

## Enhancing School Bus Safety and Pupil Transportation Safety

School bus safety and pupil transportation safety involve two similar, but different concepts. School bus safety concerns only those children on school buses. Pupil transportation safety relates to all children going to and from school and school-related activities, no matter what mode of transportation is used.

All of the available science and data indicate that today's school buses are the safest vehicles on the highway and over the years have provided excellent levels of crash protection for children. In its April 2002 report, "School Bus Safety: Crashworthiness Research" the National Highway Traffic Safety Administration (NHTSA) noted:

"Every year, approximately 450,000 public school buses travel and estimated 4.3 billion miles to transport 23.5 million children to and from school and school-related activities. The school bus occupant fatality rate of 0.2 fatalities per 100 million vehicle miles traveled (VMT) is much lower than the overall rate for motor vehicles of 1.5 per 100 million VMT. If one considered the average number of passengers on school buses versus passenger cars, there would be even a larger difference in the fatality rates per passenger mile."

A study released by the National Research Council (NRC) of the National Academy of Sciences in June 2002, "The Relative Risks of School Travel: A National Perspective and Guidance for Local Community Risk Assessment," reported that:

"Each year approximately 800 school-aged children are killed in motor vehicle crashes during normal school travel hours.<sup>[1]</sup> Of these 800 deaths, about 20 (2 percent) – 5 school bus passengers and 15 pedestrians – are school bus related. The other 98 percent of school-aged deaths occur in other motor vehicles ... or to pedestrians, bicyclists, or motorcyclists."

These studies re-affirmed the conclusions of all previous studies – school buses represent the safest way for children to travel to and from school and school-related activities. This outstanding safety record of school buses is due to several factors, including the unique Federal Motor Vehicle Safety Standards that school buses must meet, the extensive and specialized training required of school bus drivers, the recognizable color of school buses, and the ability of school bus drivers to utilize school bus lighting and signage to control traffic when children are getting on or off the school bus. Additionally, school bus drivers are trained to provide direction to children when crossing the road in front of the school bus.

While the NRC study confirmed the outstanding safety record of school buses, it also pointed out the serious risks that exist for children who do not use school buses to get to and from school and school-related activities. The NRC study was done in response to a Congressional mandate to investigate "the safety issues attendant to the transportation of school children to and from school and school-related activities by various transportation modes." As such, the NRC study provides excellent insight into both school bus safety and pupil transportation safety issues.

The NRC study collected crash data for the 9-year period from 1991 through 1999. These data show the following annual average fatalities to school children during normal school travel hours:

- 5 school bus passengers
- 15 pedestrians outside school buses
- 169 occupants of passenger vehicles with an adult driver
- 448 occupants of passenger vehicles with a teenage driver
- 131 pedestrians
- 46 bicyclists

These numbers alone do not allow for an accurate comparison among the various ways children get to and from school. In order to understand the relative safety among different modes of transportation, it is necessary to compare the number of fatalities in each mode using a common basis (or measure of exposure to risk). The most commonly used measure of exposure for motor vehicle crash data is the number of miles traveled. This allows for a comparison of the number of fatalities based on the exposure to risk as measured in the number of miles traveled. All things being equal, if a particular mode of travel accounts for 10 percent of the miles traveled, one would expect 10 percent of the fatalities to occur in that mode.

The NRC study calculated the number of miles traveled by children during normal school travel hours in each mode and compared them to the number of fatalities in each mode. The following chart provides the results. As an example, school buses provide 28 percent of the miles traveled, but school bus passengers result in less than 1 percent of the fatalities and pedestrians outside of the school bus account for less than 2 percent of fatalities. As another example, passenger vehicles with teen drivers provide only 16 percent of the miles traveled, but account for 55 percent of the fatalities.

