

School Bus Seat Belt Background

Why are there no seat belts on school buses?

History:

Thirty-five years ago in California, UCLA engineers performed a series of classic school bus crash studies, which determined that the major cause for injury in school bus accidents was the inadequacy of school bus seats. They proposed “compartmentalization” of the child occupants between high-back, well-padded and well-anchored seats capable of absorbing crash forces with large aisle side panels to contain riders. A lap belt was recommended to provide substantial additional protection.

Ten years later, in response to a Congressional mandate, NHTSA promulgated Federal Motor Vehicle Standard 222 that provided for some of the proposed features. The 222 seat was better anchored, padded and designed for energy absorbing and was 4 inches higher than seats then in use.

When Standard 222 was implemented, children who were to ride on large school buses manufactured after that date, were promised, and subsequently have relied on, being safely compartmentalized between high-back, well-padded and anchored seats for crash protection. Since that time, agencies, departments and representatives of Federal, State and Local governments, school district officials, school bus manufacturers, pupil transportation directors, and the operators of school buses have confidently and persistently assured parents and children that compartmentalization provided the optimal school bus safety system by containing the child passengers within their seating compartment during accidents. Officials insisted that because of compartmentalization, crash forces would be effectively attenuated by the padded surroundings and injuries and fatalities would be mitigated. Parents and their children have accepted and placed their trust in this advice advanced by these transportation officials. (See attached 23 YEARS OF INSTITUTIONAL DISINFORMATION)

Unfortunately, the standard fell far short of the UCLA findings. NHTSA failed to include the all-important compartmentalizing side panel, and the lap belt; seat back height increase was eight inches lower than the engineers had recommended. As a result “compartmentalization” was significantly compromised, working fairly well for front-end crashes but providing no passenger protection in side impacts and bus rollovers.

Crash Testing:

For the past 25 years and continuing with the current April 2002 “REPORT TO CONGRESS, School Bus Safety: Crashworthiness Research,” NHTSA has persisted in obscuring the absence of lateral and rollover protection by testing and evaluating the 222 seat entirely from a frontal accident configuration.

- Pre-standard testing by AMF Advanced Systems Laboratories in 1975,
- Post-standard tests by NHTSA at East Liberty Ohio in 1978,
- Transport Canada Tests of 1985 involved only front-end crashes and did not measure what happens to passengers in side and rollover accidents.

Finally, as described in the 2002 Report, NHTSA did experimentally place seven, instrumented dummies on a school bus and test crash a 25,000 lb. cab-over truck at 45 mph. into the side of the bus. Curiously, none of the dummies were belted and there was no description of the path of motion and the points of traumatic contact of the dummies during the crash sequence. This failure to compare restraint use with non-restraint is especially significant for those seated away from the impact area, across the aisle on the opposite side of the bus, where in side impacts passengers are thrown violently from their seats and where belts are most effective in reducing injury.

Inexplicably, of the 7 dummies on the bus, only 2 were Side Impact Dummies. (Containing instruments to measure lateral chest and pelvic forces.) Even more troubling is the fact NHTSA chose to place both of these Side Impact Dummies adjacent to the impact sidewall. As a result they were not thrown across the bus by crash forces mitigating the effect of the side impact crash kinematics and profoundly compromising the data.

It is characteristic of front-end crash sled testing to show the 222 seat to its best advantage and to exhibit lap restraints at their most inefficient. Since the front-end accident configuration occurs only about one-third of the time, reasonable efforts to evaluate school bus safety must also include tests involving side, rear and rollover crash forces. NHTSA has never explained their rationale for failing to properly perform these tests.

Furthermore, testing only those circumstances where the seat will perform well leads to conclusions that serve to exaggerate the safety of school buses and to imply a level of safety that is invalid. By way of example, imagine a vehicle that has good steering but faulty brakes. If only the steering is tested the authorities are able to insist that the vehicle is safe. And no matter how many times the vehicle is tested, if only the steering is checked, the myth of safety continues. In the meanwhile, the inadequacy of the braking system continues to cause accident after accident.

Although from the inception, notice of the failure of the 222 seat to properly “compartmentalize” and to protect during side impact and roll-over accidents has been detailed by this writer to NHTSA in petitions, during public testimony before the Congress and at NHTSA forums, the Agency has persistently chosen to ignore the deficiency.

Identified Harm to Children:

While the motive for the unrelenting denial by NHTSA of this obvious defect is unclear, the resultant harm caused by “compromised compartmentalization” to the children who are passengers is most evident. In September of 1999, just as the NHTSA study was beginning, the National Transportation Safety Board (NTSB) issued a report on school bus crashworthiness. The study found “compartmentalization” was ineffective during six typical school bus accidents. In every example the 222 seat failed to contain the passengers. Children were injured and killed as a result of both ejection and being tossed violently within the bus itself. The Board concluded that:

Current compartmentalization is incomplete in that it does not protect school bus passengers during lateral impacts with vehicles of large mass and in rollovers, because in such accidents, passengers do not always remain completely within the seating compartment.

The Board went on to point out that passengers who were propelled from the “compartment” were the ones more likely to be injured during side impact and rollover collisions.

