the popularity of such CRSs in the pupil transportation industry for transporting preschool and special-needs children. However, NHTSA cannot quantify these benefits at this time.

II. Statutory Authority

This NPRM is issued under the National Traffic and Motor Vehicle Safety Act (49 U.S.C. 30101 *et seq.*) and MAP–21.

a. National Traffic and Motor Vehicle Safety Act (''Vehicle Safety Act'')

Under the Vehicle Safety Act, the Secretary of Transportation [17] is responsible for prescribing motor vehicle safety standards that are practicable, meet the need for motor vehicle safety, and are stated in objective terms.[18] ''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.'' [19] ''Motor vehicle safety standard'' means a minimum performance standard for motor vehicles or motor vehicle equipment.[20] When prescribing such standards, the Secretary must consider all relevant, available motor vehicle safety information, and consider whether a standard is reasonable, practicable, and appropriate for the types of motor vehicles or motor vehicle equipment for which it is prescribed.[21] The Secretary must also consider the extent to which the standard will further the statutory purpose of reducing traffic crashes and associated deaths and injuries.[22]

b. MAP–21

MAP–21 incorporates Subtitle E, ''Child Safety Standards.'' Section 31501(b)(1) of Subtitle E requires that not later than 2 years after the date of enactment of the Act, the Secretary [23] shall commence a rulemaking proceeding to amend the standard seat assembly specifications under Federal Motor Vehicle Safety Standard Number 213 to simulate a single representative motor vehicle rear seat better.

c. NHTSA's Views

NHTSA is issuing this NPRM under Vehicle Safety Act authority and MAP–21. Section 31501(b)(2) of MAP–21

[15] A convertible CRS is a type of CRS that can be used rear-facing or forward-facing with an internal harness system to secure a child.

[16] Of 21 tests with the HIII–6YO in the proposed seat assembly, all passed the performance metrics, except for one that failed head excursion limits.

[17] The responsibility for promulgation of Federal motor vehicle safety standards is delegated to NHTSA. 49 CFR 1.95.

[18] 49 U.S.C. 30111(a).

[19] 49 U.S.C. 30102(a)(8).

[20] 49 U.S.C. 30102(a)(9).

[21] 49 U.S.C. 30111(b).

[22] Id.

[23] Authority delegated to NHTSA. 49 CFR 1.95(p)(2).

directs NHTSA to issue a final rule amending the standard seat assembly of FMVSS No. 213. NHTSA believes that, in requiring a final rule amending ''Federal Motor Vehicle Safety Standard Number 213,'' MAP–21 envisions that the rulemaking on the standard seat assembly will accord with the requirements and considerations for FMVSSs under the Vehicle Safety Act.

III. Updating the Representative Seat Assembly

To update FMVSS No. 213's assessment of CRS performance, NHTSA proposes to amend the standard seat assembly specified by FMVSS No. 213 to better simulate ''a single representative motor vehicle rear seat,'' as directed by § 31501(b) of MAP–21. The updated seat would comprise a stiffer seat cushion, representative seat geometry, and a 3-point seat belt (in lieu of the 2-point lap belt on the current seat assembly). The updated seat assembly would have only one seating position, unlike the current FMVSS No. 213 standard seat assembly, which has two positions.

a. Background on This Proposed Seat Assembly

In 2003, in response to the Transportation Recall Enhancement, Accountability and Documentation (TREAD) Act,[24] NHTSA updated the FMVSS No. 213 standard seat assembly to make it more representative of rear seats of the vehicle fleet (68 FR 37620, June 24, 2003).[25] The 2003 final rule changed the seat assembly's seat pan angle, seat back angle, spacing between the anchors of the lap belts and the rigidity of the seat back. Due to TREAD Act timeframes, limited agency resources and competing priorities, the update did not include modifications to the seat cushion.[26]

Aware that the seat cushion of the FMVSS No. 213 seat assembly was softer than the rear seat cushions of many new vehicles in the fleet, NHTSA continued to investigate seat cushion stiffness and other characteristics after the 2003 final rule. In 2012, the agency initiated a research program (''Vehicle Rear Seat Study'') as part of an initiative to assess the representativeness of the FMVSS No. 213 frontal impact sled test.[27] The Vehicle Rear Seat Study surveyed vehicles in the fleet to compile data on the rear seat environment. The study measured 43 individual rear seating positions in 24 model year (MY) 2010 vehicles. Measurements were obtained on features that included seat back angle and height, seat pan width, softness of the seat cushion, location of seat belts and locations of child restraint anchorage systems.

NHTSA used data from the Vehicle Rear Seat Study in designing the seat assembly proposed in the January 28, 2014 NPRM on FMVSS No. 213's side impact test.[28] The dynamic sled test was originally developed by Takata Corporation. The agency used the vehicle survey data to guide the proposed seat design towards a seat assembly better representing the U.S. vehicle fleet. NHTSA sought to have the proposed seat assembly geometry and the belt and child restraint anchorage locations within one standard deviation of the average values in the current vehicle fleet. The proposed side impact bench seat assembly also had features of the seat assembly of Regulation No. 44 (R.44) of the United Nations Economic Commission for Europe (ECE), ''Uniform provisions concerning the approval of restraining devices for child occupants of power-driven vehicles (child restraint systems)'' (ECE R.44).

The January 28, 2014 side impact NPRM generated many comments on the proposed side impact seat assembly, notably with regard to the difficulty some commenters had in procuring the ECE R.44 seat cushion that had been proposed for inclusion in the seat assembly. Commenters also requested some changes to the lower anchorage specifications.

b. Consistency with the Proposal for the Side Impact Bench

As noted above, NHTSA's January 28, 2014 NPRM proposing to add a dynamic side impact test to FMVSS No. 213 included specifications for a standard seat assembly that would be used in the compliance test. After reviewing the comments on the side impact proposal and other information, NHTSA is considering using the seat assembly proposed in this NPRM for the side impact test instead of the seat assembly that was proposed in the January 28, 2014 side impact NPRM. NHTSA believes that using the same specifications of the standard seat assembly (including seat geometry, seat cushion, and anchorage locations[29]) for both the side impact test and a frontal impact test makes sense, since the aim is to have a representative seat assembly and the same passenger vehicles are involved in side and frontal crashes.

The standard seat assembly proposed in the January 2014 side impact NPRM is substantially like the seat proposed in this NPRM, but NHTSA believes this proposed seat assembly is a better seat assembly primarily regarding the cushion foam. The former specified use of the ECE R.44 seat cushion, while this proposed seat assembly incorporates seat cushion foam that is more representative of the seat cushion stiffness of the current vehicle fleet. This proposed seat cushion is also easier to procure than the ECE R.44 foam. Commenters to the January 2014 side impact NPRM expressed concerns about the difficulty to source the ECE R44 seat foam, which is only available from one overseas supplier.[30] NHTSA tentatively believes that using the foam specified in this NPRM for the frontal test seat assembly would alleviate those concerns.

There would be a few adjustments that would be made to the standard seat assembly proposed in the January 2014 side impact NPRM to make it like the seat assembly proposed today. This NPRM proposes cushion foam 101.6 mm (4 inches) thick while the ECE R.44 seat cushion is 127 mm (5 inches). If the foam specified in this NPRM is used in the side impact test, the intruding door structure of the side impact standard seat assembly would need to be lowered about an inch to maintain the vertical position of the intruding door relative to the standard seat assembly. Some adjustments would also be made to the seat belt anchorage locations and the seat back height proposed in the January 2014 NPRM. These and other issues are discussed in detail below in this preamble. The positioning of the child restraint anchorage system would be slightly moved so that the lower bars would be located where they are on the frontal test seat assembly proposed today.[31]

---

[24] November 1, 2000, Pub. L. 106–414, Stat. 1800.

[25] The 2003 final rule also updated the sled pulse to provide a wider test corridor.

[26] A seat cushion consists of foam and a cover.

[27] Aram, M.L., Rockwell, T., ''Vehicle Rear Seat Study,'' Technical Report, July 2012. Report available in the docket for this NPRM.

[28] 79 FR 4570, *supra.* As noted earlier, § 31501(a) of MAP–21 states that the Secretary shall issue a final rule amending FMVSS No. 213 to improve the protection of children seated in child restraint systems during side impact crashes.

[29] Anchorage locations are aligned to the corresponding seat assembly's seat orientation reference line (SORL).

[30] See also a memorandum documenting ex parte meeting with the Juvenile Products Manufacturers Association (JPMA), available at Docket No. NHTSA–2013–0055–0004.

[31] NHTSA notes that the lower anchorage bars may not be configured like they are on the frontal test seat assembly proposed today. The lower anchorage design on the frontal test seat assembly consists of two side structures with a replaceable lower anchorage bar, a design that eases the bar's replacement. NHTSA may not incorporate this

Continued

Comments are requested on this issue of consistency between the seat assembly used in the side impact test and the seat assembly proposed in this NPRM for FMVSS No. 213's frontal impact test.

c. Seat Geometry

The Vehicle Rear Seat Study measured the vehicles' seat geometry and anchorage locations using a Seat Geometry Measuring Fixture (SGMF). The SGMF consisted of two wood blocks (600 mm x 88 mm x 38 mm) and a 76 mm (3 inches) hinge (see Figure 1 below). To make the rear seat geometry measurements, the SGMF was positioned on the centerline of each rear seat position. Point A (see Figure 1), which corresponds to the hinge location of the SGMF, was the reference point for all measurements.

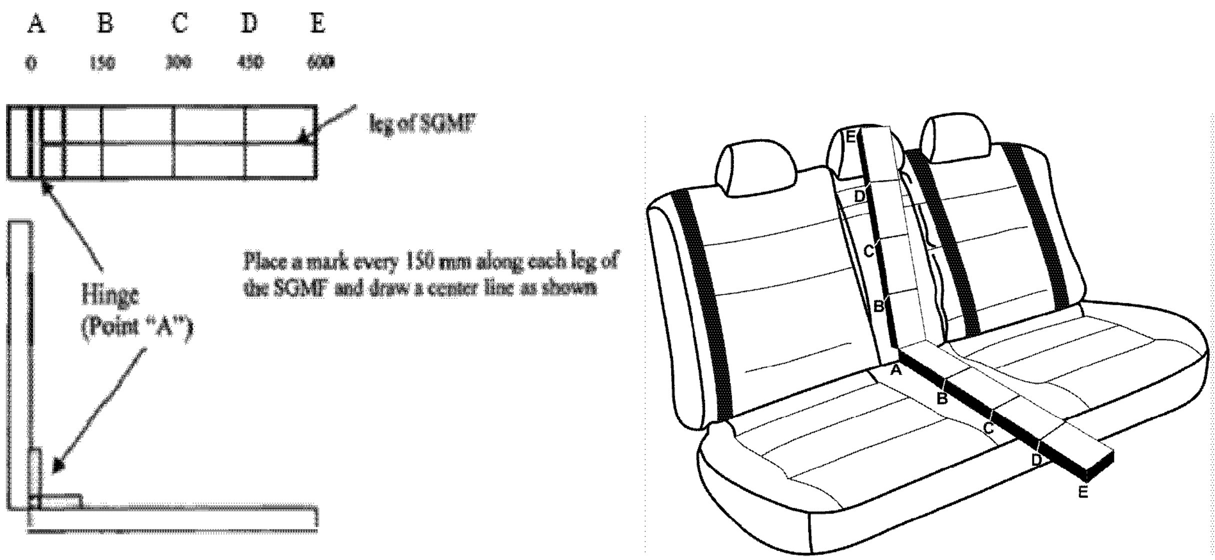


Figure 1. SGMF sketch (left), SGMF positioned in a vehicle rear seat.

1. Seat Back Angle

The Vehicle Rear Seat Study found that the average seat back angle of the surveyed vehicles was 20 degrees from vertical, with a standard deviation of 4 degrees.[32] The seat back angle ranged from a minimum of 9 degrees to a maximum of 28 degrees from vertical.

The Agency is proposing a seat back angle of 20 degrees on the updated test seat assembly. The value is representative of the seat back angles found in the vehicle fleet (within one standard deviation of the average values in the current fleet). Also, the proposed seat back angle would simplify the change to a new seat assembly in that it would be the same as the angle of the current FMVSS No. 213 test seat assembly and that of the originally-proposed standard seat for the side impact test.

2. Seat Pan Angle

For the seat pan angle, the Vehicle Rear Seat Study found that the average angle was 13 degrees from the horizontal, with a standard deviation of 4 degrees.[33] The seat pan angle ranged from a minimum of 7 degrees to a maximum of 23 degrees.

The Agency is proposing to maintain a seat pan angle of 15 degrees on the updated test seat assembly. The measurement is representative of the seat pan angles found in the vehicle fleet (within one standard deviation of the average values in the current fleet). Also, the proposed seat pan angle would simplify the change to a new seat assembly in that it would be the same as the angle of the current FMVSS No. 213 test seat assembly and that of the originally-proposed standard seat assembly for the side impact test.

The Agency notes that the seat pans of some vehicle rear seats are equipped with anti-submarining devices or are contoured in a manner to prevent submarining. The Agency did not replicate these features in the standard seat assembly for simplicity's sake. NHTSA tentatively concludes that a seat pan angle of 15 degrees is representative of the seat pan angle of rear seats in the vehicle fleet and would be sufficient for evaluating the performance of CRSs attached to the seat.

At the end of the seat geometry section, Table 3, *infra,* shows a comparison of the seat back and seat pan angles found in the vehicle fleet, and the proposed and current angles of the test seat assembly.

3. Seat Pan Length

The Vehicle Rear Seat Study showed that the average seat pan length of the surveyed vehicles was 406 mm (16 inches) with a standard deviation of 38 mm (1.5 inches).[34]

particular anchorage design into the side impact seat assembly, as some commenters to the January 2014 side impact NPRM noted that the side structure of the lower anchorages can interfere with the lower anchorage attachments of the tested CRS. Instead, NHTSA is considering reconfiguring the design of the lower anchorages of the side impact seat assembly so that undue interference would be avoided.

[32] The current seat back angle of the FMVSS No. 213 seat assembly is 20 degrees.

[33] The current seat pan angle of the FMVSS No. 213 seat assembly is 15 degrees.

[34] The current FMVSS No. 213 test seat assembly has a seat pan length of 16.3 inch (416 mm).

The Agency is proposing a seat pan length of 412 mm (16.2 inches), which is within one standard deviation of the average seat pan length in the current vehicle fleet.

4. Seat Back Height

The Vehicle Rear Seat Study showed that the average height of the seat back was 688 mm (27 inches) with a standard deviation of 76 mm (3 inches) when the head restraint was included and 578 mm (22.7 inches) with a standard deviation of 60 mm (2.3 inches) when the head restraint was not included in the measurement.[35]

The Agency is proposing a seat back height of 573 mm (22.5 inches) for the new standard seat assembly, which is within one standard deviation of the average seat back height when the head restraint is not included.

5. Rear Seat Cushions

i. Stiffness of the Bottom Seat Cushion

The Agency compared the stiffness of rear seat cushions (consisting of foam and a cover) in the fleet to that of the seat cushions used in various test programs, including FMVSS No. 213. NHTSA first measured the quasi-static stiffness (force-deflection) of the seat cushions in rear seats of 13 MY 2003–2008 passenger vehicles.[36] The 13 passenger vehicles were representative of the current vehicle fleet, and comprise a mix of different vehicle types (passenger cars, SUVs, and minivans) produced by different vehicle manufacturers.

A quasi-static load was applied at a rate of 0.374 mm/s using a 203 millimeters (mm) (8 inch) diameter disk shaped indentor. NHTSA compared the force-deflection values to those of the standard seat assembly specified in the New Programme for the Assessment of Child Restraint Systems (NPACS),[37] ECE R.44, and FMVSS No. 213. The force-deflection curves of the different seat cushions are presented in Figure 2 below.

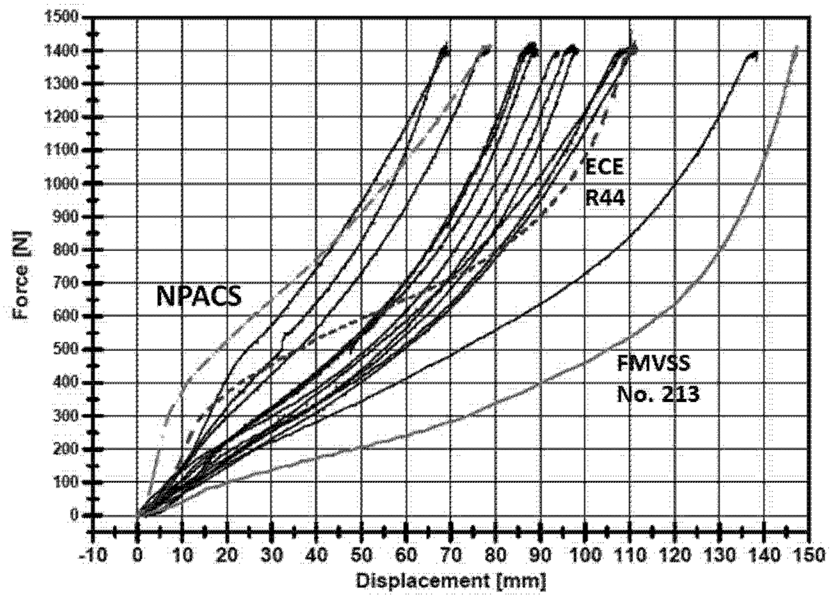


Figure 2. Force displacement response in quasi-static tests on vehicle rear seats (black solid), ECE R 44 (dashed), NPACS (dashes and dots) and FMVSS No. 213 seat cushion (grey solid).

The data showed that the current FMVSS No. 213 initial seat cushion stiffness (force for the first 25 mm of deflection) is less than that of the seat cushions in the 13 MY 2003–2008 vehicles. Conversely, the initial stiffness of the NPACS and the ECE R.44 seat cushions are greater than most of the measured vehicle seat cushions.

Since CRSs are tested on the FMVSS No. 213 standard seat assembly in a dynamic sled test, NHTSA also evaluated the dynamic stiffness of the various seat cushions. NHTSA compared the dynamic force-deflection (dynamic stiffness) of: The seat cushion in rear seats of 14 MY 2006–2011 vehicles, the seat foams specified in ECE R.44 and NPACS, and the seat cushion of the FMVSS No. 213 standard seat assembly.[38] The dynamic stiffness of the seat cushions and seat foams were determined using a pendulum impact device (PID), which consisted of an arm with a 152.4 mm (6 inch) diameter impactor (weighing 7.8 kg (17.2 lb)). The impactor was dropped at an average

[35] The current FMVSS No. 213 seat assembly has a seat back height of 20.35 inch (517 mm) and it does not have a head restraint.

[36] Wietholter, K., Louden, A., and Sullivan, L. ''Evaluation of Seat Foams for the FMVSS No. 213 Test Bench,'' June 2016 available in the docket for this NPRM.

[37] The NPACS consortium was funded in 2005 by governments of the United Kingdom, the Netherlands, Germany, the Generalitat of Catalonia, and five non-governmental organizations. The objectives of NPACS is to provide scientifically based EU wide harmonized test and rating protocols to offer consumers clear and understandable information about dynamic performance and usability of child restraint systems. NPACS is similar to NHTSA's New Car Assessment Program (NCAP) and the NCAP program administered in Europe (EuroNCAP), in that it is a voluntary consumer information program, rather than a binding regulation. The difference is that NPACS is designed to test CRSs, while NCAP focuses on vehicle performance.

[38] The ECE and NPACS foams were tested with the foams placed on a flat adjustable table, while the FMVSS No. 213 seat cushion was tested with the cushion placed on the FMVSS No. 213 standard seat assembly. The measured dynamic stiffness characteristics of the foam and cushion are not expected to differ significantly whether placed on a flat adjustable table or on a seat assembly.

impact velocity of 3.4 meters per second (m/s) (7.6 mph) on the seat cushion.[39] The PID was instrumented with a tri-axial accelerometer and an angular rate sensor to calculate the displacement and a uniaxial load cell to measure the force.

Figure 3 below shows that the ECE R.44 and NPACS foams were found to be stiffer than the vehicle fleet. The FMVSS No. 213 foam, tested on the standard seat assembly with a cover, is on the low end of the vehicle fleet rear seat stiffness.

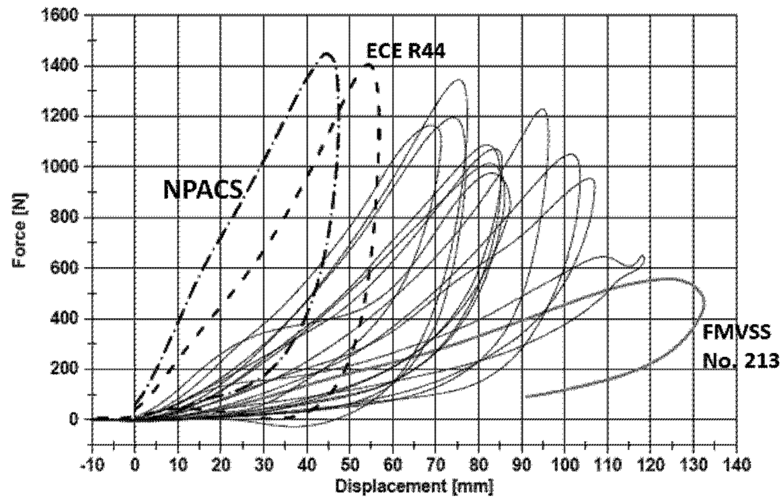


Figure 3. Dynamic force-displacement curves of seat cushions on vehicle rear seats (black thin) and ECE R.44 seat foam (black-dashed), NPACS seat foam (black-dashes and dots), and FMVSS No. 213 seat cushion (black bold).

Since the ECE R.44 and NPACS seat foam stiffness were found not to be representative of the current U.S. vehicle fleet (both quasi-static and dynamic stiffness), the agency developed a new seat cushion that would be representative. The foam used in the seat cushion was manufactured by The Woodbridge Group (Woodbridge),[40] and is referred to as the ''NHTSA-Woodbridge seat cushion'' in this NPRM. The NHTSA-Woodbridge seat cushion consists of the foam material covered by the cover used in test procedures of ECE R.44. The ECE R.44 cover material is a sun shade cloth made of poly-acrylate fiber with a specific mass of 290 (g/m^2) and a lengthwise and breadthwise breaking strength of 120 kg (264.5 lb) and 80 kg (176.3 lb), respectively.[41] The dynamic force-deflection of the NHTSA-Woodbridge standard seat cushion is shown below in Figure 4. NHTSA tentatively concludes that the stiffness of the NHTSA-Woodbridge seat cushion is satisfactorily representative of the average seat cushion stiffness found in the vehicle fleet (grey lines).

[39] *See* ''Evaluation of Seat Foams for the FMVSS No. 213 Test Bench,'' June 2016, *supra.* A 3.4 m/s (7.6 mph) test speed was used. This speed resulted in the impact device compressing the foam similar to how the foam was compressed in FMVSS No. 213 sled tests with various test dummies.

[40] The Woodbridge Group is a supplier of automotive seat foam, *http://www.woodbridgegroup.com.*

[41] The properties of this new seat cushion would be fully specified in a drawing package accompanying this document to enable interested parties to manufacture this seat cushion.

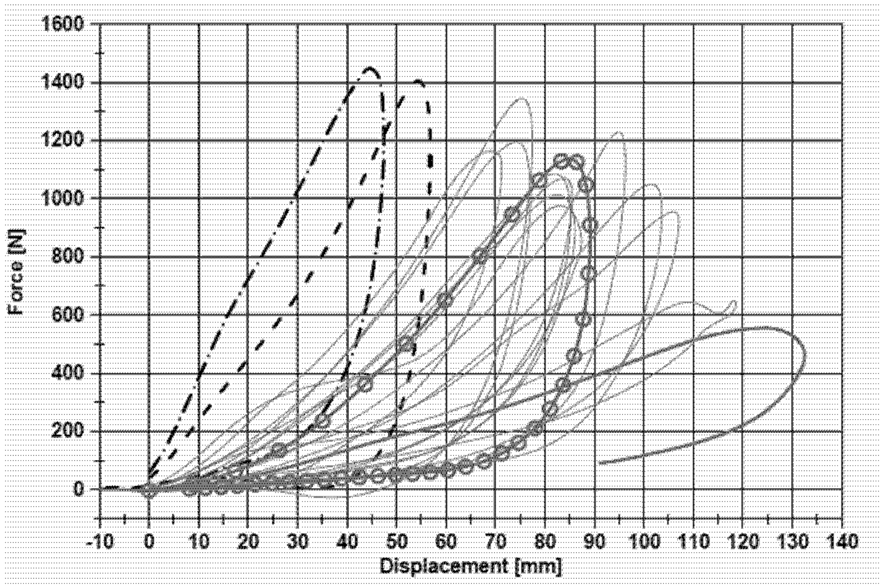


Figure 4. Dynamic force-displacement (stiffness) of ECE R.44 seat foam (black-dashed), NPACS seat foam (black-dashes and dots), FMVSS No. 213 seat cushion (dark grey solid), seat cushions on vehicle rear seats (light grey solid), and the proposed NHTSA-Woodbridge seat cushion (solid with circles).

To simplify procurement of the desired seat cushion foam, Table 1 below sets forth characteristics of the NHTSA-Woodbridge seat cushion foam as determined by the test methods specified in ASTM D–3574–03, ''Standard test methods for flexible cellular materials—slab, bonded, and molded urethane foam.'' ''IFD'' refers to the indentation force-deflection (IFD) test, which measures the force required for 25 percent, 50 percent, and 65 percent deflection of the entire product sample.[42] The compression force-deflection (CFD) test measures the force required to compress a sample of the foam (50 mm (1.96 inch) by 50 mm and 25 mm (0.98 inch) thickness) by 50 percent. Further details of seat cushion characteristics are available in the drawings that are in the docket for this NPRM.

TABLE 1—STIFFNESS OF THE NHTSA-WOODBRIDGE SEAT CUSHION FOAM

Foam characteristics	
Density	47 kg/m³ (2.9 lb/ft³).
IFD (25% deflection)	237 Newton (N) (53.2 lb).
IFD (50% deflection)	440 Newton (N) (99 lb).
IFD (65% deflection)	724 Newton (N) (162.7 lb).
CFD (50% compression)	6.6 kPa (137.8 lb/ft²).

ii. Thickness of the Bottom Seat Cushion

NHTSA tentatively concludes that the bottom seat cushion foam should be 101.6 mm (4-inches) thick. A 101.6 mm (4-inch) thickness would be representative of the seat cushions on real world vehicles. The Vehicle Rear Seat Study found an average seat pan cushion thickness for both outboard and center seating positions of 90 mm (3.5 inches) with a standard deviation of 40 mm (1.5 inches), measured at the centerline of the seating position.[43] A 101.6 mm (4 inch) seat cushion foam thickness for the seat pan also has the advantage of simplifying procurement of the foam since foam standard specifications, such as IFD, are provided by the manufacturer in 101.6 mm (4 inches) samples, as specified in test method B1 of ASTM D3574. Thus, specifying a 101.6 mm (4 inch) foam thickness would streamline compliance testing because foam of that size would be relatively simple to procure.

iii. The Foam Is Suitable for Use in the Standard's Dynamic Test

The NHTSA-Woodbridge foam not only would be representative of foam in real world vehicles, it also appears suitable for use in the FMVSS No. 213 compliance test. One concern about any foam used on the standard seat assembly is whether the foam would ''bottom out'' (fully compress) on to the rigid backing during the demanding conditions of the sled test. The current soft FMVSS No. 213 seat cushion has a tendency to bottom out in tests of

[42] Foam products are typically characterized by their IFD and density values rather than by their dynamic performance.

[43] The current FMVSS No. 213 seat assembly seat pan cushion has a thickness of 152.4 mm (6 inch).

forward-facing CRSs using the heavier test dummies specified in FMVSS No. 213 (Hybrid III 6-year-old (HIII–6YO) and Hybrid III 10-year-old (HIII–10YO) child dummies).

The Agency conducted FMVSS No. 213-type sled tests to evaluate whether the NHTSA-Woodbridge seat cushion would bottom out when tested in a severe impact test (35 g at 56.3 kilometers per hour (km/h) or 35 mph) using heavy dummies restrained in a heavy CRS. NHTSA used two samples of NHTSA-Woodbridge seat cushions (101.6 mm (4 inches)) and the Graco Smart Seat in the test series. These pulse and test speeds were more severe than the test conditions specified in FMVSS No. 213.

NHTSA selected the Graco Smart Seat for this testing because the CRS represents a heavy CRS relative to current CRSs in the market, weighing 9.5 kg (21 lb) without its base and 14.9 kg (33 lb) with its base (the base is used in rear-facing and forward-facing modes). The CRS was tested in rear-facing and forward-facing modes (with the base) using a HIII–3YO dummy and HIII–6YO dummy, and tested in the belt-positioning booster seat mode (without the base) using a HIII–6YO and HIII–10YO.

In our tests, NHTSA considered the seat cushion to have bottomed out along the front edge if the seat cushion displacement exceeded 96.5 mm (3.8 inches). Seat cushion displacement at the front edge of the seat was measured by video analysis.[44] Cushion displacement was not measured in the tests with rear-facing CRSs as the high rotation of the CRS did not allow for an accurate measurement.

Test results are shown in Table 2 below. The NHTSA-Woodbridge seat cushion did not bottom out in any of the tests, even when subjected to the severe test conditions and when using a heavy test dummy and a heavy CRS.

Table 2. Test results of the NHTSA-Woodbridge seat cushion in sled tests with 56.3 km/h (35 mph) change in velocity and 35 g peak acceleration.

Test No.	CRS Model	Dummy	CRS Mode of Use	Restraint	Head Excursion	Knee Excursion (mm)	HIC	Chest Acceleration	Cushion Displacement (in)
8854	Graco Smart Seat	HIII-10YO	Booster	SB3PT	611	780	1,183	67	2.09
		HIII-6YO	Booster	SB3PT	578	n/a	1,293	76	2.62
8855	Graco Smart Seat	HIII-10YO	Booster	SB3PT	619	784	1,242	70	2.3
		HIII-6YO	Booster	SB3PT	593	n/a	1,370	74	2.71
8856	Graco Smart Seat	HIII-10YO	Booster	SB3PT	633	789	1,324	68	2.22
		HIII-6YO	Booster	SB3PT	625	733	1,690	78	2.84
8857	Graco Smart Seat	HIII-10YO	Booster	SB3PT	628	788	1,364	70	2.32
		HIII-6YO	Booster	SB3PT	617	731	1,718	82	2.7
8858	Graco Smart Seat	HIII-3YO	RF CRS	SB3PT	n/a	n/a	968	70	n/a
		HIII-6YO	FF CRS	LATCH	749	783	1,416	57	3.76
8853	Graco Smart Seat	HIII-3YO	RF CRS	SB3PT	na	n/a	208	61	n/a
		HIII-6YO	FF CRS	LATCH	657	n/a	1,208	57	3.74

Note: SB3PT means CRS attachment using three point seat belt, LATCH means CRS attachment using child restraint anchorage system, RF means rear-facing, and FF means forward-facing.

iv. Thickness of the Seat Back Foam

For the seat back cushion, NHTSA proposes to use the NHTSA-Woodbridge seat cushion foam with a 50.8 mm (2 inch) thickness. A 50.8 mm (2 inch) thickness would be representative of seat back cushions in the fleet. The Vehicle Rear Seat Study showed that the overall seat back cushion thickness for outboard and center seating positions was 76 mm (3 inches) with a standard deviation of 29 mm (1.14 inches), measured at the centerline of the seating position. The proposed seat back cushion thickness of 50.8 mm (2 inches) is within 1 standard deviation of the average seat back cushion thickness in the vehicle fleet.

Further, while NHTSA does not believe that the seat back cushion significantly affects a CRS's dynamic performance in the frontal sled test, the Agency recognizes that a seat back cushion on the thicker side could be a potential source of variability when testing CRSs with top tethers. When the tether is tightened, the back cushion can be compressed to varying degrees. Data do not indicate that differences in compression necessarily affect CRS

[44] ''Evaluation of Seat Foams for the FMVSS No. 213 Test Bench,'' June 2016, *supra.*

performance, but a 50.8 mm (2 inch) thick foam would reduce such differences and thus facilitate a more repeatable installation.

The Agency notes also that specifying that the foam thickness is 50.8 mm (2 inches) would streamline the FMVSS No. 213 compliance test. Foam manufacturers readily produce foams in 101.6 mm (4 inch) sections. A 101.6 mm (4 inch) thick foam slab can be easily cut into two 50.8 mm (2 inch) pieces to be used for the seat back.

6. Summary of Seat Geometry Features

Table 3 below shows a comparison of features of seating assemblies found in the vehicle fleet, and the proposed and current features of the FMVSS No. 213 test seat assembly.

Table 3. Geometry of the standard seat assembly

		Average	Standard Deviation	Minimum	Maximum	Current FMVSS No. 213	ECE R.44/Takata	Upgraded FMVSS No. 213
Seat Back Angle (deg)		20	4	9	28	20	20	20
Seat Pan Angle (deg)		13	4	7	23	15	15	15
Seat Back Thickness (mm)		76	29			152.4	70	50.8
Seat Pan Thickness (mm)		90	40			152.4	140	101.6
Seat Pan Depth/Length [mm]		406	38	330	514	416	438	412
Seat Back Height [mm]	**With Head Restraint**	688	76	540	849			n/a
	Without Head Restraint	578	60	450	778	517	432	573

d. Seat Belt Anchorage Locations

FMVSS No. 213 requires CRSs (other than belt-positioning booster seats) to meet the standard's performance requirements while attached with a 2-point belt (lap belt).[45] In some tests, a top tether may be used to supplement the belt attachment. The current seat assembly has a 2-point belt for testing CRSs.

To make FMVSS No. 213's standard seat assembly more representative of the vehicle fleet, the NPRM proposes replacing the 2-point belt with a 3-point belt. (This NPRM also proposes requiring CRSs to be tested under FMVSS No. 213 while attached to the standard seat assembly using the 3-point belt.) Three-point belts were first required in outboard rear seats of passenger vehicles starting in MY 1990 and in trucks and multipurpose passenger vehicles (including passenger vans and SUVs) starting in MY 1992. Three-point belts in center rear seats were phased-in between September 1, 2005 and September 1, 2007. The on-the-road passenger vehicle fleet is now predominantly comprised of vehicles with 3-point belts in all rear seating positions, and more and more vehicles will be so equipped in the near future. Therefore, to test CRSs with what will be the most common seat belt configuration in the vehicle fleet, the agency proposes to incorporate a 3-point belt in the proposed standard seat assembly.[46]

NHTSA began its assessment of where the seat belt anchorages should be located on the updated FMVSS No. 213 standard seat assembly by considering anchor location requirements in FMVSS No. 210, ''Seat belt assembly anchorages.''[47] Figure 5 shows the side view of the proposed bench, the proposed location of the lap belt anchors and the FMVSS No. 210 corridor. This figure shows that the lap belt anchor locations on the proposed bench are within the FMVSS No. 210 corridor.

[45] Belt-positioning booster seats are currently tested with a 3-point belt system, as these child restraint systems are designed for use with 3-point belts.

[46] Incorporating a 3-point belt on the standard seat assembly would harmonize FMVSS No. 213 with the counterpart Canadian regulation (Canadian Motor Vehicle Safety Standard (CMVSS) No. 213, ''Motor Vehicle Restraint Systems and Booster Seat Safety Regulations''). While the 3-point belt anchorage locations in the Canadian standard seat assembly are different than those in this proposal, Transport Canada is considering harmonizing its standard with NHTSA's proposed changes.

[47] FMVSS No. 210 specifies a location corridor for the lap belt anchorages which is between 30 and 75 degrees from the horizontal at the H-point.

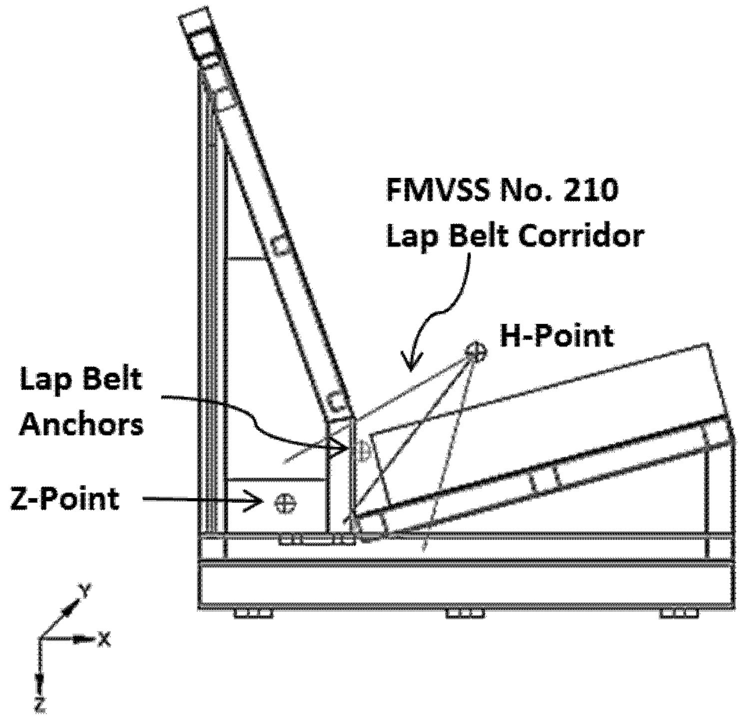


Figure 5. Proposed standard seat assembly depicting the FMVSS No. 210 corridor and the lap belt anchor location.

