April 5, 2021

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

Comments of Consumer Reports to the
National Highway Traffic Safety Administration on the
"Federal Motor Vehicle Safety Standards: Child Restraint Systems"
Notice of Proposed Rulemaking
Docket No. NHTSA-2020-0093

Consumer Reports (CR), the independent, nonprofit, and nonpartisan organization,[1] welcomes the opportunity to submit comments to the National Highway Traffic Safety Administration (NHTSA) on the notice of proposed rulemaking (NPRM) to amend Federal Motor Vehicle Safety Standard (FMVSS) No. 213, "Child restraint systems." This notice includes proposals to revise FMVSS No. 213 in several ways to help ensure the continued effectiveness of child restraint systems (CRSs) in current and future vehicles. It also includes discussion of additional topics relevant to the standard.

Among other proposed revisions to FMVSS No. 213, NHTSA seeks to update the standard seat assembly used to test CRSs for compliance with the dynamic performance requirements; adjust some of the standard's owner registration and labeling requirements; and streamline the agency's use of anthropomorphic test devices (ATDs or "test dummies") to assess restraint performance. The NPRM also includes discussion of additional areas the agency has analyzed or considered but for which it is not proposing revisions at this time. The notice furthermore requests comment on several developments in the field of child passenger safety, including research findings that raise safety concerns associated with some types of CRSs.

Consumer Reports supports numerous elements of the NPRM, but also notes there are various areas in which NHTSA is missing opportunities to improve safety in the marketplace more forcefully and in a timely manner. We offer the following comments on subjects about which our research, testing, analysis, and policy experience lead us to a defined position.

Updating the Standard Seat Assembly

[1] Founded in 1936, CR has a mission to create a fair and just marketplace for all. Widely known for our rigorous research and testing of products and services, we also survey consumers, report extensively on marketplace issues, and advocate for consumer protections around safety as well as digital rights, financial fairness, and sustainability.

Standardization of frontal and side impact benches

CR supports the standardization of the frontal and side impact benches, provided that NHTSA adequately performs due diligence in designing a sled assembly that is representative of real-world vehicle geometry & stiffness. Vehicles are certified for occupants to use the same rear seat for both impact directions, so we consider a similar approach appropriate to be used when certifying child restraint systems.

Proposed seat geometry

CR supports NHTSA's proposed seat geometry updates, as they are reflective of our own process and sled assembly. The proposed seat geometry is more representative of current vehicles, with the exception of seat contours – and we understand that repeatability would be difficult to achieve unless a separate compliance mold were created with contours for this exact testing.

Type 2 seat belts

CR supports the update of the installation method from Type 1 (lap) belts to Type 2 (lap and shoulder) belts. Not only are Type 2 belts reflective of CR's own process and testing, but they also would be more representative of current vehicles. We agree with this reason and other reasons cited in the NPRM for this proposed update.

Volvo's denied petition for use of a sled floor

While CR understands NHTSA's explanation for declining to use a sled floor for compliance purposes, NHTSA is missing a massive opportunity to evaluate the effectiveness of support legs and additional safety improvements. This NPRM is providing the opportunity for NHTSA to be forward thinking for safety features that could become more commonplace, and the agency should seize that opportunity, not decline to pursue it.

A sled floor would not need to be specific to any vehicle model. We urge NHTSA to look at other standardizing bodies and evaluate how they are testing with support legs. At this point, the floor does not need to be utilized for purposes of compliance; rather, it can be used for data collection to inform compliance in the future.

The benefits of a support leg can be realized through use of a generic floor as indicated in our testing. In CR testing with a product's support leg on a simulated floor with automotive carpeting, we have seen a 46% reduction in Head Injury Criteria (HIC15) with the CRABI-12MO and a reduction in CRS rotation during the event. Additionally, we have been collecting simulated floor loads from these test conditions.

