



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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Date: January 13, 1999

In reply refer to: H-99-2

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

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In 1996, the National Transportation Safety Board released a study on the performance and use of child restraint systems, seat belts, and air bags for children in passenger vehicles.<sup>1</sup> The Safety Board analyzed data from 120 accidents involving at least one vehicle in which there was a child passenger younger than age 11 and in which at least one occupant was transported to the hospital. As part of the study, the Board examined whether the child restraint system was properly used; that is, was the child secured in the child restraint system according to instructions of the child restraint system manufacturer, and was the child restraint properly secured to the vehicle according to instructions of the child restraint manufacturer and the vehicle manufacturer. The Safety Board determined that in 62 percent of the cases either (1) the restraint was improperly secured in the vehicle or (2) the child was improperly secured in the child restraint or (3) both errors occurred. Problems encountered included seat belts misrouted or too loose, locking clips not used as needed, child restraints facing the wrong direction (usually forward-facing rather than rear-facing), and the harness too loose or inappropriately threaded through the wrong slots or not doubled back to avoid loosening.

Properly used child restraints have proven to be effective in reducing the likelihood of death and injury to children. The National Highway Traffic Safety Administration (NHTSA) estimates that the potential effectiveness of child restraints when used correctly is 71 percent. However, when improperly securing children in the child restraints and improperly securing the child restraints in the vehicle are factored in, the effectiveness of child restraints drops to 59 percent.<sup>2</sup> The NHTSA estimated that in 1997 the lives of 312 children under age 5 were saved as a result of child restraint use.<sup>3</sup>

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<sup>1</sup> National Transportation Safety Board. 1996. *The Performance and Use of Child Restraint Systems, Seatbelts, and Air Bags for Children in Passenger Vehicles*. Safety Study NTSB/SS-96/01. Washington, DC.

<sup>2</sup> Federal Register, Vol. 62, No. 34, dated February 20, 1997.

<sup>3</sup> National Highway Traffic Safety Administration. 1997. *Children Traffic Safety Facts*. Washington, DC.

In addition to its 1996 study, the Safety Board has on several occasions addressed the issue of improper use of child restraints: in a 1983 safety study, in a 1985 symposium on ways to decrease misuse, in a 1988 study on the performance of lap and shoulder belts, and in the 1997 public forum on air bags and child passenger safety.<sup>4</sup> In its 1983 study, the Safety Board concluded that “misuse of child restraint systems appears to be a significant and widespread trend.” Improper use of child restraints has remained at consistently high levels during the timeframe of these studies: 75 percent in 1983,<sup>5</sup> 64 percent in 1984,<sup>6</sup> 80 percent in 1995,<sup>7</sup> and more than 85 percent in 1998.<sup>8</sup> In fact, misuse of child restraints has been consistently high since the late 1970s when they became widely available.

Similar results have been found by the NHTSA. In 1995, the NHTSA sponsored an observational study of more than 5,900 children who were in child restraints or wearing safety belts.<sup>9</sup> Misuse of the restraints was observed in 79.5 percent of the cases. Typical errors included nonuse or incorrect use of locking clips (72 percent), nonuse or incorrect use of harness retainer clips (58.8 percent), incorrect use of harness straps (45.8 percent), incorrect use of the seat belts with the child restraint (16.9 percent), and incorrect direction of the child restraint (9.6 percent).

For the last 25–30 years, the burden has been placed on parents and caretakers to properly install the restraint into the vehicle and properly restrain the child in the restraint. The increasing number and types of vehicles on the road and the increasing number of child restraints create an endless combination of vehicles and child restraints that make it difficult if not impossible to explain in informational brochures or by telephone how to install the child restraints. In its 1996 study, the Safety Board concluded that securing a child restraint system properly in the vehicle is complicated by several incompatibilities related to the design of child restraint systems and vehicles and vehicle seat belts. Additionally, instructions for installing child restraints are often complex, and given the number of vehicle makes and models, writing instructions that are appropriate for all vehicles is a difficult task. In its 1996 study, the Safety Board found that even when parents or caregivers had received some instructions or information—either written or verbal—about the proper use of child restraint systems, more than half still made errors in

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<sup>4</sup> (a) National Transportation Safety Board. 1983. *Child Passenger Protection Against Death, Disability, and Disfigurement in Motor Vehicle Accidents*. Safety Study NTSB/SS-83/01. Washington, DC. (b) National Transportation Safety Board. 1985. *Child Passenger Safety Symposium: Ways To Increase Use and Decrease Misuse of Child Restraints*. Safety Study NTSB/SS-85/03. Washington, DC. (c) National Transportation Safety Board. 1988. *Performance of Lap/Shoulder Belts in 167 Motor Vehicle Crashes (Volume 1)*. Safety Study NTSB/SS-88/02. Washington, DC. (d) National Transportation Safety Board. 1997. *Proceedings of the National Transportation Safety Board Public Forum on Air Bags and Child Passenger Safety*. Report of Proceedings NTSB/RP-97/01. Washington, DC.