NHTSA also considered the data on real-world anchorage locations from the Vehicle Rear Seat Study. Table 4 below shows the average position along with the standard deviation of the lap and shoulder belt anchorages measured in the 24 vehicles surveyed. Measurements were made with respect to Point A of the SGMF. The table also shows similar measurements of the seat belt anchorage locations on the current FMVSS No. 213 standard seat assembly, the proposed seat assembly, along with those in ECE R.44 and NPACS.

Table 4. Lap and shoulder belt anchor location from the 24-vehicle survey and that measured on the current FMVSS No. 213 seat assembly, proposed FMVSS No. 213 seat assembly, ECE R.44 seat assembly, and the NPACS seat assembly. All measurements are distance in millimeters from point A of the SGMF.

		24 Vehicle Survey		Current FMVSS No. 213	Proposed FMVSS No. 213	ECE R.44	NPACS
		Average	Stand. Dev.				
Shoulder Belt Location	Aft	350	118	350	393	216	213
	Lateral	247	57	247	244	302	298
	Vertical	581	72	690	634	500	514
Lap Belt Location	Fore/Aft	-57	61	-	-77	-	-
	Lateral	211	54	-	225	-	-
	Vertical	-44	82	-	-89	-	-
Distance Between Lap Belt Anchors	Outboard	450	36	427	449	-	-
	Center	356	60	400	-	-	-

NHTSA also located the anchorages to avoid interference with the seat assembly structure in an FMVSS No. 213 compliance test. Interaction of the seat belt with the vehicle seat assembly, or the child restraint with a seat belt anchorage, could introduce variability in the test results. The shoulder belt anchor is located more rearward and higher than the average location from the vehicle survey to avoid interaction of the shoulder belt with the seat back cushion, and interaction of large high back boosters with the shoulder belt anchorage hardware. The lap belt anchors are located to be more rearward and lower than the average location from the vehicle survey, to avoid interaction of the seat belt and seat belt hardware with the seat cushion.

Even with these adjustments, as shown in Table 4, *supra,* the fore/aft, lateral, and vertical positions of the lap and shoulder belt anchorages relative to point A for the proposed seat assembly are within one standard deviation of the average values found in the vehicle survey.

e. Child Restraint Anchorage System Locations

FMVSS No. 213 also requires CRSs to meet the standard's performance requirements while attached by way of a child restraint anchorage system (S5.3.2).[48] In some tests, a top tether may be used to supplement the lower anchorage attachment (S6.1.2(a)(1)).

The standard seat assembly of FMVSS No. 213 has a child restraint anchorage system consisting of two lower anchor bars and a top tether anchor. The child restraint anchorage system is configured as specified by FMVSS No. 225, ''Child restraint anchorage systems,'' for systems installed on vehicles. FMVSS No. 225 requires lower anchors to be 280 mm (11 inches) apart and have specific anchor geometry.

In the Vehicle Rear Seat Study NHTSA measured the location of the lower anchor and the tether anchor in the vehicles. Table 5 below shows the location of the lower anchors and the tether anchor from Point A of the SGMF in the 24-vehicle survey, and that of the proposed FMVSS No. 213 seat assembly. The lower anchors of the proposed standard seat assembly have a 280 mm (11 inch) lateral spacing as specified in FMVSS No. 225. Each lower anchor metal bar is 37 mm (1.45 inches) long.

The location of the lower anchorages selected for the proposed seat assembly is slightly lower than the average location in the vehicle survey.[49] NHTSA located the anchorages slightly lower because anchorages positioned higher may cause some CRS attachments to interfere with the seat back cushion. Also, the Agency was concerned that CRSs designed with rigid attachments (that attach to the lower anchor bars without use of webbing) may adopt an incorrect installation angle when the bars are higher.

NHTSA also chose an anchorage location more forward (closer to the seat bight) than the average from the Vehicle Rear Seat Study. The more forward location was selected to make it easier to install the CRS on the seat assembly in a compliance test, and to measure the tension in the belt webbing used for the lower anchorage attachment. Further, NHTSA anticipates that lower anchorages will likely be more forward than in current vehicles if future vehicles employ the design concepts discussed in NHTSA's 2015 MAP–21 NPRM, *supra,* to improve the ease-of-use of child restraint anchorage systems.[50] Thus, while the proposed

[48] Some CRSs, such as belt-positioning seats and harnesses, are excluded from this requirement.

[49] The vertical location of the lower anchors in the proposed seat assembly is just 2 mm lower than one standard deviation below the average vertical location of lower anchors in the vehicle fleet.

[50] NPRM to improve the ease-of-use of child restraint anchorage systems. 80 FR 3744, January 23, 2015. Docket No. NHTSA–2014–0123. The

Continued

lower anchorage location in the aft direction is not within one standard deviation of the average in the current vehicle fleet, NHTSA believes that the fleet will be changing. The proposed aft location of lower anchors for the upgraded standard seat would be representative of the average future vehicle fleet.

NHTSA also used the Vehicle Rear Seat Study to position the tether anchorage on the new standard seat assembly. While FMVSS No. 225 permits the tether anchorage to be in a wide area in the vehicle, the study found that the tether anchorages are mostly centered along the designated seating position (DSP) centerline. Also, the anchorages are found in two main areas: The seat back at different heights (mainly in SUVs, hatchbacks, vans, and trucks) and the package shelf (mainly in sedans and coupe type vehicles). In a few vehicles, the tether anchorage is on the rear wall (pickup trucks) or the roof. Based on sales volumes, the number of vehicles with tether anchorages in the package shelf is about the same as those with tether anchorages in the seat back.

The Agency proposes to locate the tether anchorage in the seat back area. NHTSA believes that locating the anchorage on the seat back, rather than in a position representing the package shelf, results in a slightly more demanding test as anchoring a CRS to the former causes more tether strap webbing to be used than if the anchor were directly aft of and closer to the CRS. More webbing used in the test may slightly increase the likelihood that higher head excursions could result, as webbing has a natural tendency to elongate in the sled test.

The location of the tether anchorage in the proposed standard seat assembly is within one standard deviation of the average found by the Vehicle Rear Seat Study as shown in Table 5.

TABLE 5—LOWER ANCHORS AND TETHER ANCHOR LOCATION FROM THE 24-VEHICLE SURVEY AND THOSE IN THE PROPOSED FMVSS NO. 213 STANDARD SEAT ASSEMBLY

[All measurements are in millimeters from point A of the SGMF]

		Average from vehicle survey	Proposed FMVSS No. 213
Lower Anchors	Aft	100 ± 21	58
	Lateral	137 ± 29	140
	Vertical (−) Below point A	−12 ± 24	−38
Tether Anchors (Seat Back Position)	Aft	280 ± 88	330
	Lateral	0 ± 44	0
	Vertical (−) Below point A	140 ± 281	133

IV. Installing CRSs With a Type 2 Belt Rather Than a Type 1 Belt

To drive continued effective CRS performance in today's vehicles, NHTSA proposes to require all CRSs to meet the performance requirements of FMVSS No. 213 while attached to the seat assembly with a Type 2 (lap/shoulder) belt. Currently, CRSs are sled tested while attached with a Type 1 (lap) belt.[51] With the prevalence of Type 2 belts in the rear seats of vehicles sold and on the road today, testing CRSs with the type of seat belt caregivers would be using better ensures the representativeness of the compliance test. Test data do not indicate any significant difference in performance in current child restraint designs when installed using a Type 1 versus a Type 2 belt.[52]

Adopting a requirement that CRSs meet the standard when tested with a Type 2 belt would be consistent with Canada's CMVSS No. 213, *supra.* Since 2010, Transport Canada tests CRSs equipped with internal harnesses by installing them with a Type 2 belt.[53]

V. Denial of Petition Regarding a Floor

On January 28, 2011, Volvo petitioned NHTSA requesting that the Agency amend FMVSS No. 213 by: (1) Updating the seat cushion of the sled standard seat assembly; (2) allowing a lap/shoulder belt fastening in the test procedure; and (3) adding a floor to the sled fixture used in the compliance test procedure. Volvo suggests that these amendments would make FMVSS No. 213 more reflective of real-world conditions and facilitate ''rearward-facing child seating for as long as practicable.'' Volvo states that it offers add-on and built-in booster seats in the U.S., but does not offer child restraints for children under the age of 4 ''primarily because of the inherent problems in [FMVSS] No. 213 and in showing compliance with this standard for larger rearward-facing child restraints.''

The requests of items (1) and (2) above are being met by this rulemaking. The request for adding a floor (item (3)) is denied. NHTSA discusses this request below.

Volvo believes that the most effective way to fasten a rear-facing child restraint is to use the seat belts or the ISOFIX[54] anchors together with a support leg extending down to the floor of the vehicle. Volvo states that this method of attachment has been available to Volvo and child restraint manufacturers in countries outside the U.S. for many years and has ''proven to be very practicable.'' Volvo states: ''For the US, it is not, however, possible to certify this solution to FMVSS 213 since this standard does not offer a floor for the sled specified in the test procedure.'' Volvo states that ''the addition of the floor in the sled used in standard FMVSS 213 appears to be well justified since all cars in the modern car fleet would have a floor between the first and second rows of seats.''

NHTSA is denying the request. The test parameters of the FMVSS No. 213 sled test replicate the real-world vehicle features and crash factors that bear on a child restraint's performance in protecting a child in the real world. Included in those test parameters are the test seat assembly (seat geometry, seat

NPRM proposes to require vehicle manufacturers to place the anchorages within 2 centimeters from the seat bight.

[51] NHTSA is not changing FMVSS No. 213's requirement that covered CRSs must also meet the standard's performance requirements while attached using a child restraint anchorage system.

[52] See results of test numbers 8917, 8922, 8919, 8923, 8929 and 8931 in Table 11 and test numbers 8917, 8922, 8919 and 8923 in Table 12 of this NPRM.

[53] P.C. 2010–545 April 29, 2010. 2010–05–12 *Canada Gazette Part II, Vol. 144, No. 10.*

[54] ISOFIX is a system for connecting child restraint systems to vehicles which consists of two rigid anchorages in the vehicle, two corresponding rigid attachments on the child restraint system and a means to limit the pitch rotation of the child restraint system.

cushion characteristics), methods of child restraint attachment to the test seat assembly (lap belt, lap/shoulder belt, and child restraint anchorage system), the standard's limits on head excursion, the sled crash pulse, and the test velocity. The test parameters are also chosen and designed to reflect how child restraints are actually *used* in the real world. Thus, as examples, the standard requires a universal and standardized means of attaching CRSs to reflect that CRS are used interchangeably in all models of vehicles. The standard's test parameters include a test in which the CRS is installed without attaching a tether, because non-use of a top tether is prevalent.

Studies from NHTSA's National Child Restraint Use Special Study (NCRUSS),[55] Safe Kids,[56] and the Insurance Institute for Highway Safety (IIHS)[57] have shown that tether use is still low in the field. NCRUSS found that the overall tether use was 42 percent. Safe Kids found that overall tether usage in forward-facing CRSs with internal harnesses 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 belts. IIHS researchers analyzed data from 479 vehicle observations and found that the top tether was used only 56 percent of the time. With prevalent tether nonuse in the field, NHTSA requires forward-facing CRSs to meet minimum performance requirements while untethered in an FMVSS No. 213 compliance test.

A generic floor would serve no purpose in the FMVSS No. 213 compliance test. FMVSS No. 213 standardizes the method of attachment to the vehicle seat and requires CRSs to meet the FMVSS No. 213's dynamic performance requirements when attached to the test seat assembly using the standardized attachments (seat belt assembly; child restraint anchorage system). Standardization increases the likelihood of correct installation of child restraints, as consumers do not need to learn novel ways of installing child restraints each time a new child restraint is used. Standardization also ensures that the minimum level of protection provided by FMVSS No. 213 will be provided by each child restraint installed in every vehicle. The standardized attachment does not involve the vehicle floor. The presence of a floor structure on the FMVSS No. 213 seat assembly is not a matter of significance for the standard's compliance test as CRSs are tested today.

In asking for a floor, Volvo impliedly asks that CRSs should be permitted to use a ''support leg'' in the test to meet the minimum performance requirements of the standard. The Agency denies this request for several reasons. FMVSS No. 213 is written to prevent vehicle-specific CRSs, since the risk of misuse in a vehicle for which a CRS is not designed is high in this country. This is a concern when the leg is needed to meet the minimum performance requirements of the standard.[58] Consumers might use the CRS in vehicles that may not be compatible with the use of a leg; using the CRS in a vehicle whose floor differs from the Volvo floor could have negative safety consequences when the floor attachment is needed to meet the minimum performance requirements of the standard. Or, consumers may not properly use a support leg. They might forget to use it, or might not attach it correctly to the vehicle floor. Data from NHTSA's NCRUSS and IIHS, discussed above, show that there already exists a problem of consumers not using the CRS top tether. Volvo did not provide any information showing that consumers in this country would use the leg correctly.

NHTSA also notes that Volvo did not suggest how the floor should be specified on the standard seat assembly. Under the FMVSSs, the strength and configuration of the vehicle's belt system and child restraint anchorage system are standardized to ensure the vehicle attachments are sufficient to withstand the occupied CRS's dynamic loads during a crash. The attachment strategies specified in the FMVSSs do not involve compressive loading to the vehicle floor, such as resulting from a support leg of a CRS. The FMVSSs also have no performance requirements for the vehicle floor to ensure stable installation of a support leg and sufficient rigor to withstand loading from a leg during a crash. NHTSA is concerned that the floor of some vehicles, such as those with a storage compartment under the seat, may not be strong enough to withstand the dynamic loads from a support leg. The petitioner's request to allow the floor to contribute to the performance of the CRS introduces unacceptable uncertainty that the CRS would provide the requisite minimum protection in the real world.

By stating that only the standardized means of attachment will be used in the compliance test, FMVSS No. 213 ensures that the performance of the child restraint in providing the minimum level of safety mandated by the standard is not dependent on a supplementary device that is suitable for only certain vehicle makes and models and that may or may not be used by the consumer. Since a support leg is not used in the standard's compliance test, a floor on the seat assembly is unnecessary. Accordingly, NHTSA denies the request to add a floor to the sled used in the FMVSS No. 213 compliance test.

VI. No Safety Need to Increase Crash Pulse

a. Introduction

As part of NHTSA's effort to ensure FMVSS No. 213 continues to drive effective CRS performance in today's vehicle environment, the Agency examined the sufficiency of the FMVSS No. 213 sled acceleration pulse and 48 km/h (30 mph) test velocity used in compliance testing. NHTSA has evaluated this aspect of the test procedure in each of the Agency's recurring retrospective reviews of the standard.

In 2003, NHTSA considered increasing the severity of FMVSS No. 213's sled acceleration pulse but decided against such a change. Instead, the Agency redesigned the pulse and established a corridor around it to allow the Agency to conduct compliance tests at velocities closer to the 48 km/h (30 mph) velocity specified in the standard.[59]

[55] National Child Restraint Use Special Study, DOT HS 811 679, *https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812142.* NCRUSS is a large-scale nationally-representative survey that involves both an inspection of the child passenger's restraint system by a certified child passenger safety technician and a detailed interview of the driver. The survey collected information on drivers and on child passengers ages 0–8 years between June and August 2011.

[56] ''A Look Inside American Family Vehicles 2009–2010,'' Safe Kids USA, September 2011. (*http://www.safekids.org/assets/docs/safety-basics/safety-tips-by-risk-area/sk-car-seat-report-2011.pdf.)* The study was based on 79,000 observations from ''car seat check'' events and appointments that took place between October 1, 2009 and September 30, 2010.

[57] 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,'' IIHS, April 2013. IIHS surveyed and collected data at roughly 50 suburban sites near Fredericksburg, VA, Philadelphia, PA, Seattle, WA, and Washington, DC Shopping centers, recreation facilities, child-care centers, car seat checkpoints and healthcare facilities were among the locations.

[58] FMVSS No. 213 does not prohibit Volvo or any other manufacturer from providing a support leg as long as the child restraint meets the standard's minimum performance levels without the support leg.

[59] Under FMVSS No. 213 (S6.1.1(b)(1)), the dynamic test is at a velocity change of 48 km/h (30

Continued

In that 2003 rulemaking proceeding, NHTSA requested comment on the corridor for the acceleration pulse and on the severity of the crash pulse. Commenters from all segments of the child passenger safety community were almost unanimous opposing an increase in the severity of the crash pulse. Commenters were concerned that an increase in the severity of the pulse would lead to higher costs and reduced usability of child restraints with minimal or no increase in benefits.[60]

After reviewing the comments and other factors, NHTSA decided not to increase the severity of the sled acceleration pulse. The Agency determined that increasing the severity could necessitate the redesign of many CRSs and increase costs of CRSs without a commensurate safety benefit. In that rulemaking, the Agency determined that the FMVSS No. 213 sled acceleration pulse was severe, similar to rigid barrier crash test accelerations of SUVs and trucks. Its severity was appropriately high to ensure that CRSs would maintain their structural integrity in just about all crashes involving children, and limit forces to the child's head, neck, and torso to reasonable levels, no matter what vehicle the child is in.

In preparing this NPRM, NHTSA again investigated the sufficiency of the FMVSS No. 213 sled acceleration pulse, particularly vis-à-vis an evolving occupant protection environment. Since the 2003 final rule, the stringency of the belted test of FMVSS No. 208, ''Occupant crash protection,'' was increased from 48 km/h (30 mph) to 56 km/h (35 mph),[61] which raised the question whether FMVSS No. 213's frontal test speed should be increased as well. In addition, more vehicles have become stiffer and/or smaller with high G crash acceleration pulses, and new kinds of CRSs have emerged for older and heavier children. With those developments in mind, NHTSA reevaluated the FMVSS No. 213 sled acceleration pulse and test velocity.

Guiding Principles

As stated earlier in this preamble, real world data show CRSs to be highly effective in reducing fatalities and injuries in motor vehicle crashes. NHTSA estimates that for children less than 1 year old, a CRS can reduce the risk of fatality by 71 percent when used in a passenger car and by 58 percent when used in a pickup truck, van, or SUV (light truck). Child restraint effectiveness for children between the ages 1 to 4 is 54 percent in passenger cars and 59 percent in light trucks.[62] These effectiveness estimates would be further enhanced if the misuse rate of CRSs is reduced.

Given that CRSs are already highly effective, the Agency carefully considers the unintended impacts of any rulemaking purporting to enhance CRS safety. Any enhancement that would markedly raise the price of the restraints could potentially have an adverse effect on their sales. The net effect on safety could be negative if the effect of sales losses exceeds the benefit of the improved performance of the restraints that are purchased. In addition, NHTSA also considers the effects of improved performance on the ease of using child restraints. If the use of CRSs becomes overly complex or unwieldy, the dual problems of misuse and nonuse of CRSs could be exacerbated. Thus, in considering the safety impacts of its efforts on FMVSS No. 213, the agency weighs those improvements against impacts on the price of restraints and CRS ease-of-use.

With these guiding principles in mind, the agency evaluated the sufficiency of the current FMVSS No. 213 sled acceleration pulse and test velocity. NHTSA analyzed real world crash data, the regulations of other countries, and sled test data from tests the Agency conducted on the performance of CRSs when tested to different crash test speeds and sled acceleration pulses.

b. Safety Need—Crash Data Analysis

To learn more about the crash speeds of frontal crashes in which children are involved and to compare these to crashes involving older occupants, NHTSA analyzed the NASS–CDS data files for years 2008 to 2012 to determine the change in velocity distribution of non-rollover frontal crashes. During this 5-year period, there were 754 restrained children 12 years old (12–YO) and younger who were occupants of light passenger vehicles involved in non-rollover frontal crashes with a known (estimated) change in velocity. During this same 5-year period, there were 7,749 older occupants (restrained occupants older than 12 years of age) who were occupants of light passenger vehicles involved in non-rollover frontal crashes with a known (estimated) change in velocity.

The analysis found that 99.47 percent of restrained children 12–YO and younger were involved in frontal crashes of speeds of 48 km/h (30 mph) or less, and 99.57 percent of such children were involved in frontal crashes of speeds of 56 km/h (35 mph) or less. In comparison, for older restrained occupants involved in frontal crashes, 98.5 percent and 99.27 percent were in crashes of speeds of 48 km/h (30 mph) or less and 56 km/h (35 mph) or less, respectively (Table 6).

TABLE 6—CHANGE IN VELOCITY IN TOWAWAY, NON ROLLOVER, FRONTAL CRASHES WITH KNOWN CHANGE IN VELOCITY VALUES

[NASS–CDS 2008–2012] *

	ΔV ≤30 mph (%)	ΔV ≤35 mph (%)
Restrained Children (0–12 yrs)	99.47	99.57
Other Restrained Occupants	98.5	99.27

* unweighted data (754 restrained children 0–12 years old, 7,749 others)

These data indicate that the 48 km/h (30 mph) sled test in FMVSS No. 213 ensures that CRSs are exposed to a crash condition which is at least as severe as 99.47 percent of such real-world incidents involving restrained children ages 0 to 12–YO, and that an increase in test speed to 56.3 km/h (35 mph) will only marginally increase the crashes covered by the standard. In contrast,

mph) ''with the acceleration of the test platform entirely within the curve shown in . . . Figure 2A.''

[60] To illustrate, SafetyBeltSafe commented that a velocity increase would make products more expensive and would not significantly improve CRS performance in the real world. The University of Michigan Transportation Research Institute (UMTRI) stated that its review of NASS data files indicated that a 48 km/h (30 mph) change in velocity was more severe than at least 98 percent of frontal impact crashes involving children nationwide. UMTRI was concerned that increasing the velocity of the test is not likely to increase safety, but will increase consumer cost of CRSs and may lead to CRS designs that could make the restraints less effective or more easily misused at lower severity crashes, which occur much more frequently. IIHS stated that its review of NASS cases showed that CRSs designed to pass the current 48 km/h (30 mph) sled test are providing very good protection to children in frontal crashes and that there was no evidence that designing CRSs to withstand higher crash forces could have prevented or mitigated any of the serious or fatal injuries in the reviewed NASS cases. The only commenter supporting an increase in the FMVSS No. 213 pulse was ARCCA Inc., which believed that the standard's pulse led to test velocities that were less severe than 48 km/h (30 mph) rigid barrier vehicle crash test acceleration pulses. (Docket No. NHTSA–2002–11707.)

[61] FMVSS No. 208 sets forth vehicle frontal crash tests for evaluating occupant protection for adult passengers. Examples of vehicle countermeasures used to meet the requirements include lap/shoulder seat belts, belt tensioning devices, frontal head and thorax air bag systems, improved passenger compartment integrity and vehicle front-end crumple zones.

[62] Traffic Safety Facts—Children 2013 Data. *https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812154.* Last accessed on August 23, 2016.

98.5 and 99.27 percent of older restrained occupants are involved in crashes with a change in velocity up to 48 km/h (30 mph) and 56.3 km/h (35 mph), respectively. The fraction of restrained children with change in velocity over 48 km/h (30 mph) (0.53 percent) is lower than that for older restrained occupants (1.5 percent), and this difference between the two groups is statistically significant.[63] Likewise, the estimate for the fraction of restrained children with change in velocity over 56 km/h (35 mph) (0.43 percent) is lower than that for older occupants (0.73 percent), and this difference between the two groups is statistically significant.

These results reveal that restrained children are more involved in lower-severity crashes than older occupants. The percentage of frontal crashes of restrained children covered by the 48 km/h (30 mph) sled test (99.47 percent) is greater than the percentage of frontal crashes of older occupants (99.27 percent) covered by the 56 km/h (35 mph) vehicle crash test. The data show that the current FMVSS No. 213 48 km/h (30 mph) sled test velocity does not equate to a diminished level of safety for restrained children as compared to older vehicle occupants. In fact, it could be argued that FMVSS No. 213's 48 km/h (30 mph) test provides a higher degree of protection than the 56 km/h (35 mph) test of FMVSS No. 208 in terms of the breadth of the crashes they cover involving the relevant restrained population.

c. Hard Copy Review of Case Files

While a 56 km/h (35 mph) change in velocity would only cover an additional 0.1 percent of the crashes involving restrained children, NHTSA undertook a review of case files to determine whether a change in velocity could have possibly prevented fatal or serious injury to children involved in the additional 0.1 percent of crashes. Among children 0–12 YO restrained by CRSs in passenger vehicles, about 72 are killed in crashes annually and about 634 sustain AIS 2+ injury.[64] To better understand the reason for injuries and fatalities among CRS-restrained children in frontal crashes, the agency reviewed all NASS–CDS and Crash Injury Research and Engineering Network (CIREN)[65] data files for the years 2003 to 2013 for instances in which children 12–YO and younger in CRSs[66] in rear seats of light passenger vehicles sustained AIS 3+ injuries in frontal crashes without rollover. Only those cases in which the change in velocity exceeded 40 km/h (25 mph) were considered to eliminate low severity impacts where injuries were likely due to factors such as the child being improperly restrained, or cases where information was unavailable to assess crash severity and cause of injury.

There were 18 cases that met these selection criteria for the years 2003–2013. Table 7 shows a summary of the case review of the 18 cases.

TABLE 7—NASS–CDS & CIREN (2003–2013) CASE REVIEW: CHILDREN 12–YO AND YOUNGER RESTRAINED IN CRSS WITH AIS 3+ INJURIES IN FRONTAL IMPACT WITHOUT ROLLOVER WITH A CHANGE IN VELOCITY GREATER THAN 40 KM/H (25 MPH)

Cause of AIS 3+ Injuries	Total	Percentage
Gross CRS Misuse	7	39
Exceedingly Severe	4	22
Intrusion of the Front Seat Back	3	17
Cargo intrusion	1	6
Bracing	1	6
Could not be determined	2	11
Total	18	100

The most frequent cause of AIS 3+ injury to children was gross CRS misuse. Gross CRS misuse included children restrained in a CRS intended for larger/heavier children, infant seat with the carrying handle improperly stowed, booster seats with only the lap belt used to restrain the child, and booster seat with no seat belt used. The second most frequent cause of AIS 3+ injury to CRS-restrained children was that the crash was exceedingly severe (beyond the severity of a 56 km/h (35 mph) frontal crash).

In three cases, the front seat back intruded into the restrained child's occupant space resulting in head or leg injuries. In one case, the child's right humerus was fractured due to intrusion of cargo from the trunk of the vehicle. In another case, the child's arms were braced against the front seat back before the impact and the child sustained arm fractures during the crash. The cause for injury in the remaining two cases could not be determined due to lack of evidence and/or missing or unknown data.

This hard copy case review indicates that AIS 3+ injuries to CRS-restrained children in frontal crashes are due to CRS misuse (39 percent), excessively severe crashes (beyond 56 km/h (35 mph) crash severity) (22 percent), and other factors unrelated to crash severity or CRS misuse. There is no indication that a CRS designed to meet a 56 km/h (35 mph) FMVSS No. 213 compliance test would have prevented any of these injuries.

The findings from the hard copy review are in accordance with the findings from NHTSA's National Child Restraint Use Special Study (NCRUSS) that shows that car seat and booster seat misuse in the field is 46 percent, and that CRS misuse is a more frequent causal factor for AIS 3+ injury to restrained children than the severity of the crash.[67]

[63] The analysis was conducted with unweighted data assuming random sample selection.

[64] NASS–CDS data file 2005–2009, 79 FR 4577.

[65] NHTSA's Crash Injury Research and Engineering Network (CIREN) combines data collection with professional multidisciplinary analysis of medical and engineering evidence to determine injury causation in every crash investigation conducted.

[66] Children in CRSs include children that may or may not be restrained by the internal harness of a CRS or the seat belt when using a booster seat.

[67] "Findings of the National Child Restraint Use Special Study (NCRUSS)," DOT HS 812 142. May 2015. NCRUSS is a large-scale nationally-representative survey that involves both an inspection of the child passenger's restraint system by a technician and a detailed interview of the driver. 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.

d. Globally, All Regulations Use a 30 MPH Test Speed

In considering the sufficiency of the FMVSS No. 213 test speed, NHTSA examined the regulations for child restraint systems that are implemented in other countries. The review found that the frontal sled tests in all the CRS standards simulate a 48–50 km/h (30—31.0 mph) crash (see Table 8).

TABLE 8—TEST SPEED OF FRONTAL SLED TESTS IN CRS STANDARDS FROM DIFFERENT COUNTRIES

Standard	Type of test	Speed km/h	Speed mph
UNECE R.44 [68]& R.129 [69] (Europe)	Sled Test	50	31.0
Australia AS 1754	Sled Test	49	30.4
FMVSS/Canadian MVSS No. 213	Sled Test	48.2	30.0

At the same time, the crash pulse used in FMVSS No. 213 appears more severe than that of the European and Australian regulations. Generally, for a given crash speed, vehicle crash acceleration pulses with higher peak acceleration, higher initial rise rate, and shorter duration are more severe and demanding on restraint systems. The peak acceleration of the FMVSS No. 213 sled pulse is comparable to that of the sled pulses used in other countries. The FMVSS No. 213 sled pulse corridor has a very rapid rise reaching peak acceleration much sooner than the ECE R.44/R.129 or the Australian regulations. The rapid initial rise in acceleration and the short duration of the FMVSS No. 213 acceleration pulse is also characteristic of more recent smaller passenger car models with stiff front-ends in the U.S. fleet. The duration of the FMVSS No. 213 pulse and the Australian regulation are comparable but much shorter than the ECE R.44/R.129. The Canadian standard (CMVSS No. 213) uses the same sled acceleration pulse corridor as that specified in FMVSS No. 213.

Figure 6 shows the frontal sled pulses used in FMVSS/CMVSS No. 213, UNECE R44/R129 and the Australian regulations.

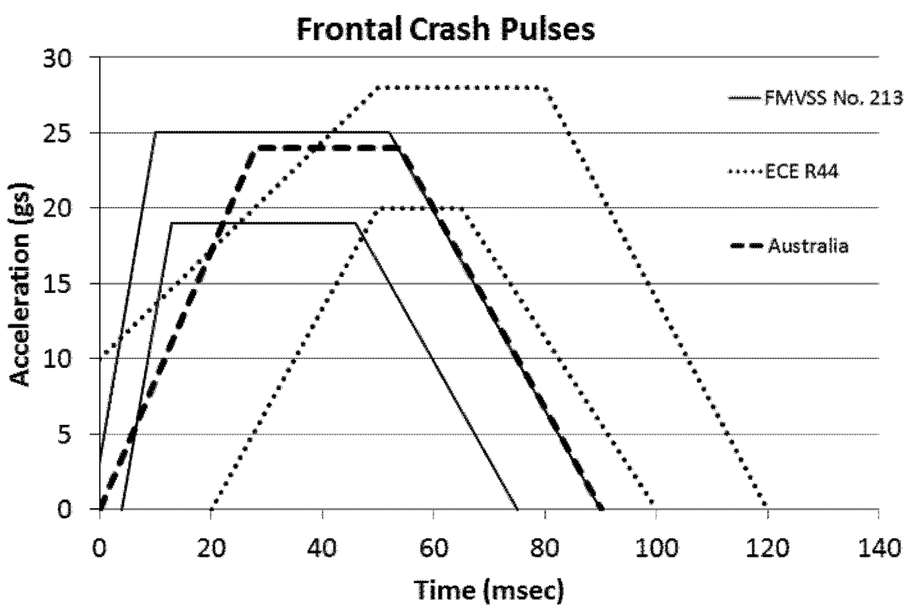


Figure 6. Frontal sled test acceleration pulse profile for different CRS standards (FMVSS No. 213, ECE R.44/R.129 and Australian Regulation)

e. Sled Testing of CRSs

NHTSA tested different kinds of CRSs in FMVSS No. 213-type sled tests at 56.3 km/h (35 mph) and 48 km/h (30 mph) change of velocities. The Agency tested the CRSs on a sled assembly comprising the current FMVSS No. 213 standard seat assembly frame [70] and the NHTSA-Woodbridge seat cushion. To assess how CRSs would perform when subjected to a 56 km/h (35 mph) pulse, the agency developed five pulses using passenger vehicle crash pulses of vehicles tested to the 56 km/h (35 mph) frontal barrier test of NHTSA's New Car Assessment Program (NCAP).

Table 9 below shows the velocity, crash pulse duration, and peak

[68] Japan, Korea, and China adopted ECE R.44 or a regulation based on the ECE R.44.

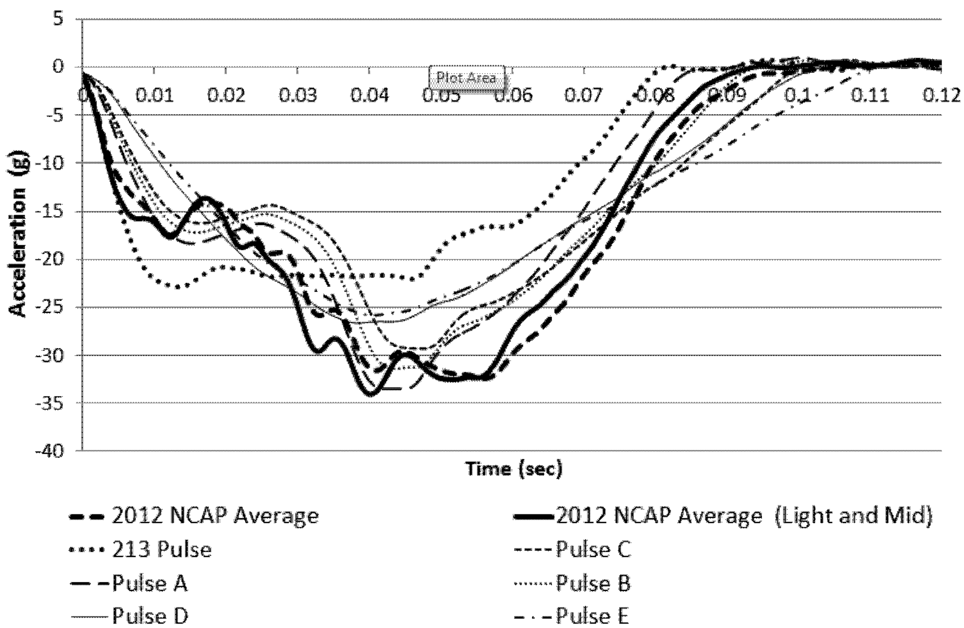
[69] Regulation No. 129—Enhanced Child Restraint Systems (ECRS). Since July 2013, CRSs in Europe (and other countries) can be approved in accordance with the new UN Regulation No. 129 for CRSs, also known as ''I-Size Regulation.'' R.129 requires all children under 15 months to be transported rear facing, adds requirement for vehicle CRS compatibility, and has a dynamic test for side impact protection. In contrast, ECE.R44 categorizes CRSs by weight groups and does not have a side impact test.

[70] The proposed test bench frame was not ready at the time the 56 km/h (35 mph) tests were performed. However, since the proposed seat assembly geometry is not significantly different from the current FMVSS No. 213 seat assembly geometry, NHTSA believes the results are comparable to a test performed in the proposed upgraded seat assembly.

acceleration for each of the five sled acceleration pulses. The first row in Table 9 sets forth the characteristics of the current FMVSS No. 213 sled acceleration pulse, and the last row shows the characteristics of the average acceleration pulse of MY 2012 passenger vehicles in the 56 km/h (35 mph) NCAP frontal crash test. Figure 7 shows the sled acceleration pulse profiles.

TABLE 9—SLED AND VEHICLE ACCELERATION PULSE CHARACTERISTICS

Pulse	Velocity (mph)	Duration (ms)	Peak acceleration (G)
213	29.7	81	23.0
A	34.3	91	33.5
B	35.0	95	31.5
C	34.3–34.6	101–103	29.0–29.3
D	34.4–35.0	100–105	26.9–29.0
E	34.5–34.8	111	25.6–25.8
Average NCAP[71]	35.0	104	32.0



Note: Light means light vehicle weighing less than 3,300 lb.
Mid means medium vehicle weighing between 3,000 to 4000 lb.

Figure 7. Sled and vehicle acceleration pulse profiles

In the 2003 final rule (*supra*),[72] the Agency identified factors of the acceleration pulse associated with crash severity: change in velocity, peak acceleration, and acceleration pulse duration. Generally, for the same change in velocity, acceleration pulses of higher peak acceleration and shorter duration are higher in crash severity. The 2003 final rule also identified a rapid rise in initial acceleration to be associated with higher crash severity. Applying these criteria to the acceleration pulses shown in Table 9 and Figure 7, pulse A could be the most severe and E the least severe. Although the current FMVSS No. 213 acceleration pulse (see Figure 7) has lower peak Gs and a lower change in velocity than the other 5 sled acceleration pulses (A through E), the FMVSS No. 213 pulse is reasonably severe because of the rapid rise in acceleration in the initial portion of the pulse (for comparison, see acceleration pulses D and E).