More broadly, the FMVSS No. 213 bench is not limited to compliance testing but could also be utilized for research and development purposes. During compliance testing, the floor could be utilized for data collection on floor loading to provide benefits for specifying a floor

surface. While the 213 bench is a compliance tool, it is also utilized as a key research tool by CRS manufacturers and academia. Addition of the floor can allow for development of beneficial features such as the support leg.

In the past three years of CR child seat testing, which seeks to be representative of the marketplace, we have seen a growth in the number of CRS models that include the support leg feature. We have also now seen the expansion of the support leg feature beyond the infant carrier CRS to include convertibles (Cybex Sirona S). In the 2016 CR ratings of infant seats, two out of 34 models had a support leg feature. In CR's 2019 infant seat ratings, 11 out of 36 models were equipped with a support leg.

Additionally, in CR's vehicle evaluation, we have seen that vehicles with a floor storage compartment or that have high drivetrain tunnels indicate in the vehicle owner's manual whether there is a restriction for support leg use.

Simulated front seat back

In the NPRM, NHTSA writes that head contact is a primary source of injury; yet, with the lack of a front seat back as a part of the standard assembly, NHTSA is missing the opportunity to represent the rear seat environment more accurately. As cited in the NPRM, 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.[2]

The excursion limit alone is not a sufficient surrogate for direct interaction of both the dummy head and feet with a simulated front seatback. Additionally, the interaction of the CRS in the rear-facing orientation with the front seat back is not taken into account properly without the presence of a front seat back structure.

In NHTSA's testing conducted in relation to determining the appropriateness of the crash pulse, the NPRM notes that in many tests with 6YO dummies and a 56 km/h (35 mph) pulse, "Test results showed the HIII-6YO dummy exhibiting unrepresentative kinematics during the test."[3] Specifically, severe head-to-knee contact occurred due to the legs of the dummy rotating upwards. The NPRM went on to say that these kinematics are unrepresentative as it is unlikely that the legs of a 6YO would rotate upwards as the front seatback would impede such rotation. It stands to reason, therefore, that the presence of a surface that simulates the front seat back provides not only a more representative vehicle-like environment, but also would also improve the likelihood of the dummy behavior representing more biofidelic kinematics.

Of secondary importance: the installation of forward-facing CRSs using lower anchors and a top tether when testing with dummies representing 6YO children in weight seems inappropriate. Lower anchor limits of 65 pounds likely prohibit children of that age from

---

[2] NPRM at 69433, footnote 109. 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.

[3] NPRM at 69407.

utilizing LATCH installation and the 6YO kinematics observed may be different with a 3-point seat belt and top tether installation. In particular, the incidence of chin-to-chest contact may have been reduced if tested appropriately with the 3-point seat belt and top tether.

Severity of Crash Pulse

Maintaining 30 mph frontal crash pulse

CR agrees that for purposes of determining compliance with current requirements, the 30 mph pulse is sufficient. However, when attempting to extrapolate differences in safety margins, a higher-severity crash pulse is necessary, such as seen in CR's child seat testing and other consumer information programs.

While CR supports NHTSA's proposal to maintain the 30 mph pulse, the testing and analysis NHTSA conducted to rule out implementation of a higher speed pulse is somewhat flawed. Based on NHTSA's test results, the elevated injury values and excursions likely were outcomes of unrepresentative kinematics (dummy contact to itself) due to the inappropriate installation method (lower anchor with top tether for HIII-6YO).

Truncating head acceleration time histories at 175 msec

CR supports truncating the data set at 175 msec. CR does the same, in order to eliminate extraneous interactions during rebound that could be attributed falsely to injury risk, and are not representative of real-world kinematics.

Registration and Labeling Changes

Registration card

CR supports updating the requirements for registration cards to allow for greater flexibility for the means by which parents may register, while still requiring a mail-in method for those not having access to advanced technology. These updates will potentially increase both the levels of registration and, consequently, recall completion rates. CR also supports that reference to communication by electronic means should permit methods other than a web address or form.

