



U.S. Department  
of Transportation

**National Highway  
Traffic Safety  
Administration**

1200 New Jersey Avenue, SE  
Washington, DC 20590

Ronna S. Weber  
Executive Director  
National School Transportation Association (NSTA)  
122 South Royal Street  
Alexandria, VA 22314

Dear Ms. Weber:

It was a pleasure to meet with you and Mr. Martin, Executive Director, National Association for Pupil Transportation (NAPT), on May 15, 2014. During this meeting, the discussion centered around school bus safety and seat belts for children riding on large school buses (buses with gross vehicle weight ratings greater than 10,000 pounds). In the meeting, you asked for the National Highway Traffic Safety Administration's (NHTSA's) views regarding seat belts in large school buses. Our views are summarized below.<sup>1</sup>

Data indicate that school buses are safer than any other mode of transportation to and from school. Every year, approximately 485,500 school buses travel approximately 4.2 billion miles to transport 23 million children to and from school and school-related activities. On average, there are about 5 school bus passenger fatalities in the United States annually. Among school transportation fatalities each year, only about 0.6 percent are school bus occupants while 79 percent are passenger vehicle occupants.

NHTSA's position regarding seat belts on large school buses, explained previously in the rulemaking RIN 2127-AK09, was reiterated in a Federal Register notice published on August 25, 2011 (attached for your reference). The 2011 document denies a petition for rulemaking from the Center for Auto Safety and 21 others requesting that NHTSA mandate the installation of lap/shoulder belts for all seating positions on large school buses. NHTSA denied the petition in the absence of a safety problem supporting a Federal requirement to install lap/shoulder belts nationwide on large school buses, which are already very safe.

Moreover, NHTSA was concerned about possible consequences of a seat belt mandate. The agency's analysis found that a Federal requirement for lap/shoulder belts on large school buses would increase the overall cost to purchase and operate these vehicles, which could reduce availability of school bus transportation and ridership of the vehicles. NHTSA estimated that

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<sup>1</sup> These summaries are based on the documents related to a rulemaking proceeding completed in 2010 (Regulation Identifier Number (RIN) 2127-AK09) (see notice of proposed rulemaking on NHTSA upgrades to school bus passenger crash protection, 72 FR 65509 (November 21, 2007); final rule, 73 FR 62744 (October 21, 2008); and response to petitions for reconsideration, 75 FR 66686 (October 29, 2010)). Please refer to those documents for a full discussion of NHTSA's views on this issue.

the increased risk from students finding alternative, less safe means of getting to and from school and related events, such as riding in a personal vehicle, could result in an increase of 10 to 19 school transportation fatalities annually. Given that large school buses are already very safe, and after considering the possible diversion of students to less safe forms of transportation, the agency determined that the decision to install seat belts on large school buses should be left to State and local jurisdictions. The State and local authorities can weigh the benefits and consequences of installing seat belts on their large school buses and can best decide whether their efforts and monies should be spent on the belts or on other measures that could be more effective in improving student transportation safety.<sup>2</sup>

In asking whether NHTSA's position concerning lap belts on school buses has changed, you implied there may be unreasonable safety risks associated with lap belts. We discussed this issue in the August 25, 2011 Federal Register document. In the document, we stated, among other things (76 FR at 53112):

The agency explained in the [October 21, 2008] final rule that it has studied lap belts in frontal crashes in the school bus research program and analyzed data from States which include side impact and rollovers, and could not determine that lap belts translate to an overall greater safety risk. Our real world data indicates that lap belts are as effective as lap/shoulder belts in rollover crashes, and benefit far side occupants in side impacts involving these vehicles.

In other words, we have not found an unreasonable safety risk associated with lap belts on large school buses. Therefore, our position concerning lap belts remains unchanged and the agency will continue to permit lap belts on large school buses.

On a different matter, we would like to clarify a point Mr. Martin raised in his June 2, 2014 email to NHTSA's Associate Administrator for Research and Program Development, Jeff Michael. Mr. Martin stated in the email, "NHTSA will not do additional testing of school buses using anthropomorphic test dummies (ATD's), believing instead that video footage now available to your researchers from actual school bus crashes provides better information." This statement is not correct and I would like to take this opportunity to address any misunderstanding.

NHTSA believes that both ATD test data and real world crash data of occupant kinematics and associated injuries, if available, are important to obtain a better understanding of restraint performance. We recognize that ATDs do not exactly replicate human response, and injury measures only provide estimates of injury risk. However, we consider ATD testing extremely valuable in our research programs. Where human response and injury outcome in a crash environment are available, we consider both sources of information (ATD test data and real world crash data) when evaluating restraint performance.

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<sup>2</sup> NHTSA also believes that States and local jurisdictions with school buses fitted with seat belts should provide training to school bus drivers and students on proper use of seat belts.

I hope that this helps you understand our views on seat belts in large school buses. We look forward to continued work with both NAPT and NSTA in the future.

Sincerely,



Lori K. Summers  
Director  
Office of Crashworthiness Standards

Attachment

behalf of an association, business, labor union, etc.). DOT's complete Privacy Act Statement was published in the *Federal Register* on April 11, 2000 (65 FR 19477).