The sled acceleration pulses A, B, and C have a pulse shape and peak acceleration level similar to the 2012 NCAP average crash pulse. They have a sharp decline to approximately 17g then a gradual decline to approximately 35 g. Sled acceleration pulses D and E have a smoother sinusoidal shape with lower peak acceleration levels.

Forward-Facing CRSs

NHTSA tested three forward-facing CRSs equipped with internal harnesses on the sled using the five different 56.3 km/h (35 mph) sled pulses and the FMVSS No. 213 48 km/h (30 mph) pulse and the HIII–3YO and HIII–6YO dummies. The CRSs were attached to the standard seat assembly using the child restraint anchorage system (''LATCH'' lower anchors and tether).

Test results showed the HIII–6YO dummy exhibiting unrepresentative kinematics during the test. In some tests, severe head-to-knee contact occurred due to the legs of the dummy rotating upwards during the test. The

[71] Average crash acceleration time histories from MY 2012 passenger vehicles in NCAP frontal crash tests.

[72] 68 FR 37640.

Agency deemed this kinematic to be unrepresentative as it is unlikely that the legs of a 6YO child in a vehicle would rotate upwards; the front seat structure would impede such rotation. (The Agency attempted to retest the CRSs with the legs of the HIII–6YO tied to the seat assembly, but sometimes this did not prevent the legs from rotating upwards.)

The Radian 65 model was tested with pulse E (with and without legs restrained) and in both tests the HIII–6YO dummy head and chest injury measures exceeded the allowable threshold levels (see Table 10). The Radian 65 model was also tested with pulse D and the dummy's chest acceleration exceeded threshold levels while HIC was barely within the threshold level (98.1 percent of 1,000 threshold level). There was chin-to-chest contact for the HIII–6YO dummy in the tests with the Radian 65 that resulted in high head and chest injury measures.

Table 10. Sled test results for forward-facing (FF) CRSs installed using the lower anchors and tether (bold and underlined=exceeded performance threshold levels)

Test Number	Pulse Code	Speed	Duration	Accel.	CRS Model	Dummy	HIC	Chest Accel. (g)	Head Excursion (mm)	Knee Excursion (mm)
		km/h	ms	g			1000	60	720	915
8832	213	47.8	81	23	Graco ComfortSport	3 YO	392.5	44.0	552	NA
8833	213	47.8	81	23	Graco ComfortSport	3 YO	567.5	41.4	540	NA
8837	B	56.3	95	31.5	Graco ComfortSport	3 YO	792.8	44.2	717	NA
8839	C	55.2	103	29	Graco ComfortSport	3 YO	430.9	39.7	696	NA
8840	C	55.2	103	29	Graco ComfortSport	3 YO	772.6	44.0	718	NA
8843	D	56.3	100	29	Graco ComfortSport	3 YO	828.7	48.3	742	NA
8834	213	47.8	81	23	Graco MyRide 65	6 YO	599.5	46.3	583	NA
8835	213	47.8	81	23	Graco MyRide 65	6 YO	781.4	45.4	519	599
8836	A	55.2	91	33.5	Graco MyRide 65	6 YO	**1595.2**	59.9	696	0
8838	C	55.7	101	29.3	Graco MyRide 65	6 YO	**1022.0**	48.5	697	784
8842	D	55.3	104	26.6	Graco MyRide 65	6 YO	**1098.5**	53.4	657	773
8845	D	56.0	103	27.2	Graco MyRide 65	6 YO	**1214.7**	52.5	696	788
8846	E	55.8	111	25.6	Graco MyRide 65	6 YO	993.1	51.8	681	NA
8844	D	55.8	105	26.98	Radian 65	6 YO	981.0	**62.7**	703	749
8847	E	55.5	111	25.7	Radian 65	6 YO	**1040.9**	**65.2**	676	763
8848	E	56.0	111	25.8	Radian 65	6 YO	**1017.5**	**61.8**	690	767

Note: Some knee excursion values are missing because the tracking targets on the dummy's knees were not visible during maximum excursion.

The Graco MyRide 65 was tested in 4 pulse types (A, C, D, and E) with the HIII–6YO dummy. In tests with pulses A, C, and D, the dummy's HIC value exceeded the injury threshold level of 1,000 due to head-to-knee contact. When tested with the HIII–6YO dummy with pulse E, HIC and chest acceleration threshold levels were met, but HIC reached 993 (99.3 percent of 1,000 injury threshold). On average, in sled tests of the Graco MyRide 65, HIC values were 72 percent greater, chest acceleration were 16 percent higher, head excursions were 24 percent higher, and knee excursions were 32 percent higher in tests with the 56 km/h (35 mph) sled pulses than in the corresponding tests with the FMVSS No. 213 sled pulse.

The Graco ComfortSport CRS was tested using the HIII–3YO dummy with acceleration pulses B, C, and D. The CRS met the HIC and chest acceleration performance criteria; however, HIC and head excursions were at elevated levels near the performance limits. HIC values were on average 65 percent greater and head excursions were 30 percent higher in tests with the 56 km/h (35 mph) sled pulses than in the corresponding tests with the FMVSS No. 213 sled pulse.

Rear-Facing and Booster Seats

NHTSA tested two rear-facing CRSs with the current FMVSS No. 213 acceleration and acceleration pulse C, using the HIII–3YO and CRABI–12MO dummies. Results showed no performance measures exceeding their corresponding threshold levels. However, HIC (953) was very close to the threshold value in the test with the infant carrier (Peg Perego Viaggio) with the CRABI–12MO dummy.

NHTSA also conducted nine tests of the Evenflo Big Kid High Back Booster Seat with pulses A, B, C, D, and E, and three tests of the Evenflo Big Kid Backless Booster seat with pulses D and E. This test series used the HIII–6YO and HIII–10YO dummies. All the performance measures were within threshold levels in these tests. However, HIC was about 52 percent higher in tests with the 56 km/h sled pulse compared to the current FMVSS No. 213 sled acceleration pulse.

Summary of Sled Test Data

The tests conducted at 48.3 km/h (30 mph) and 56.3 km/h (35 mph) indicate that increasing the test speed to 56.3 km/h (35 mph):

- Results in a high rate of failures of forward-facing CRSs tested with the HIII–6YO test dummy. This suggests that most forward-facing CRSs that are subject to testing with the HIII–6YO dummy would need redesigning to meet HIC and chest acceleration performance criteria. Alternatively, CRS manufacturers might choose not to sell forward-facing CRSs that are subject to testing with the HIII–6YO dummy, *i.e.,* CRSs recommended for use by children weighing over 18.2 kg (40 lb),[73] which would reduce the availability of those CRSs to the public.
- Causes unrepresentative head-to-knee contacts that result in high HIC values in convertible CRSs tested in a forward-facing configuration with the HIII–6YO. Real world data indicate that while head-to-knee contacts may be present in the real world during a crash, they do not result in head injuries.
- Causes unrepresentative head-to-chest contact for the HIII–6YO dummy in forward-facing CRSs that result in high head and chest injury measures.
- Results in injury measures closer to the standard's limit in some rear-facing CRSs and booster seats. This suggests that some rear-facing CRSs and booster seats may need modification.

f. Agency Decision

As discussed above, after reviewing real world crash data, regulations of other countries, and sled test data, the Agency has decided not to increase the test velocity of FMVSS No. 213 to 56.3 km/h (35 mph). To summarize, the reasons are as follows:

- CRSs are already highly effective in preventing injuries and fatalities in motor vehicle crashes. NASS–CDS data files show that restrained children are more involved in lower-severity crashes than older occupants. The percentage of frontal crashes of restrained children covered by the 48 km/h (30 mph) sled test is greater than the percentage of frontal crashes of restrained older occupants covered by the 56 km/h (35 mph) vehicle crash test. The FMVSS No. 213 48 km/h (30 mph) sled test velocity does not equate to a diminished level of safety for restrained children as compared to older vehicle occupants. In fact, it could be argued that FMVSS No. 213's 48 km/h (30 mph) test provides a higher degree of protection than the 56 km/h (35 mph) test of FMVSS No. 208 in terms of the breadth of the crashes they cover involving the relevant restrained population.
- There is no safety need to raise the FMVSS No. 213 test speed to 56 km/h (35 mph). A 56 km/h (35 mph) change in velocity would only cover an additional 0.1 percent of the crashes involving restrained children, which suggests that the benefits accrued from a higher test velocity would be very small. While only an additional 0.1 percent of the crashes would be covered, NHTSA undertook a review of case files to determine whether a change in velocity could have possibly prevented fatal or serious injury to children involved in the additional 0.1 percent of crashes. The review showed that AIS 3+ injuries to CRS restrained children in frontal crashes are due to CRS misuse, excessively severe crashes beyond 56 km/h (35 mph) crash severity, and other factors unrelated to crash severity. There is no indication that a CRS designed to meet a 56.3 km/h (35 mph) FMVSS No. 213 compliance test would have prevented or mitigated any of these injuries.
- It is unclear whether a 56 km/h (35 mph) test velocity is appropriate for the FMVSS No. 213 sled test environment with the larger size dummies. The test dummies used in the test showed possible unrepresentative dummy kinematics (exacerbated head-to-knee or chin-to-chest contact) that result in high injury measures near or above the established threshold limits.
- There may be unintended safety consequences associated with raising the FMVSS No. 213 test speed to 56 km/h (35 mph). The Agency's sled tests conducted with various crash pulses of a 56 km/h (35mph) change in velocity indicate that the designs of many forward-facing CRSs would need to be changed to comply with performance requirements of a 56 km/h (35 mph) sled velocity test. The testing also suggests that some rear-facing CRSs and booster seats may need design modifications. The design changes may increase the weight, cost, and size of these CRSs. NHTSA is concerned that the design changes could potentially reduce the usability of CRSs, resulting in non-use or misuse of child restraints for no real benefit. In addition, there is a concern that CRSs redesigned to meet increased test velocities may not perform as well in the more common low speed crashes.
- The current 48 km/h (30 mph) FMVSS No. 213 sled test velocity is similar, if not more severe, than those in CRS regulations of other countries. It may be considered more severe because of its rapid initial rise in acceleration and its short duration.

Accordingly, after consideration of these factors, NHTSA has decided that raising the FMVSS No. 213 test speed to 56 km/h (35 mph) is unwarranted at this time.

VII. Fleet Testing of CRSs on the New Seat Assembly Designs

a. Initial Standard Seat Assembly Design (V1)

NHTSA sled tested a wide array of CRSs to see how they performed on the initial seat assembly design [74] (referred

[73] The agency is unable to estimate the number of CRS models that would need redesign due to the limited nature of the agency's testing.

[74] The initial standard seat assembly design (V1) used in these sled tests only differed from the proposed standard seat assembly (V2) in minor ways. The initial standard seat assembly used in these sled tests had a shorter seat back height and slightly different seat belt and child restraint anchorage locations. NHTSA performed tests on the proposed standard seat assembly (V2) of some of the CRSs that were tested on V1 standard seat assembly; results showed no significant difference

Continued

to in this NPRM as Version 1 (V1)). The V1 seat assembly design drawings were placed in Docket No. NHTSA–2013–0055–0002 on May 17, 2015. The tests were conducted with an acceleration pulse within the FMVSS No. 213 specified acceleration corridor, with a peak acceleration of 21.2 g and average sled velocity of 46.9 km/h (29.2 mph). All CRSs met the current FMVSS No. 213 performance requirements, as well as the proposed head excursion requirement for forward-facing CRSs in the untethered condition.

The study consisted of 53 tests of 23 CRS models of 12 different makes (*i.e.* Chicco, Britax, Evenflo, etc.). The Agency [75] and booster type CRSs. The Agency selected CRSs based on: Sales volume; CRS types, makes and models; CRS weight; CRS child weight/height recommendations; variety of design (different belt path location, base size for rear-facing only CRSs); and special features (such as an inflatable feature, presence of a support leg and of rigid attachments to child restraint anchorage systems). The CRSs represented a wide variety of CRSs from different manufacturers and are representative of the range of CRSs in the current market.

Tests were performed with test dummies currently used in FMVSS No. 213, including the CRABI–12MO, HIII–3YO, HIII–6YO and HIII–10YO. The CRSs equipped with harnesses were installed by means that included: (a) The lower anchors of a child restraint anchorage system; (b) lower anchors and tether; (c) 3-point belt; (d) 2-point belt; (e) 3-point belt with tether; and (f) 2-point belt with tether.

Table 11 provides a test matrix of the CRS name, orientation, installation method, dummy used and injury measures. All the CRSs tested on the proposed standard seat assembly met all current performance requirements in FMVSS No. 213 except for one CRS (Evenflo Titan Elite). The HIC and chest acceleration values were below injury threshold levels of 1,000 and 60 g, respectively, in all the tests. The head and knee excursions of the dummies used in testing forward-facing CRSs and booster seats were below allowable limits (head excursion of 813 mm (32 inches) without tether use and 720 mm (28 inches) with tether use, knee excursion of 915 mm (36 inches)) with all the CRS models tested, except in a test with the Evenflo Titan Elite where the head excursion of the HIII–6YO dummy was 815 mm (32 inches).

in CRS performance on the two standard seat assemblies. These results are discussed in the next section. Because there were no significant differences in CRS performance on the two seat assemblies, the agency considers the results of CRS tests on V1 relevant in ascertaining the performance of CRSs on V2.

[75] A combination CRS is a type of forward-facing car seat that is used with an internal harness system to secure a child. With removal of the internal harness, it can be used as a belt-positioning booster.

BILLING CODE 4910–59–P

Table 11. Test matrix and summary results on the V1 standard seat assembly

Test Number	Seat Name	Orientation	Installation Method	Dummy	HIC 36	Chest Accel. (g)	Head Excursion (mm)	Knee Excursion (mm)
					1000	60	720 (w/ tether) 813 (w/o tether)	915
8910	Chicco Key Fit	RF Infant	LA Only	12 MO CRABI	389.1	45.2	-	-
8911	Graco Snugride 22	RF Infant	LA Only	12 MO CRABI	678.7	*48.7*	-	-
8912	Evenflo Discovery	RF Infant	LA Only	12 MO CRABI	696.4	*49.3*	-	-
8913	Baby Trend Flex Loc	RF Infant	LA Only	12 MO CRABI	685.0	44.4	-	-
8915	Cybex Aton (no leg)	RF Infant	LA Only	12 MO CRABI	537.6	46.6	-	-
8916	Britax B-Safe	RF Infant	LA Only	12 MO CRABI	493.1	45.0	-	-
8922	Graco Snugride 22	RF Infant	SB2PT	12 MO CRABI	757.0	*54.2*	-	-
8917	Graco Snugride 22	RF Infant	SB3PT	12 MO CRABI	737.2	45.2	-	-
8918	Safety1st Onboard 35	RF Infant	SB3PT	12 MO CRABI	420.6	*49.6*	-	-
8920	Evenflo Discovery (w/o base)	RF Infant	SB3PT	12 MO CRABI	250.0	42.7	-	-
8921	Evenflo Discovery	RF Infant	SB3PT	12 MO CRABI	594.6	41.4	-	-
8914	Evenflo Tribute	RF Convertible	LA Only	12 MO CRABI	548.8	43.5	-	-
8924	Evenflo Tribute	RF Convertible	LA Only	HIII-3YO	598.4	42.7	-	-
8925	Britax Marathon	RF Convertible	LA Only	HIII-3YO	456.2	43.4	-	-
8923	Evenflo Tribute	RF Convertible	SB2PT	12 MO CRABI	687.0	46.4	-	-
8919	Evenflo Tribute	RF Convertible	SB3PT	12 MO CRABI	545.8	39.7	-	-
8928	Alpha Omega Elite	RF Convertible	SB3PT	HIII-3YO	488.2	44.1	-	-
8931	Graco My Ride 65	RF Convertible	SB3PT	HIII-3YO	446.5	*50.2*	-	-
8926	Evenflo Tribute	FF Convertible	LA Only	HIII-3YO	353.24*	46.2	638	725
8934	Cosco Scenera	FF Convertible	LA Only	HIII-3YO	406.4	*47.5*	639	*745*
8910	Evenflo Titan Elite	FF Convertible	LA Only	HIII-6YO	566.0	*35.0*	**815**	*897*
8927	Alpha Omega Elite	FF Convertible	LATCH	HIII-3YO	402.0	39.9	*591*	667
8935	Cosco Scenera	FF Convertible	LATCH	HIII-3YO	271.7	39.9	439	633
8936	Cleck Foonf	FF Convertible	LATCH	HIII-3YO	384.4	35.1	*603*	629
8912	Evenflo Titan Elite	FF Convertible	LATCH	HIII-6YO	518.2	40.4	*644*	*784*
8913	Alpha Omega Elite	FF Convertible	LATCH	HIII-6YO	441.6	39.8	*640*	*759*
8914	Graco My Ride 65	FF Convertible	LATCH	HIII-6YO	398.6	41.8	520	*775*
8931	Graco Nautilus	FF Convertible	SB2PT&T	HIII-6YO	349.8	38.8	*720*	*760*
8929	Evenflo Tribute	FF Convertible	SB3PT	HIII-3YO	410.7	44.4	606	694
8930	Alpha Omega Elite	FF Convertible	SB3PT	HIII-3YO	411.2	41.3	600	676
8915	Britax Marathon	FF Convertible	SB3PT	HIII-6YO	668.4	44.4	*728*	*843*
8917	Evenflo Titan Elite	FF Convertible	SB3PT	HIII-6YO	570.4	37.9	*697*	*822*
8918	Graco Nautilus	FF Convertible	SB3PT	HIII-6YO	457.6	45.4	*691*	*780*
8920	Recaro Performance Ride	FF Convertible	SB3PT	HIII-6YO	600.1	47.1	*723*	*813*
8933	Britax Frontier 85	FF Convertible	SB3PT&T	HIII-10YO	-	39.1	*696*	*795*
8932	Cosco Scenera	FF Convertible	SB3PT&T	HIII-3YO	274.5	39.0	490	N/A
8933	Graco My Ride 65	FF Convertible	SB3PT&T	HIII-3YO	254.4	39.7	483	628
8916	Chicco Nextfit	FF Convertible	SB3PT&T	HIII-6YO	389.7	41.9	*626*	*776*
8919	Britax Marathon	FF Convertible	SB3PT&T	HIII-6YO	503.82*	39.8	*661*	*788*
8923	Evenflo Titan Elite	FF Convertible	SB3PT&T	HIII-6YO	581.27*	40.6	*642*	712
8928	Recaro Performance Ride	FF Convertible	SB3PT&T	HIII-6YO	673.6	45.7	*674*	*760*
8930	Alpha Omega Elite	FF Convertible	SB3PT&T	HIII-6YO	471.4	40.3	*596*	707
8929	Graco Nautilus	FF Convertible	SP3PT&T	HIII-6YO	420.5	41.3	*634*	731
8932	Britax Frontier 85	BPB	SB3PT	HIII-10YO	-	47.1	608	*782*
8934	Graco Nautilus	BPB	SB3PT	HIII-10YO	-	43.1	600	*754*
8935	Alpha Omega Elite	BPB	SB3PT	HIII-10YO	-	46.7	633	*761*
8936	Graco Turbo Booster	BPB	SB3PT	HIII-10YO	-	47.6	597	697
8921	Graco Nautilus	BPB	SB3PT	HIII-6YO	374.2	34.8	559	N/A
8922	Graco Turbo Booster	BPB	SB3PT	HIII-6YO	361.1	38.6	562	584
8924	Cosco Highrise Booster NB	BPB	SB3PT	HIII-6YO	289.9	42.8	510	561
8925	Evenflo Amp High Back	BPB	SB3PT	HIII-6YO	290.3	45.0	574	618
8926	Harmony Youth NB	BPB	SB3PT	HIII-6YO	297.9	43.3	551	604

Note: SB3PT means Type 2 belt, *SB2PT* means Type 1 belt, *SB3PT&T* means Type 2 belt and tether, *SB2PT&T* means Type 2 belt and tether, *LATCH* means the full child restraint anchorage system, *LA Only* means lower anchorages of the child restraint anchorage system, *RF* means rear-facing, and *FF* means forward-facing.
*HIC was calculated using a truncated acceleration pulse because of head strikes with rear seat structure during the rebound phase of the test.

Table 12 shows that the back support angle of rear-facing CRSs did not exceed 70 degrees in any of the tests with the proposed standard seat assembly.

Table 12. CRS rotation angle in sled tests with rear-facing CRSs

Test Number	Seat Name	Orientation	Installation Method	Dummy	Rotation Angle
					70 degrees
8910	Chicco Key Fit	RF Infant	LA Only	12 MO CRABI	46
8911	Graco Snugride 22	RF Infant	LA Only	12 MO CRABI	55
8912	Evenflo Discovery	RF Infant	LA Only	12 MO CRABI	*65*
8913	Baby Trend Flex Loc	RF Infant	LA Only	12 MO CRABI	*62*
8915	Cybex Aton (no leg)	RF Infant	LA Only	12 MO CRABI	37
8916	Britax B-Safe	RF Infant	LA Only	12 MO CRABI	*57*
8922	Graco Snugride 22	RF Infant	SB2PT	12 MO CRABI	36
8917	Graco Snugride 22	RF Infant	SB3PT	12 MO CRABI	47
8918	Safety1st Onboard 35	RF Infant	SB3PT	12 MO CRABI	35
8920	Evenflo Discovery (w/o base)	RF Infant	SB3PT	12 MO CRABI	35
8921	Evenflo Discovery	RF Infant	SB3PT	12 MO CRABI	46
8914	Evenflo Tribute	RF Convertible	LA Only	12 MO CRABI	*58*
8924	Evenflo Tribute	RF Convertible	LA Only	HIII-3YO	45
8925	Britax Marathon	RF Convertible	LA Only	HIII-3YO	35
8923	Evenflo Tribute	RF Convertible	SB2PT	12 MO CRABI	39
8919	Evenflo Tribute	RF Convertible	SB3PT	12 MO CRABI	53
8928	Alpha Omega Elite	RF Convertible	SB3PT	HIII-3YO	*56*
8931	Graco My Ride 65	RF Convertible	SB3PT	HIII-3YO	*56*

Note: SB3PT means Type 2 belt, *SB2PT* means Type 1 belt, *LA Only* means lower anchorages of the child restraint anchorage system and *RF* means rear-facing.

Paired Tests

NHTSA compared some of the CRSs tested on the V1 standard seat assembly with available compliance test data (using the current FMVSS No. 213 standard seat assembly) to see whether changes in the standard seat assembly affected CRS performance. The comparison was limited in that current compliance tests of CRSs with internal harnesses are conducted with a 2-point belt to install the CRS (tethered and untethered conditions), while the fleet tests with the V1 standard seat assembly were conducted with a 3-point attachment (tethered and untethered). In addition, some compliance tests used the H2–6YO at the manufacturer's option, while all applicable fleet tests with the V1 standard seat assembly used the HIII–6YO dummy.

Rear-Facing CRSs

Table 13 compares the results of sled tests on the V1 standard seat assembly with results from compliance tests using the same rear-facing infant and convertible CRS models. All performance measures were below threshold levels. Paired T-test indicated that at a 95 percent confidence level, the HIC injury measures of the CRABI–12MO in tests with the V1 standard seat assembly were not significantly different from those with the current FMVSS No. 213 specified standard seat assembly. On the other hand, the chest acceleration of the CRABI–12MO was significantly different (lower) in tests with the V1 seat assembly than those in current compliance tests ($p<0.01$). The average reduction in chest acceleration when tested on the V1 standard seat assembly was 4.7 g.

Table 13. Paired sled tests with the V1 standard seat assembly and FMVSS No. 213 compliance tests of rear-facing CRSs with the CRABI-12MO

Test Number	Test Type / Standard Seat Assembly Type	Seat Name	HIC	HIC (+) Increase (-) Reduction	Chest Accel. (g)	Chest Accel. (+) Increase (-) Reduction
8913	V1	Baby Trend Flex Loc	685.0	5.4%	44.4	-16.5%
213-MGA-12-005	FMVSS 213 Compliance	Baby Trend Encore Flex-Loc	650.0		53.2	
8910	V1	Chicco Key Fit	389.1		45.2	
213-MGA-12-013	FMVSS 213 Compliance	Chicco KeyFit 30 61472	351.0	10.9%	52.2	-13.5%
213-MGA-13-021	FMVSS 213 Compliance	Chicco KeyFit 30 64172	330.0	17.9%	50.5	-10.6%
8912	V1	Evenflo Discovery	696.4		49.3	
213-MGA-12-039	FMVSS 213 Compliance	Evenflo Discovery 3021145	686.0	1.5%	50.6	-2.5%
213-MGA-13-043	FMVSS 213 Compliance	Evenflo Discovery/Nurture 3022198	596.0	16.9%	49.1	0.5%
8911	V1	Graco Snugride 22	678.7		48.7	
213-MGA-12-058	FMVSS 213 Compliance	Graco SnugRide 1750727	693.0	-2.1%	54.8	-11.2%
213-MGA-13-056	FMVSS 213 Compliance	Graco SnugRide 1802503	722.0	-6.0%	51.4	-5.3%
8916	V1	Britax B-Safe	493.1	-1.2%	45.0	-1.7%
213-MGA-13-014	FMVSS 213 Compliance	Britax B-Safe E9BE53C	499.0		45.8	
8914	V1	Evenflo Tribute	548.8	-1.3%	43.5	-15.9%
213-MGA-13-046	FMVSS 213 Compliance	Evenflo Tribute 3812198	556.0		51.8	
8923	V1	Evenflo Tribute	687.0	21.8%	46.4	-12.4%
213-MGA-13-046	FMVSS 213 Compliance	Evenflo Tribute 3812198	564.0		52.9	

Note: V1 means standard seat assembly Version 1.

Forward-Facing CRSs

The results of the sled tests with the V1 standard seat assembly on forward-facing CRSs, versus compliance tests, are shown in Table 14. The paired sled tests showed that all injury measures were below injury threshold levels. Paired T-test of each of the HIII–3YO performance measures in Table 14 showed no significant difference (95 percent confidence level) when tested in the V1 standard seat assembly and the current FMVSS No. 213 seat assembly. Only one paired test was performed using the HIII–6YO dummy, so a paired T-test was not possible.

Table 14. Paired sled tests with the V1 standard seat assembly and compliance tests of forward-facing CRSs

Test Number	Test Type	Seat Name	Dummy	HIC		Chest Accel		Head Excursion		Knee	
	Standard Seat Assembly Type				(+) Increase (-) Reduction	(g)	(+) Increase (-) Reduction	(mm)	(+) Increase (-) Reduction	(mm)	(+) Increase (-) Reduction
8935	V1	Cosco Scenera	HIII-3YO	271.7		39.9		439		633	
213-MGA-12-030	FMVSS 213 Compliance	Dorel Scenera 5	HIII-3YO	306.0	-11.2%	38.6	3.2%	508	-13.6%	605	4.6%
213-MGA-13-036	FMVSS 213 Compliance	Dorel Scenera	HIII-3YO	289.0	-6.0%	40.7	-2.1%	518	-15.3%	605	4.6%
8934	V1	Cosco Scenera	HIII-3YO	406.4	-15.5%	47.5	15.1%	639	-7.2%	745	7.5%
213-MGA-13-036	FMVSS 213 Compliance	Dorel Scenera	HIII-3YO	481.0		41.3		688		693	
8927	V1	Alpha Omega Elite	HIII-3YO	402.0	5.2%	39.9	-12.0%	591	-3.9%	667	2.6%
213-MGA-12-026	FMVSS 213 Compliance	Dorel Alpha Omega Elite	HIII-3YO	382.0		45.4		615		650	
8926	V1	Evenflo Tribute	HIII-3YO	353.2	-33.7%	46.2	9.1%	638	-4.1%	725	-2.6%
213-MGA-13-046	FMVSS 213 Compliance	Evenflo Tribute	HIII-3YO	533.0		42.3		665		744	
8927	V1	Alpha Omega Elite	HIII-3YO	402.0	21.4%	39.9	-7.1%	591	9.9%	667	14.2%
213-MGA-13-031	FMVSS 213 Compliance	Dorel Alpha Omega Elite	HIII-3YO	331.0		43.0		538		584	
8914	V1	Graco My Ride 65	HIII-6YO	398.6	68.9%	41.8	-24.2%	520	-1.1%	775	1.3%
213-MGA-13-061	FMVSS 213 Compliance	Graco MyRide 65	HIII-6YO	236.0		55.1		526		765	

Booster Seats

Results of paired sled tests of booster seats tested on the V1 standard seat assembly and on the FMVSS No. 213 standard seat assembly are shown in Table 15. All injury measures were below injury threshold levels. The paired sled tests showed a 37.2 percent average reduction in HIC measures and a 29.3 percent average increase in head excursion in all the booster seat models tested on the proposed standard seat assembly compared to the paired compliance test.

Paired T-test indicated that HIC injury measures and head excursions in booster seat tests with the V1 standard seat assembly were significantly different (95 percent confidence level) than those in tests with the current FMVSS No. 213 standard seat assembly. On the other hand, paired T-test indicated no significant difference (95 percent confidence level) in chest acceleration and knee excursions in tests with the V1 standard seat assembly and the current FMVSS No. 213 standard seat assembly.

Table 15. Paired sled tests with the V1 standard seat assembly and compliance tests of booster seats

Test Number	Test Type	Seat Name	Dummy	HIC		Chest Accel.		Head Excursion		Knee	
	Standard Seat Assembly Type				(+) Increase (-) Reduction	(g)	(+) Increase (-) Reduction	(mm)	(+) Increase (-) Reduction	(mm)	(+) Increase (-) Reduction
8924	V1	Cosco Highrise Booster NB	HIII-6YO	289.9	-39.3%	42.8	3.3%	510	27.9%	561	20.2%
213-MGA-12-034	FMVSS 213 Compliance	Dorel Highrise Booster	H2-6YO	478.0		41.4		399		467	
8924	V1	Cosco Highrise Booster NB	HIII-6YO	289.9	-54.0%	42.8	-15.0%	510	35.8%	561	9.0%
213-MGA-13-039	FMVSS 213 Compliance	Dorel Highrise	H2-6YO	630.0		50.3		376		515	
8925	V1	Evenflo Amp High Back	HIII-6YO	290.3	-31.5%	45.0	-3.8%	574	32.3%	618	-6.1%
213-MGA-12-053	FMVSS 213 Compliance	Evenflo Amp High Back	H2-6YO	424.0		46.8		434		658	
8922	V1	Graco Turbo Booster	HIII-6YO	361.1	-14.2%	38.6	-8.7%	562	7.9%	584	-10.8%
213-MGA-12-064	FMVSS 213 Compliance	Graco TurboBooster	HIII-6YO	421.0		42.3		521		655	
8926	V1	Harmony Youth NB	HIII-6YO	297.9	-28.2%	43.3	-8.3%	551	26.1%	604	16.0%
213-MGA-12-069	FMVSS 213 Compliance	Harmony LiteRider Youth Booster	HIII-6YO	415.0		47.2		437		521	
8927	V1	Bubble Bum	HIII-6YO	194.9	-56.2%	48.8	10.7%	541	45.8%	598	10.6%
213-MGA-12-090	FMVSS 213 Compliance	Bubble Bum Inflatable Booster	HIII-6YO	445.0		44.1		371		541	
8924	V1	Cosco Highrise Booster NB	HIII-6YO	289.9	-54.0%	42.8	-15.0%	510	35.8%	561	9.0%
213-MGA-13-039	FMVSS 213 Compliance	Dorel Highrise	H2-6YO	630.0		50.3		376		515	

Summary of Sled Test Results With the V1 Standard Seat Assembly

All CRSs tested on the V1 standard seat assembly, except for one, met the FMVSS No. 213 performance requirements.

Comparing performance measures from a sample of sled tests conducted with the V1 standard seat assembly and from FMVSS No. 213 compliance tests indicate the following:

- Rear-facing CRSs with CRABI–12MO: No significant differences in HIC measures but chest accelerations were lower in tests with the V1 standard seat assembly.
- Forward-facing CRSs with HIII–3YO and HIII–6YO: No significant differences in any of the performance measures (HIC, chest acceleration, head excursion, and knee excursion).
- Booster seats with HIII–6YO: HIC measures were lower and head excursions were higher in tests with the V1 standard seat assembly. Chest accelerations and knee excursions were not significantly different from the compliance tests.
- There were no high head acceleration spikes or severe chin-to-chest contact in any of the sled tests with the proposed seat assembly.
- Testing with the V1 standard seat assembly results in only some minor changes in CRS performance relative to the specified performance limits.

b. Proposed Standard Seat Assembly Design (V2)

During the research test series with the initial bench design (V1), a few glitches were noticed, primarily with the anchorages and the seat back height. The lower anchorages deformed due to the loads during testing and the shoulder belt anchor was positioned in an overly outboard location causing the dummy to roll out of the shoulder belt in low back booster seat tests. The seat back height of the initial bench design was too low (not within one standard deviation of the average) and during low back booster seat testing, the dummies would hit the exposed metal seat back in the rebound phase causing a significant spike in head acceleration due to the contact.

In response, the Agency modified the initial bench design (V1) by: (a) Changing the design of the lower anchorages to prevent their deformation and to facilitate their easy replacement; (b) placing the shoulder belt anchor in a more inboard position that was more representative of the anchor location in the vehicle fleet and that mitigated unrealistic dummy rollout during low back booster seat tests; and, (c) increasing the seat back height to one that was more representative of seat back height in the vehicle fleet, which would also mitigate dummy head strikes with metal structure behind the seat when testing low back booster seats. These changes to the initial bench design (V1) resulted in the proposed standard seat assembly (referred to in this NPRM as Version 2 (V2)). Schematics of these changes were placed on August 25, 2015 in Docket No. NHTSA–2013–0055–0008), with more detailed drawings placed there in July 2018.

NHTSA performed a second series of sled tests with CRSs to see how they performed on V2 (the seat assembly proposed in this NPRM). The tests were conducted with an acceleration pulse within the FMVSS No. 213 specified acceleration corridor, with a peak acceleration of 21.2 g and average sled velocity of 46.9 km/h (29.2 mph). The study consisted of 40 tests of 24 CRS models of 10 different CRS makes. NHTSA tested infant, convertible, combination and booster type CRSs. Twenty-two (22) tests also replicated the selection of tests performed with the V1 standard seat assembly, to compare the performance of 15 CRS models. Four (4) tests used previously-selected CRSs models but were tested in a different attachment configuration or used a different sized dummy. Fifteen (15) tests were performed with 10 newly-selected CRS models that included some newer models in the market with particular design features (*i.e.,* Britax Clicktight technology, Graco Affix Booster with lower anchorage attachments) and expanded the variety of CRS makes and models evaluated with V1.

Tests were performed with CRABI–12MO, HIII–3YO, HIII–6YO and HIII–10YO. Rear-facing and forward-facing CRSs equipped with harnesses were installed by means that included: (a) The lower anchors of a child restraint anchorage system; (b) lower anchors and tether; (c) 3-point belt; and (d), 3-point belt with tether as appropriate. Booster seats were tested using a 3-point belt, and in the case of the Graco Affix, the lower anchors were attached to the bench per manufacturer's instructions.

Table 16 provides a test matrix of the CRS name, orientation, installation method, dummy used and injury measures. All the rear-facing CRSs, forward-facing CRSs with tether attached and booster seats tested on the proposed standard seat assembly (V2) met all performance requirements in FMVSS No. 213, regardless of the method of attachment to the seat (child restraint anchorage system or lap/shoulder belt), for each of the dummies used. For forward-facing CRSs tested without the tether attached, HIC, chest acceleration, and knee excursions were below performance limits in all the tests regardless of the method of attachment to the standard seat assembly, for each of the dummies used. Head excursions were below the performance limits for all the CRSs tested with the HIII–3YO, HIII–6YO, and HIII–10YO except for one CRS model. The Diono Radian R120 tested without the tether attached exceeded the head excursion limit using the HIII–10YO dummy.