Mode	Exposure	Exposure	Fatalities	Fatalities
	100 Million Student Miles	Percentage	Number of Student Fatalities	Percentage
School Bus:	313 <sup>[2]</sup>	28%		
Passengers			5	Less than 1%
Pedestrians			15	Less than 2%
Other Bus	38	3%	1	Less than 1%
Passenger Vehicle (Adult Driver)	580	51%	169	21%
Passenger Vehicle (Teen Driver)	184	16%	448	55%
Bicycle	4	Less than 1%	46	6%
Pedestrian	15	1%	131	16%
Total	1,134	100%	815	100%

The NHTSA study was conducted in response to a Congressional mandate “to assess occupant safety on school buses” and to “examine available information about occupant safety and analyze options for improving [school bus] occupant safety.” In response to this mandate, NHTSA “initiated a comprehensive research program to develop the next generation of school bus occupant protection.”

After reviewing real-world school bus crashes, NHTSA conducted laboratory testing to evaluate various means of potentially improving the crash protection provided to children in school buses. The testing evaluated “compartmentalization” the current form of crash protection provided in school buses, as well as changes in seat spacing and seat back height within the “compartmentalization” concept. The research also evaluated lap belts and lap/shoulder belts, in addition to an experimental airbag-belt system.

The NHTSA research confirmed that “compartmentalization is an effective restraint strategy for a frontal crash in a school bus.” However, the potential for neck injury and overriding the seat back exists in some frontal crashes. Additionally, “compartmentalization” does not completely address the crash protection needed in side and rollover crashes.

The NHTSA report provides strong evidence that lap belts are not a good form of crash protection for children in school buses. The laboratory tests for lap-belted test dummies resulted in “Neck Injury measurements in excess of twice the maximum desirable threshold.” Additionally, the NHTSA report noted that “it is clear that the potential for abdominal injury exists especially when lap belts are used.

Of all the passenger crash protection systems tested, the NHTSA report identified lap/shoulder belts as “the best overall.” However, the report identified some “unintended consequences” that could have a negative impact on “pupil transportation safety.” Specifically, the installation of lap/shoulder belts in school buses, would reduce the design capacity of the school bus.

The PSBA believes a reduction in the design capacity of school buses to the installation of lap/shoulder belts is a legitimate concern. For example, a 77-passenger school bus would only be able to transport 60 students – a 22 percent reduction in the design capacity. However, the more important issue is the real-world impact on the in-use capacity of school buses. The National Association of State Directors of Pupil Transportation Services (NASDPTS) is attempting to collect data from states to determine the number of students who would be displaced from school buses due to a reduction in the in-use capacity. Transporting fewer students in school buses would result in more students in less-safe forms of transportation. As noted in the NRC study, this would result in more fatalities and injuries to school children.

Like any other new item of equipment, the installation of lap/shoulder belts in school buses would increase the cost of new school buses. The PSBA is very concerned about the continued increase in the cost of new school buses due to additional regulations in the areas of safety and emissions. For example, the cost of meeting the new requirements of FMVSS No. 221, “School Bus Body Joint Strength,” and emission standards already promulgated by the Environmental Protection Agency are estimated to increase the price of a school bus by approximately five (5) percent. As school buses get more expensive, at present funding levels fewer buses will be purchased and fewer children will be transported on the safety form of transportation. This will result in more children transported in less-safe modes of transportation, and additional fatalities and injuries to children. As safety professionals, our goal is to transport more, not fewer, children in school buses.

Finally, the NHTSA report noted that misuse of lap/shoulder belts by children exists in passenger motor vehicles. The agency expressed its concern that misuse of lap/shoulder belts by children in school buses would cause the same types of neck and abdominal injuries that could result from lap belts.

The safety of school children is the hallmark of the school bus transportation industry. The PSBA believes the NRC and NHTSA studies provide strong evidence that decisions about enhancing school bus safety and pupil transportation safety must be made in concert.

The PSBA believes it is important to try to reduce the number of children who are killed and injured each year going to and from school and school-related activities in school buses. The PSBA also believes the approximate 800 fatalities nationwide, and associated injuries, that occur each year to children during “normal school transport hours” that are not in school buses is completely unacceptable. It is clear that adequate funding is the “bottom line” to improvements in both areas.

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[1] The NRC defined “normal school travel hours” as 6:00 a.m. to 8:59 a.m. and 2:00 p.m. to 4:59 p.m. each weekday from September 1 through June 15.

[2] The NRC study estimated the number of “student miles traveled” as 313 billion miles each year. The NHTSA study reported the number of “vehicle miles traveled” as 4.3 billion miles each year.