**Authority:** 49 U.S.C. 60101 *et seq.*; 49 CFR 1.53.

Issued in Washington, DC, on August 18, 2011.

**Jeffrey D. Wiese,**  
Associate Administrator for Pipeline Safety.  
[FR Doc. 2011-21753 Filed 8-24-11; 8:45 am]  
BILLING CODE 4910-80-P

**DEPARTMENT OF TRANSPORTATION**

**National Highway Traffic Safety Administration**

**49 CFR Part 571**

[Docket No. NHTSA-2011-0131]

**Federal Motor Vehicle Safety Standards; Denial of Petition for Rulemaking; School Buses**

**AGENCY:** National Highway Traffic Safety Administration (NHTSA), Department of Transportation.

**ACTION:** Denial of petition for rulemaking.

**SUMMARY:** This document denies a petition for rulemaking from the Center for Auto Safety (CAS) and 21 others asking that NHTSA mandate the installation of three-point seat belts (lap/shoulder belts) for all seating positions on all school buses. We are denying the petition because we have not found a safety problem supporting a Federal requirement for lap/shoulder belts on large school buses, which are already very safe. The decision to install seat belts on school buses should be left to State and local jurisdictions, which can weigh the need for, benefits and consequences of installing belts on large school buses and best decide whether their particular pupil transportation programs merit installation of the devices.

**FOR FURTHER INFORMATION CONTACT:** For legal issues: Ms. Deirdre Fujita, Office of the Chief Counsel, NCC-112, phone (202) 366-2992. For non-legal issues: Ms. Shashi Kuppa, Office of Crashworthiness Standards, NVS-113, phone (202) 366-3827. You can reach both of these officials at the National Highway Traffic Safety Administration, 1200 New Jersey Avenue, SE., Washington, DC 20590.

**SUPPLEMENTARY INFORMATION:**

**Overview**

This document denies a petition for rulemaking from the CAS and others<sup>1</sup> (hereinafter referred to as the "CAS petition") asking NHTSA to mandate the installation of three-point seat belts (lap/shoulder belt) for all seating positions on large school buses.<sup>2</sup>

Federal Motor Vehicle Safety Standard (FMVSS) No. 222, "School bus passenger seating and crash protection," requires lap/shoulder belts for all seating positions on small school buses, and requires that passengers on large school buses be protected through a concept called "compartmentalization."<sup>3</sup> The deceleration experienced by small school buses necessitates installation of the belts for adequate occupant crash protection. For large school buses, we have determined there is not a safety problem warranting national action to require the addition of lap/shoulder belts to these vehicles. Large school buses are very safe due to their greater weight and higher seating height than most other vehicles, high visibility to motorists, and occupant protection through compartmentalization. The vehicles have compiled an excellent safety record.

In considering the issue of seat belts for large school buses, NHTSA has been mindful that a requirement for seat belts

could affect funding for school transportation. A Federal requirement for seat belts on large school buses will increase the cost to purchase and operate the vehicles, which would impact school budgets. Increased costs to purchase and operate large school buses could reduce the availability of school bus service overall, and reduce school bus ridership. The reduced ridership may result in more students finding alternative, less safe means of getting to or from school or related events, such as riding in private vehicles—often with a teenage driver. When alternative means are used, the risk of traffic-related injury or fatality to children is greater than when a large school bus is used.

As such, there are many factors to be weighed in deciding whether seat belts should be installed on large school buses. Throughout the past 34 years that compartmentalization and the school bus safety standards have been in effect, the agency has openly and continuously considered the merits of a seat belt requirement for large school buses. (See, e.g., responses to petitions to require seat belt anchorages and seat belt assemblies, 41 FR 28506 (July 12, 1976) and 48 FR 47032 (October 17, 1983); response to petition for rulemaking to prohibit the installation of lap belts on large school buses, 71 FR 40057 (July 14, 2006).)

Most recently, NHTSA discussed the issue of requiring seat belts on large school buses at length in a rulemaking proceeding completed in 2010 (Regulation Identifier Number (RIN) 2127-AK09) (NPRM upgrading school bus passenger crash protection, 72 FR 65509 (November 21, 2007); final rule, 73 FR 62744 (October 21, 2008)); (RIN 2127-AK49) response to petitions for reconsideration, 75 FR 66686 (October 29, 2010)). NHTSA undertook the rulemaking to raise the minimum seat back height on school bus passenger seats, require small school buses to have lap/shoulder belts at each passenger seating position (the small buses were previously required to provide at least lap belts<sup>4</sup>), and incorporate test procedures to test lap/shoulder belts in small school buses and voluntarily-installed lap/shoulder belts in large school buses. The test procedures ensure both the strength of the seat belt systems and the compatibility of the

<sup>1</sup> The petition, dated March 9, 2010 on CAS letterhead, described itself as from the following groups and individuals in addition to the CAS: the National Coalition for School Bus Safety, Public Citizen, Consumers for Auto Reliability and Safety, Consumers Union, KidsandCars.org, Advocates for Highway and Auto Safety, Consumer Federation of America, SafetyBeltSafe U.S.A., the Trauma Foundation, the American Academy of Pediatrics (AAP), the American Association of Orthopaedic Surgeons, the Orthopaedic Trauma Association, 2safeschools.org, Safe Ride News, the Advocacy Institute for Children, Belt Up School Kids, the Coalition for Child Safety, Nancy Bauder, Lynn Brown/Rhea Vogel, Ruth Spaulding, and Norm Cherkis.