Table 16. Results of sled tests with the proposed standard seat assembly V2

Vehicle Database	Seat Name	Orientation	Installation Method	Dummy	HIC 36	Chest Accel. (g)	Head Excursion (mm)	Knee Excursion (mm)
					1000	60	720 (w/ tether) 813 (w/o tether)	915
9606	Chicco Key Fit 30	RF Infant	LA Only	12 MO CRABI	430.9	43.6	-	-
9607	Graco SnugRide 30	RF Infant	LA Only	12 MO CRABI	644.8	47.7	-	-
9608	Britax B-Safe 35	RF Infant	LA Only	12 MO CRABI	598.2	41.6	-	-
9609	Safety1st Onboard 35 Air	RF Infant	SB3PT	12 MO CRABI	363.9	41.7	-	-
9610	Evenflo Nurture	RF Infant	LA Only	12 MO CRABI	679.8	48.3	-	-
9611	Evenflo Nurture	RF Infant	LA Only	12 MO CRABI	685.4	50.4	-	-
9612	Evenflo Nurture	RF Infant	LA Only	12 MO CRABI	720.9	49.5	-	-
9613	Evenflo Tribute	RF Convertible	SB3PT	12 MO CRABI	453.9	44.9	-	-
9614	Alpha Omega Elite	RF Convertible	SB3PT	HIII-3YO	711.1	43.4	-	-
9615	Graco My Ride 65	RF Convertible	SB3PT	HIII-3YO	482.5	49.3	-	-
9616	Chicco Nextfit	RF Convertible	LA Only	HIII-3YO	653.8	45.9	-	-
9617	Evenflo Tribute	RF Convertible	LA Only	HIII-3YO	512.2	48.8	-	-
9601	Britax Frontier Clicktight	FF Convertible	SB3PT&T	HIII-10YO	-	38.4	700	831
9601	Graco My Ride 65	FF Convertible	LATCH	HIII-6YO	462.9	42.3	598	721
9602	Britax Marathon	FF Convertible	SB3PT	HIII-6YO	671.5	38.1	*725*	749
9604	Recaro Performance Ride	FF Convertible	SB3PT	HIII-6YO	714.3	45.7	*705*	754
9605	Graco Argos 80	FF Convertible	SB3PT	HIII-10YO	-	47.2	*728*	834
9605	Chicco Nextfit	FF Convertible	SB3PT&T	HIII-6YO	429.9	39.1	639	739
9606	Britax Marathon	FF Convertible	LATCH	HIII-6YO	329.2	33.1	631	723
9608	Alpha Omega Elite	FF Convertible	SB3PT&T	HIII-6YO	461.1	44.3	654	711
9611	Graco Nautilus	FF Convertible	SB3PT	HIII-6YO	570.4	44.0	*664*	725
9612	Graco Nautilus	FF Convertible	SB3PT	HIII-6YO	534.9	42.4	*656*	721
9613	Graco Nautilus	FF Convertible	SB3PT	HIII-6YO	534.9	43.1	*676*	740
9615	Evenflo Titan	FF Convertible	LA Only	HIII-6YO	523.5*	36.0	*792*	773
9618	Alpha Omega Elite	FF Convertible	LATCH	HIII-3YO	384.1	47.0	612	652
9619	Cosco Scenera NEXT	FF Convertible	LA Only	HIII-3YO	585.8	42.7	*640*	504
9620	Evenflo Tribute	FF Convertible	SB3PT	HIII-3YO	453.2	42.3	*603*	664
9603	Diono Radian R120	FF Combination	SB3PT	HIII-10YO	-	47.0	***855***	822
9620	Diono Radian R120	FF Combination	SB3PT	HIII-10YO	-	45.0	***839***	791
9602	Graco Nautilus	BPB	SB3PT	HIII-10YO	-	46.7	*574*	758
9603	Cosco Ambassador NB	BPB	SB3PT	HIII-6YO	446.9	47.9	*477*	575
9604	Harmony Youth NB	BPB	SB3PT	HIII-10YO	-	47.6	*513*	679
9607	Evenflo Chase	BPB	SB3PT	HIII-6YO	617.0	55.8	*579*	689
9609	Graco Turbo Booster	BPB	SB3PT	HIII-6YO	484.7	45.9	*568*	620
9610	Harmony Youth NB	BPB	SB3PT	HIII-6YO	399.3	52.8	*483*	591
9614	Bubble Bum	BPB	SB3PT	HIII-6YO	338.8*	51.2	*450*	591
9616	Graco Affix NB	BPB	SB3PT	HIII-6YO	478.5*	54.8	*466*	589
9617	Graco Affix NB	BPB	SB3PT	HIII-6YO	573.1*	58.1	*491*	599
9618	Graco Affix NB	BPB	SB3PT	HIII-6YO	534.5*	58.1	*495*	598
9619	Evenflo Amp NB	BPB	SB3PT	HIII-10YO	-	44.8	*500*	652

Note: SB3PT means 3-point belt, *SB2PT* means 2- point belt, *SB3PT&T* means 3-point seat belt and tether, *LATCH* means the full child restraint anchorage system, *LA Only* means lower anchorages of the child restraint anchorage system, *RF* means rear-facing, and *FF* means forward-facing.

*HIC was calculated using a truncated acceleration pulse because of head strikes with rear seat structure during the rebound phase of the test.

Comparison of sled tests on the initial (V1) and proposed (V2) standard seat assemblies with the same dummy restrained in the same or similar CRS model show that dummy performance measures were similar in both standard seat assemblies (see Table 17).

Paired T-test of rear-facing infant and convertible CRS models indicate that at a 95 percent confidence level, the HIC and chest acceleration injury measures in rear-facing infant and convertible CRS tests using the CRABI 12 MO and HIII–3YO dummy on V1 were not significantly different from those from tests on V2.

Paired T-test of each of the HIII–3YO and HIII–6YO performance measures in Table 17 showed no significant difference (95 percent confidence level) when tested on V1 compared to V2, except for knee excursions of the HIII–6YO. Knee excursions of the HIII–6YO were on average 59 mm higher on the V1 standard seat assembly than on the V2 seat assembly.

Paired T-test of each of the HIII–6YO head and knee excursions showed no significant difference (95% confidence level) when tested on the V1 and proposed (V2) standard seat assemblies. HIC results showed a significant change ($p<0.01$) but HIC measures were well within the head injury threshold level of 1,000. Only one paired test was performed using the HIII–10YO dummy; therefore, a paired T-test was not possible.

BILLING CODE 4910–59–P

Table 17. Results of paired sled tests with standard seat assemblies V1 and V2

Vehicle Database	Seat Name	Orientation	Installation Method	Dummy	Bench Design	HIC 36	Rel. Change (%)	Chest Accel. (g)	Rel. Change (%)	Head Excursion (mm)	Rel. Change (%)	Knee Excursion (mm)	Rel. Change (%)
						1000		60		720 (w/ tether) 813 (w/o tether)		915	
8916	Britax B-Safe	RF Infant	LA Only	12 MO CRABI	V1	493.1	21	45.0	-8	-	-	-	-
9608	Britax B-Safe 35	RF Infant	LA Only	12 MO CRABI	V2	598.2		41.6		-		-	
8918	Safety1st Onboard 35	RF Infant	SB3PT	12 MO CRABI	V1	420.6	-13	49.6	-16	-	-	-	-
9609	Safety1st Onboard 35 Air	RF Infant	SB3PT	12 MO CRABI	V2	363.9		41.7		-		-	
8924	Evenflo Tribute	RF Convertible	LA Only	HIII-3YO	V1	598.4	-14	42.7	14	-	-	-	-
9617	Evenflo Tribute	RF Convertible	LA Only	HIII-3YO	V2	512.2		48.8		-		-	
8928	Alpha Omega Elite	RF Convertible	SB3PT	HIII-3YO	V1	488.2	46	44.1	-2	-	-	-	-
9614	Alpha Omega Elite	RF Convertible	SB3PT	HIII-3YO	V2	711.1		43.4		-		-	
8931	Graco My Ride 65	RF Convertible	SB3PT	HIII-3YO	V1	446.5	8	50.2	-2	-	-	-	-
9615	Graco My Ride 65	RF Convertible	SB3PT	HIII-3YO	V2	482.5		49.3		-		-	

Table 17. Results of paired sled tests with standard seat assemblies V1 and V2 – Continued

Vehicle Database	Seat Name	Orientation	Installation Method	Dummy	Bench Design	HIC 36	Rel. Change (%)	Chest Accel. (g)	Rel. Change (%)	Head Excursion (mm)	Rel. Change (%)	Knee Excursion (mm)	Rel. Change (%)
						1000		**60**		**720 (w/ tether) 813 (w/o tether)**		**915**	
8934	Cosco Scenera	FF Convertible	LA Only	HIII-3YO	V1	406.4	44	47.5	-10	639	0	745	-32
9619	Cosco Scenera NEXT	FF Convertible	LA Only	HIII-3YO	V2	585.8		42.7		640		504	
8927	Alpha Omega Elite	FF Convertible	LATCH	HIII-3YO	V1	402.0	-4	39.9	18	591	4	667	-2
9618	Alpha Omega Elite	FF Convertible	LATCH	HIII-3YO	V2	384.1		47.0		612		652	
8929	Evenflo Tribute	FF Convertible	SB3PT	HIII-3YO	V1	410.7	10	44.4	-5	606	-1	694	-4
9620	Evenflo Tribute	FF Convertible	SB3PT	HIII-3YO	V2	453.2		42.3		603		664	
8910	Evenflo Titan Elite	FF Convertible	LA Only	HIII-6YO	V1	566.0	-8	34.7	4	**815**	-3	897	-14
9615	Evenflo Titan	FF Convertible	LA Only	HIII-6YO	V2	523.5 *		36.0		792		773	
8914	Graco My Ride 65	FF Convertible	LATCH	HIII-6YO	V1	398.6	16	41.8	1	520	15	775	-7
9601	Graco My Ride 65	FF Convertible	LATCH	HIII-6YO	V2	462.9		42.3		598		721	
8915	Britax Marathon	FF Convertible	SB3PT	HIII-6YO	V1	668.4	0	44.4	-14	728	0	843	-11
9602	Britax Marathon	FF Convertible	SB3PT	HIII-6YO	V2	671.5		38.1		725		749	

Table 17. Results of paired sled tests with standard seat assemblies V1 and V2 – Continued

Vehicle Database	Seat Name	Orientation	Installation Method	Dummy	Bench Design	HIC 36	Rel. Change (%)	Chest Accel. (g)	Rel. Change (%)	Head Excursion (mm)	Rel. Change (%)	Knee Excursion (mm)	Rel. Change (%)
						1000		**60**		**720 (w/ tether) 813 (w/o tether)**		**915**	
8920	Recaro Performance Ride	FF Convertible	SB3PT	HIII-6YO	V1	600.1	19	47.1	-3	723	-3	813	-7
9604	Recaro Performance Ride	FF Convertible	SB3PT	HIII-6YO	V2	714.3		45.7		705		754	
8919	Graco Nautilus	FF Convertible	SB3PT	HIII-6YO	V1	457.6	19	45.4	-5	691	-4	780	-7
9611	Graco Nautilus	FF Convertible	SB3PT	HIII-6YO	V2	*546.7*		*43.2*		*665.0*		*728.6*	
9612	Graco Nautilus	FF Convertible	SB3PT	HIII-6YO	V2								
9613	Graco Nautilus	FF Convertible	SB3PT	HIII-6YO	V2								
8930	Alpha Omega Elite	FF Convertible	SB3PT &T	HIII-6YO	V1	471.4	-2	40.3	10	596	10	707	1
9608	Alpha Omega Elite	FF Convertible	SB3PT&T	HIII-6YO	V2	461.1		44.3		654		711	
8916	Chicco Nextfit	FF Convertible	SB3PT&T	HIII-6YO	V1	389.7	10	41.9	-7	626	2	776	-5
9605	Chicco Nextfit	FF Convertible	SB3PT&T	HIII-6YO	V2	429.9		39.1		639		739	

Table 17. Results of paired sled tests with standard seat assemblies V1 and V2 – Continued

Vehicle Database	Seat Name	Orientation	Installation Method	Dummy	Bench Design	HIC 36	Rel. Change (%)	Chest Accel. (g)	Rel. Change (%)	Head Excursion (mm)	Rel. Change (%)	Knee Excursion (mm)	Rel. Change (%)
						1000		**60**		**720 (w/ tether) 813 (w/o tether)**		**915**	
8924	Cosco Highrise Booster NB	BPB	SB3PT	HIII-6YO	V1	289.9	54	42.8	12	510	-6	561	2
9603	Cosco Ambassador NB	BPB	SB3PT	HIII-6YO	V2	446.9		47.9		477		575	
8927	Bubble Bum	BPB	SB3PT	HIII-6YO	V1	194.9	74	48.8	5	541	-17	598	-1
9614	Bubble Bum	BPB	SB3PT	HIII-6YO	V2	338.8 *		51.2		450		591	
8922	Graco Turbo Booster	BPB	SB3PT	HIII-6YO	V1	361.1	34	38.6	19	562	1	584	6
9609	Graco Turbo Booster	BPB	SB3PT	HIII-6YO	V2	484.7		45.9		568		620	
8926	Harmony Youth NB	BPB	SB3PT	HIII-6YO	V1	297.9	34	43.3	22	551	-12	604	-2
9610	Harmony Youth NB	BPB	SB3PT	HIII-6YO	V2	399.3		52.8		483		591	
8921	Graco Nautilus	BPB	SB3PT	HIII-10YO	V1	-	-	43.1	8	600	-4	754	0
9602	Graco Nautilus	BPB	SB3PT	HIII-10YO	V2	-		46.7		574		758	

Note: *SB3PT* means 3-point seat belt, *SB3PT&T* means 3-point seat belt and tether, *LATCH* means the full child restraint anchorage system, *LA Only* means lower anchorages of the child restraint anchorage system, *RF* means rear-facing, *FF* means forward-facing and *BPB* means belt positioning booster seat.
Performance measures in italics represent average values of repeated tests.
*HIC was calculated using a truncated acceleration pulse because of head strikes with rear seat structure during the rebound phase of the test.

Three CRS models (Evenflo Nurture, Graco Nautilus, and Graco Affix) were tested three times on the proposed standard seat assembly (V2) to evaluate repeatability of the sled tests. Results showed that the coefficient of variation

(CV) of the injury measures was under 10 percent, which is repeatable (see Table 18).

Table 18. Coefficient of variation (CV) in repeat sled tests using the proposed standard seat assembly (V2)

Vehicle Database	Seat Name	Orientation	Installation Method	Dummy	HIC 36	Chest Accel. (g)	Head Excursion (mm)	Knee Excursion (mm)
					1000	60	813 (w/o tether)	915
9610	Evenflo Nurture	RF Infant	LA Only	12 MO CRABI	680	48	-	-
9611	Evenflo Nurture	RF Infant	LA Only	12 MO CRABI	685	50	-	-
9612	Evenflo Nurture	RF Infant	LA Only	12 MO CRABI	721	50	-	-
				Std Dev	18	1		
				Average	695	49		
				%CV	2.6%	1.8%		
9611	Graco Nautilus	FF Convertible	SB3PT	HIII-6YO	570	44	*664*	725
9612	Graco Nautilus	FF Convertible	SB3PT	HIII-6YO	535	42	*656*	721
9613	Graco Nautilus	FF Convertible	SB3PT	HIII-6YO	535	43	*676*	740
				Std Dev	17	1	8	8
				Average	547	43	665	729
				%CV	3.1%	1.5%	1.3%	1.1%
9616	Graco Affix NB	BPB	SB3PT	HIII-6YO	479	55	*466*	589
9617	Graco Affix NB	BPB	SB3PT	HIII-6YO	573	58	*491*	599
9618	Graco Affix NB	BPB	SB3PT	HIII-6YO	535	58	*495*	598
				Std Dev	39	2	12	5
				Average	529	57	484	595
				%CV	7.3%	2.7%	2.6%	0.8%

Note: SB3PT means 3-point belt, *LA Only* means lower anchorages of the child restraint anchorage system, *RF* means rear-facing, *FF* means forward-facing and *BPB* means belt positioning booster seat.

BILLING CODE 4910–59–C

The higher seat back in the V2 seat assembly was intended to reduce dummy head contact with rear seat structure of the seat assembly that was observed in the V1 seat assembly. While the number of head contacts with the rear seat structure were reduced compared to the V1 assembly, head contact still occurs in the V2 seat assembly when testing backless booster seats with the HIII–6YO dummy. For these tests, the HIC calculation was made using a head acceleration pulse truncated between 175–200 msec that corresponded to a time in the rebound phase before the head impact with the seat support structure. NHTSA seeks comment on whether, in the FMVSS No. 213 compliance test, HIC should be computed for backless booster seats tested with the HIII–6YO dummy using an acceleration pulse that is truncated to 175 msec.

Summary of All Sled Test Performed on the Proposed Seat Assembly (V2)

NHTSA performed 40 tests using 24 CRS models and 10 makes using the proposed seat assembly (V2). Results showed the following:

- Rear-facing CRSs including infant carriers and convertibles tested with the CRABI–12MO or the HIII–3YO dummies: Six (6) CRS models were tested with the CRABI–12MO dummy and 4 were tested with the HIII–3YO dummy. All the CRSs tested met all the performance requirements.
- Forward-facing CRSs tested with the HIII–3YO dummy: One (1) CRS model was tested with tether attached and two (2) CRS models were tested without tether attached. All CRSs tested met all the performance requirements.
- Forward-facing CRSs tested with the HIII–6YO dummy: Four (4) CRSs tested with the tether attached met all the performance requirements. Four (4) CRS models were tested without the tether attached. All met all the performance requirements.
- Forward-facing CRSs tested with the HIII–10YO dummy: One (1) CRS model was tested with the tether attached and 2 CRS models were tested without the use of the tether. The CRS tested with the tether attached met all performance requirements. The CRSs tested without the tether met all performance requirements, except for one that exceeded the head excursion limit.
- Booster seats with the HIII–6YO dummy: Six (6) booster seat models were tested and all met all performance requirements.
- Booster seats with the HIII–10YO dummy: Three (3) booster seat models were tested and all met all performance requirements.

VIII. Communicating With Today's Parents

NHTSA proposes to amend several of FMVSS No. 213's owner information and labeling requirements to improve communication with today's CRS owners.

a. CRS Owner Registration

1. Background

NHTSA established a CRS owner registration program in FMVSS No. 213 (S5.8) to increase the ''completion rate'' of recalled restraints, *i.e.,* the percentage of recalled units sold to consumers for which the consumer contacts the manufacturer for free remedy of the defect or noncompliance.[76] Prior to the registration program in FMVSS No. 213, there was a 10 to 13 percent completion rate for child restraint recalls.

NHTSA believed that the CRS completion rate could be increased by disseminating recall information directly to individual owners. Prior to the program, consumers were only indirectly notified of a safety recall by notice to the general public. At the same time, CRS owners were eager to know if their CRS was recalled and were highly motivated to remedy their CRSs if the restraints had been recalled.[77] Given this interest, NHTSA believed that owners were not completing the remedy because they were unaware that their CRS had been recalled. NHTSA adopted the registration program to facilitate direct notification of owners in a recall campaign.

There are three aspects to the registration program: (a) Manufacturers' providing a registration form to purchasers of new CRSs; (b) labeling on the CRS and in the owner's manual to notify and register owners who did not use the mail-in card (this particularly targets second-hand owners of the CRS); and (c) recordkeeping requirements for manufacturers to maintain registrants' contact information for 6 years in case a defect or noncompliance arose with the CRS leading to a safety recall (49 CFR part 588, ''Child restraint systems recordkeeping requirements''). This NPRM proposes changes to program aspects (a) and (b).

With regard to (a) above, FMVSS No. 213 requires manufacturers to provide a standardized, postage-paid registration form with each CRS.[78] The Agency designed the form in part using information obtained in a NHTSA study of consumers' attitudes about the intended program.[79] The researchers found that focus group participants—

> [I]ndicated that they would be most likely to return a pre-addressed, postage-prepaid card with an uncluttered graphic design that clearly and succinctly communicates the benefits of recall registration, differentiates itself from a warranty registration card, and requires minimal time and effort of the participant's part.

The study also showed that participants reacted favorably to the idea of being assured by the manufacturer that their names would not be placed on a mailing list if they registered their restraints.

In view of the study's findings, NHTSA standardized the form's text and layout to increase the likelihood that the owners would register.

The form consists of two parts (see Figures 9a and 9b of FMVSS No. 213). The first part (''information card'') contains a message on the importance of registering the CRS and instructions for registering.[80] The information card is intended to motivate owners to register.

The second part (''mail-in card'') is to be mailed in by the owner to register. On the mail-in card, manufacturers must preprint their return address and information identifying the model name or number of the CRS to which the form is attached, so that owners do not need to look up and provide that information themselves (a possible impediment to completing the registration). The card must have distinct spaces for the owner to fill in his/her name and address and must use tint to highlight to the owner that minimal input is required to register. To distinguish the mail-in card from a warranty card or some kind of advertisement material, the standard prohibits any other information from appearing on the card, except for identifying information that distinguishes a particular CRS from other systems of that model name or number. The card must meet minimum U.S. Postal Service size and thickness specifications so that it can be mailed as a postcard. To encourage consumers to mail back the card, manufacturers must pay the postage.

[76] Final rule, 57 FR 41428, September 10, 1992. NHTSA also issued the rule to assist the agency in determining whether manufacturers met their recall notification responsibilities under the Vehicle Safety Act, and to motivate owners to register CRSs for recall notification purposes.

[77] NPRM, February 19, 1991, 56 FR 6603, 6604.

[78] The form must be attached to a contactable surface of the CRS so that the owner will notice the form and need to handle it physically.

[79] See March 9, 1993 final rule discussion of focus group testing by National Analysts, ''Child Safety Seat Registration: The Consumer View,'' February 1991, 57 FR at 41426.

[80] In 2005, NHTSA amended the requirements to permit information regarding online registration to be included on this part of the owner registration form (September 9, 2005; 70 FR 53569).

2. Overview

The CRS owner registration program has had mixed success. Prior to the registration program in FMVSS No. 213, there was a 10 to 13 percent completion rate for child restraint recalls. The average recall completion rate is about 40 percent in recent years, which, while much higher than that before the program, is still low compared to the completion rate for vehicle recalls.[81] When NHTSA issued the final rule adopting the registration program (1992), the Consumer Product Safety Commission (CPSC) had information showing a return rate for warranty cards of 20 to 30 percent for cards that did not have postage paid and 40 percent for cards that had postage paid. The current average registration rate for child restraint systems is only 23 percent, even with a postage-paid card.

NHTSA's intention in issuing this NPRM is to raise the 23 percent CRS owner registration rate. By raising the registration rate, the Agency seeks to raise the CRS recall completion rate.

NHTSA is taking graduated steps to raise the CRS owner registration rate. NHTSA's CRS registration program primarily involves the interaction between the CRS manufacturer and the CRS owner; the primary instrument enabling and facilitating that interaction is the registration form required by S5.8 of the standard.[82]

CRS manufacturers have expressed to NHTSA their interest in exploring different registration methods, given the advances in communication technologies. They would like to optimize the design of the registration form to increase registrations. However, the current registration form requirements prevent CRS manufacturers from changing the language and format of the form to capture the consumer's interest and persuade them to register.

In response, the agency is proposing to provide flexibility to CRS manufacturers in the content and format of the form. NHTSA believes that manufacturers will take advantage of additional flexibilities to craft more optimized and effective forms of communication that will lead to higher rates of registration without introducing consumer confusion that could have an adverse effect on registration. The Agency requests comment on this assumption for all aspects of the proposed changes here.

Twenty-eight (28) years have passed since the final rule[83] establishing the registration program for FMVSS No. 213. Since that time, a generation of children has grown to become the new parents of today. This new generation grew up with and continues to interact with vast, rapidly-changing advancements in electronic communication and information technology. To make FMVSS No. 213 more responsive to the communication preferences and practices of today's parents, this NPRM would provide manufacturers leeway to use additional modern and creative means of outreach and information exchange in an effort to increase owner registration rates. NHTSA's purpose in allowing this flexibility is to allow CRS manufacturers the opportunity to cultivate their method of communicating with their customer-caregivers and to use innovative ways to get their customers to register.

At the same time, however, NHTSA believes that the registration form also must be designed to meet the needs of owners who may not have access to or may not be comfortable with modern electronic means of communication. The Agency has drafted the proposed amendatory language in a way that maintains features of the current form for owners who would register by mail.

NHTSA also recognizes that reducing the restrictions on the content and format of the form reduces the standardization of the form, which raises some concerns. The standardized registration form is readily recognizable, easy to understand and designed with carefully considered text and formatting features. When manufacturers are given substantial leeway to design content and format, it introduces a risk that some designs may be confusing or ineffective. This proposal provides more flexibility but also limits certain aspects of design that NHTSA believes would be ineffective, such as advertisements on the form, and the Agency requests comment on whether any other aspects should be similarly prohibited. Likewise, the Agency requests comment on whether any of the design aspects that the agency has proposed to cease being standardized should, instead, remain standardized.

Further, in the event NHTSA finalizes the proposal to increase flexibility here, NHTSA anticipates that it will monitor the content and format that manufacturers use on the forms to see if more standardization is needed. Standardization might be appropriate not only to disallow confusing or ineffective designs, but to promote particularly effective content and format that have resulted in increased registration rates.

3. Proposed Changes to the Registration Program

i. Information Card

The information card is the top part of the two-part registration form shown in Figures 9a and 9b of FMVSS No. 213. The size, font, color, and layout of the information card are currently prescribed in Figures 9a and 9b, as is the attachment method (fold/perforation) of the information card to the lower part of the form (the mail-in card). The information card sets forth: (a) Prescribed wording advising the consumer of the importance of registering; (b) prescribed instructions on how to register; and (c) prescribed statements that the mail-in card is pre-addressed and that postage is already paid.

The Agency proposes to remove the restrictions on size, font, color, layout, and attachment method of the information card portion. These changes would provide flexibility to CRS manufacturers on how the required information is presented to the consumer. The Agency believes that these changes have the potential to increase registration rates, but does not have information suggesting the extent to which this would occur and requests comments on what effect, in any, these changes will have on increasing registration rates. Comments are also requested on whether a two-part registration form format is warranted. Assuming it is, this NPRM proposes that manufacturers can decide how the information card is attached to the mail-in card. The agency believes that the information card should be easily detachable from the mail-in card portion, without the use of scissors and the like.

In addition, the agency is proposing to amend the requirements in (a) and (b) above such that the wording would no longer be prescribed. Instead, CRS manufacturers would be given leeway to use their own words to convey the importance of registering the CRS and to instruct how registration is achieved. NHTSA would allow statements explaining how consumers can use

[81] The average recall completion rate for vehicles for the 10-year period from 2006 to 2015 is 79 percent.

[82] This NPRM focuses on improving the registration form to enhance the interaction between manufacturers and owners but the agency asks for comment on ways registration rates could possibly improve by the involvement of third parties, such as retailers and other dealers. NHTSA is interested in learning about programs that have involved point-of-sale registration, the practicalities of the arrangement (*e.g.,* how the merchant conveyed the owner information to the manufacturer), and the successes and challenges associated with them.

[83] Final rule, 57 FR 41428, September 10, 1992.

electronic (or any other means) of registering, as long as instructions are provided on using the paper card for registering (including that the mail-in card is pre-addressed and that the postage is pre-paid). NHTSA requests comment on any benefits or safety risks of allowing manufacturers to provide their own language here.

NHTSA also proposes to permit or possibly require a statement that the information collected through the registration process will not be used by the manufacturer for any purpose other than contacting the consumer in the event of a recall. Comments are requested on NHTSA's requiring such a statement. NHTSA also proposes to continue to prohibit any other information unrelated to the registration of the CRS, such as advertising or warranty information.

These proposed changes to the information card, if adopted, would affect the collection of information, ''Consolidated Child Restraint System Registration, Labeling and Defect Notification,'' OMB Control Number: 2127–0576. This NPRM includes a request for comment on the collection of information. Comments are requested from manufacturers on whether they plan to take advantage of this increased flexibility in providing information to consumers to motivate them to register their child restraints.

ii. Mail-In Card

The Agency proposes that the mail-in card portion of the form (the lower half of the form depicted in Figures 9a and 9b of FMVSS No. 213) does not need to be changed.[84] The current mail-in card has the basic elements needed for registering by mail, including the necessary owner contact information, preprinted CRS restraint information (Figure 9a), manufacturer's preprinted address and prepaid postage information (Figure 9b), and minimum size of the card (important so it can be mailed to the manufacturer as a postcard).

NHTSA requests comment on whether other elements should be added to or eliminated from the currently required mail-in card, and if leeway should be given on how the card is formatted.

iii. Electronic Registration Form

FMVSS No. 213 currently permits manufacturers to provide a web address on the information card to enable owners to register online (S5.8.1(d)). The web address must provide a direct link to an ''electronic registration form'' meeting the requirements of S5.8.2 of the standard. Under S5.8.2, the electronic registration form must conform to a specified format and have certain content, including: (a) A prescribed message to advise the consumer of the importance of registering; (b) prescribed instructions on how to register; and, (c) fields to record the CRS's model name or number and date of manufacture, and the owner's name, mailing address, and optionally, the owner's email address.

This NPRM proposes to amend S5.8.1(d) so that the electronic form may be reached by using methods other than a web address. For instance, should consumers be able to access the electronic form by a code (such as a QR[85] code)? NHTSA is also considering amending S5.8.l to delete the specific reference to an ''electronic registration form,'' and, instead, reference any electronic means to register owners.

With regard to the requirements for the electronic registration form (S5.8.2), NHTSA proposes to change the requirements for elements (a) and (b) above, from NHTSA-prescribed messages to messages crafted by the CRS manufacturer conveying the importance of registering and instructions on how to register. Comments are requested on whether S5.8.2 should be further amended, possibly by rescinding some of the requirements in that section. What changes are needed to allow innovative electronic methods for registering CRSs? How can FMVSS No. 213 facilitate use of those technologies? What benefits or safety risks would be introduced by allowing these flexibilities?

iv. Information on Labels and in Owners' Manuals

NHTSA also proposes that provisions in FMVSS No. 213 requiring information on registering CRSs on child restraint labels[86] and in owners' manuals[87] also be amended in the manner discussed above.

b. Information on Correctly Using CRSs

NHTSA proposes to lessen restrictions in labeling and owner's manual requirements so that manufacturers have more flexibility in providing information on correct CRS use (S5.5, S5.6). The agency intends for manufacturers to determine the words and diagrams that most effectively instruct consumers on using their CRSs and to determine how the labeling should be presented to communicate best with consumers. The goal of the proposal is to increase the correct use of CRSs.

1. Removing Requirements for Specific Wording

FMVSS No. 213 requires manufacturers to label CRSs with information on the maximum height and weight of the children who can safely occupy the system (S5.5.2(f)). NHTSA believes there is a continued need for this ''use information'' to be permanently labeled on CRSs. However, because S5.5.2(f) prescribes specific statements for the label that have become dated and that are not optimized for particular CRS designs and features, the agency proposes to rescind the requirement that they be used. Instead, NHTSA proposes requiring that the information be provided for each mode the CRS can be used (rear-facing, forward-facing, booster) and, subject to the conditions discussed below, manufacturers would have the flexibility to provide the use information in statements or a combination of statements and pictograms at locations that they deem most effective.

The proposed conditions are based on sound best practice recommendations developed by the child passenger safety community.

Conditions on the Provided Use Information

i. NHTSA and the entire child passenger safety community strongly recommend that children up to the age of 1 be kept riding rear-facing at least up to the age of 1. NHTSA further recommends that children 1 to 3 years of age ride rear-facing as long as possible, until they reach the manufacturer-recommended upper height or weight limit for riding rear-facing in the CRS, and that children 4 to 7 years of age ride forward-facing in CRSs with internal harnesses as long as they are within the height and weight limits allowed by the CRS's manufacturer.[88]

With these recommendations in mind, NHTSA proposes that the use information manufacturers provide for CRSs that can be used in multiple ''modes'' (rear-facing, forward-facing, booster) must provide information about the weight and height of children for

[84] Typographical errors would be corrected, such as the spelling of the words ''postage'' and ''mailed.''

[85] QR code means Quick Response Code. This is a matrix barcode similar to a standard Universal Product Code (UPC) barcode but has greater storage capacity. Usually QR codes are used for product tracking, item identification and general marketing.

[86] See S5.5.2(m) and S5.5.5(k).

[87] See S5.6.1.7 and S5.6.2.2.

[88] *https://www.safercar.gov/parents/CarSeats/Right-Car-Seat-Age-Size.htm?view=full.*

each mode of use. Currently S5.5.2(f) requires the *overall* maximum and minimum height and weight ranges of the children for whom the CRS is recommended, which are not broken down by modes of use. The requirement to parse the height and weight ranges *by mode* would result in clearer instructions on when to turn a child forward-facing, so that children are not turned forward-facing too soon.

To illustrate, instead of stating that a convertible (a CRS that can be used rear-facing and forward-facing) is for use by children weighing 5 to 65 lb (2.3 to 29.5 kg) and with heights up to 48 inches (121.9 centimeters (cm)), the statements or a combination of statements and pictograms would indicate that the CRS is used rear-facing by children weighing 5 to 40 lb (2.3 to 18.1 kg) and with heights up to 48 inches (121.9 cm), and forward-facing by children weighing 27 to 65 lb (12.2 to 29.5 kg) and with heights up to 48 inches (121.9 cm). This information may be provided in combination with pictograms on labels already provided on the CRS, as shown in Figure 8. Evenflo and SafeRide News have requested this amendment in a petition for rulemaking, *supra.* NHTSA grants this part of the petition.

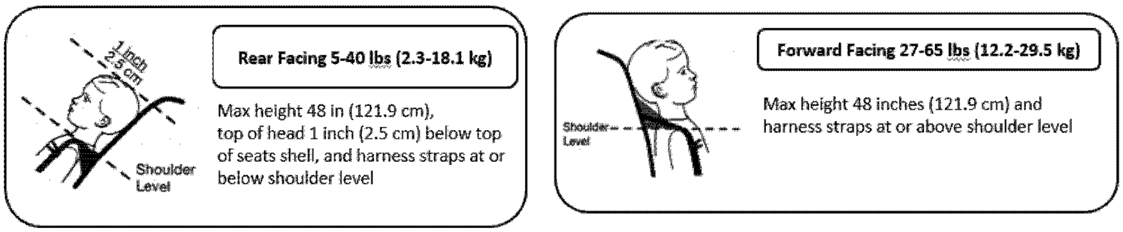


Figure 8. Example of manufacturer-recommended weight and height of children for rear-facing and forward-facing modes of use, currently included on labels voluntarily provided by some manufacturers.

ii. Given the need for children to be kept rear-facing at least up to the age of 1, NHTSA proposes that CRSs may only be recommended for forward-facing use by children weighing a minimum of 12 kg (26.5 lb). The 26.5 lb value corresponds to the weight of a 95th percentile 1-year-old. This provision would apply to CRSs designed to be used only forward-facing and to CRSs that are designed for use rear-facing for infants and forward-facing for older children (*i.e.,* the latter restraints cannot use a ''turnaround weight'' that is less than 12 kg (26.5 lb)).

The purpose of this provision is to increase the number of children younger than 1 that are transported rear-facing, because a child under 1 is significantly safer rear-facing than forward-facing in a crash. FMVSS No. 213 currently sets the minimum weight recommendation for a child in a forward-facing CRS at 9 kg (20 lb) (S5.5.2(k)(2)), but that weight is too low to capture a sufficiently full population of children 1-year-old and younger. A 50th percentile 1-year-old weighs 10 kg (22 lb); hence the 9 kg (20 lb) threshold is unsatisfactory because it does not cover more than half the children under 1 year of age. The change to 12 kg (26.5 lb) would capture almost all 1-year-olds and would therefore increase the likelihood that children under 1 will be transported rear-facing.

Another benefit from the 12 kg (26.5 lb) minimum weight would be to increase the likelihood that more young toddlers would be transported rear-facing. Rear-facing CRSs support the infant or toddler's posterior torso, neck, head, and pelvis and help to distribute crash forces over the entire body. Developmental considerations, including incomplete vertebral ossification, more horizontally oriented spinal facet joints, and excessive ligamentous laxity put young children at risk for head and spinal cord injury. Rear-facing CRSs address this risk by supporting the child's head, preventing the relatively large head from moving independently of the proportionately smaller neck.

Although NHTSA recommends that children 1 to 3 ride in rear-facing child restraints as long as possible to address the above risks, many caregivers are not following this recommendation and instead appear to be following labeling instructions that specify a turnaround weight of 9kg (20 lb).[89] NCRUSS[90] data indicate that, among children weighing less than 9 kg (20 lb), 93 percent were restrained in a rear-facing CRS, yet among children weighing 9 to 13.1 kg (20 to 29 lb), only 22 percent were restrained in a rear-facing CRS. The weight of 12 kg (26.5 lb) corresponds to the weight of a 75th percentile 18-month-old (18MO) and about a 50th percentile 2-year-old. Raising the turnaround weight to 12 kg (26.5 lb) would help keep a larger percentage of very young children restrained rear-facing.

As explained in the Appendix to this NPRM, NHTSA estimates 0.7 to 2.3 lives saved and 1.0 to 3.5 moderate to serious injuries prevented by this amendment.

iii. NHTSA currently recommends that children riding forward-facing should be restrained in CRSs with internal harnesses (car safety seats) as long as possible before transitioning to a booster seat. FMVSS No. 213 permits booster seats only to be recommended for children weighing at least 13.6 kg (30 lb) (S5.5.2(f)). Based on an analysis of field data and other considerations, NHTSA believes the 13.6 kg (30 lb) value should be raised. Thirty pounds corresponds to the weight of a 50th percentile 3-year-old, and to the weight of a 95th percentile 18-month-old; *i.e.,* children too small to be safely protected in a booster seat.

