

testing all types of infant restraints, and be able to provide test results that assess the performance of the restraint in the real world.” The agency also stated that it “will consider a test procedure for incorporation into Standard 213 as soon as a suitable one is developed” (59 FR 7646).

We do not agree with Xportation that the CRABI test procedure merits adoption into the Federal safety standard or that child restraints tested to the procedure need not be labeled with the air bag warning label that all rear-facing restraints must now bear. The agency’s knowledge of air bags has changed tremendously since 1994, when NHTSA undertook the rulemaking that first required an air bag warning label. We undertook the air bag warning rulemaking after finding in NHTSA laboratory sled tests with top- and mid-mounted air bags that the air bags produced substantial increases in the values for the head injury criterion (HIC) and chest acceleration of dummies seated in rear-facing restraints, compared to the values for dummies in rear-facing restraints tested with no air bag. There had not yet been any deaths or injuries caused by an air bag at that time. At that time, the agency was guardedly optimistic about the possibility that a suitable test procedure could develop out of the CRABI task force work that would obviate the need for requiring all rear-facing restraints to have an air bag warning label.

Beginning in 1994, however, the risk posed by passenger air bags to infants in rear-facing restraints began to manifest itself in real-world deaths and injuries. Three air bag-related fatalities were children in rear-facing restraints in 1995, 6 in 1996, 4 in 1997, 5 in 1998, and 3 in 1999.⁴ NHTSA developed various strategies to counter the rising number of fatally-injured children in rear-facing child restraints, including amending Standard No. 213 to make the warning label more direct in its warning and much more conspicuous (61 FR 60206; November 27, 1996). The agency, together with the automobile industry and child passenger advocates, also began a vigorous and successful consumer information campaign to get children seated in the back seat rather than in the front passenger seat.

We also became much more knowledgeable about air bags. In December 1997, to better understand air bag design and performance characteristics, NHTSA sent an information request to nine automobile manufacturers requesting detailed technical information on then-current

industry practices on air bag technologies and how design and performance had evolved through the 1990s. The agency analyzed the responses and identified numerous trends in air bag design both on the driver side and the passenger side. The information showed that manufacturers have made many changes to air bag design. “Air Bag Technology In Light Passenger Vehicles,” Hinch *et al.*, October 26, 1999 (see Docket 2814–47).

This information has led us to evaluate the CRABI procedure in a better informed, more critical light. While at one point we were somewhat optimistic about the CRABI procedure, we now do not believe that it or any other procedure adequately assesses the safety risks to rear-facing children from an air bag.

Review of the SAE procedure

The CRABI procedure is set forth in the SAE’s Surface Vehicle Information Report SAE J2189, “Guidelines for Evaluating Child Restraint System Interactions With Deploying Airbags,” March 1993. As noted by the SAE in that document, there are many uncertainties associated with the procedure. The SAE explained that the document is styled an “information report,” as opposed to a “recommended practice,” “because of the general inexperience in testing the interaction between child restraint systems and deploying air bags and the lack of real-world accident data.” The explanation continues:

This document describes dummies, procedures, and configurations that can be used for investigating the interactions that occur between a deploying airbag and a CRS [child restraint system]. Static tests may be used to sort CRS/airbag interaction on a comparative basis in either an actual or a simulated vehicle environment. Systems that appear to warrant further testing may be subjected to an appropriate dynamic test at a speed near that needed to deploy an airbag or at a higher speed commonly used to evaluate CRS performance. No test matrix is specified at this time for evaluating either a CRS or an airbag during interaction with each other. Instead, engineering judgment based on prior experience with CRS and/or airbag testing should be used in selecting the tests to be conducted with each individual system. Such tests may be aimed not only at producing interactions with the most severe results but also at identifying those conditions that produce the least interaction and/or satisfactory CRS performance results. Baseline tests to indicate the performance of a CRS in the absence of airbag deployment are also recommended for comparison purposes.

The CRABI test procedure could be an acceptable *starting point* in evaluating the performance of particular child

restraints with specific air bag systems. However, NHTSA believes that the procedure alone would not be able to provide test results that sufficiently assess the performance of a restraint in the real world. J2189 does not specify a test matrix, but relies on the tester’s engineering judgment as to the test configurations and conditions that should be used. Xportation provides no explanation or discussion as to which configurations and conditions it believes need or need not be specified that would assure the safe performance of a child restraint with the air bags in existing and future model year vehicles.

Perhaps the reason that Xportation did not do so is because it is virtually impossible to do so. J2189 is predicated on the tester’s being able to tune the air bag system to simulate a specific air bag system. If J2189 were incorporated into Standard No. 213, a very limited type of air bag system would be simulated by the standard. Yet, NHTSA’s survey data (Hinch *et al.*, *supra*) show great variation in air bag system characteristics and performance. Moreover, air bag systems have changed significantly in recent years. Some of the changes reduced the aggressivity of air bags, such as by reducing air bag outputs in the most recent model year vehicles compared to the earlier generation vehicles. Some of the changes involved changes in inflator characteristics, new air bag shapes, sizes, fabrics, venting systems and venting levels, occupant size and location sensors, seat position sensors, belt use sensors, and crash severity sensors, as well as computation algorithms that use the information in making air bag deployment decisions. Manufacturers also seem to be on the threshold of making a significant leap in introduction of sophisticated technologies to improve air bag performance. In short, a test procedure that only replicates one or a few types of air bag systems does not assure that a child restraint that meets performance criteria tested to that procedure will perform adequately with the myriad of air bag designs currently on the road and those that will be installed in future vehicles.

The safety risk posed to infants in rear-facing child restraints by deploying air bags is so great that a test procedure used to assess the performance of the child restraint must carefully evaluate that risk. For example, if an “air bag-resistant” child restraint fails to work, an infant in that restraint is almost certain to be injured when the air bag deploys. Xportation has not provided data showing that a child would not be injured by a type of air bag system that

⁴ There were 0 in 2000 and 1 in 2001.