<sup>2</sup> "School bus" is defined in 49 CFR 571.3 as a bus that is sold, or introduced in interstate commerce, for purposes that include carrying students to and from school or related events, but does not include a bus designed and sold for operation as a common carrier in urban transportation. A "bus" is a motor vehicle, except a trailer, designed for carrying more than 10 persons. In this document, when we refer to "large" school buses, we refer to school buses with a gross vehicle weight rating (GVWR) of more than 4,536 kilograms (kg) (10,000 pounds (lb)). These large school buses may transport as many as 90 students. "Small" school buses are school buses with a GVWR of 4,536 kg (10,000 lb) or less. Generally, these small school buses seat 15 persons or fewer, or have one or two wheelchair seating positions.

<sup>3</sup> Compartmentalization is a protective envelope formed of strong, closely spaced seats that have energy absorbing seat backs so that passengers are cushioned and contained by the seat in front in the event of a school bus crash. Compartmentalization is described more fully in the next section of this denial notice.

<sup>4</sup> Small school buses are different from large ones in that they are built on the same chassis and frame as a light truck and thereby have similar crash characteristics of a light truck. The upgraded seat belt requirements (from lap belts to lap/shoulder belts) on these vehicles reflects the similar upgrade to lap/shoulder belts in other passenger vehicles.

seat belt systems with compartmentalization.

In that rulemaking, the agency presented up-to-date information and discussed the reasoning behind the agency's decision not to propose to require seat belts in large school buses. The NPRM and final rule preambles presented data and findings from the following studies of the National Transportation Safety Board (NTSB), National Academy of Sciences (NAS), and NHTSA (in chronological order):

#### Studies

- *NTSB, 1987*

In 1987, the NTSB reported on its investigation of forty-three post-standard school bus crashes.<sup>5</sup> The NTSB concluded that most fatalities and injuries in school bus crashes occurred because the occupant seating positions were directly in line with the crash forces, and that seat belts would not have prevented those injuries and fatalities. (NTSB/SS-87/01, Safety Study, Crashworthiness of Large Post-standard School Buses, March 1987, National Transportation Safety Board.)

- *NAS, 1989*

A 1989 NAS study concluded that the overall potential benefits of requiring seat belts on large school buses were insufficient to justify a Federal mandate for installation. The NAS also stated that funds used to purchase and maintain seat belts might be better spent on other school bus safety programs with the potential to save more lives and reduce more injuries. (Special Report 222, Improving School Bus Safety, National Academy of Sciences, Transportation Research Board, Washington, DC 1989).

- *NTSB, 1999*

In 1999, the NTSB reported on six school bus crashes it investigated in which passenger fatalities or serious injuries occurred away from the area of vehicle impact. The NTSB found compartmentalization to be an effective means of protecting passengers in school bus crashes. However, because many of those passengers injured in the six crashes were believed to have been thrown from their compartments, the NTSB believed other means of occupant protection should be examined. (NTSB/SIR-99/04, Highway Safety Report, Bus Crashworthiness Issues, September 1999, National Transportation Safety Board).

- *NAS, 2002*

In 2002, the NAS published a study that analyzed the safety of various transportation modes used by school

children to get to and from school and school-related activities. The NAS found that among 815 school-age children killed in motor vehicle crashes during normal school travel hours each year, less than 0.6 percent are passengers in school buses, 1.8 percent are children outside the bus near the loading/unloading zone, 22 percent are students walking/bicycling, and 75 percent are in crashes involving passenger vehicles, especially those with teen drivers. The report stated that changes in any one characteristic of school travel can lead to dramatic changes in the overall risk to the student population. Thus, the NAS concluded, it is important for school transportation decisions to take into account all potential aspects of any changes in school transportation. (Special Report 269, "The Relative Risks of School Travel: A National Perspective and Guidance for Local Community Risk Assessment," Transportation Research Board of the National Academies, 2002.)

- *NHTSA, 2002*

In 2002, NHTSA issued a report to Congress detailing school bus occupant safety and analyzing options for improvement. NHTSA concluded that compartmentalization effectively lowered injury measures by distributing crash forces with the padded seating surface. Lap belts showed little to no benefit in reducing serious/fatal injuries. The agency determined that properly used lap/shoulder belts have the potential to be effective in reducing fatalities and injuries for not only frontal collisions, but also rollover crashes where seat belt systems are particularly effective in reducing ejection. However, the addition of lap/shoulder belts on buses would increase capital costs and reduce seating capacity on the buses. ("Report to Congress, School Bus Safety: Crashworthiness Research, April 2002," <http://www.nhtsa.gov/DOT/NHTSA/NRD/Multimedia/PDFs/Crashworthiness/SchoolBus/SBReportFINAL.pdf>.)

In addition, the agency considered the public discussions at a July 11, 2007 roundtable meeting with State and local government policymakers, school bus and seat manufacturers, pupil transportation associations, and consumer groups. (Notice of public meeting, 72 FR 30739, June 4, 2007, Docket NHTSA-2007-28103.)

