

manufacturer's ability to recommend a child restraint for a weight above that of the heaviest dummy used to test the restraint. AAP stated that such a restriction could mislead parents into thinking that children should use seat belts once the child is heavier than 62 lb, when in fact, most children do not fit seat belts until a much heavier weight.

In a rulemaking amending FMVSS No. 213 to incorporate several test dummies into the standard (61 FR 30827; June 18, 1996), NHTSA responded to Consumer's Union (CU) belief, expressed during that rulemaking, that restraints (*e.g.*, convertible child seats) should not be permitted to be recommended for children weighing more than the largest test dummy used to test the restraint (*e.g.*, 33 lb). The agency determined that such an approach was unnecessarily restrictive, given that there has been no showing that the wider array of dummies incorporated into Standard No. 213 by that rulemaking were insufficient surrogates for the children for whom the restraints are recommended. The agency also believed that CU's suggestion could have unintended safety consequences, because it would have the effect of forcing young children out of child restraints specifically designed for them (typically 20 to 40 lb) and into restraints that may not be appropriate for their size, *i.e.*, booster seats for a 3-year-old or the vehicle's belt systems. The agency believed that while it might be hypothetically possible that a restraint that passed FMVSS No. 213 when tested with a dummy could fail when restraining a child weighing slightly more than the dummy, on balance, the possibility of such a failure is outweighed by the safety risk of forcing children into restraints that might not adequately restrain them.

NHTSA reaffirms the conclusions reached in that rulemaking and concurs with the views of TraumaLink and AAP that information on tests with current test dummies does not indicate a need to restrict recommending child restraints for children weighing more than the test dummies used to test the restraint. As to CU's suggestion for developing dummies that reach the maximum weight recommended for a restraint or requiring the addition of ballast weights to existing dummies, this suggestion is beyond the scope of the present rulemaking.

#### *e. Injury Criteria*

##### *1. Post-NPRM Testing*

*i. JPMA.* In its comment to the NPRM, JPMA stated that it had conducted a series of 80 sled tests at Veridian Engineering in response to the proposal, to try to understand how the proposed dummies performed compared to the dummies currently in use. The tests also evaluated the proposed changes to the standard bench seat, as well as the proposed injury criteria. JPMA described its test plan as including all test modes for all of the proposed dummies with representative samples of all types of child restraint/harness combinations and installation methods, including lap belt only, lap/shoulder belt, and LATCH. JPMA acknowledged that: "While a total of 80 tests were conducted, this series only begins to explore the results of the proposed changes and does not allow analysis of the net effect of each change, nor does it provide enough history to define the potential variability in test results which could occur. Much more testing is required to define the new effect of each change and the potential variation which can have a significant impact on design and ability to define compliance margins."

*ii. NHTSA Series I and II.* PAX conducted a series of dynamic sled tests for NHTSA to evaluate the performance of various child restraints on the revised test seat assembly. The tests used the CRABI and Hybrid III 3- and 6-year-old dummies to evaluate whether these dummies could meet the proposed scaled HIC, chest injury limits and Nij measures. Time and resource considerations limited the testing to 5-point harness rear-facing infant seats, convertible safety seats, and belt-positioning seats. Restraints were evaluated while installed using a lap belt, a lap/shoulder belt, and the LATCH system. HIC measurements were obtained, but testing problems arose with respect to the neck injury and chest deflection data. Because of these problems, NHTSA conducted a second series of dynamic sled tests at VRTC to replicate the tests performed at PAX with the 3- and 6-year-old dummies. These tests were conducted using the same type of child restraints.

*iii. Results of JPMA and NHTSA Series I and II.* The charts provided in a docket submission titled "Comparison of PAX/VRTC and JPMA Sled Tests" summarizes the results of the testing performed by both NHTSA and by JPMA. For HIC and chest acceleration, results are presented for both the proposed scaled injury limits and for the same tests using the existing injury

criteria limits stated in FMVSS No. 213. Because chest deflection and Nij limits are not currently specified in FMVSS No. 213, the only charts provided are for the proposed criteria limits.

NHTSA testing performed at PAX and VRTC, described in the NPRM, resulted in dummy responses that were generally within the injury limits proposed in the NPRM, with the exception of Nij. (While acceptable Nij readings were found in tests using the Hybrid III 3-year-old dummy, there were widespread failures in both rear- and forward-facing tests using the CRABI 12-month old dummy and each of four tests with the Hybrid III 6-year-old dummy.) However, the test results presented by JPMA were quite different. JPMA's testing, using the revised test seat assembly and new dummies as NHTSA tested, but across a wider variety of child restraint types, showed very mixed results. In many instances, the measured injury parameters either exceeded or marginally passed the scaled injury limits proposed in the NPRM. Further, there were many JPMA tests that resulted in either failing or marginal results when using the existing injury criteria. This raised questions regarding the combined effect of the changes to the test seat assembly, incorporation of the new dummies, and use of the scaled injury criteria limits together.

*iv. NHTSA Series III.* In an effort to determine if the use of varying restraint types in the JPMA testing (as opposed to NHTSA's use of 5-point harness restraints only) could be identified as the predominant factor in explaining the disparity between the JPMA and NHTSA test results, NHTSA conducted a third series of sled tests. These tests were performed at VRTC, and attempted to closely parallel the testing performed by JPMA. In addition to a number of additional 5-point harness restraints, NHTSA also tested forward-facing convertible overhead shield child restraints, and shield-type boosters both with and without the shield.

A total of 20 additional tests were conducted in this third series of sled tests. The results of this series of sled tests more closely paralleled those found in the JPMA tests, in that a wider range of failing and marginal test results were seen as compared to the predominately passing results seen in the PAX test series. The testing of 5-point harness restraints at PAX resulted in injury values that were predominately within the established or proposed limits (with the exception of Nij). However, the VRTC Series III tests showed a wider variation in both marginal and failing responses that appear to be a result of the restraint type