NHTSA proposes to amend S5.5.2(f) to raise the 13.6 kg (30 lb) limit to 18.2 kg (40 lb), which is greater than the weight of a 97th percentile 3-year-old (17.7 kg (39.3 lb)) and approximately the weight of an 85th percentile 4-year-old. NHTSA's field data analyses indicate risks associated with booster seat use by 3- and 4-year-old children.[91] The Agency conducted statistical analyses of field data (NASS CDS data from 1998–

[89] As noted above, S5.5.2(k)(2) permits a turnaround weight of 9 kg (20 lb). Although NHTSA meant for that weight to be a minimum, many CRSs use a turnaround weight of only 9kg (20 lb).

[90] ''Findings of the National Child Restraint Use Special Study (NCRUSS),'' *supra.*

[91] ''Booster Seat Effectiveness Estimates Based on CDS and State Data,'' NHTSA Technical Report, DOT HS 811 338, July 2010. *http://www-nrd.nhtsa.dot.gov/Pubs/811338.pdf,* last accessed on October 1, 2018.

2008 and 17 combined years of State data from Kansas, Washington and Nebraska) to estimate the effect of early graduation from CRSs with an internal harness (car safety seats) to booster seats. NHTSA found that among 3- and 4-year-olds, there was as much as a 27 percent increased risk in non-incapacitating to fatal injury when restrained in booster seats compared to car safety seats. The analysis indicated that this effect may be more pronounced for children 3 years old and younger than for older children. These data indicate a need to keep children in CRSs with internal harnesses (car safety seats) until after the child turns 4 years old.[92] NHTSA estimates this change could save 1.2 to 4 lives and prevent 1.6 to 5.2 moderate to serious injuries. In addition, NHTSA's proposed side impact test for CRSs would only apply to child restraints recommended for children weighing less than 18.2 kg (40 lb). Keeping children in car safety seats longer (until at least a weight of 18.2 kg (40 lb)) would enhance their protection in side impacts as well.

2. Labeling of Use Information

The Agency proposes deleting a requirement in S5.5.2(g)(1)(i) that the use information required by S5.5.2(f) must be in a specific warning label. The use information would still be on the CRS in a visible location, but would not have to be part of the ''warning label'' statements. NHTSA tentatively concludes that if S5.5.2(f) is amended as proposed in this NPRM, the use information that S5.5.2(f) provides will be clearer to consumers, and there would not be a need to highlight the information on the specific warning label at issue.

3. Deleting S5.5.2(k)(2)

This NPRM proposes deleting the labeling requirement of S5.5.2(k)(2), as S5.5.2(k)(2) would duplicate the information of S5.5.2(f) if the latter were amended as described above. Both provisions would instruct consumers to use the rear-facing CRS with children weighing under a specified weight limit.

4. Other Requests of Evenflo and Safe Ride News Petition

Evenflo and Safe Ride News (SRN) request that NHTSA amend S5.5.2(k)(2) to reference a turnaround age (of 2 years old). The petitioners refer to the age of 2 based on a then-American Academy of Pediatrics (AAP) recommendation that children use rear-facing CRSs up to at least age 2 or until they reach the highest weight or height of the particular CRS they are using.[93]

NHTSA is denying this request. As explained above, the Agency believes that the label specified by S5.5.2(k)(2) is no longer necessary given the labeling changes proposed in this NPRM, and has proposed deleting that statement. Instead, NHTSA is proposing that manufacturers include statements, or a combination of statements and pictograms, specifying the manufacturer's recommendations for the mass and height ranges of children who can safely occupy the system in each applicable mode (*i.e.,* rear-facing, forward-facing, or booster), subject to NHTSA's amended minimum weight recommendations. NHTSA believes that the proposed change addresses the concerns of Evenflo and SRN's relating to caregiver confusion on the wording of the label, as the requirement to parse the height and weight ranges *by mode* would result in clearer instructions on when to turn a child forward-facing, so that children are not turned forward-facing sooner than recommended.

In addition, the proposed labeling changes align with NHTSA's recommendation that children under age 1 should always ride in a rear-facing car seat, and children 1–3 years old ride rear-facing as long as possible, until they reach the manufacturer-recommended upper height or weight limit for riding rear-facing in the CRS. As discussed above, rear-facing CRSs address the risk of head and spinal cord injury for infants and toddlers, and the longer that these children are transported rear-facing, the longer they can take advantage of the posterior torso, neck, head, and pelvis support that a rear-facing CRS provides.

However, since children of the same age vary by size, NHTSA declines to refer to a hard age on the CRS label. CRSs are made to protect the child occupant based on the management of crash forces based on the child's height and weight, not his or her age. NHTSA's recommendations aim to provide general guidance to the public on what CRSs are appropriate to use during specific child age ranges, as an age-based recommendation is easier for consumers to remember than a weight-based one. Raising the minimum weight for forward-facing CRSs to children that weigh a minimum of 12 kg (26.5 lb), while also including the maximum weight and height for each mode on the label, aligns with NHTSA's recommendations by ensuring children are almost always kept in rear-facing seats until they are at least age 1, while also making clear that children over age 1 who are below the maximum weight and height for a seat's rear facing mode can remain rear-facing. NHTSA continues to recommend that children remain in a rear-facing car seat until he or she reaches the maximum height or weight limit allowed by the CRS manufacturer.

NHTSA believes that it is also important to note that the AAP has since updated their 2011 recommendation on car seat use by removing the specific age 2 milestone.[94] AAP's 2018 best practice recommendation is that, ''All infants and toddlers should ride in a rear-facing CRS as long as possible, until they reach the highest weight or height allowed by their CRS's manufacturer.'' AAP's 2018 recommendation is aligned with NHTSA's recommendation. Accordingly, the Agency believes that, for the CRS label, specifying the appropriate child weight and height ranges is more accurate to identify the child occupant for whom the CRS is designed to protect than specifying an age.

NHTSA is also denying the petitioners' request to delete a requirement that the use information include the heights of the children who can occupy the system safely. The petitioners request that NHTSA delete this requirement because they believe ''overall child height is not the most useful measure.'' The petitioners suggest that consumers be instead directed to ''follow height requirements described in the owner's manual, up to a maximum of ____ inches (____ cm).'' The petitioners believe that the caregiver can determine whether his or her child's height is within the maximum for the seat and can be alerted to important information on height by the CRS owner's manual.

NHTSA denies this request. The Agency does not believe that the caregiver should be referred to the CRS owner's manual for information on the height limits for a child to use the restraint safely, because many consumers do not consult the manual.[95]

[92] A 50th percentile 48-month-old weighs 16.1 kg (35.5 lb).

[93] AAP Updates Recommendation on Car Seats (March 21, 2011), *available at https://web.archive.org/web/20170824075402/https://www.aap.org/en-us/about-the-aap/aap-press-room/pages/aap-updates-recommendation-on-car-seats.aspx.*

[94] Benjamin D. Hoffman, M.D., FAAP, New child passenger safety seat guidance advises kids to rise rear-facing as long as possible; drops age criterion (Aug. 30, 2018), *https://www.aappublications.org/news/2018/08/30/passengersafety083018.*

[95] Findings from NCRUSS (DOT HS 811 679, *https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812142*) indicate that only 66 percent of caregivers consulted the user's manual when installing a child restraint. There was no

The Agency believes that height information should be permanently attached to the CRS where it is readily available and easily accessible.

IX. Streamlining NHTSA's Use of ATDs in Compliance Tests To Reflect CRS Use Today

a. Introduction

To simplify and to make more evaluative NHTSA's compliance testing of CRSs, this NPRM proposes to streamline how the Agency uses ATDs (test dummies) to assess CRS performance. Many of these changes would make the Agency's use of the ATDs more reflective of how CRSs are used today. The proposed changes are discussed below.

By way of background, child restraint systems must meet FMVSS No. 213's performance requirements when dynamically tested with test dummies that represent children of various ages. The current dummies used in compliance testing are the newborn infant, the CRABI–12MO, HIII–3YO, HIII–6YO or the H2–6YO, and the HIII–10-year-old child dummy.

NHTSA selects which test dummy to use based in part on the height and weight of the children for whom the manufacturer recommends for the child restraint (see S7 of FMVSS No. 213). To illustrate, Table 19 below shows which dummies NHTSA uses to test child restraints based on the height and weight recommendations established for the restraint by the manufacturer. If a child restraint is recommended for a range of children whose weight overlaps, in whole or in part, two or more of the weight ranges in the table, the restraint is subject to testing with the dummies specified for each of those ranges. Thus, for example, if a child restraint is recommended for children having weights from 10 kg to 22.7 kg (22—50 lb), it would be subject to testing with the CRABI–12MO, the HIII–3YO, and the HIII–6YO or H2–6YO dummies.

TABLE 19—CURRENT USE OF DUMMIES BASED ON MANUFACTURER'S WEIGHT RECOMMENDATION

[571.213, S7]

CRS recommended for use by children of these weights—	Are compliance tested by NHTSA with these ATDs (subparts refer to 49 CFR part 572)
Weight (W) ≤5 kg (11 lb), Height (H) ≤650 mm (25.5 inches)	Newborn (subpart K).
Weight 5 kg (11 lb) <W ≤10 kg (22 lb), Height 650 mm (25.5 inches) <H ≤850 mm (33.5 inches).	Newborn (subpart K), CRABI–12MO (subpart R).
Weight 10 kg (22 lb) <W ≤18.2 kg (40 lb), Height 850 mm (33.5 inches) <H ≤1100 mm (43.3 inches).	CRABI–12MO (subpart R), HIII–3YO (subpart P).
Weight 18kg (40 lb) <W ≤22.7 kg (50 lb), Height 1100 mm (43.3 inches) <H ≤1250 mm (49.2 inches).	HIII–6YO (subpart N) or H2–6YO (subpart I) (manufacturer's option).
Weight 22.7 kg (50 lb) <W ≤30 kg (65 lb), Height 1100 mm (43.3 inches) <H ≤1250 mm (49.2 inches).	HIII–6YO (subpart N) or H2–6YO (subpart I) (manufacturer's option), and weighted HIII–6YO (subpart S).
Weight greater than 30 kg (65 lb), Height greater than 1250 mm (49.2 inches).	HIII–10YO (subpart T).*

* No HIC measured with HIII–10YO.

(**Note:** CRSs with internal harnesses that weigh more than 30 kg (65 lb) with an ATD are not tested with that ATD on the child restraint anchorage system of the standard seat assembly.)

b. Testing CRSs for Children Weighing 10–13.6 kg (22–30 lb)

Currently under FMVSS No. 213, CRSs labeled for use by children in the weight range 10 kg to 18.2 kg (22 lb to 40 lb) are subject to testing with the CRABI 12MO and the HIII–3YO dummy (S7.1.2(c)). This NPRM proposes to amend these specifications so that child restraints would not be subject to testing with the 3YO dummy unless the recommended weights of children for whom the CRS is marketed is 13.6 to 18.2 kg (30—40 lb). NHTSA proposes this change because, as a practical matter, 3YOs are too large to fit in a CRS recommended for children in the lower end of the 10 to 18.2 kg (22—40 lb) weight range. The intent of this change is to reduce unnecessary test burdens. NHTSA proposes amending S7.1.2(c) by splitting the 10 to 18.2 kg (22—40 lb) weight range into a 10 to 13.6 kg (22—30 lb) and a 13.6 to 18.2 kg (30—40 lb) weight range. CRSs recommended for children in the former range (10 to 13.6 kg (22—30 lb)) would be tested with the CRABI 12MO, while CRSs for children in the latter (13.6 to 18.2 kg (30—40 lb)) would be tested with the HIII–3YO.[96]

NHTSA is particularly mindful of the effect the amendment would have on infant carriers.[97] The current CRS market has infant carrier models recommended for children weighing up to 10 kg (22 lb), 13.6 kg (30 lb), 15.8 kg (35 lb), and 18.2 kg (40 lb) and with child height limits ranging from 736 mm (29 inches) to 889 mm (35 inches). Absent the amendment, these infant carriers would be subject to testing with the HIII–3YO (35 lb) dummy rear-facing. However, the HIII–3YO dummy (stature of 945 mm (37.2 inches)) does not fit easily in infant carriers. Current infant carriers would also likely fail FMVSS No. 213's head containment requirement (S5.1.3.2) with the HIII–3YO without substantial redesign that would add weight, bulk and cost to the CRS.

Given the purpose of infant carriers, there does not seem be a safety need warranting such redesign. Current infant carriers are convenient to use with infants and are popular with parents. The availability and ease-of-use of current carriers may result in more infants riding rear-facing than if the carriers were heavier, bulkier and more expensive.

NHTSA expects that the proposed amendment would not necessitate any design changes in infant carriers. Currently there are a number of infant carriers that are marketed for children weighing up to 15.8 kg (35 lb) or 18.2 kg (40 lb). The Agency expects that manufacturers will reduce the maximum weight recommendations such that the restraints would be

specific detail on what topic in the manual was reviewed.

[96] As a practical matter, most CRS would be subject to testing using at least two ATDs since most CRS are sold for children of weights spanning more than one weight category. A CRS that is recommended for a weight range that overlaps, in whole or in part, two or more of the weight ranges is subject to testing with the ATDs specified for each of those ranges (571.213, S7).

[97] An infant carrier is a rear-facing CRS designed to be readily used in and outside of the vehicle. It has a carrying handle that enables caregivers to tote the CRS plus child outside of the vehicle.

marketed for children up to 13.6 kg (30 lb). Because NHTSA does not believe that the infant carriers are significantly used by children weighing more than 13.6 kg (30 lb),[98] the proposed amendment is not likely to engender an unfulfilled need for the carriers by over-13.6 kg (30 lb) children. On the other hand, if a manufacturer would like to continue marketing its infant carrier for children weighing more than 13.6 kg (30 lb), it may do so, provided it can certify that the CRS can meet the performance requirements of FMVSS No. 213 when tested with the HIII–3YO test dummy. Comments are requested on this issue.

This NPRM also proposes to amend S7.1.2's height specifications for testing with the ATDs so that height categories are consistent with the corresponding weight limits. This is to simplify the standard. This proposal is explained further below.

Currently S7.1.2(b) specifies that the newborn and CRABI–12MO dummies are used to test CRSs recommended for children in a height range from 650 mm to 850 mm. The average height of a 12MO child is 750 mm (29.5 inches), not 850 mm. NHTSA proposes to change the upper end of that height range to 750 mm (29.5 inches), to correspond to the average height of a 12MO child (750 mm (29.5 inches)) (which also is the height of the CRABI–12MO ATD). The revised height range would be part of a new S7.1.1(b).

Similarly, as discussed earlier, proposed S7.1.1(c) specifies that the CRABI–12MO dummy would be used to test a CRS recommended for children weighing 10 to 13.6 kg (22 to 30 lb). A child weighing 13.6 kg (30 lb) on average is about 870 mm (34.3 inches) tall. (The 95th percentile 18MO child weighs about 13.6 (30 lb) and has a corresponding height of about 870 mm (34.3 inches).) Therefore, to make the height specifications for testing with ATDs consistent with the corresponding weight limits, this NPRM proposes that CRSs would be tested with the CRABI–12MO if they are recommended for children in the weight range of up to 13.6 kg (30 lb) or in the height range of up 870 mm (34.3 inches).

c. Testing CRSs for Children Weighing 13.6–18.2 kg (30–40 lb)

This NPRM proposes amendments affecting CRSs labeled for use by children of weights from 13.6 kg to 18.2 kg (30–40 lb). Currently, these CRSs are subject to testing with the CRABI–12MO and the HIII–3YO (S7.1.2(c)).[99] NHTSA has tentatively determined that the CRSs do not need to be tested with the CRABI–12MO, since the 10 kg (22 lb) dummy is not representative of 13.6 to 18.2 kg (30–40 lb) children for whom the restraint is intended.[100] A new S7.1.1(d) would apply to these CRSs.

The new S7.1.1(d) would specify that NHTSA would test CRSs recommended for children in the weight range of 13.6 kg to 18.2 kg (30—40 lb) with the HIII–3YO dummy. Also, to make the height specification for testing with the ATD consistent with the corresponding weight limit proposed in S7.1.1(c), NHTSA proposes to use the HIII–3YO dummy to test CRSs recommended for children in the height range of 870 mm to 1,100 mm (34.3 to 43.3 inches), instead of 850 mm to 1,100 mm (33.5 to 43.3 inches).

d. Testing CRSs for Children Weighing 18–29.5 kg (40–65 lb)

FMVSS No. 213 currently provides child restraint manufacturers the option of having NHTSA use the HIII–6YO or the H2–6YO in compliance tests of CRSs for children weighing 18 to 29.5 kg (40 to 65 lb) (S7.1.3). This NPRM proposes to test these CRSs only with the HIII–6YO. The HIII–6YO is preferred as it is a more biofidelic test device than the H2–6YO dummy, and more and more CRS manufacturers are using the HIII rather than the H2–6YO dummy. Further, it is becoming increasingly difficult to obtain replacement parts for the older H2–6YO dummy.

NHTSA adopted the HIII–6YO in FMVSS No. 213 in response to a mandate in the Transportation Recall Enhancement, Accountability and Documentation (TREAD) Act[101] that directed NHTSA to consider a number of rulemakings to improve CRS safety, including one on incorporating use of the HIII–6YO in FMVSS No. 213 compliance tests. NHTSA incorporated the ATD into FMVSS No. 213 after determining in its rulemaking that the dummy is ''considerably more biofidelic'' than the H2–6YO dummy, and with enhanced capability to measure an array of impact responses never before measured by a child test dummy, such as neck moments and chest deflection.[102]

Problems arose after adoption of the HIII–6YO in FMVSS No. 213, however. The HIII–6YO had been successfully used in low-risk deployment and static suppression compliance tests of advanced air bags under FMVSS No. 208, ''Occupant crash protection.'' However, in the FMVSS No. 213 test environment where no air bag is present, the HIII–6YO exhibited unrealistic chin-to-chest and head-to-knee contact in tests of booster seats, which resulted in inordinately high, often times failing HIC values recorded by the dummy.

NHTSA responded by adopting a provision permitting the optional use of the H2–6YO dummy in place of the HIII–6YO. NHTSA originally intended the matter as an interim measure to provide manufacturers time to adjust to the new ATD, and later, on extension, to provide NHTSA time to develop seating procedures for the dummy.[103] However, in 2011, NHTSA issued a final rule to permit optional use of the H2–6YO ''until further notice.'' The Agency announced that, while the HIII–6YO is an advanced test dummy with state-of-the-art capabilities and is used by some CRS manufacturers in certifying restraints, NHTSA wanted to complete ongoing efforts to improve the HIII–6YO dummy to make it more useful as an FMVSS No. 213 test device before testing child restraints solely with the ATD.[104]

Since 2011, NHTSA has pursued long-term improvements to the biofidelity of the HIII–6YO. Part of NHTSA's work involves development of a Large Omnidirectional Child (LODC) dummy using the HIII–10YO dummy, formulating LODC concepts and mechanisms that can eventually be adapted to the design of a 6YO prototype.[105]

[98] Feedback from child passenger safety technicians involved in child restraint system checks indicates that infants usually outgrow infant carriers because of reaching the height limit of the carrier rather than the weight limit. Further, as an infant reaches a 13.6 kg (30 lb) weight, the weight of the infant and the infant carrier together becomes too heavy for a caregiver to pull out of the vehicle and carry around by a handle. Therefore, parents often switch to a convertible or all-in one CRS as the child weight nears 13.6 kg (30 lb).

[99] The CRABI–12MO is not used to test a booster seat (S7.1.2(c)).

[100] However, if such a CRS were also labeled for use by children weighing less than 13.6 kg (30 lb), then the CRS would be subject to testing with the CRABI–12MO.

[101] November 1, 2000, Public Law 106–414, 114 Stat. 1800.

[102] Final rule, 68 FR 37620, June 24, 2003.

[103] 70 FR 44520, July 28, 2005; 73 FR 45355, August 5, 2008. The Hybrid III ATD was called the ''HIII–6C''and the Hybrid II was called the ''H2–6C'' in these documents.

[104] 76 FR 55825, September 9, 2011.

[105] The improvements in the prototype HIII–10YO LODC dummy include: A head with pediatric mass properties; a neck that produces head lag with free Z-axis rotation at the atlanto-occipital joint; a flexible thoracic spine; multi-point thoracic deflection measurement capability; skeletal anthropometry representative of a seated child; and an abdomen that can directly measure belt loading. More information on the LODC dummy can be found at: *http://www.nhtsa.gov/DOT/NHTSA/NVS/Public%20Meetings/SAE/2016/Development%20of%20the%20LODC%20ATD-SAE2016.pdf.*

Yet also since 2011, new information indicates NHTSA may not need to wait longer to use the HIII–6YO solely as the 6YO child ATD in FMVSS No. 213 compliance tests. While developing this NPRM, NHTSA tested the HIII–6YO in booster seats and in CRSs with internal harnesses (''harnessed-CRSs'') on the proposed standard seat assembly and found that the ATD did not exhibit high head injury measures and high head acceleration spikes in the dynamic tests. Chin-to-chest contact occurred at times, but it was a significantly softer contact than the contact observed in tests on the current seat assembly. On the proposed seat assembly, the high HIC values and the high head acceleration spikes that had been measured by the dummy on the current seat assembly were absent. NHTSA believes this change is due to the firmer seat cushion on the proposed assembly that prevents the CRS from bottoming out against the seat frame.

The difference in head accelerations due to the different seat assemblies is illustrated below. Figure 9 shows the head accelerations of the HIII–6YO in tests on the current FMVSS No. 213 standard seat assembly in booster seats (solid lines), and on the proposed standard seat assembly in booster seats (dashed lines) and in forward-facing harnessed-CRSs (dotted lines). As shown in the figure, the peak head accelerations curves of the HIII–6YO in tests with the proposed standard seat assembly are lower in magnitude than in tests with the current seat assembly and show the absence of severe head acceleration spikes.[106]

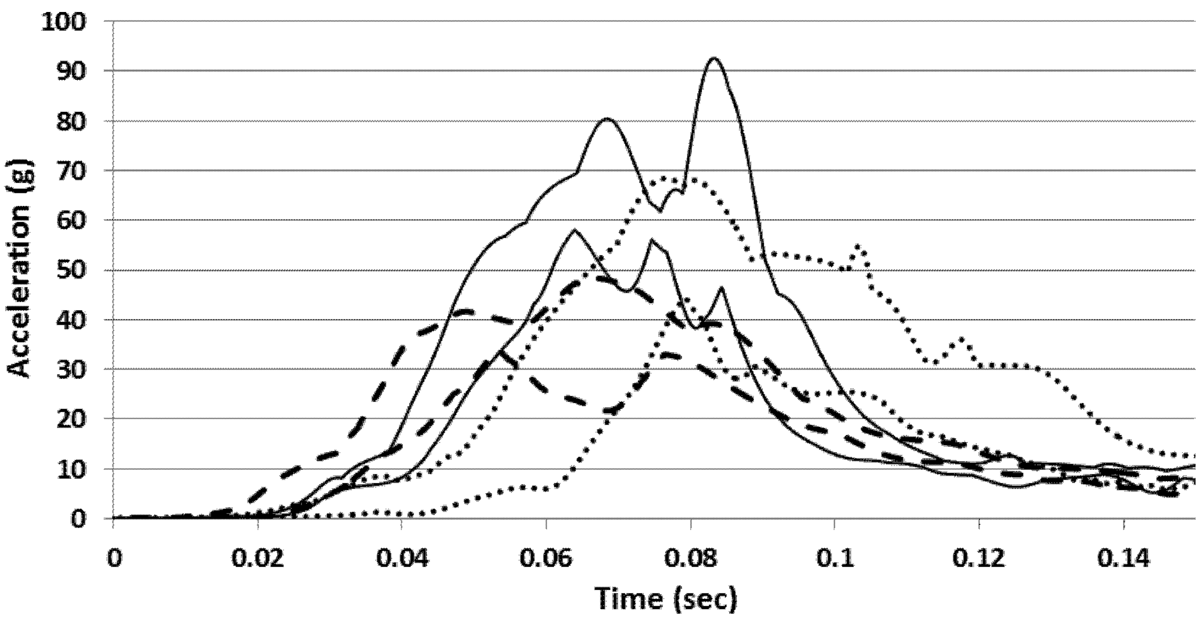


Figure 9. Head acceleration time histories and minimum and maximum corridors in tests with the HIII-6YO dummy with dummy restrained in (1) booster seats on current FMVSS No. 213 standard seat assembly (solid line), (2) booster seats on proposed standard seat assembly (dashed line) and (3) forward-facing CRSs with and without tether attached on proposed standard seat assembly (dotted line).

Those data are consistent with other data showing that the HIII–6YO dummy measures lower peak head acceleration and HIC on the proposed seat assembly than on the current FMVSS No. 213 assembly. As shown in Table 20 below, the average peak head acceleration and average HIC of the HIII–6YO on the proposed standard seat assembly were 52.9 g and 447.4, respectively. The average peak head acceleration and average HIC of the HIII–6YO dummy in tests conducted on the current FMVSS No. 213 standard seat assembly were 77.6 g and 976.2, respectively. This amounted to an average peak head acceleration that was 31.8 percent lower and an average HIC that was 54.2 percent lower when the proposed standard seat assembly is used versus the current seat assembly. Again, we attribute the overall change in magnitude in peak head acceleration to the stiffer seat cushion foam in the proposed standard seat assembly.

BILLING CODE 4910–59–P

[106] Full detail of the sled tests results are discussed in Section VII of this preamble, *supra*.

Table 20. Peak head acceleration and HIC measures in tests performed with the HIII-6YO and H2-6YO on the current FMVSS No. 213 seat assembly and tests performed with the HIII-6YO dummy on the proposed standard seat assembly.

Bench	Test No and CRS Model	Dummy	Time of peak head acceleration (sec)	Peak head acceleration (g)	HIC
FMVSS No. 213 (Research VRTC)	6769 - Safety 1st Apex 65	HIII	0.070	67.88	733.14
	6770 - Safety 1st Apex 65	HIII	0.068	80.43	862.28
	6773 - Britax Parkway	HIII	0.084	87.90	1195.59
	6774 - Britax Parkway	HIII	0.083	92.61	1192.59
	6771 - Britax Parkway	HIII	0.067	70.63	1043.39
	6778 - Cosco Ventura	HIII	0.078	66.20	829.90
	Average		**0.075**	**77.61**	**976.15**
Proposed Bench	8924 - Cosco Highrise Booster NB	HIII	0.052	40.55	289.92
	8927 - BubbleBum	HIII	0.049	41.66	194.87
	8926 - Harmony Youth NB	HIII	0.069	39.81	297.87
	8921 - Graco Nautilus BPB	HIII	0.067	48.36	374.16
	8922 - Graco TurboBooster	HIII	0.069	46.15	361.08
	8925 - Evenflo Amp HighBack	HIII	0.069	41.18	290.31
	8918 - Graco Nautilus	HIII	0.078	52.99	457.61
	8917 - Evenflo Titan Elite	HIII	0.103	54.87	570.40
	8920 - Recaro PerformanceRide	HIII	0.081	68.05	600.13
	8915 - Britax Marathon	HIII	0.078	64.27	668.36
	8910 - Evenflo Titan Elite	HIII	0.092	53.23	566.03
	8914 - Graco My Ride 65 (tethered)	HIII	0.075	50.41	398.55
	8916 - Chicco Nextfit (tethered)	HIII	0.074	54.82	389.71
	8929 - Graco Nautilus (tethered)	HIII	0.072	55.50	420.50
	8913 - AlphaOmegaElite (tethered)	HIII	0.072	55.66	441.55
	8923 - Evenflo Titan Elite (tethered)	HIII	0.077	60.53	581.27
	8912 - Evenflo Titan Elite (tethered)	HIII	0.080	56.82	518.18
	8919 - Britax Marathon (tethered)	HIII	0.078	56.85	503.83
	8928 - Recaro Performance Ride (tethered)	HIII	0.077	68.43	673.55
	8931 - Graco Nautilus (tethered)	HIII	0.077	47.11	349.81
	Average		**0.074**	**52.86**	**447.38**
FMVSS No. 213 (Compliance MGA)	Dorel Highrise Booster (H2) 213-MGA-12-034	H2	0.058	60.91	478.00
	Evenflo Amp High Back Booster (H2) 213-MGA-12-053	H2	0.078	50.72	424.00
	Graco Turbo Booster (H2) 213-MGA-12-064	H2	0.075	47.35	421.00
	Dorel Alpha Omega Elite (H2) 213-MGA-13-031	H2	0.074	52.72	331.00
	Dorel Highrise (H2) 213-MGA-13-039	H2	0.165	87.99	630.00
	Evenflo Titan (H2) 213-MGA-13-047	H2	0.093	48.65	359.00
	Evenflo Big Kid Sport Amp High Back (H2) 213-MGA-13-053	H2	0.057	49.50	402.00
	Graco MyRide 65 (H2) 213-MGA-13-061	H2	0.087	46.76	236.00
	Average		**0.086**	**55.57**	**410.13**

BILLING CODE 4910–59–C

In short, these data indicate that updating the standard seat assembly would eradicate the impediments found in the past to using the HIII–6YO dummy in compliance tests. When CRSs are tested on the proposed, more realistic standard seat assembly, the HIII–6YO's chin-to-chest contact is absent or significantly reduced in severity. The absence of contact or softer chin-to-chest contact results in lower

HIC scores compared to the HICs from tests of both the HIII–6YO and the H2–6YO on the current FMVSS No. 213 seat assembly. Thus, we believe we should terminate the optional use of the H2–6YO in compliance tests, as the primary reason NHTSA permitted continued use of the H2–6YO is no longer valid.

Another reason is to improve our overall assessment of CRS performance in the FMVSS No. 213 test. The HIII–6YO dummy is more biofidelic than the H2–6YO dummy.[107] The HIII–6YO has been shown to have good kinematics replicating that of a human in slow speed sled testing, exhibiting similar head and pelvis excursion as human children.[108] Testing CRSs on the updated (proposed) standard seat assembly in itself would yield dummy kinematics more representative of the kinematics of restrained children in real world frontal crashes than current tests, given the proposed seat assembly is specially designed to represent a current vehicle rear seat. However, having the HIII–6YO be a part of the test would amplify that realism.

Importantly, using the HIII–6YO could improve our assessment of CRS performance particularly in the significant safety area of head injury. NASS–CDS data from 1995–2009 show that 39 percent of AIS 2+ injuries to restrained children in frontal crashes are to the head and face, with 59 percent of these injuries due to contact with the seat and back support.[109] Mandatory use of the HIII–6YO in compliance testing could boost those efforts to address the head injury problem.

The HIII–6YO dummy yields a more accurate depiction of the restrained child's head excursion and would help better ensure CRSs are designed to prevent head impacts. Test data indicate the HIII–6YO exhibits more head excursion than the older H2–6YO dummy in FMVSS No. 213 tests. Table 21 shows paired sled test data of the HIII–6YO on the proposed seat assembly and the H2–6YO on the current FMVSS No. 213 seat assembly, with the dummies restrained in the same or equivalent booster seat model. Paired T-tests indicated that the measured differences in HIC and head excursion were significant (p-value <0.01).

BILLING CODE 4910–59–P

Table 21. Paired comparison of responses of the HIII-6YO on the proposed seat assembly and the H2-6YO on the current seat assembly (compliance test data), using the same booster seats.

Test Number	Seat Name	Dummy	HIC36		Chest Clip		Head Excursion		Knee Excursion	
				(+) Increase (-) Reduction	(g)	(+) Increase (-) Reduction	(mm)	(+) Increase (-) Reduction	(mm)	(+) Increase (-) Reduction
8924	Cosco Highrise Booster NB	HIII-6YO	289.92	-39.3%	42.77	3.3%	510	27.9%	561	20.2%
213-MGA-12-034	Dorel Highrise Booster 22297AOF	H2-6YO	478		41.4		399		467	
8924	Cosco Highrise Booster NB	HIII-6YO	289.92	-54.0%	42.77	-15.0%	510	35.8%	561	9.0%
213-MGA-13-039	Dorel Highrise 22297BHW	H2-6YO	630		50.3		376		515	
8925	Evenflo Amp High Back	HIII-6YO	290.31	-31.5%	45	-3.8%	574	32.3%	618	-6.1%
213-MGA-12-053	Evenflo Amp High Back 31911337	H2-6YO	424		46.8		434		658	
8922	Graco Turbo Booster	HIII-6YO	361.08	-14.2%	38.64	-8.7%	562	7.9%	584	-10.8%
213-MGA-12-064	Graco TurboBooster 1781042	HIII-6YO	421		42.3		521		655	
8926	Harmony Youth NB	HIII-6YO	297.87	-28.2%	43.29	-8.3%	551	26.1%	604	16.0%
213-MGA-12-069	Harmony LiteRider Youth Booster 0304003	HIII-6YO	415		47.2		437		521	
8927	Bubble Bum	HIII-6YO	194.87	-56.2%	48.81	10.7%	541	45.8%	598	10.6%
213-MGA-12-090	Bubble Bum Inflatable Booster	HIII-6YO	445		44.1		371		541	

BILLING CODE 4910–59–C

The average HIC, chest acceleration, and head and knee excursions are shown in Table 22.

[107] HIII–6YO also has extended instrumentation capability in many areas, such as in the neck and chest, which would be advantageous in the event a need should arise to measure the corresponding risk of injury to children in child restraints.

[108] Seacrist, T., et al., ''Kinematic Comparison of the Hybrid III and Q-Series Pediatric ATDs to Pediatric Volunteers in Low-Speed Frontal Crashes,'' 56th Annals of Advances in Automotive Medicine, October 2012.

[109] In a study of 28 cases of children ages 0 to 15 who sustained AIS 2+ head or face injuries in a frontal crash, researchers found that the front row seat back and the B-pillar were the most commonly contacted components. Arbogast, K.B., S. Wozniak, Locey, C.M., Maltese, M.R., and Zonfrillo, M.R. (2012). Head impact contact points for restrained child occupants. *Traffic Injury Prevention,* 13(2):172–81.

TABLE 22—AVERAGE HIC, CHEST ACCELERATION, HEAD EXCURSION, AND KNEE EXCURSION OF THE HIII–6YO ON THE PROPOSED SEAT ASSEMBLY AND THE H2–6YO ON THE CURRENT SEAT ASSEMBLY USING THE SAME BOOSTER SEAT MODEL

ATD	HIC	Chest acceleration	Head excursion	Knee excursion
HIII–6YO on proposed seat assembly	288	43 g	537 mm	584 mm
H2–6YO on current seat assembly	492	46 g	416 mm	533 mm

T-test showed that there was no significant difference (p-value<0.15) between the chest acceleration and knee excursion measures of the HIII–6YO in the proposed seat assembly and the H2–6YO on the current standard seat assembly when restrained in the same booster seat model.

NHTSA requests comments on whether using the HIII–6YO and the updated seat assembly would examine more closely the ability of CRSs to manage the kinematics of a restrained child in modern vehicles than a test with the H2–6YO.

NHTSA is also concerned that replacement parts for the ATD are becoming increasingly more difficult for the agency to procure. Although NHTSA's crash test dummies are designed to be durable and capable of withstanding crash testing without unreasonably breaking, all test dummies need refurbishment and parts replacement from time to time. As the H2–6YO is not a state-of-the-art dummy, it has become more difficult for NHTSA to obtain replacement parts for the ATD. The Agency is concerned that as parts become harder to obtain, NHTSA's inability to obtain parts will delay and impede its compliance test program. Ending the optional use of the H2–6YO dummy in compliance testing would avoid that potential problem.

NHTSA does not believe that terminating the optional use of the H2–6YO dummy would affect the manufacture of current child restraints significantly. First, while the head and knee excursions of the HIII–6YO dummy were greater than those of the H2–6YO, the excursion levels were well below FMVSS No. 213's excursion limits.[110]

Second, most CRS manufacturers are already using the HIII–6YO dummy to test some or all of their CRS models. Information from manufacturers to NHTSA in 2014 showed that 43 percent of CRS manufacturers use the HIII–6YO to test their CRSs, 21 percent use the H2–6YO and 36 percent use both dummies for testing their various CRS models. Manufacturers using both the H2–6YO and HIII–6YO dummies test at least 50 percent of their models using the HIII–6YO dummy.

For the above reasons, NHTSA is proposing to specify in FMVSS No. 213 that the agency will only use the HIII–6YO and not the H2–6YO dummy, with provision of sufficient lead time (*e.g.,* 3 years after publication of a final rule) for the change. Comments are requested on the issues discussed above.

e. Positioning the Legs of the HIII–3YO Dummy in Rear-Facing CRSs

Because CRSs labeled for use by children in the 10 kg–18.2 kg (22–40 lb) weight range are often sold to be used rear-facing, we seek to make more evaluative our compliance testing of these CRSs when so used.

Under current FMVSS No. 213, rear-facing CRSs labeled for use by children in the 10 kg–18.2 kg (22–40 lb) weight range are subject to testing with the (33 lb) HIII–3YO test dummy. In the past, testing with the 3YO dummy rear-facing has been complicated by the dummy's legs oftentimes getting crammed against the seat back[111] and the Agency not knowing how it ought to position the ATD's legs in the compliance test. In this NPRM, we propose a dummy leg positioning procedure that calls for placing the ATD's legs up against the seat back and removing the test dummy's knee joint stops to allow the leg to extend at the knee in the dynamic test. The procedure is already used by some commercial test labs and CRS manufacturers to test rear-facing CRSs for older children.