The agency explained in the NPRM and final rule preambles of the documents comprising RIN 2127-AK09 that, after considering all available information, NHTSA was not able to conclude that requiring seat belts on large school buses would protect passengers against an unreasonable risk

of death or injury in an accident. NHTSA continued: "Whether the same conclusion can be made by a State or local jurisdiction is a matter for local decision-makers and we encourage them to make the decisions most appropriate for their individual needs to most safely transport their students to and from school." *Id.* 73 FR at 62745.

Following publication of the final rule, CAS *et al.* submitted the petition for rulemaking discussed today to require lap/shoulder belts on large school buses. The petition refers to a "Highway Accident Brief" published November 12, 2009 by the NTSB.

Also following publication of the final rule, the State of Alabama completed a comprehensive study to evaluate the merits of having lap/shoulder belts on newly purchased large school buses in Alabama. Among other factors, the State evaluated the rate of seat belt use, the effects on bus discipline, the attitudes of other stakeholders, the loss of capacity attributable to seat belts, and cost effectiveness of requiring lap/shoulder seat belts. The study found that, for Alabama, the cost and consequences of ordering the seat belts on large school buses would exceed the benefit. The authors concluded that if funding is to be spent on school bus safety, more lives could be saved in Alabama by investing in enhanced safety measures in loading/unloading zones.

Additionally, following publication of the final rule, NHTSA completed an estimate of possible impacts that reduced school bus ridership might have on traffic-related injury or fatality. This analysis is discussed later in this document. The agency undertook the analysis to understand, in a more comprehensive manner, the possible consequences of a national requirement for seat belts on large school buses. If a national requirement were imposed, how could such a requirement affect the availability of school bus service? How might reduced availability of school bus service impact pupil transportation safety? The analysis is illustrative in nature and is based on established economic methodologies. Under the described conditions, the agency estimates that the increased risk from students finding alternative, less safe means of getting to and from school could result in an increase of 10 to 19 school transportation fatalities annually.

After carefully considering the petition for rulemaking and all the above information, the agency is denying the petition.

The agency notes that part of the response repeats some discussion from the November 21, 2007 NPRM and the October 21, 2008 final rule comprising

<sup>5</sup> FMVSS No. 222 became effective on April 1, 1977.

RIN 2127-AK09, *supra*. The discussion is set forth again here because it is relevant, particularly because a large part of the petitioners' "facts which it is claimed establish that an order is necessary"<sup>6</sup> are not new, having been previously raised to the agency and to which NHTSA has responded. The agency is repeating some of the discussion set forth in the November 21, 2007 NPRM and the October 21, 2008 final rule for completeness, and to provide a context for discussion of the petition.

## Discussion

### Introduction

School buses are one of the safest forms of transportation in the United States. Every year, approximately 485,500 school buses travel approximately 4.2 billion miles to transport 23 million children to and from school and school-related activities.<sup>7</sup> The school bus occupant fatality rate of 0.23 fatalities per 100 million vehicle miles traveled (VMT) is nearly 6 times lower than the rates for passenger cars (1.29 per 100 million VMT<sup>8</sup>). The safety of current school buses was confirmed by NAS in 2002.<sup>9</sup>

The agency estimates that an average of 19 school-age children die in school bus-related traffic crashes<sup>10</sup> each year: 5 are occupants of school buses and 14 are pedestrians near the loading/unloading zone of the school bus.<sup>11</sup> These numbers do not include school-age children who are killed going to or from school using means other than by school buses.

The CAS petition cited an American Association of Pediatrics (AAP) analysis of the National Electronic Injury Surveillance System (NEISS). The AAP analysis indicated that there are 17,000 school bus-related nonfatal injuries annually, among which 7,200 were crash related, 4,060 were during boarding/alighting, 1,160 were slips/fall related, 860 were non-crash related, and

3,750 were of other/unknown cause. Among those injured in this study, 97 percent were treated and released from the hospital. Most of these injuries were of minor severity (sprains, strains, and bruises).

We agree with the petitioners that school bus crashes are an important public health priority. Due to regulation in this area and public interest in the safety of school buses, school buses are very safe vehicles. The Motor Vehicle and School Bus Safety Amendments of 1974, which amended the National Traffic and Motor Vehicle Safety Act (Vehicle Safety Act), directed NHTSA to issue motor vehicle safety standards applicable to school buses and school bus equipment. In response to this legislation, NHTSA revised several of its safety standards to improve existing requirements for school buses, extended ones for other vehicle classes to those buses, and issued new safety standards exclusively for school buses. FMVSS No. 222 was promulgated to improve protection to school bus passengers during crashes and sudden driving maneuvers.

Effective since 1977, FMVSS No. 222 contains occupant protection requirements for school bus seating positions and restraining barriers. Its requirements for school buses with GVWRs of 4,536 kilogram (kg) (10,000 pound (lb)) or less differ from those set for school buses with GVWRs greater than 4,536 kg (10,000 lb), because the "crash pulse," or deceleration, experienced by the small school buses is more severe than that of the large buses in similar collisions. For the small school buses, the standard includes requirements that all seating positions must be equipped with properly installed seat belts for passengers. NHTSA decided that seat belts were necessary on small school buses to provide adequate crash protection for the occupants.

