



# National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Log H-583

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Date: November 2, 1995

In reply refer to: H-95-17

Honorable Ricardo Martinez  
Administrator  
National Highway Traffic Safety Administration  
Washington, D.C. 20590

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In 1994, the National Transportation Safety Board initiated a safety study to evaluate the performance of occupant restraint systems (child safety seats and safety belts) for children under the age of 11.<sup>1</sup> During the data collection phase of the study,<sup>2</sup> the Safety Board has investigated seven accidents in which an infant or small child was killed or severely injured as a result of an air bag deployment.

On November 14, 1994, in Banning, California, a 3-month-old child who was seated in the right front passenger seat was severely injured when the passenger-side air bag of a 1994 Toyota Corolla deployed in a low-speed collision. The child was seated in a rear-facing, improperly installed infant safety seat; the harness straps were not properly threaded to securely hold the child in the seat, and the two-part seat was not properly secured in its base. The child sustained skull fractures as a result of the impact of the air bag compartment cover flap to the back of the infant safety seat at the location of the child's head. The Toyota had a label on the right front sun visor warning against using a child safety seat in the right front passenger seat.<sup>3</sup>

On July 18, 1995, in Gilbertsville, Pennsylvania, a 20-day-old child who was seated in the right front passenger seat was killed when the passenger-side air bag of a 1995 Ford Escort deployed. The child was in a convertible child safety seat that

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<sup>1</sup> The notification criteria for the study included accidents involving at least one vehicle in which there was a child passenger under the age of 11 and in which at least one occupant was transported to the hospital. Accidents were selected from States within close proximity to the Safety Board's highway regional offices located in California, Georgia, New Jersey, and Texas.

<sup>2</sup> The data collection phase of the study is ongoing.

<sup>3</sup> National Transportation Safety Board. Accident Number WRH-95-F-HCO2.

was facing rearward. The child sustained multiple skull fractures and crushing injuries to the brain as a result of the impact of the air bag compartment cover flap with the back of the child safety seat at the location of the child's head. The investigation determined that the collision occurred at a speed of about 23 mph. The Ford had a label on the right front sun visor warning against using a rear-facing child safety seat in the right front passenger seat. The child safety seat also had a warning label that read, "when used in a rear facing mode do not place in the front seat of a vehicle that has a passenger air bag."<sup>4</sup>

On September 20, 1995, in Long Beach, California, a 5-month-old child who was seated in the right front passenger seat was killed when the passenger side air bag of a 1994 Toyota Camry deployed. The child was in an infant safety seat that was facing rearward. The child sustained fatal head injuries as a result of the impact of the air bag compartment cover flap with the back of the child safety seat at the location of the child's head. The Toyota had a label on the right front sun visor warning against using a rear-facing child safety seat in the right front passenger seat. The child safety seat also had a warning label regarding use in a vehicle that has a passenger air bag.<sup>5</sup>

On October 3, 1995, in Irvine, California, a 6-month-old child who was seated in the right front passenger seat was severely injured when the passenger-side air bag of a 1995 Ford Escort deployed. The child was in a convertible child safety seat that was facing rearward. The child sustained skull fractures as a result of the accident. Preliminary information indicates that the skull fractures were a result of the impact of the air bag compartment cover flap to the back of the safety seat at the location of the child's head.<sup>6</sup>

On March 3, 1995, in Houston, Texas, a 9-year-old child who was seated in the right front passenger seat of a 1995 Plymouth Voyager Minivan was killed when the passenger-side air bag deployed in a low-speed collision. The child was restrained by the lap portion of the lap/shoulder belt, but there is conflicting evidence about whether the child was using the shoulder portion of the lap/shoulder belt. The child sustained a fatal cervical spine injury as a result of head contact with the air bag.<sup>7</sup>

On October 10, 1995, in Salt Lake City, Utah, a 5-year-old child who was seated in the right front passenger seat of a 1994 Chevrolet Camaro was killed when the passenger-side air bag deployed. Preliminary information indicates that the child was not restrained by the lap/shoulder belt. The child sustained a skull fracture as

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<sup>4</sup> National Transportation Safety Board. Accident Number NRH-95-F-HC11.

<sup>5</sup> National Transportation Safety Board. Accident Number WRH-95-F-HC29.

<sup>6</sup> National Transportation Safety Board. Accident Number WRH-96-F-HC02.