Re-review of major crashworthiness studies by the NTSB details that compartment failure occurred to unrestrained passengers in every lateral and rollover crash (See attached REVIEW OF MAJOR SCHOOL BUS CRASHWORTHINESS STUDIES BY THE NATIONAL TRANSPORTATION SAFETY BOARD).

Contributing to compartmentalization failure are such factors as the slippery nature of the school bus seat covering, the reduced containment because of the smaller sizes of young children, and the effect of relative opening of the compartment for children seated on or closer to the aisle. In addition, school buses-- because of their high center of gravity are-- relatively unstable and are subject to frequent rollovers.

As the result of the NTSB's strong recommendations, there was some hope that NHTSA might finally take action to provide belts for the buses.

NHTSA 2002 Report:

After four years of effort and at a cost to taxpayers of hundreds of thousands of dollars, the National Highway Traffic Safety Administration (NHTSA) again failed to properly identify "compromised compartmentalization" as a design defects in school buses and refused to implement needed safety improvements to protect the 25 million children who ride school buses back and forth to school every school day.

In preparing the current April 2002, "REPORT TO CONGRESS, School Bus Safety: Crashworthiness Research," in order to assess crash outcomes, NHTSA analyzed 31 actual crashes. Just nine (29%) were front end. In spite of the fact that 7 out of 10 of these real world accidents were not frontal, NHTSA made no attempt to evaluate the effectiveness of "compartmentalization" in protecting the young passengers in all real world crash configurations. Had NHTSA chosen to evaluate the complete range of all accident possibilities, they would certainly have concluded, as did the NTSB, that "compartmentalization" was compromised and incomplete.

Clearly, NHTSA has demonstrated an all-consuming disinterest in the mechanics of the side impact school bus crash. The report devotes only 3 of the 54-page report to the side test. By contrast, the frontal sled tests were carefully evaluated based on different dummy sizes, seat configurations, and restraint systems. Detailed discussions of dummy kinematics for all variables were recorded. In the final analysis however, the information gathered in the frontal sled tests was little different from that developed in the aforementioned pre- and post-standard testing in the 1970s. On the other hand, the side impact test was programmed to produce so little information one must wonder why NHTSA chose to perform the crash at all and how, based on the paucity of data, they could conclude that restraints were not needed in large school buses.

Cost: On the very first page of the NHTSA Report, the Agency is careful to quote from a June 25, 1998 letter from Congressman James A. Traficant, Jr. admonishing NHTSA to consider the impact on school districts of requiring occupant restraint systems and design and seating capacity changes. While based on recent events the credibility of Mr. Traficant is questionable (at best), NHTSA's first responsibility is to establish considerations of safety paramount to and above all concerns for the supposed inconvenience of the districts. As regards cost, school bus officials should consider the following costs of "compromised compartmentalization":

- A \$28 million accident settlement by the Flagstaff Arizona School District for a school bus rollover accident which caused 31 injuries and 5 ejections. One child suffered a head injury that requires long-term care and another was left a quadriplegic after the accident.
- Successful litigation based on the failure of compartmentalization and absence of seat belts with commensurate settlements has occurred in Corpus Christi and Galveston Texas, Cincinnati, Ohio, Philadelphia, Pennsylvania, Columbia, Maryland, and Memphis, Tennessee.
- On March 28, 2000, a train struck the passenger side of a Murray County, Georgia, School District school bus. During the accident sequence, the driver and three children were ejected. Two of the ejected passengers received serious injuries and one was fatally injured. Of the four passengers who remained inside the bus, two were fatally injured, one sustained serious injuries. One, who was restrained by a lap belt, suffered only minor injuries.
- The short-term pain and suffering of those injured and recovering.

- The lifetime of suffering for those with permanent disabilities.
- The cost of litigation should lack of restraints cause injury.
- The increased cost of liability insurance.

NHTSA also argues that the installation of seat belts would cause a 17% loss of seating capacity resulting in substantial additional expenses to school districts. They allege that this is because three restraints cannot be fitted to a 39" seat. As those familiar with school transportation are fully aware, except for children in the earliest grades, no 39" seat can accommodate three students. For NHTSA to assume that all school buses are operating at full capacity with 3 to a seat does not represent reality in school transportation.

Conclusion: Once again NHTSA has failed miserably in addressing the problem of "compromised compartmentalization" in school bus side impact and rollover accidents. As a direct result, children will continue to be killed and injured in school bus accidents. Since NHTSA will not act, the responsibility to correct this well documented inadequacy now resides with the Congress.

As an officer of Physicians for Automotive Safety and the National Coalition for School Bus Safety, Dr. Yeager has been a leader in the enactment of two first in the nation laws in New Jersey, one to require use of seat belts on school buses and another to require use of bicycle helmets. In addition, he has been instrumental in passing legislation raising the drinking age to 21, requiring school buses to have high-back padded seats, roof hatches and crossing gates, child restraint laws, moped helmet use and providing for ice cream truck stop signs. Dr Yeager has been a recipient of the Certificate of Appreciation, US Department of Transportation, the Governor's Highway Safety Award, Johnson and Johnson/Safe Kids, New Jersey Honoree of the Year, and Advocates for Highway and Auto Safety, Safety Leader Award.