For large school buses, FMVSS No. 222 relies on requirements for "compartmentalization" to provide passenger crash protection. Investigations of school bus crashes prior to issuance of FMVSS No. 222 found the school bus seat was a significant factor in causing injury. NHTSA found that the seat failed the passengers in three principal respects: By being too weak, too low, and too hostile (39 FR 27584; July 30, 1974). In response to this finding, NHTSA developed a set of requirements which comprise the compartmentalization system.

Compartmentalization ensures that passengers are cushioned and contained by the seats in the event of a school bus

crash by requiring school bus seats to be positioned in a manner that provides a compact, protected area surrounding each seat. If a seat is not compartmentalized by a seat back in front of it, compartmentalization must be provided by a padded and protective restraining barrier. The seats and restraining barriers must be strong enough to maintain their integrity in a crash yet flexible enough to be capable of deflecting in a manner which absorbs the energy of the occupant. They must meet specified height requirements and be constructed, by use of substantial padding or other means, so that they provide protection when they are impacted by the head and legs of a passenger. Compartmentalization minimizes the hostility of the crash environment and limits the range of movement of an occupant. The compartmentalization approach ensures that high levels of crash protection are provided to each passenger independent of any action on the part of the occupant to buckle up.

Nonetheless, throughout the past 34 years that compartmentalization and the school bus safety standards have been in effect, the agency has openly and continuously considered the consequences, pros and cons, of a seat belt requirement for large school buses. The most recent detailed discussion of the issue was in NHTSA's October 21, 2008 final rule.

### October 21, 2008 Final Rule

On October 21, 2008, the agency issued a final rule, *supra*, upgrading the passenger protection requirements for school buses. The NPRM preceding the final rule discussed the agency's considerations when we drafted the NPRM as to whether to propose requiring lap/shoulder belts in large school buses. We considered whether Federal enhancements on an already very safe vehicle were reasonable and appropriate, given the low safety need<sup>12</sup> and especially when the cost of installing and maintaining lap/shoulder belts on the buses could impact the ability of transportation providers to transport children to or from school or spend funds in other areas affecting pupil safety. After considering that large school buses were already very safe, and

<sup>6</sup> 49 CFR 552.4(c), Requirements for petition for rulemaking.

<sup>7</sup> Based on the 2006-07 school year, "School Bus Fleet, 2009 Fact Book," page 30.

<sup>8</sup> 2008 Traffic Safety Facts FARS/GES Annual Report, <http://www.nrd.nhtsa.dot.gov/Pubs/811170.pdf>.

<sup>9</sup> National Academy of Sciences, Special Report 269: The Relative Risks of School Travel: A National Perspective and Guidance for Local Community Risk Assessment, National Research Council, Washington, DC, September 2002.

<sup>10</sup> A school bus-related crash is a crash which involves, either directly or indirectly, a school bus body vehicle (e.g., a yellow school bus), or a non-school bus functioning as a school bus (e.g. a transit bus functioning as a school bus), transporting children to or from school or school-related activities.

<sup>11</sup> School Transportation-Related Crashes, Traffic Safety Facts 2008 Data, DOT HS 811 165.

<sup>12</sup> As indicated earlier, among 19 school-age child fatalities in school transportation-related crashes each year, 5 are passengers of school buses while 14 are killed outside the school bus at or near the loading/unloading zone, by motorists passing the bus or by the school bus itself. Children inside the bus are typically killed in crashes when they are in the direct zone of intrusion of the impacting vehicle or object, in such circumstances seat belts will not be effective in preventing the fatality.

after considering the possibility that seat belts on large school buses could affect school bus service and ridership, NHTSA decided not to propose to require lap/shoulder belts on large school buses.

The agency estimated the benefit that seat belts in large school buses may offer in frontal, side, and rollover crashes. For frontal crashes, we estimated the benefits of seat belts by using the sled test data obtained from NHTSA's 2002 school bus safety study. For estimating the incremental benefits of seat belts in rollover and side crashes, the agency used the effectiveness estimates of 74 percent for rollover crashes and 21 percent for side crashes attributed to seat belts in passenger cars.<sup>13</sup> We estimated that lap/shoulder seat belts would save about 2 lives per year and prevent about 1,900 crash injuries, of which 97 percent are of minor/moderate severity (mainly cuts and bruises), assuming every child wore them correctly on every trip.

The agency estimated that the incremental cost of installing lap/shoulder belts on a new 45-inch school bus seat to be \$467–\$599 and that on a 30-inch seat to be \$375–\$487. The incremental cost of newer seat designs that minimize any loss in seating capacity due to seat belts was estimated to be within these cost ranges. Assuming that an average large school bus has 11 rows of seats with 2 seats per row, we estimated the incremental cost of installing lap/shoulder belts in large school buses to be \$5,485–\$7,346. (This cost does not include added fuel costs to operate the buses, which would increase due to the added weight from the seat belt system and different school bus seats.) The benefits would be achieved at a cost of between \$23 and \$36 million per equivalent life saved. (This estimate of cost per equivalent life saved did not factor in increased fuel costs or the effect of the loss in seating capacity.)