<sup>5</sup> Shelness, Annemare; Jewett, Jean. 1983. “Observed Misuse of Child Safety Seats.” In: Proceedings, Child Injury and Restraint Conference. Paper 207-215. Society of Automotive Engineers, Warrendale, PA.

<sup>6</sup> National Highway Traffic Safety Administration. 1984. *The Incidence and Factors Associated With Misuse*. Prepared by Goodell-Grivas, Inc., Washington, DC. December.

<sup>7</sup> Knoebel, K.Y.; Decina, L.E. 1995. *Patterns of Misuse of Child Safety Seats: Final Statistical Analysis*. Report to the National Highway Traffic Safety Administration. Bionetics Corporation, KETRON Division, Malvern, PA. October 2.

<sup>8</sup> Based on observations at child restraint clinics, which are discussed later in this letter.

<sup>9</sup> National Highway Traffic Safety Administration. 1996. *Observed Patterns of Misuse of Child Safety Seats*. Traffic Tech. No. 133. Washington, DC. September.

securing the child in the restraint and/or securing the child restraint systems in the vehicles. Because of this problem, the Safety Board asked the NHTSA to evaluate, in conjunction with the child restraint manufacturers, the design of child restraint systems with the goal of simplifying placement of a child in a restraint system (Safety Recommendation H-96-23) and to revise the necessary Federal Motor Vehicle Safety Standards to provide for the secure and uniform installation of child restraint systems (Safety Recommendation H-96-24). The NHTSA has responded by revising Federal regulations for testing of child restraints and by preparing a final rule (soon to be published) on universal anchorages. Both recommendations are currently classified “Open—Acceptable Response.”

The intent of the new universal anchorage rule expected to be announced by the NHTSA in the near future will provide a restraint attachment that is used solely for child restraints and would be compatible regardless of vehicle make or model. However, the installation of universal anchorages will only partially reduce the improper use of child restraints for several reasons. First, universal anchorages are to be phased into all new vehicles over a period of several years, and the older model vehicles will remain on the market and in use by the public for the next 10–15 years. Current problems with the compatibility of child restraint systems will remain with these vehicles. Such problems include seat belt anchorages that are forward of the seat bight<sup>10</sup> and do not permit a child restraint to be tightly secured by the vehicle seat belt, and the need for supplemental hardware such as locking clips or supplemental seat belts to hold the child restraint securely.

Second, the problem of properly securing the child in the child restraint will continue to exist. Continual education is necessary to ensure that harness straps are in the correct slots, harness clips are used properly, and harnesses are snug enough to protect the child.

Third, proper installation of the tether, which is expected to be required by the NHTSA’s new rule, will create yet a new problem for parents. Tethers, which improve performance of child restraint systems, provide an additional opportunity for misuse of child restraints. The Safety Board’s 1983 safety study on child passenger protection against death, disability, and disfigurement in motor vehicle accidents concluded that the most prevalent misuse problem with child restraints that required a tether was the failure to use or to correctly anchor the tether. In conjunction with that study, the Safety Board asked the NHTSA to require newly manufactured vehicles under 10,000 pounds gross vehicle weight to be equipped with tether anchorages or pre-drilled holes for the installation of such anchorages at all rear-most seating positions.<sup>11</sup> Testimony at the Safety Board’s 1997 public forum on air bags and child passenger safety confirmed the need for hardware availability. The correct tether use rate in Canada is about 65 percent; Canada has required vehicles to have pre-drilled tether anchor locations in rear seating positions since 1989. Australia, where tethers are also required on child restraints, provides pre-drilled tether anchor locations at all rear seating positions and the attachment hardware for at least one rear seating position. The correct tether use rate in Australia is about 89 percent.

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<sup>10</sup> The intersection of the seat cushion and the seat back.

<sup>11</sup> Safety Recommendation H-83-53 was classified “Closed—Acceptable Alternate Action” on January 1, 1986, when the NHTSA changed its test procedures to effectively eliminate the need for tether attachments.

Educational campaigns are one way to ensure that important information on the proper use of a child restraint is communicated to the public. Public safety announcements, videos and brochures, advertisements, and dealer education all contribute to increased knowledge of proper child restraint use. In conjunction with its 1996 safety study, the Safety Board issued Safety Recommendation H-96-30, which asked auto manufacturers to implement a child restraint training program at dealerships,<sup>12</sup> and Safety Recommendation H-96-22, which asked the NHTSA to ensure coordinated, comprehensive, and continuing programs with stable funding. The Safety Board believes that an effective way of teaching parents and others how to correctly use child restraints is at these types of hands-on child restraint clinics or “checkups,” which are typically sponsored by local police, fire departments, emergency personnel, and hospitals. General Motors and the National Safe Kids Campaign have also teamed together and are major organizers of child restraint checkups. From July 1997 to mid-November 1998, more than 600 child restraint checkup clinics have been sponsored, 14,591 restraints have been checked, and 32,222 people have attended the checkup events. The average misuse rate was reported at 87 percent.