Labeling height & weight limits per usage mode

CR supports the removal of the requirement for labeling of the overall maximum height and weight limits for a seat, in favor of requirements for limits for each use mode. Currently, overall height and weight limit labeling can cause confusion, as parents and caregivers do not necessarily understand that they may be superseded by limits for each use mode. CR agrees that separating limits by use mode would provide clearer information to parents and caregivers of when to make key orientation or seat type transitions.

Increasing the forward-facing threshold to 26.5 lb (12 kg)

CR is not in support of a 26.5 lb minimum child weight threshold for forward-facing CRSs and suggests that the threshold should be a full integer weight value that is easier for parents and caregivers to retain. The ½ lb increment may be too difficult for the average consumer to remember and a more "even" number may be easier to retain.

Increasing the booster threshold to 40 lb (18.2 kg)

CR supports a booster threshold of 40 lb. In CR's evaluation, we deduct points for belt positioning boosters with allowable weight limits of less than 40 lb.

CR also suggests that the side impact tests should be expanded to booster-age children. Typically, kids in boosters have less protection without a CRS shell, and are too tall to be protected by the FMVSS 201-compliant door panel. Side-impact testing for CRSs at greater than 40 lb should be conducted with the appropriate dummy, not the Q3s.

Deleting use language from warning labels

Another opportunity to serve consumers that NHTSA should consider is to replace the current compliance statement on warning labels with a decal similar to the ECE R44/R129 icon. CR considers an icon such as that used for ECE R44/R129 to be most useful to consumers.

Streamlining ATDs

Only testing with CRABI-12MO for CRSs with 22-30 lb weight limit and up to 34.3" height limit

As is expressed in the NPRM that "NHTSA does not believe that the infant carriers are significantly used by children weighing more than 13.6 kg (30 lb)," and in NHTSA referencing the existing weight and height disparities on existing infant seats, CR agrees that a market shift to infant seats with a maximum weight of 30 lb may be warranted.[4]

This would also result in a shift toward rear-facing convertibles that provide additional shell space and head protection for rear-facing children. CR currently recommends that parents and caregivers make the transition to a rear-facing convertible seat by a child's first birthday to prevent the risk of kids being too tall for their infant carrier, even if they are still within the allowable height limits.

To accompany this change in test requirements, NHTSA should consider limiting the maximum weight for which infant carriers can be used to 30 lb – thus eliminating the need for the HIII-3YO test dummy. This would be a more successful means of ensuring infant seats are tested appropriately, rather than expecting the market pressures for higher-weight-capacity infant seats to subside.

[4] NPRM at 69430.

As an alternative to the HIII-3YO, in CR testing, we have had success testing with a weighted CRABI-12MO dummy (30 lb, additional weight distribution similar to that of the CRABI-18MO), which changes the dynamics of the CRS and interaction with the simulated front seatback. Many of the structural integrity issues we have seen in our testing have resulted at the upper limit of the CRS weight capacity. We strongly recommend including a weighted CRABI-12MO for structural integrity compliance testing.

In CR's tests, 19 out of 28 infant seats tested with the weighted CRABI-12MO had head contact with our simulated front seatback, indicating that kinematics of the dummy do change as a result of additional weight, even when height is within the allowable confines of the shell.

Only testing with the HIII-3YO for CRSs with 30-40 lb weight limit and 34.3"-43.3" height limit

If NHTSA chooses to allow the higher-weight 30-40 lb infant seats, CR strongly opposes the proposal to remove the CRABI-12MO testing requirement for CRSs with a 30-40 lb capacity. As indicated in the NPRM, many seats with rear-facing weight limits exceeding 30 lb are designed specifically for newborns and infants and should be tested to ensure that the injury metrics for the average-sized infant using those seats are within the appropriate injury thresholds. In CR's testing, of the 36 infant seat models we have rated, 28 infant seats have weight capacities greater than 30 lb. When tested with the CRABI-12MO, 17 out of 28 had head contact with our simulated front seatback.

