

Dockets Management System
U.S. Department of Transportation
PL 401
400 Seventh Street, SW
Washington, DC 20590-7938

December 22, 2000

Re: Docket Number NHTSA-7938

National Highway Traffic Safety Administration:

The draft Child Restraint Safety Plan (November 2000) provides critically important strategies to meet NHTSA's stated goal to "improve the safety of motor vehicle occupants from birth through age 10." A truly comprehensive plan to address this goal, however, must necessarily include specific strategies aimed at the provision of improved "adult" belt restraint systems, which appropriately accommodate both children and adults (i.e. "size-appropriate restraints") in all positions occupied by child passengers. The plan's omission of any reference to upgrading the federal motor vehicle safety standards (FMVSS) other than FMVSS 213 to include consideration of child occupants is a significant oversight that must be addressed in order to prevent needless highway deaths and catastrophic injuries among America's older children. Please allow us to expand.

A gap in protection exists for older children who have outgrown booster seats and are placed in most adult, 3-point belts with fixed shoulder belt anchorage points.¹ Boys on average do not reach the 50th percentile adult, male seated height until age 15 ½ and the average girl never reaches this height.² A shoulder belt with a fixed upper anchorage, which is typical in the rear occupant space, can create torso belt routing that will allow rollout from the shoulder belt in frontal oblique collisions. In a few collisions that we have investigated, belt trajectories that pass across the neck of older children and small adults have formed an artificial fulcrum in the cervical spine. Concomitant neck loading has resulting in quadriplegia. Excessive webbing lengths can promote child occupant excursion, rebound and injurious head contact. The differences in older child protection reported in U.S. versus Australian car crashes suggest that safety improvements may be achieved with more rigorous safety standards to improve seat belt systems to safely accommodate older children.

¹ Bidez, Martha Warren and Syson, Stephen R. Kinematics, Injury Mechanisms and Design Considerations for Older Children in Adult Torso Belts, SAE 2001-01-0173 (Accepted for presentation at the 2001 SAE World Congress; March 5-8, 2001).

² Anthropometry of Infants, Children and Youths to Age 18 for Product Safety Design, SAE SP-450.

NHTSA has stated in its global harmonization policy that it would identify the best international practices and upgrade to those standards, which must necessarily include strategies to critically evaluate all U.S. motor vehicle safety standards related to the protection of children. On January 5, 1999,³ NHTSA requested comments on its draft policy statement regarding priorities for implementing the 1998 agreement on the global technical regulations. This notice stated that, in May 1998, NHTSA had published a final rule

Reaffirming its policy of focusing its international harmonization activities on identifying those foreign vehicle safety standards that clearly reflect best practices, i.e., that require significantly higher levels of safety performance than the counterpart U.S. standard. NHTSA's policy is to upgrade its standards to the level of those foreign standards.

In keeping with the above stated, appropriate intent of NHTSA to at least meet (if not, we suggest, exceed) the highest foreign standards in motor vehicle safety, we emphasize a sense of urgency to conduct an objective, comprehensive review of all U.S. FMVSS within the context of the international efforts related to child safety. Three example FMVSS upgrades are listed below:

1. NHTSA should modify FMVSS 209 and 210 to adopt Australian Design Rule (ADR) 4 safety requirements that all belts must fit children as small as 50th percentile 6 years olds, as well as up to 95th percentile males. Further, the adoption of ADR 4 will effectively eliminate many torso belt anchor locations that are too high for children. (The feasibility of this design goal in production vehicles was established in Australia more than two decades ago with concomitant reductions in the threshold age for children to safely use "adult" belts.)
2. NHTSA should require automobile manufacturers to, at a minimum, sled test the restraints with a six-year-old child dummy. All passenger seating positions should be required to meet the proposed child dummy IARV's, using a crash pulse based on that vehicle's crash test accelerations, or the FMVSS 213 pulse. Rear seat testing should be conducted with the appropriate front seats adjusted to the rearmost position. All restraints should be required to meet a minimum restraint quotient⁴ to prevent the use of excessive pelvic displacement or submarining to meet the FMVSS 208 injury criteria.

³ Docket no. NHTSA-98-4956, notice 1, RIN 2127-AH29.

⁴ Viano, D.C. and Sudhakar, A., Assessing the Safety Performance of Occupant Restraint Systems, SAE 902328.

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3. NHTSA should revisit the proposed child head strike protection requirements of the original FMVSS 201, taking into consideration the poor performance of some existing adult belts with or without a booster seat.

In summary, a gap in protection appears to exist for older children who have (or appear to have) outgrown booster seats and are placed in front and rear, 3-point belts, which are primarily designed to accommodate adults. The draft NHTSA Child Restraint System Safety Plan must be expanded to include a comprehensive review of all U.S. FMVSS with strategies to upgrade to the highest international standards and thereby "improve the safety of motor vehicle occupants from birth through age 10," or whatever the threshold age required for protection in 3-point belts.

Sincerely,

Martha Warren Bidez, Ph. D.

Stephen R. Syson