<sup>7</sup> National Transportation Safety Board. Accident Number CRH-95-F-HC10.

a result of head contact with the air bag and subsequent head contact with the roof of the vehicle.<sup>8</sup>

On October 22, 1995, in Baltimore, Maryland, a 7-year-old child who was seated in the right front passenger seat of a 1995 Dodge Caravan was killed when the passenger-side air bag deployed. Preliminary information indicates that the child was not restrained by the lap/shoulder belt. The child sustained head and neck injuries.<sup>9</sup>

Prior to implementation of the safety study, the Safety Board investigated an accident that occurred on April 22, 1993, in Canton, Ohio, in which a 6-year-old child, who was seated unrestrained in the right front passenger seat of a 1993 Volvo, was killed when the passenger-side air bag deployed. The child died of a brain injury caused by blunt force trauma.<sup>10</sup>

Based on the low impact speeds of most of these accidents, such as in the Gilbertsville, Pennsylvania accident, and the lack of intrusion into the passenger compartment where these children were seated, the Safety Board believes that in each of the accidents the child would have survived the accident with minor or no injuries had the air bag not deployed. The Safety Board also believes that the non-use or improper use of the vehicle lap/shoulder belts in the Houston, Texas; Salt Lake City, Utah; Baltimore, Maryland; and Canton, Ohio accidents, resulted in the child being positioned too close to the air bag compartment module on the dashboard, so that when the air bag deployed, the child's head and upper body were struck by the air bag at its peak deployment force.

In its final regulatory analysis of warning labels on rear-facing child restraints for vehicles with air bags, the National Highway Traffic Safety Administration (NHTSA) stated, "approximately 26 percent of all infants currently travelling in motor vehicles are in the rear-facing mode in the front seat and would be in potential danger from a deploying passenger-side air bag."<sup>11</sup> The NHTSA estimates that about 10.7 million passenger cars and 1.2 million light trucks with passenger-side air bags are on the road as of July 1, 1995. As more passenger cars and light trucks enter the

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<sup>8</sup> National Transportation Safety Board. Accident Number WRH-96-F-HC01.

<sup>9</sup> National Transportation Safety Board. Accident Number NRH-96-F-HC01.

<sup>10</sup> National Transportation Safety Board. Accident Number NRH-93-FH-011.

<sup>11</sup> National Highway Traffic Safety Administration, Office of Regulatory Analysis, Plans, and Policy. Final Regulatory Analysis, "Warning Labels on Rear Facing Child Restraints for Vehicles with Air Bags." January 1994.

market with passenger-side air bags,<sup>12</sup> the likelihood increases that more infants and unrestrained or improperly restrained small children will be killed as the result of air bag deployments.

### **Rear-facing child safety seats**

The NHTSA is aware of the dangers of placing a rear-facing child safety seat in the front seat of a vehicle with a passenger-side air bag and has addressed the problem from both a regulatory and public information perspective. In 1991 before any fatalities of this nature had occurred, the NHTSA issued a consumer advisory that warned the public not to use a rearward facing child safety seat in a seating position equipped with an air bag. The NHTSA advised that "rear facing infant seats used in the front seat of a vehicle extend forward to a point near the dashboard where they can be struck by a deploying air bag. The force of an air bag is powerful enough to severely injure an infant." In 1993, the NHTSA issued a regulation that required manufacturers to put notices on sun visors and to provide information in the vehicle owner's manual regarding the dangers of using a rear-facing child safety seat in the front seat of a vehicle with a passenger-side air bag.<sup>13</sup> In 1994, the NHTSA issued similar rules to label child safety seats about the danger and to include information in the child safety seat owner's manual.<sup>14</sup> In May 1995,<sup>15</sup> the NHTSA issued regulations that would allow manufacturers of vehicles without a back seat and vehicles with a back seat that is too small to accommodate a rear-facing child safety seat to install a manual switch that would deactivate the passenger-side air bag on passenger cars manufactured before September 1, 1997, and on light trucks

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<sup>12</sup> All passenger cars are required to have passenger-side air bags by model year 1998. All light trucks and multipurpose vehicles (e.g., minivans) with a gross vehicle weight rating of 8,500 pounds or less and an unloaded vehicle weight of 5,500 pounds or less are required to have passenger-side air bags by model year 1999. (49 CFR Section 571.208)

<sup>13</sup> Federal Register Notice Volume 58, Number 169, September 2, 1993.

<sup>14</sup> Federal Register Notice Volume 59, Number 32, February 16, 1994.

<sup>15</sup> Federal Register Notice Volume 60, Number 99, May 23, 1995.

manufactured before September 1, 1998,<sup>16</sup> to allow for the safe use of a rearward facing child safety seat in the front seat of those vehicles.

