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U.S. Perspective on Child Restraints and Child Restraint Anchorage Systems

NHTSA estimates that a CRS can reduce the risk of fatality by 71% for children less than 1 year old and by 54% for children 1-4 years old. NHTSA recommends children under the age of 1 year be restrained in rear-facing car seats, 1-3 year olds be restrained rear-facing as long as possible (until they outgrow the car seat), and 4-7 year olds be restrained in forward facing car seats with a harness and tether until they outgrow the car seat. NHTSA also recommends children 0-12 years old be restrained in rear seating positions.

NHTSA's National Child Restraint Use Special Study (NCRUSS), conducted in 2011, observed the use of car seats and booster seats for child passengers (birth to 8 year old) in 4, 167 vehicles. NCRUSS is a nationally representative survey.

Results from the NCRUSS survey indicated that 96% of the children were in rear seating positions and 94% were in car seats or booster seats. The method of installation of car seats is as follows:

Installation method	Rear Facing infant CRS	Convertible Rear facing CRS	Forward Facing CRS
Lower anchors	57%	67%	46%
Seat belt	34%	23%	44%
Lower anchors + seat belts	8%	9%	6%

Per the NCRUSS survey, tether use for forward facing CRSs was 42% (48% tether use with lower anchor installation and 12% tether use with seat belt installation). NHTSA has ongoing consumer education efforts to improve tether use for forward facing seats in both lower anchor and seat belt installations.

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Child restraint anchorages were required in order to standardize and improve the ease of installing car seats. According to the NCRUSS survey, among the car seats that were installed using lower anchors, 11% were loosely installed while installed using seat belts, 27% were loosely installed. Nearly all car seats sold in the United States have flexible lower anchor attachments (<<1 percent have ISOFIX attachments) in addition to having means to install them using seat belts. Also, vehicles with three or more rear seating positions are required to be equipped with child restraint anchorage systems at no fewer than two rear seating positions and a tether anchorage at an additional seating position.

Comment [C1]: Not sure if necessary, but I think it is important to stress that they all have both options for installation (unlike ECE R44) and that all vehicles are equipped with it which stresses our preference for standardization.

NHTSA believes 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 helps with easy and simple messaging for consumer education.

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NHTSA's focus is on improving child restraint use and reducing misuse. NHTSA initiated rulemaking to improve the usability of child restraint anchorage system (80 FR 3744, Docket No. NHTSA-2014-0123). The goal of this rulemaking is to improve the ease of use of the lower anchorages and tether anchorages and to increase the rate of correct use of child restraints.

Submitted by the experts from United States of America

Informal document GRSP-58-24
(58th GRSP, 8-11 December 2015, agenda item 9)

NHTSA believes that the current tether anchor zone in FMVSS No. 225 is reasonable with minor modifications to improve accessibility of the anchors. NHTSA performed sled tests using different fore-aft and lateral tether anchorage locations at extreme points within the allowable zone in FMVSS No. 225 and found no difference in CRS performance (see further details in the notice and in the docket - Docket No. NHTSA-2014-~~0123-0003~~). **Tether anchor zones that are significantly larger than that specified in FMVSS No. 225 may reduce the level of protection afforded by child restraints and reduce the usability of tether anchors.**

NHTSA believes that static test loads lower than 15 kN may not ensure sufficient strength of the child restraint anchors in real world crashes. Vehicle crash tests conducted by Transport Canada and NHTSA's sled tests indicate that due to stiffer vehicle front-end (higher crash acceleration) and heavier child restraints, there is a likelihood of anchor loads exceeding their strength level in real world crashes. Total loads on child restraint anchorages in excess of 20 kN were recorded in vehicle crash tests with one lower anchor failure (Docket No. NHTSA-2014-~~0026-0002~~ and NHTSA-2014-~~0026-0005~~).

NHTSA is also conducting research to improve the compatibility among vehicles and child restraints. Child restraint envelopes were developed and compatibility was assessed in various vehicle models. See <http://www.umtri.umich.edu/our-results/projects/umtri-workshop-new-tools-child-occupant-protection>.

Comment [C2]: This reference was wrong. There is a study we did for the LATCH Usability rule that placed the tether in the roof, seat back and package shelf, centered and to the sides to evaluate the performance and loads. This is the correct reference

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Comment [C3]: This is the TC document

Comment [C4]: This is VRTC document with sled tests using vehicles.

Since you are talking about the crash tests you may want to delete the second one -0005