One-time clinics, however, do not provide a stable resource for parents who may need additional information at a later time. Further, the success of the event is dependent on the publicity for the event. Some parents may learn about the event too late or may not be available the day of the clinic or never learn of it at all. Typically, these clinics are a one-time event held at the dealership for a certain period of time (about 4 hours). Despite the positive nature of these clinics, the Safety Board is concerned that many parents and caretakers will not benefit from these clinics and, consequently, child restraints will continue to be improperly used.

To help parents properly install child restraints and their tethers, Australia has established permanent fitting stations in parts of that country, where, for no charge, parents come in and have the installation of their child restraint checked and corrected, as necessary.<sup>13</sup> In 1985, the Traffic Authority of New South Wales (NSW) set out to reduce injuries from incorrectly fitted restraints and established a Statewide network of 60 child restraint fitting stations. Since that time, a total of 132 fitting stations have been established in NSW, and other Australian States have also begun establishing child restraint fitting stations. The Road Traffic Authority of NSW funds the fitting stations and ensures that the people checking and correcting the installation of child restraints are properly trained. KIDSAFE, an organization in Australia dedicated to the prevention of childhood injury, has also conducted child restraint checkups. The organization sponsors both one-time events as well as some permanent fitting stations. Possibly one of its best models of a permanent fitting station is located in Canberra. Residents know about the fitting stations and routinely bring their vehicles and child restraints to the station to determine if the child restraints have been installed properly. Even at this location, the misuse rate has been reported at about 75 percent.

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<sup>12</sup> Chrysler, Ford, GM, Jaguar, Mazda, Mitsubishi, Nissan, Saab, Subaru, Toyota, Volkswagon, and Volvo have all responded positively to this recommendation.

<sup>13</sup> For those fitting stations sponsored by auto clubs, the auto club membership fee includes service at the fitting station.

The Safety Board believes that permanent fitting stations are feasible in the United States and would eliminate the problems associated with a one-time checkup event. Most importantly, permanent fitting stations will reach more people than will sporadic child restraint clinics. The permanent fitting stations would provide a stable resource of information and informed, qualified people to assist with the installation of child restraints.

The Safety Board recognizes that there are likely to be some concerns regarding the fitting stations, specifically liability and ensuring that staff are qualified to install child restraints. The Safety Board believes that such issues can be handled by ensuring that fitting station staff are required to pass a certification course and have an opportunity for recurrent training. The NHTSA has developed a 4-day certification course on child restraints in which attendees learn about child restraint installation, including possible combinations of types of seat belts, belt buckles, harness clips, and vehicle design. The course also provides information about some of the more serious outcomes of an improperly restrained child: death, paralysis, and head injury. Currently, about 1,000 people nationwide have become certified, and 220 have reached instructor level.

With respect to the liability issue, the Safety Board is aware that liability insurance is available in Australia to protect the States. KIDSAFE was able to obtain insurance to cover liability. The Roads and Traffic Authority in NSW in Australia also carries liability insurance. The people installing the seats in NSW are covered as long as they follow the fitting station child restraint installation manual. Similar insurance coverage could be obtained in the United States. It is also possible that parents and caregivers could be required to sign waivers to protect the individuals installing the restraints.

The Safety Board believes that fitting stations could be established at a variety of locations in this country. Many States require inspection of safety features of vehicles on an annual basis. Child restraints should not be considered anything less than an added safety feature in the vehicle and should be checked periodically. An option available to the States would be to have a permanent location for child restraint checkups at State motor vehicle sites where services such as issuing driver licenses or inspecting motor vehicles are conducted. States could also establish fitting stations by coordinating with fire houses, automobile dealerships, and National Safe Kids or other safety advocacy groups.

The Safety Board believes that deaths and injuries to children can be reduced if they are properly secured in child restraints and if the restraints are properly secured in the vehicle. The high misuse rate of child restraints suggests that parents and others need training in properly using the seats. Therefore, the Safety Board is recommending that the States coordinate the establishment of multiple, permanent locations where child restraints can be properly installed in passenger vehicles and parents/caregivers can receive hands-on assistance in the proper use of child restraint systems by qualified or certified personnel.

The Safety Board also acknowledges that there will be additional costs to the States to maintain permanent fitting stations or checkup points. Such costs will include personnel, training, educational information, and equipment. The Safety Board believes that vehicle manufacturers

and child restraint manufacturers should share with the States the responsibility of funding the fitting stations. Therefore, the Safety Board is recommending that vehicle manufacturers and child restraint manufacturers support the establishment and existence of the child restraint fitting stations. Additionally, the Safety Board believes that the NHTSA can play a role in this area and should develop incentive grant programs to assist in the funding of the restraint fitting stations.

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

Develop incentive grant programs to assist in the funding of child restraint fitting stations. (H-99-2)

Also, the Safety Board issued safety recommendations to the States, vehicle manufacturers, and child restraint manufacturers. If you have any questions, you may call 202-314-6517.

Chairman HALL, Vice Chairman FRANCIS, and Members GOGLIA and BLACK concurred in this recommendation. Member HAMMERSCHMIDT did not concur.

By: Jim Hall  
Chairman