After considering all available information, NHTSA was not able to conclude that there exists an

<sup>13</sup> The benefits analysis is explained in the Final Regulatory Evaluation (FRE), Final Rule to Upgrade School Bus Passenger Crash Protection in FMVSS Nos. 207, 208, 210, and 222, Docket No. NHTSA-2008-0163-0002, <http://www.regulations.gov>. We used the passenger car effectiveness estimates because real-world data on the effectiveness of seat belts on buses is not available. Data are available on the effectiveness of seat belts on passenger cars and light trucks. We used the passenger car effectiveness estimates to calculate the effectiveness of seat belts in school bus side impact and rollover events because the passenger car effectiveness is closer to what we expect for school buses. The light truck effectiveness estimates are highly influenced by ejections, which are not common in large school buses.

unreasonable risk of death or injury in an accident that justified an FMVSS requirement for seat belts on large school buses.<sup>14</sup> Aside from the fact that large school buses were already very safe, real world data showed that fatalities and injuries occurring in school bus loading/unloading zones, and fatalities and injuries associated with other school transportation modes (walking, biking, transporting in private vehicles), are significantly higher than those occurring in the school bus. The agency determined that a Federal requirement for seat belts to address fatalities and injuries on large school buses would not be appropriate since large school buses were very safe and the cost of such a requirement would likely impact the monies available to local jurisdictions to use toward their pupil transportation programs. The greater cost to buy and operate a school bus with seat belts may reduce the number of school buses available for pupil transportation and divert the limited school transportation funds away from important safety programs, such as driver and pupil training on safe loading/unloading practices.

In the October 2008 final rule, the agency affirmed that States and local jurisdictions should continue to have the choice of whether to order seat belts on their large school buses since belts could enhance compartmentalization. We stated our view that States and local school districts are better able to analyze school transportation risks particular to them and identify approaches to best manage and reduce those safety risks.

The agency encouraged local officials to make the decisions most appropriate for their individual needs to most safely transport their students to and from school. (Final rule, 73 FR at 62745.)

#### The Petition

The CAS petition requests the agency to mandate a lap/shoulder belt requirement for all seating positions on

<sup>14</sup> Under the Vehicle Safety Act, NHTSA is authorized to prescribe motor vehicle safety standards that are practicable, that meet the need for motor vehicle safety, and that are stated in objective terms. Under the Safety Act, "motor vehicle safety" means the performance of a motor vehicle or motor vehicle equipment in a way that protects the public against unreasonable risk of accidents occurring because of the design, construction, or performance of a motor vehicle, and against unreasonable risk of death or injury in an accident. \* \* \* 49 U.S.C. 30102(a)(8). After considering all available information, we could not conclude that a requirement for seat belts on large school buses would protect against an unreasonable risk of accident or an unreasonable risk of death or injury in an accident. 73 FR at 62745. Based on available information, we concluded that a science-based, data-driven determination that there should be a Federal requirement for seat belts could not be supported.

all school buses. The petitioners disagree with the agency's discussion in the November 21, 2007 NPRM and October 21, 2008 final rule on this subject (RIN 2127-AK09) and believe that the agency "ignored" NTSB recommendation NTSB/SIR-99/04 (1999).<sup>15</sup> NTSB/SIR-99/04 recommended, among other things, that NHTSA develop performance standards for school bus occupant protection systems that account for frontal impacts, side impacts, rear impacts, and rollovers (Recommendation H-99-45), and recommended that NHTSA require new school buses to have an occupant crash protection system that meets the new performance standards and retains passengers within the seating compartment throughout the accident sequence of all accident scenarios (H-99-46). The petitioners state that NTSB classified NHTSA's response to H-99-46 as "Closed—Unacceptable Action."<sup>16</sup>

The petitioners provided an overview of the development of seat belts in motor vehicles, starting in the 1950s, and expressed dissatisfaction with FMVSS No. 222 due to the standard's specifying, since 1977, requirements for compartmentalization for large school buses and not for seat belts. They base many of their arguments for a seat belt requirement on what they believe to be limitations of compartmentalization, views that were previously expressed, most recently in response to the 2007 NPRM of RIN 2127-AK09, by proponents of the opinion that NHTSA should require seat belts on large school buses.

The petitioners cite an NTSB Highway Accident Brief<sup>17</sup> regarding a May 28, 2008, school bus rollover accident near Milton, Florida, in which all the passengers were wearing lap belts and only one sustained a serious injury (according to the NTSB, the injury was possibly due to a loosely worn belt.) The NTSB determined that injury severity in the Milton, Florida crash "was mitigated by the use of lap belts." The petitioners state that NTSB referred to a similar rollover crash in

<sup>15</sup> National Transportation Safety Board, Highway Special Investigation Report, Bus Crashworthiness Issues, September 21, 1999.

<sup>16</sup> With regard to H-99-45, the NTSB explains in the Highway Accident Brief NTSB/HAB-9/03, footnote 4 that "[t]he Board's vote on the status of Safety Recommendation H-99-45 was split, with two members voting 'Closed—Acceptable Alternative Action' and two members voting 'Closed—Unacceptable Action.' As a result of the split vote, Safety Recommendation H-99-45 remained 'Open—Acceptable Response.'"

<sup>17</sup> National Transportation Safety Board, Highway Accident Brief, School Bus Loss of Control and Rollover, Interstate 10, Near Milton, Florida, May 28, 2008, NTSB/HAB-09/03.