The positioning procedure is based on data analyzing toddler lower extremity postures when seated in rear-facing CRSs. NHTSA initiated a research project conducted by the University of Michigan Transportation Research Institute (UMTRI) to identify toddlers' common lower extremity postures.[112] UMTRI evaluated 29 subjects ages 18- to 36-months in two rear-facing conditions (wide and narrow seat).[113] UMTRI took anthropometry measures, surface scans and coordinate measures to evaluate the toddler seating postures.

UMTRI found that the most common seating postures for toddlers in rear-facing restraints are with the child's legs bent and ''relaxed'' with the bottom part of the feet up against the seat back, and with the child's legs spread and ''feet flat against each other.'' These seating positions are not achievable by the HIII–3YO dummy due to the dummy's limited hip range of motion. However, the children also frequently sat with their legs bent and elevated against the vehicle seat back. The HIII–3YO's legs are able to achieve this bent and elevated position.

We have tentatively decided to position the HIII–3YO's legs bent and elevated in rear-facing seats as shown by many of the children in the UMTRI study. Positioning the ATD's legs this way would replicate a typical position many children take in a rear-facing CRS. As noted above, the proposed procedure is already used by some commercial test labs and CRS manufacturers to test rear-facing CRSs for older children.

As part of the study, UMTRI conducted sled tests to compare the proposed positioning protocol to those used by Transport Canada in Canadian Motor Vehicle Safety Standard (CMVSS) No. 213 and by various commercial test labs and CRS manufacturers, to assess differences, if any, in CRS performance and the ease-of-use of the procedures.[114] UMTRI evaluated the following protocols: (a) Positioning the ATD in an unaltered state (baseline);[115] (b) removing knee joint stops to allow the leg to extend at the knee (NHTSA's proposed procedure); (c) removing lower leg completely (used by CMVSS

[110] Since not every CRS on the market was tested, there may be some that may need some design changes to meet the head excursion limit when tested with the HIII–6YO on the proposed seat assembly. However, the design changes would be warranted for child safety, as using the HIII–6YO better replicates the kinematics of an actual child than the H2–6YO.

[111] Positioning the HIII- 3YO dummy in a rear-facing CRSs has proven difficult in laboratory tests because of the bracing interaction between the legs of the dummy and the seat which can change the pre-test set recline angle of the rear-facing CRS and the pre-test applied lap belt tension.

[112] ''Toddler Lower Extremity Posture in Child Restraint Systems,'' March 2015, UMTRI–2014–8.

[113] UMTRI also identified the children's common lower extremity postures in forward-facing seats (long and short cushion). *Id.*

[114] ''Assessment of ATD Selection and Use for Dynamic Testing of Rear Facing Restraint Systems Designed for Larger Toddlers.'' UMTRI–2014–12. March 2015.

[115] Experienced bracing between the seat and CRS because of the legs.

No. 213); (d) removing lower leg and attaching the shank mass to the sides or top of thigh (used by CMVSS No. 213); and (e) bending the leg at the knee. The sled tests were conducted using three convertible child restraints (Graco Comfort Sport, Cosco Scenera and Cosco Scenera 40RF).

Test results in Table 23 show that the different seating procedures had little effect on the response data (HIC, chest acceleration, seat back rotation) obtained from tests of the three restraints.[116] Table 23 shows that the coefficient of variation of the different dummy configurations in three different CRSs was less than 10 percent except for one that showed an 11 percent CV for HIC.

TABLE 23—HIII–3YO RESPONSES IN SLED TESTS WITH DIFFERENT SEATING CONFIGURATIONS

UMTRI test number (NT12##)	CRS	Dummy configuration	Max seat back angle (degrees)	HIC	Chest acceleration 3 ms clip (g)
53	Cosco Scenera	A–Baseline	57	342	39
54	Cosco Scenera	B–Kneestop	59	293	38
55	Cosco Scenera	D–Shank	56	296	39
52	Cosco Scenera	E–Bent Knee	57	334	37
Average			57.3	316.3	38.3
Standard Deviation			1.3	25.4	1.0
CV			2%	8%	3%
50	Cosco Scenera 40	A–Baseline	55	383	38
49	Cosco Scenera 40	B–Kneestop	55	359	40
48	Cosco Scenera 40	D–Shank	54	361	40
51	Cosco Scenera 40	E–Bent	55	337	37
Average			54.8	360.0	38.8
STD			0.5	18.8	1.5
CV			1%	5%	4%
41	Graco Comfort Sport	A–Baseline	54	358	41
42	Graco Comfort Sport	B–Kneestop	54	350	45
45	Graco Comfort Sport	C—No leg	51	364	41
46	Graco Comfort Sport	D–Shank	51	436	35
44	Graco Comfort Sport	E–Bent	55	334	40
Average			53	368.4	40.4
STD			1.9	39.4	3.6
CV			4%	11%	9%

UMTRI also found that sled testing went more smoothly with some of the procedures than with others. An unaltered HIII–3YO dummy installation (baseline) created the most interaction (bracing) between the dummy's legs and the standard seat assembly. Removing the HIII–3YO knee joint and bending the legs at the knee (proposed procedure) were found to be easy to do in the lab and added little time to the testing process. Removing the HIII–3YO lower legs and attaching them to the upper leg was not a simple task; the reattached segments were not sufficiently coupled using tape and it added bulk to the thigh area of the dummy. We are also concerned that the added bulk of the reattached segments can create fit issues in narrow CRSs.[117]

In summary, more and more CRSs are sold for use rear-facing with older children. The proposed positioning procedure would facilitate NHTSA's compliance testing of the CRSs to the requirements of FMVSS No. 213. The procedure involves removing the dummy's knee joint stops to allow the leg to bend freely at the knee. Removing the knee joint stops results in a seating posture that toddlers adopt in real life, minimizes the possibility of bracing between the CRS and the standard seat assembly, is a task easily accomplished in the test lab and minimizes changes to the HIII–3YO dummy.[118]

f. Table Summarizing Proposed Amendments

Table 24 below illustrates this NPRM's proposed weight categories discussed above.

[116] ''Assessment of ATD Selection and Use for Dynamic Testing of Rear Facing Restraint Systems Designed for Larger Toddlers,'' *supra.*

[117] UMTRI also tested a CRABI–18MO by adding mass to the torso and thigh of the dummy to achieve a 33–35 lb weight. UMTRI found that while adding mass to the CRABI–18MO dummy was not difficult, the flexible weights have to be attached around the torso of the dummy which changes the shape of the dummy and may affect the ATD's biofidelity. In addition, the CRABI–18MO is not incorporated into 49 CFR part 572. Therefore, the CRABI–18MO was not further considered.

[118] NHTSA and UMTRI explored making changes to the HIII–3YO dummy to allow it to achieve the ''relaxed'' and ''feet flat against each other'' postures shown by toddlers in the study. Efforts involved reshaping the dummy's thigh flesh and changing the thigh joint to a ball-and-socket joint to improve the range of motion of the dummy's hips. However, prototypes showed that making those changes yielded little improvement in the seating posture and that a more involved effort would be needed to attain the postures. Since the test data indicated that different seating procedures had little effect on the response data, we decided there was not a sufficient need to pursue modifying the HIII–3YO dummy. ''Toddler Lower Extremity Posture in Child Restraint Systems,'' *supra.*

TABLE 24—PROPOSED USE OF DUMMIES BASED ON MANUFACTURER'S WEIGHT AND HEIGHT RECOMMENDATIONS

CRS recommended for use by children of these weights and heights—	Are compliance tested by NHTSA with these ATDs (subparts refer to 49 CFR part 572)
Weight (W) ≤5 kg (11 lb), Height (H) ≤650 mm (25.5 inches)	Newborn (subpart K).
Weight 5 kg (11 lb) <W ≤10 kg (22 lb), Height 650 mm (25.5 inches) <H ≤750 mm (29.5 inches).	Newborn (subpart K), CRABI–12MO (subpart R).
Weight 10 kg (22 lb) <W ≤13.6 kg (30 lb), Height 750 mm (29.5 inches) <H ≤870 mm (34.3 inches).	CRABI–12MO (subpart R).
Weight 13.6 kg (30 lb) <W ≤18.2 kg (40 lb), Height 870 mm (34.3 inches) <H ≤1100 mm (43.3 inches).	HIII–3YO (subpart P).
Weight 18.2 kg (40 lb) <W ≤22.7 kg (50 lb), Height 1100 mm (43.3 inches) <H ≤1250 mm (49.2 inches).	HIII–6YO (subpart N).
Weight 22.7 kg (50 lb) <W ≤29.5 kg (65 lb), Height 1100 mm (43.3 inches) <H ≤1250 mm (49.2 inches).	HIII–6YO (subpart N) and weighted HIII–6YO (subpart S).
Weight greater than 29.5 kg (65 lb), Height greater than 1250 mm (49.2 inches).	HIII–10YO (subpart T*).

* HIC is not a pass/fail criterion when testing with the HIII–10YO dummy.
(**Note:** CRSs with internal harnesses exceeding 29.5 kg (65 lb) with an ATD are not tested with that ATD on the child restraint anchorage system of the standard seat assembly.)

g. Consistency With NHTSA's Use of ATDs in the Proposed Side Impact Test

NHTSA requests comment on the merits of adopting the above proposed dummy selection categories in the January 28, 2014 proposed side impact test for CRSs, regarding CRSs for children weighing up to 18.2 kg (40 lb). The January 28, 2014 NPRM referred to the weight categories currently in FMVSS No. 213 to determine which ATD NHTSA would use in a side impact compliance test. That is, NHTSA proposed to use the CRABI–12MO dummy to test CRSs designed for children weighing up to 10 kg (22 lb), and to use a newly-developed side impact ATD (called the ''Q3s'') to test CRSs for children weighing 10 to 18.2 kg (22–40 lb). To align the side impact test with this frontal impact test proposal, NHTSA is considering using the CRABI–12MO to test CRSs designed for children weighing up to 13.6 kg (30 lb), and using the Q3s (3YO dummy) to test CRSs designed for children weighing 13.6 to 18.2 kg (30–40 lb) in the side impact test. The Agency's reasons for considering this change are the same ones discussed above in this NPRM relating to fitting the ATDs in the CRSs and how representative the ATDs are of the children who would be using the CRS. Further, NHTSA believes it would make sense for CRSs to be tested with the same ATDs in both the frontal impact and side impact tests.

X. School Bus CRSs

FMVSS No. 213 permits a type of CRS that is designed for exclusive use on school buses. The CRS type is a ''harness,'' which the standard defines in S4 as ''a combination pelvic and upper torso child restraint system that consists primarily of flexible material, such as straps, webbing or similar material, and that does not include a rigid seating structure for the child.'' NHTSA amended FMVSS No. 213 to accommodate harnesses manufactured for use on school bus seats because many school districts and school bus operators needed a product with a seat back mount to transport preschoolers, children who need help sitting upright, and children who need to be physically restrained because of physical or behavioral needs.[119] The seat back mount of the specialized harnesses manufactured for use on school bus seats does not use a seat belt to attach to the seat and thus can be used on large school buses without seat belts, which most large school buses do not have.

NHTSA has become aware of a CRS that is also designed exclusively for school bus use. The CRS uses a seat back mount to attach to the school bus seat without the use of a seat belt. However, because the CRS is not a harness, it does not qualify as a school bus harness under the wording of the standard and is not permitted under FMVSS No. 213.[120]

NHTSA proposes amendments to FMVSS No. 213 to make the standard more design-neutral regarding CRSs that are designed for exclusive use on school bus seats. To permit restraints for exclusive school bus use other than harnesses, the proposed amendments would include a new design-neutral definition for this type of CRS.

NHTSA proposes to amend FMVSS No. 213 so that CRSs manufactured for exclusive use on school bus seats could be certified using a seat back mount or a seat back and seat pan mount attachment method. Specifically, NHTSA proposes to add a definition of ''school bus child restraint system'' in S4 of FMVSS No. 213 that would define the term as a child restraint system (including harnesses), sold for exclusive use on school bus seats, that has a label conforming with S5.3.1(b) of FMVSS No. 213.

NHTSA proposes amending S5.3.1(b) to require school bus CRSs to bear a permanent warning label, depicted in Figure 12 of FMVSS No. 213, that is permanently affixed to the part of the harness or strap that attaches the CRS to a vehicle seat back. This label must be plainly visible when installed and easily readable, the message area must be white with black text and no less than 20 square centimeters, and the pictogram shall be gray and black with a red circle and slash on a white background and no less than 20 mm in diameter.

NHTSA proposes to amend table S5.1.3.1(a) which specifies the head and knee excursion requirements. School bus CRSs would be subject to the current excursion limit requirements for harnesses manufactured for use on school bus seats when installed using a seat back mount or seat back and seat pan mounts. Also, NHTSA proposes to amend the table to S5.3.2 to indicate that school bus CRSs must meet the relevant requirements of the standard when attached with a seat back mount or seat back and seat pan mounts.

This NPRM also proposes to amend S5.6.1.11 of FMVSS No. 213 to require that printed instructions accompanying these school bus CRSs include the warning statement: ''WARNING! This restraint must only be used on school bus seats. Entire seat directly behind must be unoccupied or have restrained occupants.''

[119] 69 FR 10928, March 9, 2004.

[120] NHTSA letter to IMMI, September 21, 2016 *https://isearch.nhtsa.gov/files/14-001678%20IMMI%20STAR%20crs.htm.*

School bus CRSs would not be required to have lower attachments to install the CRS using the child restraint anchorage system, nor would they be required to meet performance requirements when tested using seat belt and lower anchorages attachment methods. School bus CRSs would not need to have alternative methods of attachments other than the seat back mount or seat back and seat pan mounts because school bus seats do not always have seat belts and/or lower anchorages.

XI. Child Passenger Safety Issues Arising From Research Findings

NHTSA requests comment on several developments in child passenger safety that have arisen in the research context. The Agency would like commenters' views on how best to approach those developments. The Agency has docketed a paper that discusses these issues in more detail.

1. NHTSA has reviewed research reports on testing done on certain kinds of child restraints—CRSs not yet widely available in the U.S—that raise concerns about a potential unreasonable risk of submarining [121] or ejection from these devices in some crash scenarios. The CRSs in question are inflatable booster seats, and ''shield-type'' child restraints (shield-only-CRSs) available in markets overseas. Comments are requested on the findings of the reports.[122]

(a) *Inflatable booster seats:* Transport Canada conducted 25–30 mph frontal impact crash tests of different vehicle models, with the HIII–6YO and HIII–10YO dummies restrained in inflatable boosters in rear seats. In the tests, the dummies experienced significant submarining due to excessive compression of the inflatable booster during the crash event. Booster seats sold in Canada are required to compress by not more than 25 mm when subjected to a 2,250 N quasi-static compression force. Inflatable booster seats cannot meet the requirements of this quasi-static compression test and so inflatable boosters are not sold in Canada. Comments are requested on the findings of the research crash tests conducted in Canada, on the booster seat compression test requirements in Canada, and on the safety need to have a compression test in FMVSS No. 213.

(b) *Shield-only-CRSs:* Shield-only-CRSs only have a shield to restrain a young child's upper torso, lower torso, and crotch. While such CRSs are currently not available in the U.S., there are a wide variety of shield-only-CRSs in Europe intended for children weighing less than 13.6 kg (30 lb). Child dummies (representing children aged 18-months old and 3-years-old) restrained in shield-only-CRSs in simulated vehicle rollover tests, 64 km/h (40 mph) offset frontal impact vehicle crash tests, and in 64 km/h (40 mph) Allgemeiner Deutsher Automobil-Club (ADAC) type frontal impact sled tests were completely or partially ejected from the CRSs. These test results raise concern about the ability of a shield-only-CRS to retain small children in the CRS in certain crashes or in a rollover. NHTSA seeks comment on the findings of these research tests. Should FMVSS No. 213 require shield-only-CRSs to have additional shoulder belts and a crotch strap, similar to the requirements for child restraints that have belts designed to restrain the child (S5.4.3.3)?

2. NHTSA requests information on a matter showing up in the field concerning children under 1YO outgrowing infant carriers by height much earlier than by weight. Research studies conducted at UMTRI [123] show that some infant carriers marketed as suitable for children up to 13.6 kg (30 lb), which is greater than the weight of a 95th percentile 1 YO and an average 1.5 YO, cannot ''fit'' the height of a 95th percentile 1 YO or an average 1.5 YO.[124] NHTSA believes that infant carriers' height and weight recommendations should better match the children for whom the CRS is recommended. NHTSA seeks comment on UMTRI's research findings regarding how current infant carriers fit children that they are designed for. Should infant carriers' height and weight recommendations better match up to better accommodate the children for whom the CRS is recommended?

3. NHTSA has supported the development of computer models of children of different weights and heights to assist CRS manufacturers in designing child restraints that better fit the children for whom the CRS is recommended.[125] These virtual models are available to the public to improve the fit of CRSs to children.[126] NHTSA requests comments from manufacturers and other parties on whether they used the models and whether the models were helpful.

XII. Proposed Lead Time

This NPRM proposes that the compliance date for most of the amendments in this rulemaking action would be three years following the date of publication of the final rule in the **Federal Register**, with optional early compliance permitted (exceptions are discussed below). NHTSA tentatively believes that a 3-year period is in the public interest because CRS manufacturers would need to gain familiarity with the new standard seat assembly and new test protocols, and would need time to assess their products' conformance to the new FMVSS No. 213 test requirements. They would need time to implement design and production changes as needed. A 3-year lead time also aligns with the typical design cycle of child restraints.

Exceptions to the proposed 3-year compliance date would be as follows. NHTSA proposes a 180-day compliance date for the proposed changes to registration card requirements and the proposed changes to permit school bus child restraint systems (early optional compliance would be permitted). A 1-year compliance date is proposed for labeling requirement changes (early optional compliance would be permitted). NHTSA would like to implement these changes as early as possible to attain the safety benefits they can achieve. The proposed time should provide enough time to change the card and labels. The proposed 180-day compliance date would be sufficient for school bus CRSs since the proposed amendment would remove a restriction on the manufacture of such products.

XIII. Corrections and Other Minor Amendments

This NPRM proposes a few housekeeping and other amendments to the text of FMVSS No. 213.

a. Correct Reference

The Agency would amend S5.5.2(l)(3)(i) of FMVSS No. 213 by correcting a reference to ''S5.5.2(l)(3)(A)(i), (ii), or (iii).'' The reference would be corrected to refer to ''S5.5.2(l)(3)(i)(A), (B), or (C).''

[121] ''Submarining'' refers to the tendency for a restrained occupant to slide forward feet first under the lap belt during a vehicle crash, which could result in serious abdominal, pelvic, and spinal injuries.

[122] Reports documenting vehicle crash tests using inflatable and shield-type CRSs are available in the docket for this NPRM.

[123] Manary. M., et al., ''Comparing the CRABI–12 and CRABI–18 for Infant Child Restraint System Evaluation.'' June 2015. DOT HS 812 156. The report is available in the docket for this NPRM.

[124] Field experience indicates that children at the higher end of growth charts typically outgrow the carriers by height at around 9–10 months.

[125] NHTSA has sponsored an UMTRI project developing toddler virtual dummies for use in improving of the fit of CRSs to child passengers. Information on a 2015 UMTRI workshop describing development of the toddler virtual fit dummies can be found at: *http://umtri.umich.edu/our-results/projects/umtri-workshop-new-tools-child-occupant-protection.*

[126] Toddler virtual models available for download at: *http://childshape.org/toddler/manikins/.*

b. Section 5.1.2.2

The Agency is removing and reserving S5.1.2.2 because it applies to CRSs manufactured before August 1, 2005 and so is no longer applicable.

c. Table to S5.1.3.1(a) and Test Configuration II

The Agency is correcting the table to S5.1.3.1(a), which specifies performance criteria and test conditions for FMVSS No. 213's occupant excursion requirements for add-on forward-facing CRSs. When NHTSA created the table the agency inadvertently did not include a reference to Test Configuration II of FMVSS No. 213.[127] NHTSA seeks to correct this oversight.

Test Configuration II is a 32 km/h (20 mph) ''misuse'' test that applies to CRSs that are ''equipped with a fixed or movable surface described in S5.2.2.2.'' [128] (S6.1.2(a)(2).) [129] In Test Configuration II, NHTSA tests those types of CRSs without attaching ''any of the child restraint belts unless they are an integral part of the fixed or movable surface.'' [130] In addition, the child restraint is untethered (S6.1.2(a)(2)(i)). The tested child restraint must meet all the dynamic performance requirements of the standard, not just excursion requirements, when tested in this manner.[131] Test Configuration II is intended to address the possibility that the restraint's internal belt system will be misused or not used at all by the caregiver. If this happens, Test Configuration II ensures that the restraint will offer some minimal protection even when the CRS is not properly used.

d. Updating Reference to SAE Recommended Practice J211/1

Current specifications of the test device for built-in child restraints in FMVSS No. 213 (S6.1.1(a)(2)(i)(B) and S6.1.1(a)(2)(ii)(G)) require that instrumentation and data processing be in conformance with SAE Recommended Practice J211 (June 1980), ''Instrumentation for Impact Tests.'' SAE Recommended Practice J211 has been revised several times since June 1980 and most test facilities are currently using newer versions of the document. FMVSS No. 208, ''Occupant crash protection,'' currently refers to the document as SAE Recommended Practice J211/1 (March 1995). The 1995 version of SAE J211/1 is consistent with the current requirements for instrumentation and data processing in FMVSS No. 213. Using the same Recommended Practice J211/1 (1995) in S6.1.1(a)(2)(i)(B) and S6.1.1(a)(2)(ii)(G) would update the FMVSS No. 213 provisions and facilitate the processing of test results when combining a test of built-in child restraints with an FMVSS No. 208 test. Therefore, NHTSA proposes updating the reference to SAE Recommended Practice J211(1980) in sections S6.1.1(a)(2)(i)(B) and S6.1.1(a)(2)(ii)(G) to SAE Recommended Practice J211/1 (1995).[132]

XIV. Regulatory Notices and Analyses

Executive Order (E.O.) 12866, E.O. 13563, and DOT Rulemaking Procedures

The Agency has considered the impact of this rulemaking action under E.O. 12866, E.O. 13563, and the Department of Transportation's administrative rulemaking procedures set forth in 49 CFR part 5, subpart B. This rulemaking is not considered significant and was not reviewed by the Office of Management and Budget under E.O. 12866, ''Regulatory Planning and Review.''

Estimated Benefits and Costs

The NPRM proposes to amend FMVSS No. 213 by (a) updating the standard seat assembly to represent better the rear seating environment in the current vehicle fleet, (b) amending several labeling and owner information requirements to improve communication with today's CRS owners and to align with current best practices for child passenger safety, and (c) amending how NHTSA uses ATDs to make the Agency's compliance tests more evaluative of CRS performance. The proposal would provide some safety benefits with, at most, minimal incremental costs.

Updated Sled Assembly

The proposed updates to the sled test would better align the performance of CRSs in compliance tests to that in real world crashes.

NHTSA tested 24 CRS models representing the market of infant carrier, convertible, all-in-one, and booster type CRSs on the proposed standard seat assembly with the appropriate size dummies. All but one forward-facing CRS models met the current and proposed performance requirements. The Diono Radian tested with the HIII–10YO dummy met all performance requirements except for the head excursion limit in the untethered condition. Based on these data, the Agency believes that only a few CRSs may need minor redesign to meet the requirements in the proposed standard seat assembly (V2).[133]

NHTSA believes that a lead time of three years is sufficient for the redesign. The Agency has not estimated a cost of this redesign, assuming the redesign could be incorporated into a typical business model involving manufacturers refining child restraint designs to freshen their product lines. The refinements result in new product offerings that appeal to consumers and help manufacturers remain competitive.

There would be costs involved in changing the standard seat assembly used by NHTSA to assess CRS compliance. Manufacturers are not required to use the standard seat assembly, but as a practical matter they usually choose to do so, to test their CRSs as similarly to the tests conducted by NHTSA. The one-time cost of the updated standard seat assembly sled

[127] NHTSA adopted the table into FMVSS No. 213 in a March 5, 1999 final rule establishing the requirements for child restraint anchorage systems for vehicles and corresponding requirements for CRSs (64 FR 10786).

[128] S5.2.2.2 states that each forward-facing child restraint system shall have no fixed or movable surface: (a) directly forward of the dummy and intersected by a horizontal line, parallel to the seat orientation reference line (term defined in S4 of FMVSS No. 213), in the case of the add-on child restraint system, or parallel to a vertical plane through the longitudinal center line of the vehicle seat, in the case of a built-in child restraint system, and (b) passing through any portion of the dummy, except for surfaces which restrain the dummy when the system is tested in accordance with S6.1.2(a)(2), so that the child restraint system shall conform to the requirements of S5.1.2 and S5.1.3.1.

[129] S6.1.2(a)(2)(i) and (ii) also state that Test Configuration II applies to ''backless child restraint system[s] with a top anchorage strap'' and to a ''built-in booster seat with a top anchorage strap.'' NHTSA is proposing to remove references in FMVSS No. 213 to those CRSs because such restraints are no longer or have never been produced.

[130] See FMVSS No. 213 S10.2.1(b)(2) and S10.2.2(c)(2).

[131] The CRSs must also meet the requirements of FMVSS No. 213 when tested to Test Configuration I's 48 km/h (30 mph) tests. The CRSs' internal belts are attached in Test Configuration I but the top tether cannot be attached to meet FMVSS No. 213's head excursion limit of 813 mm (32 inches) and the other dynamic performance requirements in S5.1 of the standard.

[132] NHTSA would also reference the updated SAE J211/1 in the compliance test procedure proposed for FMVSS No. 213a's side impact test. See 79 FR at 4603, S6.1.2(f).

[133] Preliminary tests with the proposed standard seat assembly using an average 23.3 g peak acceleration pulse and an average 47.5 km/h (29.5 mph) velocity within the FMVSS No. 213 acceleration corridor showed dummy HIC and chest accelerations in some booster seats, tested with the HIII–6YO and HIII–10YO dummies, near or exceeding allowable threshold levels. While NHTSA expects that some booster seats may need to be redesigned to meet the performance measures when tested with a higher acceleration pulse, these redesigns could be accomplished without additional material cost. For example, different foams could be used in the CRS seating cushions that work better with the proposed stiffer standard seat cushion foam to lower the HIC and chest g values.

buck is about $8,000. If a manufacturer chooses to build the assembly itself or uses one at an independent test facility, either way there would be minimal cost impacts when the cost of the assembly and testing CRSs is distributed among the hundreds of thousands of CRSs that would be sold by each manufacturer.

Labeling and Owner Registration

The Agency believes that the proposed updates to the labeling requirements would benefit safety by reducing the premature graduation of children from rear-facing CRSs to forward-facing CRSs, and from forward-facing CRSs to booster seats. The Agency estimates 1.9 to 6.3 lives would be saved and 2.6 to 8.7 moderate-to-critical severity injuries would be prevented annually by aligning FMVSS No. 213's use instructions with current best practices on transporting children.[134]

The proposed changes to the labeling requirements would have minimal or no cost impacts, as mostly they are deregulatory. Manufacturers would be given the flexibility to provide required information in statements or a combination of statements and pictograms at locations that they deem most effective. Manufacturers may provide the recommended child weight and height ranges for the use of CRSs in a specific installation mode on existing voluntary labels by simply changing the minimum child weight limit values. Since no additional information would be required on the labels by this NPRM, the size of the label would not need to be increased. Thus, there would be minimal or no additional cost for the label. There would also be no decrease in sales of forward-facing car safety seats or of booster seats as a result of the proposal to raise the minimum child weight limit values for forward-facing CRSs and booster seats. Most forward-facing CRSs cover a wide child weight range, so the labeling changes would only affect how consumers use the products and not the sale of them. For example, consumers would still purchase forward-facing car safety seats but would wait to use them forward-facing until the child is at least 1. They would still purchase convertible CRSs, but will delay turning the child forward-facing until the child is at least 1. Consumers would still purchase booster seats, but would use them only from when the child reaches 18.2 kg (40 lb).

The proposed changes to the registration program generally lessen restrictions and are optional for manufacturers to implement. These proposed changes to the registration card would provide flexibility to manufacturers in how they communicate with consumers and would likely help improve registration rates and recall completion rates. NHTSA cannot quantify the benefits at this time.

NHTSA estimates there would be no costs associated with the proposed changes. While the changes could affect the collection of information pursuant to the Paperwork Reduction Act (which is discussed later in this section), there would be no additional material cost associated with the proposed changes to the registration card or to the CRS label or owner manual pertaining to registration. Manufacturers could use the same card and labels and just change the wording on them.

ATDs

The proposed updates of how ATDs are used in the sled test for assessing CRS performance better accords with current CRS designs and best practices for transporting child passengers compared to the current specifications in FMVSS No. 213. NHTSA cannot quantify the possible safety benefits at this time.

Some of the proposed changes lessen testing burdens by reducing the extent of testing with ATDs. For example, the NPRM proposes that CRSs for children weighing 10 kg to 13.6 kg (22 to 30 lb) would no longer be subject to testing with the HIII–3YO dummy. NHTSA estimates a reduction in testing cost of $540,000 for the current number of infant carrier models in the market.[135] Also, CRSs for children weighing 13.6–18.2 kg (30–40 lb) would no longer be tested with the CRABI–12MO. However, the Agency does not expect any reduction in testing costs from this latter modification since all CRSs with internal harnesses are sold for children weighing less than 13.6 kg (30 lb), and so would still be subject to testing with the CRABI–12MO in that regard. The proposed positioning procedure for the legs of the HIII–3YO dummy in rear-facing CRSs is unlikely to have cost implications because the procedure is the same as that currently used by manufacturers.

Similarly, NHTSA believes that testing CRSs solely with the HIII–6YO rather than the H2–6YO dummy would not have significant cost implications. This is because there would be little or no design changes needed for the CRSs due to this proposed update since nearly all the CRSs tested with the HIII–6YO in the proposed standard seat assembly complied with all the FMVSS No. 213 requirements.[136] NHTSA's testing also showed that CRSs that currently comply with FMVSS No. 213 using the H2–6YO dummy also met all the performance requirements in the standard when tested using the HIII–6YO dummy in the proposed standard seat assembly. In addition, manufacturers are increasingly certifying at least some of their CRS models for older children using the HIII–6YO dummy rather than the H2–6YO and so most manufacturers already have access to the HIII–6YO dummy and would not need to purchase the dummy as a result of this proposed update. Most CRS manufacturers hire commercial test labs to test their CRSs for conformance with FMVSS No. 213 requirements. These labs already have the HIII–6YO dummy since some of their CRS manufacturer clients currently want to certify their CRSs based on tests with the HIII–6YO dummy. Thus, there would not be a cost increase to purchase and test with the dummy.

NHTSA believes that a lead time of three years is sufficient for redesigning CRSs that may need modifications to comply with the proposed updates to ATD selection for the sled test because most CRSs would need minor or no modifications as a result of the proposed updates. Further, a 3-year time frame aligns with the typical design cycle for CRSs. The Agency notes also that manufacturers have the option of not changing CRS designs in some instances, and may instead change the weight of the children for whom the CRS is recommended. Narrowing the population of children for whom the CRS is recommended could result in reducing the number of ATDs NHTSA and manufacturers use in compliance and certification tests, respectively.

School Bus Child Restraint Systems

The proposed changes to include in FMVSS No. 213 a new type of CRS

[134] Details of the benefits analysis are provided in the Appendix to this NPRM.

[135] There are currently 45 infant carrier models with recommended upper weight limit exceeding 10 kg (22 lb). Each rear-facing CRS is tested in three different configurations on the standard seat assembly with each dummy used for testing the CRS: (1) CRS installed using seat belts, (2) CRS installed using the lower anchors and no tether, and (3) CRS installed without the base using the lower anchors and no tether. The cost of a sled test is estimated at $4,000. Therefore, the cost savings by not testing the 45 infant carrier models using the HIII–3YO dummy is estimated to be $540,000 (= $4,000 × 3 × 45). Since manufacturers typically conduct more than one test in each of the CRS installation configurations, NHTSA expects the actual cost savings to be greater than the estimated $540,000.

[136] Of 21 tests with the HIII–6YO in the proposed seat assembly, all passed the performance metrics, except for one that failed head excursion limits.

manufactured for exclusive use on school bus seats would allow the sale of these products. The Agency estimates there would be no cost impacts associated with the proposed changes because the amendment would permit more products to be sold for school bus use. The benefits of the proposed changes are associated with the popularity of such CRSs in the pupil transportation industry for transporting preschool and special-needs children. However, NHTSA cannot quantify these benefits at this time.

Executive Order 13771

Executive Order 13771 titled ''Reducing Regulation and Controlling Regulatory Costs,'' directs that, unless prohibited by law, whenever an executive department or agency publicly proposes for notice and comment or otherwise promulgates a new regulation, it shall identify at least two existing regulations to be repealed. In addition, any new incremental costs associated with new regulations shall, to the extent permitted by law, be offset by the elimination of existing costs. Only those rules deemed significant under section 3(f) of Executive Order 12866, ''Regulatory Planning and Review,'' are subject to these requirements. As discussed above, this rule is not a significant rule under Executive Order 12866 and, accordingly, is not subject to the offset requirements of 13771.

This proposed rule is expected to be an E.O. 13771 deregulatory action because NHTSA believes it would reduce the cost of complying with NHTSA's requirements. The proposed rule would amend FMVSS No. 213 to update the standard seat assembly and reduce costs by eliminating unnecessary or outdated requirements, such as unnecessary testing of infant carriers with the 3YO dummy. The proposal to eliminate unnecessary testing with the 3YO test dummy would result in a reduction in testing costs of $540,000 for the current number of infant carrier models in the market. Removing the restrictions in the owner registration program will enable manufacturers to interact with consumers using modern methods of communication, which should encourage design innovation and productivity. Proposals to update labels and owners' manuals would not increase costs, as manufacturers would be replacing current labels and manuals with updated versions. NHTSA estimates that virtually all CRSs made in the U.S. would meet FMVSS No. 213's performance requirements on the proposed seat assembly.

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. NHTSA believes that virtually all CRSs would meet FMVSS No. 213's requirements on the new seat assembly without modification. Manufacturers may need to change the labels on their child restraints pursuant to the proposed requirements, but the changes are minor and would entail switching out values on current labels.

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 this 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 Orders 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 this 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 this 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.

National Technology Transfer and Advancement Act

Under the National Technology Transfer and dvancement 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 SAE International (SAE). The NTTAA directs agencies to provide Congress, through OMB, explanations when the agency decides not to use available and applicable voluntary consensus standards. NHTSA searched for but did not find voluntary consensus standards directly applicable to the amendments proposed in this NPRM, other than the minor proposal to update the reference to SAE Recommended Practice J211/1 to the March 1995 version.

However, consistent with the NTTAA, NHTSA reviewed the procedures and regulations developed globally to test child restraints dynamically and found areas of common ground.[137] While there is no single procedure or regulation of another country that sufficiently replicates frontal crashes occurring in the U.S., the agency considered various aspects of international regulations pertaining to the testing of child restraint systems. NHTSA analyzed aspects of the seating assemblies used by NPACS, ECE R.44 and Transport Canada's CMVSS No. 213 and the frontal test speeds used worldwide in sled tests. NHTSA proposes a requirement to test CRSs with Type 2 (3-point) seat belts, which is consistent with CMVSS No. 213. NHTSA tentatively concludes that the provisions would increase CRS safety, and would promote harmonization of our countries' regulatory approaches in testing CRSs.

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.

[137] The NTTAA seeks to support efforts by the Federal government to ensure that agencies work with their regulatory counterparts in other countries to address common safety issues. Circular No. A–119, ''Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities,'' January 27, 2016, p. 15.

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, NHTSA has noted that it has reviewed the procedures and regulations developed by Transport Canada regarding testing CRSs with Type 2 (3-point) seat belts, and tentatively agrees with the merits of the CMVSS No. 213 provision. Comments are requested on the above policy statement and the implications it has for this rulemaking.

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

Paperwork Reduction Act

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 changes to the owner registration program (571.213, S5.8) constitute changes to a ''collection of information'' requirement for child restraint system manufacturers. NHTSA is providing a 60-day comment period on reporting burdens and other matters associated with the proposal.

OMB has promulgated regulations describing what must be included in the request for comment document. Under OMB's regulation (at 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 proposed 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: Businesses, Individuals and Households.

Summary of the Collection of Information:

Child restraint manufacturers are required to provide an owner registration card for purchasers of child restraint systems in accordance with title 49 of the Code of Federal Regulations (CFR), part 571, section 213, ''Child restraint systems.'' The registration card is required to be perforated into two parts. The top part (information part) contains a message and suitable instructions to be retained by the purchaser. The size, font, color, and layout of the top part are currently prescribed in Figures 9a and 9b,[138] as is the attachment method (fold/perforation) of the information card to the lower part of the form (the mail-in card). The top part of the registration card sets forth: (a) Prescribed wording advising the consumer of the importance of registering; (b) prescribed instructions on how to register; and (c) prescribed statements that the mail-in card is pre-addressed and that postage is already paid.