The NHTSA has also made efforts to inform the public about the dangers of using a rearward facing child safety seat in the front seat of a passenger car or light truck with an air bag through its child passenger safety training programs, national conferences, and distribution of public information brochures. The NHTSA has trained thousands of State and local advocates, fire and rescue personnel, and law enforcement officers who work within their local communities to educate parents about proper use of child safety seats. Air bag/child safety seat compatibility is a component of each training program. To support and supplement these efforts, the NHTSA has produced thousands of public information brochures aimed at proper use of child safety seats that include information on the dangers of using a rearward facing child safety seat in the front seat of a passenger car or light truck with an air bag for distribution through a nationwide network of child passenger safety advocacy groups, child safety seat loan programs, and the auto safety hotline.<sup>17</sup> In addition, numerous similar brochures with warnings about air bag/child safety seat compatibility are distributed by the child safety seat manufacturers and child passenger safety advocacy groups that warn against the use of rear-facing child safety seats in the front seat of vehicles with passenger-side air bags.

The Safety Board commends the NHTSA on its proactive efforts to inform the public about this problem. However, the recent accidents described above raise some concerns about the effectiveness of the approach that NHTSA has taken. Although four of the vehicles involved in the accidents described above had (1) warnings on the passenger-side sun visors advising against using a rear-facing child safety seat in the front passenger seat, (2) information in the vehicle owner's manual, and (3) in two cases, warnings on the child safety seat, none of the parents had seen the warnings. In addition, the investigations revealed that the public information and education efforts had reached the parents of only one of these children. In that specific case, the information received did not discuss the dangers of using rear-facing child safety seats in the front seat of vehicles with passenger side air bags. These accidents

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<sup>16</sup> Other technologies are expected to be available after these dates to deactivate the passenger-side air bag. For example, "smart" air bags are expected to be available after these dates to deactivate or slow the deployment of the passenger-side air bag. A "smart" air bag system has sensors that can detect such things as the occupant's size, weight and distance from the air bag compartment, whether the lap/shoulder belt is being worn, and the severity of the accident. The "smart" system then determines whether the air bag should be deployed and, if so, how much inflation is required. Some smart air bag designs are considering a two-stage deployment that allows for less inflation for lower speed impacts and a second stage of inflation for a more severe accident. (See Fredlin, Steven R. "Injury Reduction Potential for 'Smart' Airbags." 39th Annual Proceedings Association for the Advancement of Automotive Medicine. October 16-18, 1995.)

<sup>17</sup> The NHTSA is currently printing 100,000 new public information brochures with this warning for distribution.

strongly indicate that a more effective approach is needed to inform a larger segment of the population about this important safety issue.

### **Unrestrained or improperly restrained small children**

Air bags are now promoted as supplemental restraint systems by the NHTSA and the automobile industry; that is, for full protection, an occupant needs to use the lap/shoulder belt in conjunction with the air bag. A 1986 NHTSA brochure, "Facts You Should Know About Air Bags," says "Air bags alone can reduce the chance of fatality in frontal crashes by 20-40 percent....Even more effective is an air bag in combination with a lap and shoulder belt, which can reduce the chance of fatality by 45 to 55 percent." The Safety Board recognizes the effectiveness of air bags in most accident situations and the number of lives that have been saved as a result of air bags. However, based on the recent accidents, the Board is concerned that air bags may kill or severely injure small children under certain circumstances. The Board believes that precautions can be taken to prevent these needless deaths and injuries.

Therefore, the Safety Board believes that an immediate, highly visible nationwide multi-media campaign should be conducted to advise current owners of vehicles with passenger-side air bags, current owners of rear-facing child safety seats, and the motoring public of the dangers of placing a rear-facing child safety seat or an unrestrained or improperly restrained small child in the front seat of a vehicle equipped with a passenger-side air bag.

The National Association of Broadcasters can rapidly provide copies of public service announcements to its member television and radio stations and can inform television and radio stations through its weekly newsletter of the importance of airing information about these accidents and warnings to the public. The Advertising Council, Inc., has experience in developing messages to the public in an understandable manner and has worked with the NHTSA on prior occupant restraint public service announcements.

Therefore, the National Transportation Safety Board recommends that the National Highway Traffic Safety Administration:

Immediately develop and implement, in cooperation with the National Association of Broadcasters and the Advertising Council Inc., a highly visible nationwide multi-media campaign to advise the public about the dangers of placing a rear-facing child safety seat or an unrestrained or improperly restrained small child in the front seat of a vehicle equipped with a passenger-side air bag. (Class I, Urgent Action) (H-95-17)

The Safety Board also issued safety recommendations to the domestic and foreign automobile manufacturers; the child safety seat manufacturers; the National Association of Broadcasters; the Advertising Council, Inc.; the Department of Health and Human Services; the Association of State and Territorial Health Officers; the American Hospital Association; the American Academy of Nurse Midwives; the American College of Obstetricians and Gynecologists; the American Academy of Family Physicians; the American Academy of Pediatrics; the International Childbirth Education Association; the Academy of Certified Birth Educators; the Lamaze Communications, Inc.; the Reading Hospital and Medical Center; and Shinn and Associates.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT and GOGLIA concurred in this recommendation.

By:   
Jim Hall  
Chairman