Flagstaff, Arizona, on August 14, 1996. In the Arizona crash, the large school bus did not have passenger seat belts, and the accident resulted in multiple ejections and one passenger sustaining lifetime crippling injuries.<sup>18</sup>

The petitioners also believe that NHTSA should require seat belts on large school buses because there has been a "thirty-year history of failure by school districts and states to voluntarily install belts on large school buses." The petition refers to a January 9, 2010 fatal crash in Hartford, Connecticut, involving a school bus carrying 16 students and 2 adult passengers, which did not have seat belts.<sup>19</sup> The petition states that following the crash, there was a State move to require seat belts on school buses, but it was unsuccessful. "History has demonstrated that \* \* \* voluntary implementations by school authorities are extremely rare unless the vehicle construction improvement is required by law or regulatory standard at time of manufacture."

#### *NHTSA Response to Petition*

NHTSA has considered the question of whether seat belts should be required on large school buses from the inception of compartmentalization and the school bus safety standards and has reassessed its decisions repeatedly. Each time, after analyzing the implications of a seat belt requirement and all available information, we have concluded that a seat belt requirement for large school buses has not been shown to be warranted.

We have discussed our position regarding the need for seat belts on large school buses at length in the 2007 NPRM and 2008 final rule documents of RIN 2127-AK09. To the extent the petitioners' assertions are repetitive of previously discussed points-of-view, our positions on the issues are set forth at length in the November 21, 2007 and October 21, 2008 preambles, and are summarized above. For plain language purposes and to avoid redundancy when possible, we do not repeat the detailed discussion here; interested persons can review those documents for the agency's full response to the issues. In Appendix A of today's document, we address a few miscellaneous issues the petitioners raised, in a question-and-answer format.

<sup>18</sup> The NTSB/HAB-09/03 calls the Florida and Arizona accidents "comparable." The NTSB document does not have a statement about the possible effect of belts in the Arizona accident.

<sup>19</sup> According to the petitioners, the school bus "crashed through a roadside guardrail, plummeted down a 20-foot drop-off, and ended in the ravine below. One child was killed, and fifteen were injured."

We carefully considered NTSB's recommendation H-99-46 when we developed the 2007 NPRM and 2008 final rule documents. We recognized in the RIN 2127-AK09 rulemaking that seat belts in large school buses may have some effect on reducing the risk of harm in frontal, side and rollover crashes, since seat belts can help restrain occupants within the seat and prevent their ejection and impact with interior surfaces. We estimated that in frontal, side and rollover crashes, lap/shoulder belts would save 2 lives annually.<sup>20</sup>

After considering all views, including H-99-46, we could not agree with those asking us to propose to require seat belts on large school buses. We assessed the safety need for seat belts. Since school buses are already very safe and are the safest mode of school transportation, a seat belt mandate would result in very few benefits.

We also weighed that safety need against possible negative consequences of requiring seat belts on large school buses. The greater cost to purchase and operate a large school bus with seat belts may reduce the number of school buses available for pupil transportation, and/or divert limited school transportation funds away from other necessary safety programs, such as driver and pupil training on safe loading/unloading practices. We determined that it would be inappropriate for NHTSA to require seat belts given the low safety need for the belts, when such a decision has a direct bearing on the ability of the local decision-makers to allocate and spend limited pupil transportation resources on other school transportation safety needs that are likely to garner greater benefits, perhaps at lower cost.

It bears repeating that the agency has been acutely aware that a decision on requiring seat belts in large school buses cannot ignore the implications of such a requirement on pupil transportation costs. The agency has been attentive to the fact that, as a result of requiring belts on large school buses, school bus purchasers would have to buy and operate belt-equipped vehicles regardless of whether seat belts would

<sup>20</sup> This number is low because in side crashes, children are typically killed when they are in the direct zone of intrusion of the impacting vehicle or object. Seat belts would be unlikely to be effective in preventing the side crash fatality. NHTSA is conducting research to determine how the passenger compartment can be made more protective to mitigate injurious impacts with interior surfaces. In rollover crashes, seat belts are effective in mitigating occupant ejections, but real world data show that school bus passenger fatalities and injuries in rollover events are rare (8 serious injuries and 2 fatalities annually).

be appropriate for their needs. NHTSA has concluded that those costs should not be imposed on all purchasers of school buses when large school buses are currently very safe. In the area of school transportation especially, where a number of needs are competing for limited funds, we did not believe there was reason to limit the policymaking discretion of the States and local governments in deciding school transportation issues.

As presented later in this document, our analysis shows that a National lap/shoulder belt requirement for large school buses could result in an increase of 10 to 19 student fatalities annually in the U.S. A State or local jurisdiction, that is able to, could adjust its budget in the face of a seat belt mandate to avoid impacting its pupil transportation safety program in a manner that might result in this net increase in student fatalities. However, each State or local jurisdiction will differ in its ability to adjust to the cost impacts of a belt mandate. Moreover, even if a State or local jurisdiction were able to adjust its budget, the soundness of a public policy that imposes this burden on State or local jurisdictions is debatable when the incremental benefit from seat belts on large school buses is so low. We believe that the decision to reallocate local resources to account for a seat belt mandate should be a matter left to the policymaking discretion of the State or local authorities.

