April 22, 2014

The Honorable David J. Friedman  
Acting Administrator  
National Highway Traffic Safety Administration  
1200 New Jersey Avenue SE  
Washington, DC 20590


Dear Acting Administrator Friedman:

The Insurance Institute for Highway Safety (IIHS) welcomes the opportunity to comment on the National Highway Traffic Safety Administration’s (NHTSA) Notice of Proposed Rulemaking (NPRM) to amend Federal Motor Vehicle Safety Standard (FMVSS) 213 Child Restraint Systems to include a side impact test procedure for child safety seats for children weighing up to 40 pounds. IIHS supports the decision to set minimum standards for child safety seat performance in side impacts but suggests some modifications to the proposal. This includes ensuring that the test environment for forward-facing restraints is consistent with parents’ use of restraints and evaluating the tradeoff between potentially larger rear-facing child restraints and premature graduation to forward-facing child restraints. We also recommend that the use of booster seats be limited to children weighing at least 40 pounds, effectively exempting booster seats from the proposed rule.

The NPRM proposes testing of child safety seats for children weighing up to 40 pounds, including both rear-facing and forward-facing child restraints (Section VI, Potentially Affected Child Restraints). The countermeasures expected to improve performance in these tests include additional padding and larger side wings, which will likely result in larger and heavier child restraints. There is already a market trend toward larger child restraints that can limit options for parents with smaller cars, especially if more than one child restraint is needed. If the side impact test requirements lead to uniformly large child restraints, IIHS is concerned there may be an adverse effect of children graduating prematurely to less safe restraints, e.g., moving from a rear-facing to a forward-facing child restraint or from a child safety seat into vehicle seat belts. Injury risk is lowest overall for children in rear-facing child restraints, and rear-facing restraints are particularly effective at reducing injury in side impact crashes (Henary et al. 2007). In the preliminary testing included in the NPRM, only one rear-facing seat failed the head containment requirement, suggesting that many seats may not need to be redesigned to ensure good performance. The geometry and orientation of rear-facing seats means they are most at risk for being too large for smaller vehicles (Bing et al. 2014), so that even moderate increases in size may result in fewer seats that fit in the rear seats of smaller vehicles. If there is any indication that, in response to the rule, child restraint manufacturers will modify rear-facing restraint designs in a manner that increases restraint size, then NHTSA should evaluate the tradeoff between these larger seats and the potential for premature graduation to forward-facing restraints. One potential option is for NHTSA to consider exempting rear-facing child restraints from the standard because rear-facing restraints, as currently designed, are very effective at reducing injuries in side impact crashes.

The NPRM proposes to exclude testing of child safety seats for children weighing more than 40 pounds (Section VI, Potentially Affected Child Restraints). IIHS agrees with this decision for the reasons stated in the NPRM. Specifically, there is no dummy available that represents a child more than 40 pounds and is validated for side impact testing. Additionally, children more than 40 pounds seated in booster seats are likely to be tall enough to take advantage of vehicle countermeasures such as curtain side airbags.
Measurements taken during IIHS’s tests of booster seat belt fit indicate that the center of gravity of a typical 6-year-old child’s head is 600-650 mm above the vehicle seat when seated on a booster, which is above the beltline of 500 mm specified in the NPRM. On average, the seated height of the 6-year-old dummy in a booster seat is within a few centimeters of the seated height of the 5th percentile female dummy used in the rear seat of IIHS’s side impact test program. In the most recent 5 years of side impact evaluations, more than 80 percent of more than 200 vehicle makes and models have received the top ratings for injury mitigation for the rear seat occupant, and that proportion jumps to 95 percent for the most recent 2 years of evaluations. In these tests, injury risk to rear-seat occupants is reduced by a combination of vehicle countermeasures such as curtain airbags, door structural improvements, and voluntary padding of the beltline, which is not currently required by FMVSS 201 Occupant Protection in Interior Impact. We would expect that vehicle countermeasures that have improved outcomes for the 5th percentile female dummy in our testing would also reduce the likelihood of injury to a 6-year-old seated in a booster seat. The phase-in of rulemaking that specifies ejection mitigation requirements (FMVSS 226) also is increasing coverage of curtain airbags, further increasing the likelihood that smaller statured occupants will benefit from curtain airbags. Strengthening FMVSS 201 requirements to include testing of the rear seat beltline also would help ensure benefits for smaller occupants.

The NPRM proposes that child restraints with internal harnesses be secured to the side impact seat assembly with the LATCH system, including the top tether for forward-facing child restraints (Section XI, The Proposed Test Procedure, B. Rear Seat Environment Parameters). The NPRM indicates that NHTSA found no meaningful difference in performance in preliminary testing comparing child restraints attached with lower anchors with those attached with seatbelts, therefore it seems reasonable to forego testing with lap and shoulder belts. However, IIHS recommends extending the testing to forward-facing restraints installed without the top tether. Observational surveys have found that about half of all forward-facing child restraints are installed without using the top tether (Cicchino & Jermakian 2014, Decina & Lococo 2007, Eichelberger et al. 2014, Jermakian & Wells 2011, O’Neil et al. 2011), and dynamic performance of child restraints changes when the top tether is used (Kapoor et al. 2011, Lumley 1997, Menon & Ghati 2007). Because tether non-use is common in the field, dynamic testing of child restraints should include a no-tether condition to ensure any countermeasures developed as part of the testing program will be effective at reducing injuries under those circumstances.

The NPRM proposes that belt-positioning booster seats designed for children weighing less than 40 pounds be included in the rule (Section VI, Potentially Affected Child Restraints). IIHS recommends that NHTSA limit the use of boosters to children weighing 40 pounds or more, effectively excluding boosters from the proposed rule. The primary function of booster seats is to elevate children and correctly position vehicle lap and shoulder belts on their smaller anatomy so they can take advantage of vehicle countermeasures designed for larger occupants. Boosters on their own are not child restraints, and they necessarily work in tandem with the vehicle environment and restraints to provide optimal protection in a crash. The vehicle restraints and side impact countermeasures are not fully replicated in the side impact sled test, which limits the ability of this test to evaluate booster performance. Children weighing less than 40 pounds are likely too small to take full advantage of vehicle countermeasures, but it is important that these smaller children be protected by this rule. As a result, IIHS recommends that NHTSA limit the use of boosters to children weighing 40 pounds or more.

In summary, side impact protection is improving for all occupants due to vehicle design changes. However, because of their short stature, the youngest occupants in forward-facing child restraints are the least likely to benefit from these improvements. IIHS supports setting minimum standards for forward-facing child safety seat performance in side impacts, but the standard should incorporate a test without the top tether, which is similar to how half of forward-facing restraints are used in the real world. The closer the laboratory test is to the real-world environment, the more likely that improvements in child safety seat performance will reduce injury risk to children in crashes. Finally, IIHS recommends that
NHTSA limit the use of boosters to children weighing 40 pounds or more, thus excluding boosters from the standard and preventing them from being marketed to children too small to benefit from vehicle countermeasures.

Sincerely,

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Senior Research Scientist

cc: Docket Clerk, Docket No. NHTSA-2014-0012

References


