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Adam Kopstein, Manager
Product Safety & Compliance Office

January 28, 2011

Mr. David Strickland, Administrator
U.S. Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Re: Petition for Rulemaking

Dear Administrator Strickland,

According to statistics from the National Center for Statistics and Analysis (NCSA) nearly 250,000 children are injured every year in motor vehicle crashes and about 2,000 of these children die from their injuries. This means about 700 are killed or injured every day. Child fatalities relating to car crashes are the leading cause of death to children between the age of 2 and the age of 14. Improved protection of children traveling in cars is therefore an urgent and prioritized task for all involved responsible parties, i.e., motor vehicle manufacturers, child seat manufacturers, and government authorities.

Child restraints to be used in cars were first developed and designed in the late 1960's. Volvo introduced its first child seats to be fitted in cars in 1972. Since that time, Volvo has offered a range of child restraints covering all child stages, from infant through toddler and up to the age when a child is large enough to no longer need a restraint. This, together with focused efforts in applied occupant protection and biomechanics research, has made Volvo the leading motor vehicle manufacturer in preventing crash related injuries and fatalities.

Even applying this unique knowledge and experience in developing and designing a comprehensive child safety product range, Volvo has nevertheless found it very difficult to certify and assure compliance with the US standard for child restraints, FMVSS 213. This is primarily due to outdated constraints and omissions in the standard that are in urgent need of amendment. A more modern standard would improve the ability of manufacturers to certify child restraints, and result in broader child restraint offerings in the US. Volvo strongly believes its proposed changes would help to increase the level of child protection in motor vehicles in the US.

Volvo Car Corporation hereby petitions the agency to make the following changes/amendments to Federal Motor Vehicle Safety Standard FMVSS 213:

- Add a floor to the sled used in the test procedure for showing compliance with the standard.
- Modify the seat cushion for the bench used in the sled test.
- Allow for a three-point belt fastening in the test procedure.

Volvo Cars
FMVSS 213 Petition

Background.

The level of protection of children in traffic in Sweden has been recorded as the highest for any country in the world. One of the reasons for this impressive record is a key principle adopted in the first generation of child restraints sold in Sweden in the 1960s: children should ride facing rearward as long as practicable and possible, however, at least until 3 to 4 years old. In the research leading up to the first generation of child seats, medical researchers used the experiences from the very successful space travels during the 1960s, where the astronauts had a rearward-facing position during all sequences when being exposed to high g-forces. This principle helps to distribute the forces acting on the body more evenly, without severe high tension forces on neck and spine.

Small children and toddlers have a very different body weight distribution when compared with an adult. A child's head is proportionally heavier in relation to the body when compared with an adult. In the case of a child seated in a forward-facing child restraint during a frontal crash, where the child's body is subjected to high g-forces pulling the head forward while the child's body is being restrained by the belts in the child restraint, high forces and moments act on the child's head. This, together with a child's comparatively weaker neck ligaments, raises the risk of the child sustaining injuries. On the other hand, if the child restraint faces rearward, the forces on the child's body will be distributed over the area of the back of the child restraint and no tension and pulling forces will act on the child's neck. Field follow-up studies have also shown the benefits of rearward-facing as compared to forward facing both in frontal and side impact situations.

For Volvo Car Corporation the experience and knowledge of the importance of how to position small children, i.e., facing rearward until 3 to 4 years old, has been so convincing that the company's principle and policy remain firm in recommending rearward-facing child seating for as long as practicable. Volvo products, therefore, also follow this policy, and offer, where this is possible rearward-facing restraints for this category of children.

Volvo Car Corporation presently offers child restraints in the US including both factory installed, built-in booster seats as well as add-on (accessory) booster seats. These restraints are for children age 4 and older, up to the age when a child no longer needs a child restraint, i.e., around the age of 10. Meanwhile, no child restraints are being offered for smaller children, primarily because of the inherent problems in Federal Motor Vehicle Standard No 213 and in showing compliance with this standard for larger rearward-facing child restraints.

Addition of a floor for the sled used in the test procedure.

In the test procedure according to FMVSS 213 S5.1 (Dynamic performance), the child restraint can either be fasten by a lap shoulder belt or a LATCH anchor system, i.e. lower ISOFIX anchors together with a top tether belt hooked on to the back of the child restraint.

For a rearward-facing child restraint, however, the most effective way to fasten the restraint is to use the belts or the ISOFIX anchors together with a support leg extending down to floor of the vehicle. This solution has been available for many years for the child restraints that both Volvo and child seat manufacturers offer in countries outside of the US and has proven to be very practicable. 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. The child seat standard applied in most other parts of the world, i.e. ECE R44, does offer a sled with a floor. This standard also offers possibilities to certify the child seat with a support leg.

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 row of seats.

Modification of the seat cushion in the test bench.

When installing a rearward-facing child seat in the seat in the test bench of the sled used in the test procedure, most of the weight of the restraint will rest on the front edge of the cushion. This means that the cushion will be compressed and the child seat will rotate forward. The amount of rotation depends on the firmness and geometry of the cushion, which affect how much support the cushion can provide.

The cushion presently specified by the standard is based on the rear seat cushion of a Chevrolet Impala of a model year from the late 1960s, i.e., from the time the standard was first being developed in the early 1970s. Rear seats of modern cars, on the other hand, have very different specifications and do perform and respond very differently from the seat in the bench test. Modern cars have seat cushions that are much firmer than the sled test cushion and are equipped with anti-submarining devices to prevent a belted occupant from sliding under the lap belt in a crash. These factors will significantly change the possibilities to fasten a rearward child seat in a modern car in comparison with a car from the 1960s. This is not, however, reflected in the standard and consequently works toward preventing the certification of child seats with proven real-world safety performance.

Use of three-point belts when fastening child seats.

Today all cars are required to have and also do offer three-point belts in the rear. Most cars in the whole US car fleet are equipped with three-point belts in the rear. The likelihood of a parent in need of fastening a child seat in a car with only two point lap belts is extremely low. Volvo Cars believes that standard 213 should consequently be modified to allow the use of three-point lap-and-shoulder belts when showing compliance with the standard. The test bench used by the standard therefore needs to be modified accordingly.

This change only adapts the regulation to the current, real-world state of vehicle fleets, and would give a more real-life reflection of the fastening of child seats and consequently a more accurate reflection of the performance of child seats in a crash situation.

ECE R44, the test bench in the standard used in most countries for showing compliance for child restraints, does have three-point lap-shoulder belts. Also, Canada has just recently decided to allow fastening of child seats using three-point lap-shoulder belts in their test procedure for compliance with CMVSS 213.

Conclusion

Volvo Cars hereby petitions the National Highway Traffic Safety Administration to make amendments and changes to Federal Motor Vehicle Standard 213, Child Restraint Systems, that would make the standard more in tune with the real-world conditions affecting the fastening of child seats and would consequently allow further improvement in the level of protection provided to children in motor vehicle crashes in the US. This will raise the level of both the child restraint standard and possibly also the range of child protection offerings in the US.

If you have any comments, or would like to discuss this petition please call me directly at 201-767-4871.

Sincerely,

A handwritten signature in blue ink, appearing to read 'A. Kopstein', with a stylized flourish at the end.

Adam Kopstein
Volvo Cars of North America

Volvo Cars
FMVSS 213 Petition