The bottom part (the mail-in card) is to be returned to the manufacturer by the purchaser. The bottom part includes prepaid return postage, the pre-printed name/address of the manufacturer, the pre-printed model and date of manufacture, and spaces for the purchaser to fill in his/her name and address. Optionally, child restraint manufacturers are permitted to add to the registration form: (a) Specified statements informing CRS owners that they may register online; (b) the internet address for registering with the company; (c) revisions to statements reflecting use of the internet to register; and (d) a space for the consumer's email address.

Child restraint manufacturers are also required to provide printed instructions with new CRSs, with step-by-step information on how the restraint is to be used, and a permanently attached label that gives ''quick look'' information on matters such as use instructions and information on registering the CRS.

Under this NPRM, the Agency is proposing to amend the requirements that prescribe wording advising the consumer of the importance of registering and instructing how to register. NHTSA proposes to stop prescribing the wording. Instead, CRS manufacturers would be given leeway to use their own words to convey the importance of registering the CRS and to instruct how registration is achieved. NHTSA would allow statements instructing consumers to use electronic (or any other means) of registering, as long as instructions are provided on using the paper card for registering (including that the mail-in card is pre-addressed and that the postage is pre-paid). NHTSA also proposes to permit or possibly require a statement that the information collected through the registration process will not be used by the manufacturer for any purpose other than contacting the consumer in the event of a recall.

The Agency also proposes to remove restrictions on manufacturers on their use of size, font, color, layout, and attachment method of the information card portion. NHTSA proposes to continue a current provision that prohibits any other information unrelated to the registration of the CRS, such as advertising or warranty information.

If the proposed changes to the information card are adopted, NHTSA anticipates a change to the hour burden or costs associated with the revised information card, labels and owner's manuals. Child restraint manufacturers produce, on average, a total of approximately 15,000,000 child restraints per year. NHTSA estimates there are 29 CRS manufacturers with 159 distinct CRS models.

The hour burden associated with the revised label consists of the child restraint manufacturer: (a) Designing the information card with statements to instruct how to register, encourage registration and optionally, how to register electronically and how the submitted information will be used; and (b) updating this information on the existing information card, label and instruction manual. NHTSA assumes for purposes of this NPRM analysis that each manufacturer would design the registration information on the information card, label and manuals 5 times per year, whether it is to use different registration cards designs in different CRS models or to adapt the design to improve registrations. The Agency estimates 50 hours of additional burden per child restraint manufacturer for the designing of the registration card (information card portion), labels and manuals that no longer have prescribed text (50 hours × 5 designs/year × 29 CRS manufacturers = 7,250 hours annually).

Estimated Additional Annual Burden: 7,250 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 of 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, you should mention the docket number of this document. You may call the Docket at (202) 366–9826. Please identify the proposed collection of information for which a comment is provided, by referencing its OMB

[138] Prescribed in FMVSS No. 213, ''Child restraint systems.'' As discussed in this preamble, this NPRM proposes to relieve some of those restrictions.

clearance number. It is requested, but not required, that two copies of the comment be provided. 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).

Regulation Identifier Number

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulatory and Deregulatory Actions. 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?

NHTSA has considered these questions and attempted to use plain language in writing this proposed rule. Please inform the agency if you can suggest how NHTSA can improve its use of plain language.

Incorporation by Reference

In updating the standard seat assembly used in the FMVSS No. 213 frontal test, NHTSA would incorporate by reference a drawing package titled, ''NHTSA Standard Seat Assembly; FMVSS No. 213, No. NHTSA–213–2019,'' dated May 2019, into FMVSS No. 213 (49 CFR 571.213). The drawing package consists of detailed drawings of and other materials related to the proposed standard seat assembly. Interested persons could use the drawing package to manufacture the standard seat assembly for their own use if they wished to do so.

NHTSA has placed a copy of the drawing package in the docket for this NPRM. Interested parties can download a copy of the drawing package or view the materials on line by accessing *www.Regulations.gov.* We also will place a copy of the drawing package in the docket of the final rule that incorporates the new standard seat assembly into FMVSS No. 213.

This NPRM also proposes to change an incorporation by reference of SAE Recommended Practice J211, ''Instrumentation for Impact Tests,'' revised 1980, to a 1995 version of J211 (J211/1). SAE J211/1, Revised March 1995, ''Instrumentation for Impact Test—Part 1—Electronic Instrumentation,'' provides guidelines and recommendations for techniques of measurement with electronic instrumentation used in impact tests. These include a series of performance recommendations for data channels, guidelines for selecting a frequency response class for electronic instrumentation, and guidelines on sign convention and digital data processing. The Director of the Federal Register has already approved the incorporation by reference of SAE Recommended Practice J211/1 (1995) into 49 CFR part 571 (see 49 CFR 571.5(l)(4)). Interested parties can obtain a copy of the SAE Recommended Practice J211/1 (March 1995) ''Instrumentation for Impact Test—Part 1—Electronic Instrumentation,'' from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096. Telephone: (724) 776–4841, website: *www.sae.org.*

XV. Public Participation

How do I prepare and submit comments?

To ensure that your comments are correctly filed in the Docket, please include the Docket Number in your comments.

Your comments must be written and in English. Your comments must not be more than 15 pages long. NHTSA 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, and there is no limit on the length of the attachments.

If you are submitting comments electronically as a PDF (Adobe) file, NHTSA asks that the documents be submitted using the Optical Character Recognition (OCR) process, thus allowing NHTSA to search and copy certain portions of your submissions.

Please note that pursuant to the Data Quality Act, in order for substantive data to be relied on and used by NHTSA, it must meet the information quality standards set forth in the OMB and DOT Data Quality Act guidelines. Accordingly, NHTSA encourages you to consult the guidelines in preparing your comments. DOT's guidelines may be accessed at *https://www.transportation.gov/regulations/dot-information-dissemination-quality-guidelines.*

Tips for Preparing Your Comments

When submitting comments, please remember to:

Identify the rulemaking by docket number and other identifying information (subject heading, **Federal Register** date and page number).

Explain why you agree or disagree, suggest alternatives, and substitute language for your requested changes.

Describe any assumptions you make and provide any technical information and/or data that you used.

If you estimate potential costs or burdens, explain how you arrived at your estimate in sufficient detail to allow for it to be reproduced.

Provide specific examples to illustrate your concerns, and suggest alternatives.

Explain your views as clearly as possible, avoiding the use of profanity or personal threats.

To ensure that your comments are considered by the agency, make sure to submit them by the comment period deadline identified in the **DATES** section above.

For additional guidance on submitting effective comments, see https://www.regulations.gov/docs/Tips_For_Submitting_Effective_Comments.pdf.

How can I be sure my comments were received?

If you wish Docket Management to notify you upon its receipt of your comments, enclose a self-addressed, stamped postcard in the envelope containing your comments. Upon receiving your comments, Docket Management will return the postcard by mail.

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?

NHTSA 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, NHTSA will also consider comments that the docket receives after that date. If the docket receives a comment too late for the agency to consider it in developing a final rule, NHTSA 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, NHTSA will continue to file relevant information in the docket as it becomes available. Further, some people may submit late comments. Accordingly, the agency recommends 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 and reserving paragraphs (k)(5) through (8), adding paragraph (k)(9), and revising paragraph (l)(4), to read as follows:

§ 571.5 Matter incorporated by reference.

* * * * *

(k) * * *

(5) [Reserved.]

(6) [Reserved.]

(7) [Reserved.]

(8) [Reserved.]

(9) Drawing Package, ''NHTSA Standard Seat Assembly; FMVSS No. 213, No. NHTSA–213–2019,'' (consisting of drawings and a bill of materials), May 2019, into § 571.213.

(l) * * *

(4) SAE Recommended Practice J211/1, revised March 1995, ''Instrumentation for Impact Test—Part 1—Electronic Instrumentation'' into §§ 571.202a; 571.208; 571.213; 571.213a 571.218; 571.403.

* * * * *

■ 3. Section 571.213 is amended by—

■ Adding, in alphabetical order, a definition of ''school bus child restraint system'' to S4;

■ Removing and reserving S5.1.2.2;

■ Revising S5.1.3.1(a);

■ Revising S5.3.1(b);

■ Revising S5.3.2;

■ Revising the introductory text of S5.5.2;

■ Revising S5.5.2(f), S5.5.2(g)(1)(i), removing and reserving S5.5.2(k)(2);

■ Removing and reserving S5.5.2(l)(2), revising S5.5.2(l)(3)(i);

■ Revising S5.5.2(m), S5.5.5(f), S5.5.5(k), S5.6.1.7, S5.6.1.11, S5.6.2.2, S5.8.1, S5.8.2, and S5.9(a);

■ Adding S6.1.1(a)(1)(i) and revising S6.1.1(a)(1)(ii);

■ Revising S6.1.1(a)(2)(i)(B) and S6.1.1(a)(2)(ii)(G);

■ Removing and reserving S6.1.1(c);

■ Revising S6.1.2(a), S6.1.2(a)(1) and S6.1.2(a)(2) and S6.2(d)(1)(ii);

■ Adding S7.1.1;

■ Revising the introductory paragraph to S7.1.2;

■ Revising S7.1.3, and,

■ Adding S10.2.2(e), and Figures 1D, 1D', 1E, 1E', 9c and 9d.

The revised and added text and figures read as follows:

§ 571.213 Child restraint systems.

* * * * *

S4. Definitions * * *

School bus child restraint system means a child restraint system (including a harness) manufactured and sold only for use on school bus seats, that has a label conforming with S5.3.1(b).

* * * * *

S5.1.2.2 [Reserved]

* * * * *

S5.1.3.1 * * *

(a)(1) For each add-on child restraint system manufactured before [*date 3 years after date of publication of final rule*]—

(i) No portion of the test dummy's head shall pass through a vertical transverse plane that is 720 mm or 813 mm (as specified in table 2 to this S5.1.3.1(a)) forward of point Z on the Standard Seat Assembly No. NHTSA–213–2003, measured along the center SORL (as illustrated in figure 1B of this standard); and

(ii) Neither knee pivot point shall pass through a vertical transverse plane that is 915 mm forward of point Z on the Standard Seat Assembly No. NHTSA–213–2003, measured along the center SORL. * * *

(2) For each add-on child restraint system manufactured on or after [*date 3 years after date of publication of final rule*]—

(i) No portion of the test dummy's head shall pass through a vertical transverse plane that is 720 mm or 813 mm (as specified in table 3 to this S5.1.3.1(a)) forward of point Z on the Standard Seat Assembly No. NHTSA–213–2019, measured along the center SORL (as illustrated in figure 1D of this standard); and

(ii) Neither knee pivot point shall pass through a vertical transverse plane that is 915 mm forward of point Z on the Standard Seat Assembly No. NHTSA–213–2019, measured along the center SORL.

TABLE 2 TO S5.1.3.1(a)—ADD-ON FORWARD-FACING CHILD RESTRAINTS MANUFACTURED BEFORE

[Date 3 years after date of publication of final rule]

When this type of child restraint	Is tested in accordance with—	These excursion limits apply	Explanatory note: in the test specified in 2nd column, the child restraint is attached to the test seat assembly in the manner described below, subject to certain conditions
Harnesses, backless booster seats and restraints designed for use by physically handicapped children.	S6.1.2(a)(1)(i)(A)	Head 813 mm; Knee 915 mm	Attached with lap belt; in addition, if a tether is provided, it is attached.
School bus child restraint systems.	S6.1.2(a)(1)(i)(A)	Head 813 mm; Knee 915 mm	Attached with seat back mount, or seat back and seat pan mounts.
Belt-positioning seats	S6.1.2(a)(1)(ii)	Head 813 mm; Knee 915 mm	Attached with lap and shoulder belt; no tether is attached.
Child restraints other than harnesses, backless booster seats, restraints designed for use by physically handicapped children, school bus child restraint systems, and belt-positioning seats.	S6.1.2(a)(1)(i)(B)	Head 813 mm; Knee 915 mm	Attached with lap belt; no tether is attached.
	S6.1.2(a)(1)(i)(D)	Head 813 mm; Knee 915 mm	Attached to lower anchorages of child restraint anchorage system; no tether is attached.
	S6.1.2(a)(1)(i)(A)	Head 720 mm; Knee 915 mm	Attached with lap belt; in addition, if a tether is provided, it is attached.
	S6.1.2(a)(1)(i)(C)	Head 720 mm; Knee 915 mm	Attached to lower anchorages of child restraint anchorage system; in addition, if a tether is provided, it is attached.
Child restraints equipped with a fixed or movable surface described in S5.2.2.2 that has belts that are not an integral part of that fixed or movable surface.	S6.1.2(a)(2)(i)	Head 813 mm; Knee 915 mm	Attached with lap belt or lower anchorages of child restraint anchorage system; no tether is attached.

TABLE 3 TO S5.1.3.1(a)—ADD-ON FORWARD-FACING CHILD RESTRAINTS MANUFACTURED ON OR AFTER

[Date 3 years after date of publication of final rule]

When this type of child restraint	Is tested in accordance with—	These excursion limits apply	Explanatory note: in the test specified in 2nd column, the child restraint is attached to the test seat assembly in the manner described below, subject to certain conditions
Harnesses and restraints designed for use by physically handicapped children.	S6.1.2(a)(1)(iv)(A)	Head 813 mm; Knee 915 mm.	Attached with lap and shoulder belt; in addition, if a tether is provided, it is attached.
School bus child restraint systems.	S6.1.2(a)(1)(iv)(A)	Head 813 mm; Knee 915 mm	Attached with seat back mount, or seat back and seat pan mounts.
Booster seats	S6.1.2(a)(1)(iv)(B)	Head 813 mm; Knee 915 mm	Attached with lap and shoulder belt; no tether is attached.
Child restraints other than harnesses, restraints designed for use by physically handicapped children, school bus child restraint systems, and booster seats.	S6.1.2(a)(1)(iv)(B)	Head 813 mm; Knee 915 mm	Attached with lap and shoulder belt; no tether is attached.
	S6.1.2(a)(1)(iv)(D)	Head 813 mm; Knee 915 mm	Attached to lower anchorages of child restraint anchorage system; no tether is attached.
	S6.1.2(a)(1)(iv)(A)	Head 720 mm; Knee 915 mm	Attached with lap and shoulder belt; in addition, if a tether is provided, it is attached.
	S6.1.2(a)(1)(iv)(C)	Head 720 mm; Knee 915 mm	Attached to lower anchorages of child restraint anchorage system; in addition, if a tether is provided, it is attached.
Child restraints equipped with a fixed or movable surface described in S5.2.2.2 that has belts that are not an integral part of that fixed or movable surface.	S6.1.2(a)(2)(i)	Head 813 mm; Knee 915 mm	Attached with lap and shoulder belt or lower anchorages of child restraint anchorage system; no tether is attached.

* * * * *

S5.3.1 * * *

(b) School bus child restraint systems must have a label, that conforms in content to Figure 12 and to the requirements of S5.3.1(b)(1) through S5.3.1(b)(3) of this standard, and that is permanently affixed to the part of the school bus child restraint system that attaches the system to a vehicle seat back.

(1) The label must be plainly visible when installed and easily readable.

(2) The message area must be white with black text. The message area must be no less than 20 square centimeters.

(3) The pictogram shall be gray and black with a red circle and slash on a white background. The pictogram shall be no less than 20 mm in diameter.

S5.3.2 Each add-on child restraint system manufactured before [*date 3 years after date of publication of final rule*] and each add-on child restraint system manufactured on or after [*date 3 years after date of publication of final rule*] shall be capable of meeting the requirements of this standard when installed solely by each of the means indicated in the following tables 5 and 6, respectively, for the particular type of child restraint system:

TABLE 5 TO S5.3.2 MEANS OF INSTALLATION FOR CHILD RESTRAINTS MANUFACTURED BEFORE

[Date 3 years after date of publication of final rule]

Type of add-on child restraint system	Type 1 seat belt assembly	Type 1 seat belt assembly plus a tether anchorage, if needed	Child restraint anchorage system	Type 2 seat belt assembly	Seat back mount, or seat back and seat pan mounts
School bus child restraint systems					X
Other harnesses		X			
Car beds	X				
Rear-facing restraints	X		X		
Belt-positioning seats				X	
All other child restraints	X	X	X		

TABLE 6 TO S5.3.2 MEANS OF INSTALLATION FOR CHILD RESTRAINTS MANUFACTURED ON OR AFTER

[Date 3 years after date of publication of final rule]

Type of add-on child restraint system	Type 2 seat belt assembly plus a tether anchorage, if needed	Child restraint anchorage system	Type 2 seat belt assembly	Seat back mount, or seat back and seat pan mounts
School bus child restraint systems				X
Other harnesses	X			
Car beds			X	
Rear-facing restraints		X	X	
Booster seats			X	
All other child restraints	X	X	X	

* * * * *

S5.5.2 The information specified in paragraphs (a) through (e) and paragraphs (g) through (m) of this section shall be stated in the English language and in letters and numbers that are not smaller than 10 point type. Unless otherwise specified, the information shall be labeled on a white background with black text. Unless written in all capitals, the information shall be stated in sentence capitalization.

* * * * *

(f) Statements or a combination of statements and pictograms specifying the manufacturer's recommendations for the mass and height ranges of children who can safely occupy the system in each applicable mode (rear-facing, forward-facing, booster), except manufacturers shall not recommend forward-facing child restraint systems with internal harnesses for children of masses less than 12 kg (26.5 lb), and shall not recommend booster seats for children of masses less than 18.4 kg (40 lb). For seats that can only be used as belt-positioning seats, manufacturers must include the maximum and minimum recommended height, but may delete the reference to maximum weight.

* * * * *

(g) * * *

(1) * * *

(i) As appropriate, the statements required by the following sections will be bulleted and placed after the statement required by 5.5.2(g)(1) in the following order: 5.5.2(k)(1), 5.5.2(h), 5.5.2(j), and 5.5.2(i).

* * * * *

(k)(1) * * *

(2) [Reserved]

* * * * *

(l) * * *

(2) [Reserved]

(3) * * *

(i) If the child restraint is designed to meet the requirements of this standard when installed by the child restraint anchorage system according to S5.3.2, and if the sum of the weight of the child restraint and the maximum child weight recommended for the child restraint when used with the restraint's internal harness or components is greater than 65 lb when used forward-facing or rear-facing, include the following statement on this installation diagram: ''Do not install by this method for a child weighing more than *.'' At the manufacturer's option, ''*'' is the child weight limit in English units in accordance with S5.5.2(l)(3)(i)(A), (B) or (C). The corresponding child weight limit in metric units may also be included in the statement at the manufacturer's option.

* * * * *

(m) Statements informing the owner of the importance of registering the child restraint for recall purposes and instructing the owner how to register the child restraint at least by mail and by telephone, providing a U.S. telephone number. The following statement must also be provided: ''For recall information, call the U.S. Government's Vehicle Safety Hotline at 1–888–327–4236 (TTY: 1–800–424–9153), or go to *www.NHTSA.gov.*''

* * * * *

S5.5.5 * * *

(f) The same statement(s) provided under S5.5.2(f).

* * * * *

(k) Statements informing the owner of the importance of registering the child restraint for recall purposes and instructing the owner how to register the child restraint at least by mail and by telephone, providing a U.S. telephone number. The following statement must also be provided: ''For recall information, call the U.S. Government's Vehicle Safety Hotline at 1–888–327–4236 (TTY: 1–800–424–9153), or go to *www.NHTSA.gov.*''

* * * * *

S5.6.1.7 Statements informing the owner of the importance of registering the child restraint for recall purposes and instructing the owner how to register the child restraint at least by mail and by telephone, providing a U.S. telephone number. The following statement must also be provided: ''For recall information, call the U.S. Government's Vehicle Safety Hotline at 1–888–327–4236 (TTY: 1–800–424–9153), or go to *www.NHTSA.gov.*''

* * * * *

S5.6.1.11 For school bus child restraint systems, the instructions must include the following statement:

''WARNING! This restraint must only be used on school bus seats. Entire seat directly behind must be unoccupied or have restrained occupants.'' (The instruction's reference to a ''restrained occupant'' refers to an occupant restrained by any user-appropriate vehicle restraint or child restraint system (*e.g.,* lap belt, lap and shoulder belt, booster seat or other child restraint system.)

* * * * *

S5.6.2.2 The instructions for each built-in child restraint system other than a factory-installed restraint shall include statements informing the owner of the importance of registering the child restraint for recall purposes and instructing the owner how to register the child restraint at least by mail and by telephone, providing a U.S. telephone number. The following statement must also be provided: ''For recall information, call the U.S. Government's Vehicle Safety Hotline at 1–888–327–4236 (TTY: 1–800–424–9153), or go to *www.NHTSA.gov.*''

* * * * *

S5.8.1 *Attached registration form.*

(a) Each child restraint system, except a factory-installed built-in restraint system, shall have a registration form attached to any surface of the restraint that contacts the dummy when the dummy is positioned in the system in accordance with S6.1.2 of Standard 213. The form shall not have advertising or any information other than that related to registering the child restraint system.

(b) Each attached form shall provide a mail-in postcard that conforms in size, and in basic content and format to the forms depicted in Figures 9c and 9d of this section.

(1) The mail-in postcard shall:

(i) Have a thickness of at least 0.007 inches and not more than 0.0095 inches;

(ii) Be pre-printed with the information identifying the child restraint for recall purposes, such as the model name or number and date of manufacture (month, year) of the child restraint system to which the form is attached;

(iii) Contain space for the owner to record his or her name, mailing address, email address, and other pertinent information; and

(iv) Be addressed to the manufacturer, and be postage paid.

(c) The registration form attached to the child restraint shall also provide information:

(1) Informing the owner of the importance of registering the child restraint; and,

(2) Instructing the owner how to register the CRS.

(3) Manufacturers must provide statements informing the purchaser that the registration card is pre-addressed and that postage has been paid.

(4) Manufacturers may provide instructions to register the child restraint electronically. If an electronic registration form is used, it must meet the requirements of S5.8.2 of this section.

(5) Manufacturers must provide statements to the owner explaining that the registration card is not a warranty card, and that the information collected from the owner will not be used for marketing purposes.

S5.8.2 *Electronic registration form.*

(a) Each electronic registration form must meet the requirements of this S5.8.2. Each form shall:

(1) Contain statements at the top of the form:

(i) Informing the owner of the importance of registering the CRS; and,

(ii) Instructing the owner how to register the CRS.

(2) Provide as required registration fields, space for the purchaser to record the model name or number and date of manufacture (month, year) of the child restraint system, and space for the purchaser to record his or her name and mailing address. At the manufacturer's option, a space is provided for the purchaser to record his or her email address.

(b) No advertising information shall appear on the electronic registration form.

(c) The electronic registration form may provide information identifying the manufacturer or a link to the manufacturer's home page, a field to confirm submission, and a prompt to indicate any incomplete or invalid fields prior to submission.

(d) If a manufacturer printed the electronic address (in form of a website or code) on the attached registration form provided pursuant to S5.8.1, the electronic registration form shall be accessed directly by the electronic address. Accessing the electronic address (in form of a website or code) that contains the electronic registration form shall not cause additional screens or electronic banners to appear.

S5.9 * * *

(a)(1) Each add-on child restraint system manufactured before [*date 3 years after publication date of final rule*], other than a car bed, harness, school bus child restraint system, 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 components. [*NHTSA notes: inclusion of the following text was proposed by a January 23, 2015 NPRM, 80 FR 3744, 3775.* ''*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.*'']

(2) Each add-on child restraint system manufactured on or after [*date 3 years after publication date of final rule*], other than a car bed, harness, school bus child restraint system 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, ''NHTSA Standard Seat Assembly; FMVSS No. 213, No. NHTSA–213–2019'' (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 components. [*NHTSA notes: inclusion of the following text would be consistent with a January 23, 2015 NPRM, 80 FR at 3775.* ''*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.'']

* * * * *

S6.1.1 * * *

(a) * * *

(1) * * *

(i) The test device for add-on restraint systems manufactured before *date 3 years after publication date of final rule*] is a standard seat assembly consisting of a simulated vehicle bench seat, with three seating positions, which is depicted in Drawing Package, ''NHTSA Standard Seat Assembly; FMVSS No. 213, No. NHTSA–213–2003,'' (consisting of drawings and a bill of materials) dated June 3, 2003 (incorporated by reference; see § 571.5). The assembly is mounted on a dynamic test platform so that the center SORL of the seat is parallel to the direction of the test platform travel and so that movement between the base of the assembly and the platform is prevented. As illustrated in Figures 1A and 1B of this standard, attached to the seat belt anchorage points provided on the standard seat assembly are Type 1 seat belt assemblies in the case of add-on child restraint systems other than belt-positioning seats, or Type 2 seat belt assemblies in the case of belt-positioning seats. These seat belt assemblies meet the requirements of Standard No. 209 (§ 571.209) and have webbing with a width of not more than 2 inches, and are attached to the anchorage points without the use of retractors or reels of any kind. As illustrated in Figures 1A' and 1B' of this standard, attached to the standard seat assembly is a child restraint anchorage system conforming to the specifications of Standard No. 225 (§ 571.225).

(ii) The test device for add-on restraint systems manufactured on or after [*date 3 years after publication date of final rule*] is a standard seat assembly consisting of a simulated vehicle rear seat which is depicted in Drawing Package, ''NHTSA Standard Seat Assembly; FMVSS No. 213, No. NHTSA–213–2019,'' (consisting of drawings and a bill of materials) dated May 2019 (incorporated by reference; see § 571.5). The assembly is mounted on a dynamic test platform so that the center SORL of the seat is parallel to the direction of the test platform travel and so that movement between the base of the assembly and the platform is prevented. As illustrated in Figures 1D and 1E of this standard, attached to the seat belt anchorage points provided on the standard seat assembly is a Type 2 seat belt assembly. The seat belt assembly meets the requirements of Standard No. 209 (§ 571.209) and has webbing with a width of not more than 2 inches, and are attached to the anchorage points without the use of retractors or reels of any kind. As illustrated in Figures 1D' and 1E' of this standard, attached to the standard seat assembly is a child restraint anchorage system conforming to the specifications of Standard No. 225 (§ 571.225).

(2) * * *

(i) * * *

(B) The platform is instrumented with an accelerometer and data processing system having a frequency response of 60 Hz channel frequency class as specified in SAE Recommended Practice J211/1 (1995), ''Instrumentation for Impact Tests,'' (incorporated by reference, see § 571.5). The accelerometer sensitive axis is parallel to the direction of test platform travel.

(ii) * * *

(G) All instrumentation and data reduction is in conformance with SAE Recommended Practice J211/1 (1995), ''Instrumentation for Impact Tests,'' (incorporated by reference, see § 571.5).

* * * * *

S6.1.1(c) [Reserved]

S6.1.2 *Dynamic test procedure.*

(a) Activate the built-in child restraint or attach the add-on child restraint to the seat assembly in any of the following manners, at the agency's option.

(1) *Test configuration I.*

(i) *Child restraints other than belt-positioning seats, manufactured before [date 3 years from date of publication of final rule].* Attach the child restraint in any of the following manners specified in S6.1.2(a)(1)(i)(A) through (D), unless otherwise specified in this standard.

(A) Install the child restraint system at the center seating position of the standard seat assembly, in accordance with the manufacturer's instructions provided with the system pursuant to S5.6.1, except that the standard lap belt is used and, if provided, a tether strap may be used. Attach school bus child restraint systems in accordance with the manufacturer's instructions provided with the system pursuant to S5.6.1, *i.e.,* the seat back or seat back and seat pan mounts are used.

(B) Except for a harness, a school bus child restraint system, a backless child restraint system with a tether strap, and a restraint designed for use by physically handicapped children, install the child restraint system at the center seating position of the standard seat assembly as in S6.1.2(a)(1)(i)(A), except that no tether strap (or any other supplemental device) is used.

(C) Install the child restraint system using the child restraint anchorage system at the center seating position of the standard seat assembly in accordance with the manufacturer's instructions provided with the system pursuant to S5.6.1. The tether strap, if one is provided, is attached to the tether anchorage.

(D) Install the child restraint system using only the lower anchorages of the child restraint anchorage system as in S6.1.2(a)(1)(i)(C). No tether strap (or any other supplemental device) is used.

(ii) *Belt-positioning seats manufactured before [date 3 years from date of publication of final rule].* A belt-positioning seat is attached to either outboard seating position of the standard seat assembly in accordance with the manufacturer's instructions provided with the system pursuant to S5.6.1 using only the standard vehicle lap and shoulder belt and no tether (or any other supplemental device). Place the belt-positioning seat on the standard seat assembly such that the center plane of the belt-positioning seat is parallel and aligned to the center plane of the outboard seating positions on the standard seat assembly and the base of the belt-positioning seat is flat on the standard seat assembly cushion. Move the belt-positioning seat rearward on the standard seat assembly until some part of the belt-positioning seat touches the standard seat assembly back. Keep the belt-positioning seat and the seating position center plane aligned as much as possible. Apply 133 N (30 pounds) of force to the front of the belt-positioning seat rearward into the standard seat assembly and release.

(iii) In the case of each built-in child restraint system, activate the restraint in the specific vehicle shell or the specific vehicle, in accordance with the manufacturer's instructions provided in accordance with S5.6.2.

(iv) *Child restraints other than booster seats, manufactured on or after [date 3 years from date of publication of final rule].* At the agency's option, attach the child restraint in any of the following manners specified in S6.1.2(a)(1)(iv)(A) through (D), unless otherwise specified in this standard.

(A) Install the child restraint system on the standard seat assembly, in accordance with the manufacturer's instructions provided with the system pursuant to S5.6.1, except that the standard lap and shoulder belt is used and, if provided, a tether strap may be used. Attach the school bus child restraint system in accordance with the manufacturer's instructions provided with the system pursuant to S5.6.1, *i.e.,* the seat back or seat back and seat pan mounts are used.

(B) Except for a harness, a school bus child restraint system, and a restraint designed for use by physically handicapped children, install the child restraint system on the standard seat assembly as in S6.1.2(a)(1)(iv)(A), except that no tether strap (or any other supplemental device) is used.

(C) Install the child restraint system using the child restraint anchorage system on the standard seat assembly in accordance with the manufacturer's instructions provided with the system pursuant to S5.6.1. The tether strap, if one is provided, is attached to the tether anchorage.

(D) Install the child restraint system using only the lower anchorages of the child restraint anchorage system as in S6.1.2(a)(1)(iv)(C). No tether strap (or any other supplemental device) is used.

(v) Booster seats manufactured on or after *[date 3 years from date of publication of final rule].* A booster seat is attached to the standard seat assembly in accordance with the manufacturer's instructions provided with the system pursuant to S5.6.1 using only the standard lap and shoulder belt and no tether (or any other supplemental device). Place the booster seat on the standard seat assembly such that the center plane of the booster seat is parallel and aligned to the center plane of the standard seat assembly and the base of the booster seat is flat on the standard seat assembly cushion. Move the booster seat rearward on the standard seat assembly until some part of the booster seat touches the standard seat assembly back. Keep the booster seat and the seating position center plane aligned as much as possible. Apply 133 N (30 pounds) of force to the front of the booster seat rearward into the standard seat assembly and release.

(2) *Test configuration II.* (i) In the case of each add-on child restraint system manufactured before *[date 3 years from date of publication of final rule]* which is equipped with a fixed or movable surface described in S5.2.2.2 that has belts that are not an integral part of that fixed or movable surface, install the add-on child restraint system at the center seating position of the standard seat assembly using only the standard seat lap belt to secure the system to the standard seat. Do not attach the top tether. In the case of each add-on child restraint system manufactured on or after *[date 3 years from date of publication of final rule]* which is equipped with a fixed or movable surface described in S5.2.2.2 that has belts that are not an integral part of that fixed or movable surface, install the add-on child restraint system on the standard seat assembly using only the lap and shoulder belt to secure the system to the standard seat, or at NHTSA's option, only the lower anchorages of the child restraint anchorage system. Do not attach the top tether.

(ii) In the case of each built-in child restraint system which is equipped with a fixed or movable surface described in S5.2.2.2 that has belts that are not an integral part of that fixed or movable surface, activate the system in the specific vehicle shell or the specific vehicle in accordance with the manufacturer's instructions provided in accordance with S5.6.2.

* * * * *

(d) Belt adjustment.

(1) * * *

(i) * * *

(ii) All Type I belt systems used to attach an add-on child restraint to the standard seat assembly, and any provided additional anchorage belt (tether), are tightened to a tension of not less than 53.5 N and not more than 67 N, as measured by a load cell used on the webbing portion of the belt. All belt systems used to attach a school bus child restraint system are also tightened to a tension of not less than 53.5 N and not more than 67 N, by measurement means specified in this paragraph.

* * * * *

S7.1.1 Child restraints that are manufactured on or after *date three years after date of publication of the final rule*], are subject to the following provisions.

(a) A child restraint that is recommended by its manufacturer in accordance with S5.5 for use either by children in a specified mass range that includes any children having a mass of not greater than 5 kg (11 lb), or by children in a specified height range that includes any children whose height is not greater than 650 mm, is tested with a 49 CFR part 572 subpart K dummy (newborn infant dummy).

(b) A child restraint that is recommended by its manufacturer in accordance with S5.5 for use either by children in a specified mass range that includes any children having a mass greater than 5 kg but not greater than 10 kg (11 to 22 lb), or by children in a specified height range that includes any children whose height is greater than 650 mm but not greater than 750 mm, is tested with a 49 CFR part 572 subpart K dummy (newborn infant dummy), and a part 572 subpart R dummy (CRABI 12-month-old infant dummy).

(c) A child restraint that is recommended by its manufacturer in accordance with S5.5 for use either by children in a specified mass range that includes any children having a mass greater than 10 kg but not greater than 13.6 kg (22 to 30 lb), or by children in a specified height range that includes any children whose height is greater than 750 mm but not greater than 870 mm, is tested with a part 572 subpart R dummy (CRABI 12-month-old infant dummy).

(d) A child restraint that is recommended by its manufacturer in accordance with S5.5 for use either by children in a specified mass range that includes any children having a mass greater than 13.6 kg but not greater than 18.2 kg (30 to 40 lb), or by children in a specified height range that includes any children whose height is greater than 870 mm but not greater than 1100 mm, is tested with a part 572 subpart P dummy (Hybrid III 3-year-old dummy).

(e) A child restraint that is recommended by its manufacturer in accordance with S5.5 for use either by children in a specified mass range that includes any children having a mass greater than 18.2 kg (40 lb) but not greater than 22.7 kg (50 lb), or by children in a specified height range that includes any children whose height is greater than 1100 mm but not greater than 1250 mm is tested with a 49 CFR part 572, subpart N dummy (Hybrid III 6-year-old dummy).

(f) A child restraint that is recommended by its manufacturer in accordance with S5.5 for use either by children in a specified mass range that includes any children having a mass greater than 22.7 kg (50 lb) but not greater than 29.5 kg (65 lb) or by children in a specified height range that includes any children whose height is greater than 1100 mm but not greater than 1250 mm is tested with a 49 CFR part 572, subpart N dummy (Hybrid III 6-year-old dummy) and with a part 572, subpart S dummy (Hybrid III 6-year-old weighted dummy).

(g) A child restraint that is recommended by its manufacturer in accordance with S5.5 for use either by children in a specified mass range that includes any children having a mass greater than 29.5 kg (65 lb) or by children in a specified height range that includes any children whose height is greater than 1250 mm is tested with a 49 CFR part 572, subpart T dummy (Hybrid III 10-year-old dummy).

S7.1.2 Child restraints that are manufactured before [*date three years after date of publication of the final rule*], are subject to the following provisions and S7.1.3.

* * * * *

S7.1.3 *Voluntary use of alternative dummies.* For child restraint systems manufactured before [*date 3 years after date of publication of a final rule*], at the manufacturer's option (with said option irrevocably selected prior to, or at the time of, certification of the restraint), when this section specifies use of the 49 CFR part 572, subpart N (Hybrid III 6-year-old dummy) test dummy, the test dummy specified in 49 CFR part 572, subpart I (Hybrid II 6-year-old dummy) may be used in place of the subpart N test dummy.