As also expressed in the NPRM, while the HIII-3YO "fits" infant seats in terms of weight, the HIII-3YO's head typically extends far above the carrier shell, potentially resulting in stresses and kinematics that would not be experienced by a heavier child within the limits and confines of the shell. This reinforces the disparity between existing weight and height limits for infant carriers, and should be addressed by guidelines for labeling and the use of an appropriate surrogate to evaluate the kinematics and structural integrity of such seats that is closer to their allowable height.

HIII-6YO for 40-65 lb capacity CRSs, not HII-6YO

CR supports the use of the HIII-6YO in place of the HII-6YO.

Removing knee stops for rear-facing 3YO tests; bending and elevating legs against seatback

CR supports the removal of the knee stops for rear-facing 3YO tests. In CR's testing, we remove the knee stops and extend the legs against the back of the seat. The feet are not braced against the seatback. We have found no issues with this methodology. For higher-weight-capacity (>30 lb) infant carriers & rear-facing convertibles that, when installed, are flush against the seatback, the proposed leg positioning of knees bent and legs braced against seatback will prove more challenging.

Adopting Table 24 categories for side impact testing for CRSs with under 40-lb capacities

Consumer Reports recommends that the CRABI-12MO should also be tested with CRSs with 30-40 lb capacities; the Q3s will be too tall for infant carriers with capacities of 30 lb or greater. In CR's evaluation of the proposed side impact test, the Q3s was often too tall for the rear-facing infant seats, and thus did not benefit from the side "wings" of the rear-facing shell for containment, but rather "rolled out" of the shell. As the Q3s would be too tall for the rear-facing height limits of such seats, this result is not representative and reinforces that not addressing the disparity between weight and height limits for rear-facing infant seats will continue to complicate testing in side impact scenarios as well.

Child Passenger Safety Issues Arising in Research

U.S. compression test for inflatable boosters

CR has not seen submarining with inflatable boosters in our 35 g / 35 mph testing.

NHTSA requirement for shield-only-CRSs to have additional shoulder and crotch straps

There are not currently any shield-only-CRSs in the U.S. market. Preventing their use would be more cost effective, presumably, than the research and development needed to determine how to regulate them best.

Infant carrier height and weight measurements should better match real-world children

Consumer Reports supports that height limits should more accurately match rear-facing-only infant seat weight limits to reflect real children. Higher weight limits should not be used as a marketing tool without an appropriate accompanying height limit (e.g., a 30-lb CRS should not have a 29" height limit).

NHTSA may be missing an opportunity to address the current disconnect in the weight and height limits of rear-facing-only infant seats. Current rear-facing-only infant seats have weight maximums that are not commensurate with the seat's shell height or height limitations. Of the 36 infant seats currently in CR's ratings, 33 have maximum weight limits of between 30 and 35 lb, but have height limits between 30 and 32". Referencing CDC growth charts (Birth to 36 months: Boys Weight-for-length percentiles) and considering the combination of the lowest weight limit for that group (30 lb) with the highest height limit (32"): a 35-lb child is approximately a 95th percentile 28-month-old, whose height would be between 35"-40". Of the 66 infant seats listed on healthychildren.org, only three have a 35" height limit. However, 46 out 66 infant seats listed there have a 35-lb limit. This practice potentially results in misuse for kids remaining in their rear-facing infant carrier after they have exceeded the height limitations.

To mitigate the potential for consumer harm resulting from this practice, NHTSA should set standards prohibiting manufacturers from having weight and height allowances that are so disparate. In the interest of speedily addressing this known issue, the agency should implement these standards through the current rulemaking process rather than waiting for another.

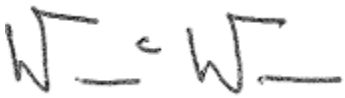
Conclusion

Consumer Reports thanks NHTSA for its consideration of our comments. Please do not hesitate to contact us if you have any questions. We look forward to working together to continue improving the safety of motor vehicle transportation for all child passengers.

Respectfully submitted,

Jennifer Stockburger
Director of Operations
Auto Test Center

Emily A. Thomas, Ph.D.
Automotive Safety Engineer



William Wallace
Manager, Safety Policy