

seat belt fit and injury criteria, particularly head excursion. Both determined that the weighted dummy failed to accurately represent the height of booster occupants. NTSB stated that the addition of weight to the dummy's spine and pelvis was not representative of weight distribution in an actual child. Ford expressed concern that the weighting of the 6-year-old dummy could result in inaccurate output of the injury criteria. Ford expected the weighted dummy to show abnormally high chest deflection and abnormally low chest acceleration, and higher head excursion. Ford was also concerned that the low relative mass of the lower extremities could reduce knee excursion compared to a more biofidelic dummy. Ford stated that adding mass to the spine and lengthening the lumbar spine might result in the weighted dummy not submarining under conditions that would cause a more biofidelic dummy to submarine. Public Citizen, Graco, and the Alliance commented that the weighted dummy would not perform the same as the 10-year-old dummy which NHTSA has been developing and which was referenced in Public Law 107-318 (Dec. 4, 2002; 116 Stat. 2772) ("Anton's Law").¹²

IIHS, ACTS, Public Citizen, the Alliance, and GM stated that the lack of biofidelity should preclude the use of the weighted dummy. Many commenters urged the agency to develop the 10-year-old dummy as an alternative. Public Citizen urged the agency to move ahead with regulations in anticipation of the 10-year-old dummy's future availability. NTSB suggested using the European 10-year-old dummy (P-series) as an interim measure. While acknowledging the existence of problems with the P-series, NTSB stated that European dummy would better represent height and seat belt fit.

While raising concerns with biofidelity, a number of commenters agreed that, if necessary, the weighted 6-year-old dummy could be used in a limited capacity to test the structural

integrity of child restraints until such time as the Hybrid III 10-year-old dummy became available. Evenflo also supported using the weighted dummy to measure head excursion.

The agency agrees that the Hybrid III 10-year-old dummy, envisioned by Anton's Law, represents the long-term solution to the issue of testing booster seats certified for higher weights. Development of the Hybrid III 10-year-old dummy is proceeding as quickly as possible, but this dummy is not currently ready for use in compliance tests. The agency is currently testing the Hybrid III 10-year-old dummy to determine its suitability for FMVSS No. 213 compliance testing. A notice proposing to incorporate this dummy into Part 572 for use in compliance testing is expected to be published in early 2004.

Despite limited results showing a general correlation between the testing performance of the weighted 6-year-old dummy and the Hybrid III 6-year-old dummy, the agency is persuaded by the comments that the weighted dummy should not be used for testing with full instrumentation. The weighted dummy would not perform the same as the 10-year-old dummy in development and it may not accurately represent an 8-year-old child. IIHS stated that the weighted dummy is too short to represent the tallest occupants for whom boosters are recommended, noting that "[s]itting height is an important factor in testing booster seats because a poorly designed booster may permit too much head excursion for taller occupants. Weight is, at most, a secondary issue for the restraints because the vehicle belts, which are not subject to testing under this standard, restrain the inertia of booster seat occupants."

While the 0.7-inch increase in sitting height achieved through the addition of weights to the Hybrid III 6-year-old dummy is comparable to that of a 50th percentile 8-year-old child, the overall weight and height, and consequently the weight distribution, are not. The 50th percentile 8-year-old child is 50.5 inches tall, as compared to the 50th percentile 6-year-old child which is 45.5 inches tall. The weight added to the 6-year-old dummy is not distributed as it would normally be on a 50th percentile 8-year-old, making injury measurements suspect.

The agency agrees that the kinematics of the weighted 6-year-old dummy may not be representative of the older child that it attempts to model and it could potentially interact with the belt system differently than a dummy developed to represent an 8-year-old child. Therefore, the weighted dummy will be used only

as a means of ballast to evaluate the structural integrity of the tested child restraint. While the weighted dummy will not be instrumented to determine compliance, it will be instrumented to collect data for use in research.

Anton's Law¹³ directs the agency to initiate a rulemaking proceeding to establish performance requirements for child restraints, including booster seats, for the restraint of children weighing more than 50 lb. Through use of the weighted 6-year-old dummy, the structural integrity of a CRS recommended for children between 50 and 65 lb can be tested. NHTSA recommends children to be placed in booster seats until they are 8-years old, or 57 inches tall. The weight of a 50th percentile 8-year-old male is approximately 57 lb. The weight of a 50th percentile 8-year, 9 month-old male is approximately 62 lb. Use of the 62 lb weighted dummy as ballast ensures that booster seats certified up to 65 lb will not structurally fail in a crash.

While several commenters suggested using alternative dummies as an interim measure, none of the suggested alternatives are appropriate even for use as ballast. NTSB recommended using the European P-series 10-year-old dummy in a limited capacity to provide a better means of evaluating proper seat belt fit and to enhance efforts to enact booster seat laws in the states. NHTSA is not confident in the ability of the P-series dummy to uniformly load the restraint system in a manner necessary for the evaluation of the booster seat, even structurally. The P-series dummy is designed with too many degrees of freedom, and its interaction with a restraint system would be inconsistent.

AAP suggested using the Hybrid III 5th percentile female to test child restraints to allow regulation up to 80 lb in advance of the availability of the Hybrid III 10-year-old dummy. The weight of the Hybrid III 5th percentile female dummy is 108 lb, 28 lb heavier than the maximum weight of a child that the child restraint would be certified for in compliance testing. The heavier weight of the 5th percentile female dummy would not offer an accurate representation of an 8-year-old or even 10-year-old child.

3. Specific Issues Relating to the Use of the New Dummies in Standard No. 213

i. Seat Back Height Requirement. S5.2.1.1 specifies that each child

¹³ Section 3 of Public Law 107-318 directs the Secretary of Transportation to consider whether to include injury performance criteria for child restraints, including booster seats and other products for use in passenger motor vehicles for the restraint of children weighing more than 50 pounds.

¹² On December 4, 2002, Congress enacted Public Law 107-318 (Anton's Law) "to provide for the improvement of the safety of child restraints in passenger motor vehicles, and for other purposes." Section 4 of Public Law 107-318 directed that—

(a) Not later than 24 months after the date of the enactment of this Act, the Secretary shall develop and evaluate an anthropomorphic test device that simulates a 10-year old child for use in testing child restraints used in passenger motor vehicles.

(b) Within 1 year following the development and evaluation carried out under subsection (a), the Secretary shall initiate a rulemaking proceeding for the adoption of an anthropomorphic test device as developed under subsection (a).

Other provisions relating to child restraint performance were also included in the statute.