* * * * *

S10.2.2 * * *

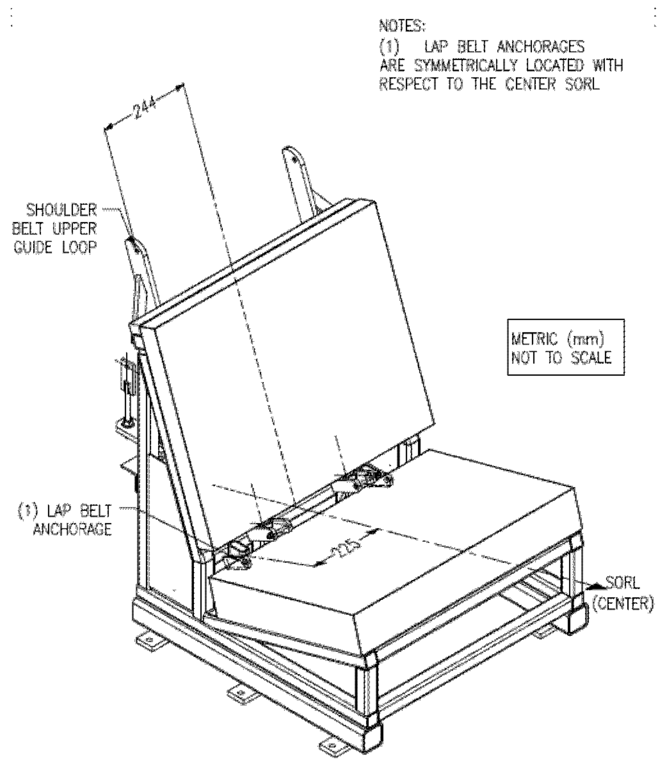
(e)(1) When using the Hybrid III 3-year-old (part 572, subpart P) dummy in a rear-facing child restraint system with an internal restraint system, remove the knee stop screw (210–6516 in drawing 210–5000–1,-2; incorporated by reference, see § 571.5) from the right and left knee so as to let the knees hyperextend.

(2) Place the Subpart P dummy in the forward- or rear-facing child restraint system being tested so that the back of the dummy torso contacts the back support surface of the system. For a child restraint system equipped with a fixed or movable surface described in S5.2.2.2 that is being tested under the conditions of test configuration II, do not attach any of the child restraint belts unless they are an integral part of the fixed or movable surface. For all other child restraint systems and for a child restraint system with a fixed or movable surface that is being tested under the conditions of test configuration I, attach all appropriate child restraint belts and tighten them as specified in S6.1.2. Attach all appropriate vehicle belts and tighten them as specified in S6.1.2. Position each movable surface in accordance with the instructions that the manufacturer provided under S5.6.1 or S5.6.2.

Figures to § 571.213

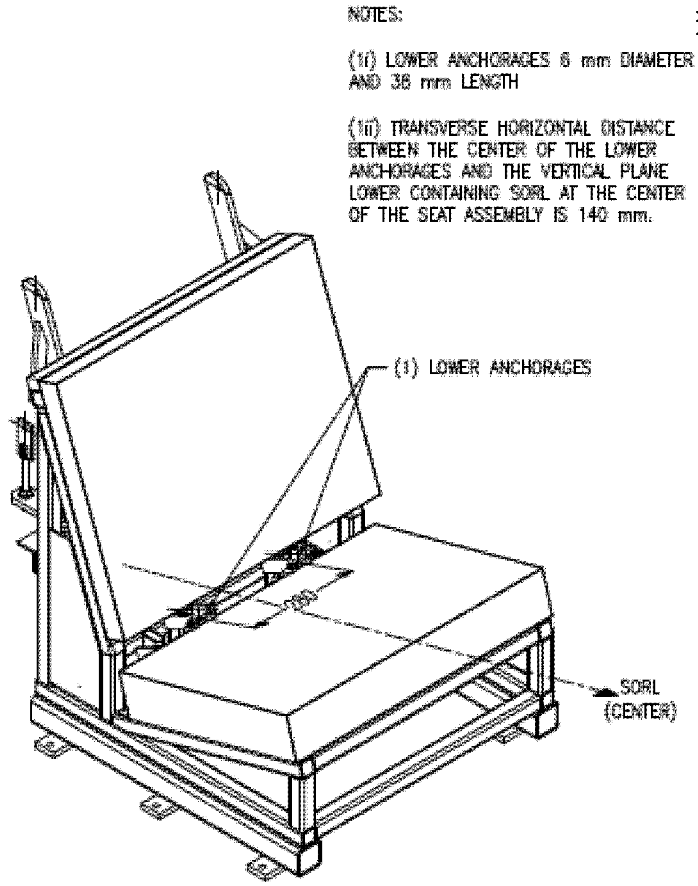
* * * * *

BILLING CODE 4910–59–P



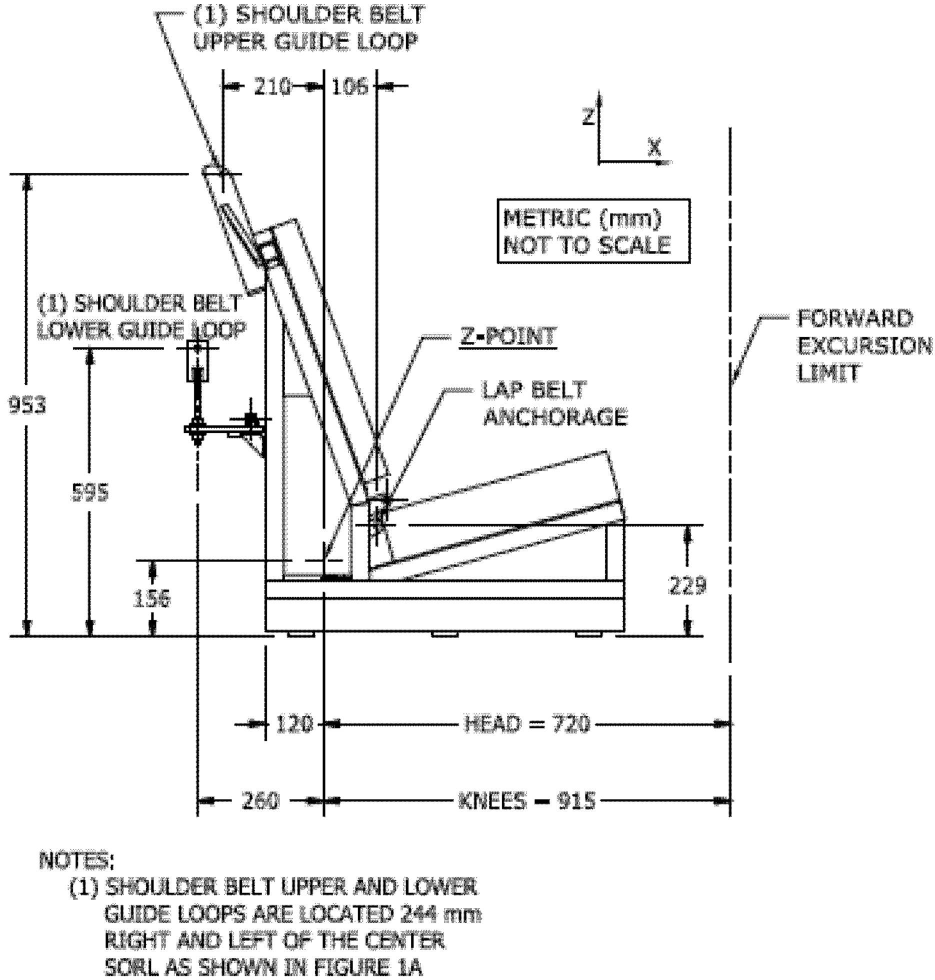
SEAT ORIENTATION REFERENCE LINE AND SEAT BELT ANCHORAGE POINT LOCATIONS ON THE STANDARD SEAT ASSEMBLY

Figure 1D



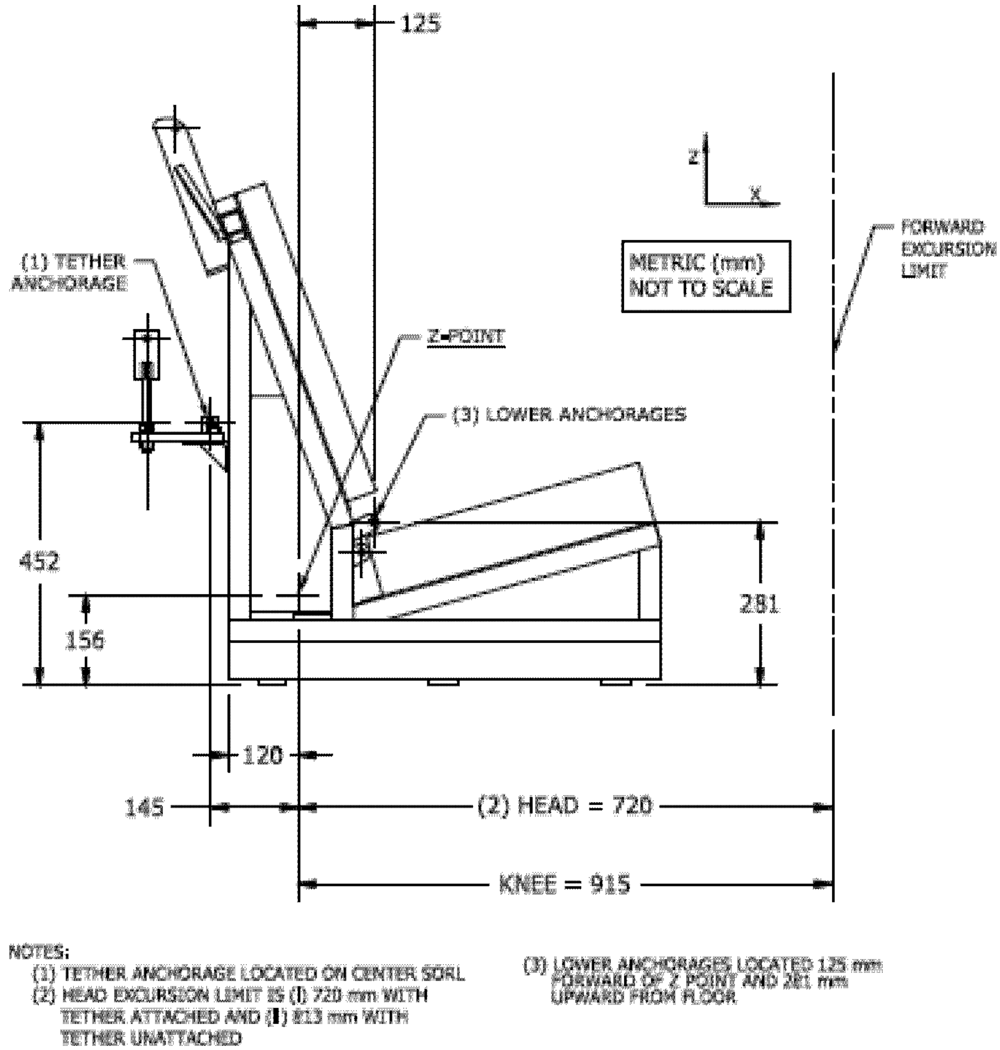
SEAT ORIENTATION REFERENCE LINE AND LOCATION OF THE LOWER ANCHORAGES OF THE CHILD RESTRAINT ANCHORAGE SYSTEM ON THE STANDARD SEAT ASSEMBLY

Figure 1D'



LOCATION OF SHOULDER BELT UPPER AND LOWER GUIDE LOOPS AND FORWARD EXCURSION LIMITS ON THE STANDARD SEAT ASSEMBLY

Figure 1E



LOCATION OF THE CHILD RESTRAINT ANCHORAGES AND FORWARD EXCURSION LIMITS ON THE STANDARD SEAT ASSEMBLY
Figure 1E’

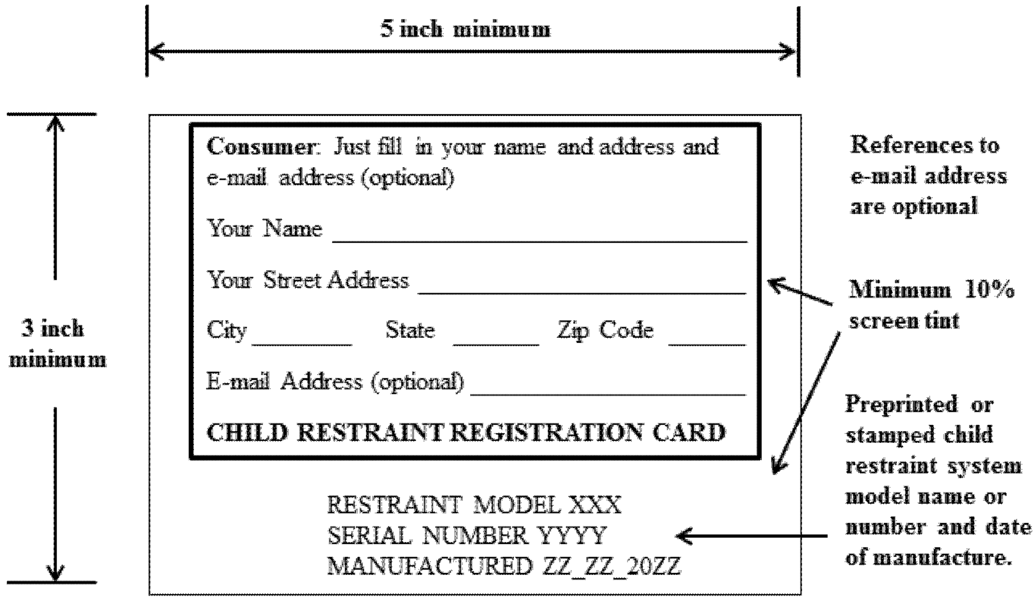


Figure 9c – Registration mail-in postcard for child restraint systems – product identification number and purchaser information side

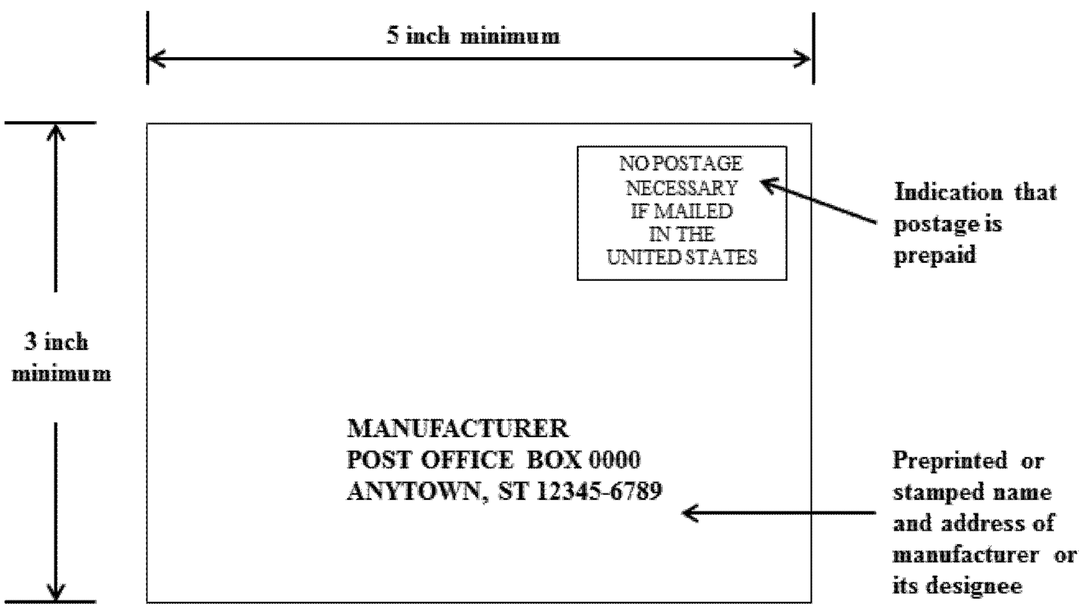


Figure 9d – Registration mail-in postcard for child restraint systems – address side

BILLING CODE 4910–59–C

Note: The following appendix will not appear in the Code of Federal Regulations.

Appendix to Preamble

Estimation of Potential Benefits From the Proposed Increase in the Manufacturer-Recommended Minimum Child Weight for Use of Forward-Facing CRSs and Booster Seats

Under FMVSS No. 213, manufacturers label their child restraints with information about the children for whom the CRS is recommended, based on the children's height and weight. Children should be rear-facing until they are at least 1 year in age, as physically they are safer riding rear-facing so that their head and neck are supported by the CRS back structure in a crash. Currently, the standard requires forward-facing child restraints to be recommended for children weighing a minimum of 9 kg (20 lb). This NPRM proposes to raise this minimum to 12 kg (26.5 lb), because 12 kg (26.5 lb) corresponds to the weight of a 95th percentile one-year-old. In addition, FMVSS No. 213 currently requires booster seats to be recommended for children weighing at least 13.6 kg (30 lb). This NPRM proposes to raise that weight limit to 18.2 kg (40 lb). The proposed increase in the manufacturer-recommended minimum child weight for forward-facing CRSs reduce the premature graduation from rear-facing CRSs to forward-facing CRSs, and from forward-facing car safety seats to booster seats. The proposed changes would align the standard with current best practices on child passenger safety and are anticipated to have a beneficial effect on child passenger safety. This appendix provides the data and analysis methodology to illustrate and estimate that beneficial effect, in terms of potential lives saved and injuries prevented.

(1) Increasing Manufacturer-Recommended Minimum Child Weight for Forward-Facing CRS Use From 9 kg to 12 kg (20 lb to 26.5 lb)

Increasing the manufacturer-recommended minimum child weight for use of forward-facing CRSs from 9 kg to 12 kg (20 lb to 26.5 lb) could potentially reduce premature graduation of children to forward-facing CRSs. NHTSA recommends [139] that all children up to the age of one year should always ride in rear-facing CRSs and that children 1 to 3 years of age ride in rear-facing CRSs as long as possible and until they reach the upper height or weight limit allowed by the CRS's manufacturer. By supporting the entire posterior torso, neck, head, and pelvis, a rear-facing CRS distributes crash forces over the entire body rather than focusing them only at belt contact points as with a forward-facing CRS. Therefore, biomechanical experts, together with the child passenger safety community, recommend rear-facing CRS use for infants and toddlers.

To determine the potential lives saved and injuries prevented by this proposal, the Agency reviewed literature and analyzed available data for: (a) Estimating the incremental effectiveness of rear-facing CRSs over forward-facing CRSs in protecting children in crashes; (b) determining the number of children killed and injured in CRSs categorized by age of child; (c) the percentage of children by age in rear-facing and forward-facing CRSs; (d) the percentage of children by age weighing less than 12 kg (26.5 lb); and, (e) the percentage of caregivers who would follow manufacturer's instructions provided on CRS labels and the users' manual regarding use of the CRS.

Incremental Effectiveness of Rear-Facing CRSs Over Forward-Facing CRSs

McMurry, et al.[140] examined the National Automotive Sampling System—Crashworthiness Data System (NASS–CDS) data files for the years 1988–2015 to compare the injury risk for children up to the age of 2 years in rear-facing CRSs and forward-facing CRSs. The data showed an extremely low injury rate in children up to 2 years of age in both rear-facing CRSs and forward-facing CRSs. McMurry noted that children 2–YO and younger experienced lower rates of injury when restrained in rear-facing CRSs than when restrained in forward-facing CRSs, but this difference was not statistically significant. Due to the absence of any other field data to estimate the incremental effectiveness of rear-facing CRS over forward-facing CRSs for children up to 2 years of age, NHTSA used the weighted data in NASS–CDS reported by McMurry, as shown in Table A–1. Though the weighted data is provided as a percentage, it can still be used to determine incremental effectiveness of rear-facing CRS over forward-facing CRS since effectiveness is estimated from a ratio of injured to uninjured occupants.

TABLE A–1—NUMBER OF INJURED AND UNINJURED CHILD OCCUPANTS BY AGE AND CRS ORIENTATION (RFCRS OR FFCRS) ALONG WITH SURVEY-WEIGHTED PERCENTAGES

[NASS–CDS 1988–2015]

Age	RFCRS	FFCRS
Infants (0–11 months)		
Uninjured	551 (99.4%)	71 (99.3%)
Injured	27 (0.6%)	3 (0.7%)
Effectiveness of RFCRSs over FFCRSs	=1-(0.6/99.4)/(0.7/99.3) = 0.144	
1 year-olds (12–23 months)		
Uninjured	98 (99.8%)	339 (99.5%)
Injured	3 (0.2%)	14 (0.5%)
Effectiveness of RFCRSs over FFCRSs	=1-(0.2/99.8)/(0.5/99.5) = 0.601	

McMurry's data in Table A–1 shows that the effectiveness of rear-facing CRSs over forward-facing CRSs for 0–11 months is 14.4 percent and that for 12–23 months is 60.1 percent. Based on biomechanical testing, the incremental protection offered by rear-facing CRSs over forward-facing CRSs should be greater for smaller/younger children than larger/older children. The 60.1 percent incremental effectiveness of rear-facing CRSs over forward-facing CRSs for 12–23 month-old children seems to be rather high considering the low fatality and injury rates for this age group, so the agency used the same effectiveness rate for this age group as that computed for the 0–11 month age group. Therefore, for estimating the potential benefits of raising the minimum child weight limit for forward-facing CRSs from 9 kg to 12 kg, the incremental effectiveness of 14.4 percent was used for rear-facing CRSs in preventing fatalities among children 0 to 23 months over that of forward-facing CRSs.

Number of Children Retrained in CRSs Killed Annually in Motor Vehicle Crashes

The Fatality Analysis Reporting System (FARS) data files for the 5-year period from 2010 to 2014 were analyzed to determine the annual average number of children restrained

[139] NHTSA's Car Seat Recommendations: *https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/nhtsacarseatrecommendations.pdf.*

[140] McMurry, T.L., Arbogast, K.B., Sherwood, C.P., Vaca, F., Bull, M., Crandall, J.R., Kent, R.W., ''Rear-facing versus forward-facing child restraints: an updated assessment,'' Injury Prevention, 2017;0:1–5.doi:10.1136/injuryprev-2017–042512.

in CRSs killed in motor vehicle crashes (see Table A–2). These data files were also analyzed to determine the percentage of fatally injured children in different types of CRSs (rear-facing CRSs, forward-facing CRSs, and booster seats) (see Table A–3).

TABLE A–2—AVERAGE ANNUAL FATALITIES AMONG 0–7 YEAR-OLD CHILDREN RESTRAINED IN CRSS IN REAR SEATING POSITIONS OF LIGHT VEHICLES

[2010–2014 FARS]

Crash mode	Age (years)									
	<1	1	2	3	4	5	6	7	Total	Percent total
Rollover	9.4	8.2	6.6	6.2	6.2	6.2	3.6	2.2	48.6	28.0
Front	9.2	11.8	9	11.8	8.8	5.8	4.6	2.2	63.2	36.4
Side	8.2	6.2	5.4	6	3.6	3	2.6	1.8	36.8	21.2
Near-side	5.2	3.8	3.6	4	1.8	1.8	1.8	1.2	23.2	13.4
Far-side	3	2.4	1.8	2	1.8	1.2	0.8	0.6	13.6	7.8
Rear	4.2	5.6	4.2	3	3.2	2.6	1.4	0.8	25.0	14.4
Total	31	31.8	25.2	27	21.8	17.6	12.2	7	173.6	100.0

TABLE A–3—PERCENTAGE OF FATALLY INJURED CHILDREN RESTRAINED IN DIFFERENT CRS TYPES OF CRSS IN REAR SEATING POSITIONS OF LIGHT VEHICLES BY AGE OF CHILD

[FARS 2010–2014]

CRS type	Age (years)							
	<1 (percent)	1 (percent)	2 (percent)	3 (percent)	4 (percent)	5 (percent)	6 (percent)	7 (percent)
RFCRS	73.5	11.9	1.6	0.0	0.0	0.0	0.0	0.0
FFCRS	26.5	85.1	78.7	58.2	38.5	36.5	23.1	11.1
Booster	0.0	3.0	19.7	41.8	58.5	63.5	76.9	88.9

Percentage of Children 0 to 3–YO Weighing Less Than 12 kg (26.5 lb)

The percent of children weighing less than 12 kg (26.5 lb) for children of age less than 1 year, 1-year, 2 years, and 3-years was determined using the 2000 Center for Disease Control (CDC) Growth Charts. The percent of girls and boys weighing less than 12 kg from the growth charts for each month from newborn to 36 months of age was determined and averaged for 12-month periods to determine the percentage of children weighing less than 12 kg for less than 1-year, 1-year, 2-years, and 3-years of age (see Table A–4).[141]

TABLE A–4—PERCENT OF CHILDREN WEIGHING LESS THAN 12 kg (26.5 lb) BY CHILD AGE

[2000 CDC growth charts]

	<1 YO (percent)	1 YO (percent)	2 YO (percent)	3 YO (percent)
Percentile	99.8	71.4	22.3	0

Percentage of Caregivers Following Information on CRS Use on CRS Labels or the Users' Manual

The proposed raising of the manufacturer-recommended minimum child weight for use of forward-facing CRSs from 9 kg to 12 kg could reduce premature graduation of children from rear-facing CRSs to forward-facing CRSs. However, this is contingent upon caregivers reading and following the manufacturer-supplied information on CRS use on the CRS labels and the Users' manual.

There is no field data on the percentage of caregivers who would follow the information on CRS labels or the manual but inferences can be made from studies on CRS misuse. NHTSA conducted a detailed review of side impact crashes for the years 2002—2009 [142] and frontal impact crashes for the years 2003–2013 [143] where a CRS restrained child was killed. This review showed that, among survivable side and front crashes with a child fatality, nearly half the children were incorrectly restrained in CRSs, meaning that the CRSs were either not installed appropriately in the vehicle and/or the children were not restrained correctly in CRSs in accordance with manufacturer's instructions. Further, NHTSA's National Child Restraint Use Special Study (NCRUSS) published in 2015 noted CRS misuse of about 46 percent (DOT HS 812 157). This high rate of CRS misuse means that a change in the minimum child weight for use of forward-facing CRSs that is provided on CRS labels and in the Users' manual is highly unlikely to lead to all caregivers making the switch, as existing instructions themselves are not followed by all caregivers.

The Agency does not have further information on the efficacy of instructions on CRS labels and the manual and is therefore using the low rates of 15 percent and 50 percent of caregivers that would follow the instructions on the CRS labels and manual for forward-facing CRS use.

Estimating Lives Saved

Using the information derived from field data on the incremental effectiveness of rear-facing CRSs over forward-facing CRSs, the number of children killed who are restrained in forward-facing CRSs, the percentage of children weighing less than 12 kg, and the assumptions regarding caregivers following CRS use instructions supplied by the

[141] Data from 2000 CDC *http://www.cdc.gov/growthcharts.*

[142] PRIA for the January 28, 2014 NPRM to include a side impact test in FMVSS No. 213 (79 FR 4570, Docket No. NHTSA–2014–0012).

[143] This NPRM upgrading the frontal sled test in FMVSS No. 213.

manufacturer, the agency estimates that the lives of 0.7–2.3 children 0–2 YO could be saved (see Table A–5) by raising the manufacturer-recommended minimum child weight for use of forward-facing CRSs from 9 kg to 12 kg.

TABLE A–5—ESTIMATE OF POTENTIAL LIVES SAVED FROM THE PROPOSED INCREASE IN THE MANUFACTURER-RECOMMENDED MINIMUM CHILD WEIGHT FOR USE OF FORWARD-FACING CRSS FROM 9 kg TO 12 kg

	Age (years)		
	<1	1	2
Average Annual Fatalities (a)	31	31.8	25.2
Percent in FFCRS (b)	26.5%	85.1%	78.7%
Percent weight less than 26.5 lb (c)	99.8%	71.4%	22.3%
Target Population (d) = (a)×(b)×(c)	8.2	19.3	4.4
Effectiveness of RFCRSs vs FFCRSs (e)	14.4%	14.4%	14.4%
Percent people following instructions (f)	15%–50%	15%–50%	15%–50%
Benefits for 15% follow instructions (d)×(e)×0.15	0.2	0.4	0.1
Benefits for 50% follow instructions (d)×(e)×0.5	0.6	1.4	0.3

Moderate-to-Critical Injuries Prevented Among Children Restrained in CRSs in Motor Vehicle Crashes

The agency analyzed NASS–CDS data files for the year 2010–2014 to determine average annual Abbreviated Injury Scale (AIS) [144] 2+ injured children who are restrained in CRSs in rear seating positions of light vehicles. On an annual average, there were 31 children under 1 year of age and 77 children 1–2 years old that sustained AIS 2+ injuries for the period 2010–2014 (See Table A–6).

TABLE A–6—AVERAGE ANNUAL ESTIMATES OF 0 TO 7 YEAR-OLD CRS RESTRAINED CHILDREN WITH AIS 2+ INJURIES IN REAR SEATING POSITIONS OF LIGHT PASSENGER VEHICLES INVOLVED IN MOTOR VEHICLE CRASHES BY CRASH MODE

[Weighted data NASS–CDS 2010–2014]

Crash mode	Age (years)				
	Under 1	1–2 YO	3 YO *	4–7 YO	Total
Rollover	0	0	0	172	172
Front	0	55	37	47	139
Side	30	14	10	1	55
Near-side	29	5	4	0	38
Far-side	1	9	6	1	17
Rear	1	7	5	73	86
Total	31	77	51	293	452

* NASS–CDS data have very few cases of restrained injured children. For this reason, the ages are grouped together. About 40% of AIS 2+ injuries among AIS 2+ 1–3 YO children are to 3-year-old children. Therefore, the number of 1–2 YO children injured is 128*0.6 = 77.

The information on whether children were restrained in RFCRS or FFCRS was not available in many cases in the NASS–CDS data files so this information was obtained from the National Child Restraint Use Survey System (NCRUSS) [145] as shown in Table A–7.[146]

TABLE A–7—TYPE OF CRS USED TO RESTRAIN CHILDREN IN NON-FATAL CRASHES

[NCRUSS]

	RFCRS percent	FFCRS percent	Booster percent	Seat belt percent
under 1YO	96	4	1	
1–2YO	11	86	2	1
3 YO		76	22	2
4–7YO		30	64	6

As before, 15 percent to 50 percent of caregivers were assumed would follow the manufacturer's instructions on CRS labels or the Users' manual regarding CRS use and would keep children weighing less than 12 kg (26.5 lb) in rear-facing CRSs. Using these assumptions along with the percentage effectiveness of RFCRSs over FFCRS and the 2010–2014 NASS–CDS data, the agency

[144] The Abbreviated Injury Scale is a 6-point ranking system used for ranking the severity of injuries. AIS2+ Injuries means injuries of severity level 2 (moderate), 3 (serious), 4 (severe), 5 (critical) according to the Abbreviate Injury Scale. *www.aaam.org.*

[145] National Child Restraint Use Special Study, DOT HS 811 679, *https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812142.* NCRUSS is a large-scale nationally-representative survey that involves both an inspection of the child passenger's restraint system by a certified child passenger safety technician and a detailed interview of the driver. The survey collected information on drivers and child passengers ages 0–8 years between June and August 2011.

[146] Tables C–5 and C–6 of DOT–HS–812142.

estimated that 1.0–3.5 AIS 2+ injuries could be prevented for children 0–2 YO (see Table A–8) by the proposed change in the manufacturer-recommended minimum child weight limit for forward-facing CRS use.

TABLE A–8—ESTIMATE OF INJURIES PREVENTED FROM THE PROPOSED INCREASE IN THE MANUFACTURER-RECOMMENDED MINIMUM CHILD WEIGHT FOR USE OF FORWARD-FACING CRSS FROM 9 kg TO 12 kg

	Age (years)	
	<1	1–2
Average Annual AIS 2+ injured children (a)	31	77
Percent in FFCRS (b)	4.0%	86.0%
Percent weight less than 12 kg (26.5 lb) (c)	99.8%	71.4%
Target Population (d) = (a)x(b)x(c)	1.2	47.3
Effectiveness of RFCRSs vs FFCRSs (e)	14.4%	14.4%
Percent people following label (f)	15%–50%	15%–50%
Benefits for 15% follow label (d)x(e)x0.15	0.0	1.0
Benefits for 50% follow label (d)x(e)x0.50	0.1	3.4

The agency estimates that the increase in the minimum child weight from 9 kg to 12 kg for FFCRS use could potentially save 0.7–2.3 lives and prevent 1.0–3.5 AIS 2+ injuries.

(2) Increasing Manufacturer-Recommended Minimum Child Weight for Booster Seat Use

Increasing the manufacturer-recommended minimum child weight for booster seat use from 13.6 kg to 18.2 kg (30 lb to 40 lb) would reduce premature graduation from forward-facing CRSs to booster seats. NHTSA determined that among 3- to 4-year-olds, there is a 27 percent increased risk of moderate to fatal injuries when restrained in booster seats compared to forward-facing CRSs.[147] The effectiveness of FFCRS over booster seats is likely reduced for older children who may be taller and have improved belt fit in a booster seat. So, for children 5—7 years of age, NHTSA assumed that there is a 10 percent increased risk of fatal injuries when restrained in booster seats compared to forward-facing CRSs. An average 3-year old weighs 13.6 kg (30 lb) and an average 4-year old weighs 16.1 kg (35.5 lb). Using the 2000 Center for Disease Control (CDC) Growth Charts, the agency determined the percentage of children weighing less than 18.2 kg (40 lb) for each age group (see Table A–9).

TABLE A–9. PERCENT OF CHILDREN WEIGHING LESS THAN 18.2 kg (40 lb) BY AGE OF CHILD

[2000 CDC growth charts]

	2 YO (percent)	3 YO (percent)	4 YO (percent)	5 YO (percent)	6 YO (percent)	7 YO (percent)
Percentile	100	100	82.5	50	20	4

To determine the lives saved by increasing the minimum child weight for booster seat use, the agency: (1) Used the fatality data in Table A–2, the percentage of children in booster seats in Table A–3, and the percentage of children weighing less than 18.2 kg (40 lb) in Table A–9; (2) made the same assumptions that 15 percent to 50 percent of caregivers would follow manufacturer's instructions in the CRS labels and/or Users' manual and keep children weighing less than 18.2 kg (40 lb) in CRSs with internal harnesses, and (3) followed a similar analysis method as in Table A–5. Based on this analysis, the agency estimates that 1.2- 4 lives could potentially be saved (see Table A–10) by raising the manufacturer-recommended minimum child weight for booster seat use from 13.6 kg to 18.2 kg (30 lb to 40 lb).

TABLE A–10—ESTIMATE OF LIVES SAVED FOR PROPOSED LABEL CHANGE INCREASING WEIGHT OF CHILDREN IN BOOSTER SEATS FROM 13.6 TO 18.2 kg

[30 to 40 lb]

	Age					
	2	3	4	5	6	7
Average Annual Fatalities (a)	25.2	27	21.8	17.6	12.2	7
Percent in booster seats (b)	19.7%	41.8%	58.5%	63.5%	76.9%	88.9%
Percent weight less than 18.2 kg (40 lb) (c)	100.0%	100.0%	82.5%	50.0%	20.0%	4.0%
Target Population (d) = (a)x(b)x(c)	5.0	11.3	10.5	5.6	1.9	0.2
Effectiveness of FFCRSs vs Boosters (e)	27.0%	27.0%	27.0%	10.0%	10.0%	10.0%
Percent people following label (f)	15%-50%	15%-50%	15%-50%	15%-50%	15%-50%	15%-50%
Benefits for 50% follow label (d)x(e)x0.15	0.2	0.5	0.4	0.1	0.0	0.0
Benefits for 15% follow label (d)x(e)x0.5	0.7	1.5	1.4	0.3	0.1	0.0

[147] DOT HS 811 338 July 2010—Booster seat effectiveness estimates based on CDS and State data.

Using the data in Table A–6 and Table A–7 and following the analysis as shown in Table A–10, the number of AIS 2+ injuries were estimated that could potentially be prevented by the proposed increase in the minimum child weight recommendation for booster seat use from 13.6 to 18.2 kg (30 to 40 lb). This analysis, shown in Table A–11, estimated that 1.6–5.2 AIS 2+ injuries could be prevented.

TABLE A–11—ESTIMATE OF INJURIES PREVENTED FOR PROPOSED INCREASE IN MANUFACTURER-RECOMMENDED MINIMUM CHILD WEIGHT FOR BOOSTER SEAT USE FROM 13.6 TO 18.2 kg

[30 to 40 lb]

	Age	
	1–3	4–7
Average Annual AIS 2+ injured children (a)	128	293
Percent in Boosters (b)	9.0%	64.0%
Percent weight less than 18.2 kg (40 lb) (c)	100.0%	39.1%
Target Population (d) = (a)×(b)×(c)	11.5	73.4
Effectiveness of FFCRSs vs. boosters (e)	27.0%	10.0%
Percent people following label (f)	15%–50%	15%–50%
Benefits for 70% follow label (d)×(e)×(f)	0.5	1.1
Benefits for 15% follow label (d)×(e)×0.15	1.6	3.7

The agency estimates that the increase in the minimum child weight for booster seat use from 13.6 kg to 18.2 kg (30 lb to 40 lb) could potentially save 1.2–4 lives and prevent 1.6–5.2 AIS 2+ injuries.

In summary, the proposed increase in the manufacturer-recommended minimum child weight for forward-facing CRS use and booster seat use could potential save 1.9 to 6.3 lives and prevent 2.6 to 8.7 AIS 2+ injuries.

Issued in Washington, DC, under authority delegated in 49 CFR 1.95 and 501.8.

James C. Owens,

Deputy Administrator.

[FR Doc. 2020–21477 Filed 10–30–20; 8:45 am]

BILLING CODE 4910–59–P