It is true that seat belts have been proven beneficial in rollover crashes. However, real world data show that school bus passenger fatalities and injuries in rollover events are rare. The CAS petition cites two school bus accidents in support of its position that there is a safety need for seat belts on large school buses. We cannot agree that citing to these rare instances of fatal rollover crashes forms the basis for a finding of a problem of national significance that warrants trumping local policymaking on this matter.

Under the Vehicle Safety Act, the Federal motor vehicle safety standards we issue must "meet the need for motor vehicle safety." "Motor vehicle safety" means the performance of a motor vehicle or motor vehicle equipment in a way that protects the public against unreasonable risk of accidents occurring because of the design, construction, or performance of a motor vehicle, and against unreasonable risk of death or injury in an accident \* \* \* 49 U.S.C. 30102(a)(8). In large school buses, fatal rollover crashes are rare (approximately 1 crash per year, resulting in 2 fatalities annually), as are fatal side impact crashes in which seat belts would have



prevented death or serious injury. Fatal non-rollover frontal crashes in large school buses are uncommon (less than 1 crash per year). Large school buses are already very safe vehicles. More important, as explained below, requiring seat belts on large school buses is likely to have the effect of increasing fatalities related to school transportation. After considering all available information, we cannot conclude there is an unreasonable risk of death or injury in an accident that warrants a Federal requirement for seat belts on large school buses.

#### *The Role of States and Local School Districts*

The petitioners state a Federal requirement for seat belts on large school buses is needed because there has been a "thirty-year history of failure by school districts and states to voluntarily install belts on large school buses."

We strongly disagree with characterizing a State's decision not to order seat belts on large school buses as a "failure." We believe that it is most appropriate if the decision to order seat belts on large school buses were left to the States and local jurisdictions rather than to NHTSA. 73 FR at 62750. States and local school districts are better able to recognize and analyze school transportation risks particular to their areas and identify approaches to best manage and reduce those safety risks. Local officials are in the best position to decide whether to purchase seat belts, since the officials must weigh a multitude of unique considerations bearing on purchasing decisions, especially when faced with budgetary constraints. Contrary to the petitioners' view, we believe that if, after weighing all the considerations, a purchaser decides not to purchase the belts, then the purchaser is determining what is best for its needs. 73 FR at 62752.

An example of a State's undertaking a comprehensive assessment of whether to purchase belts for large school buses is illustrated by the State of Alabama. Its study is summarized below.

#### *Alabama Study Group on School Bus Seat Belts*

On September 30, 2010, at the direction of Alabama Governor Bob Riley, Alabama issued a comprehensive study evaluating the need for seat belts in its school buses.<sup>21</sup> Governor Riley

<sup>21</sup> Turner, D., Anderson, K., Tedla, E., Lindly, J., Brown, D., "Cost-Effectiveness of Lap/Shoulder Seat Belts on Large Alabama School Buses," September 30, 2010. [https://docs.alsde.edu/documents/120/Pilot\\_Project\\_Cost\\_Effectiveness.pdf](https://docs.alsde.edu/documents/120/Pilot_Project_Cost_Effectiveness.pdf).

had formed a Study Group on School Bus Seat Belts in the wake of a tragic school bus crash in Huntsville<sup>22</sup> that took the lives of four students in November 2006. The Study Group's report, "Cost-Effectiveness of Lap/Shoulder Seat Belts on Large Alabama School Buses," was issued as part of an Alabama School Bus Seat Belt Pilot Project. The project was conducted for the Alabama State Department of Education and the Governor's Study Group on School Bus Seat Belts by the University Transportation Center for Alabama, at the University of Alabama in Huntsville.

The goal of the project was to explore the implementation of lap/shoulder belts on newly-purchased large school buses in Alabama. The study included determining the rate of seat belt use, the effects on bus discipline, the attitudes of other stakeholders, the loss of capacity attributable to seat belts, and cost effectiveness of requiring lap/shoulder seat belts. The study also considered flexible seating systems in its analysis.<sup>23</sup>

The study found that school buses in Alabama travelled 83 million miles in 2009–2010 and on an average had 560 traffic crashes annually. The authors noted that school bus crashes per mile travelled is significantly lower than that of other vehicles in the State. In addition, since 1976, there were only five pupil fatalities inside of Alabama school buses.

As part of the pilot project, 12 school buses in the state were equipped with lap/shoulder belts. Researchers observed over 125,000 pupils inside the school buses, and determined that the average seat belt use in Alabama school buses was approximately 61.5 percent. Seat belt use was found to be quite variable in different buses, ranging from 4.8 to 94.5 percent. The study noted a 5 to 18 percent reduction in seating capacity of school buses with seat belts.

The study reported that the estimated net benefit of implementing seat belts on Alabama school buses was –\$104 million to –\$125 million. The net benefit is negative because the cost of the seat belts exceeds the benefit.

The authors of the study recommended using more cost-effective safety measures, other than implementing seat belts across Alabama's large school bus fleet. Most

<sup>22</sup> National Transportation Safety Board, NTSB/HAB–09/02, Highway Accident Brief: School Bus Bridge Override Following Collision With Passenger Vehicle, Huntsville, Alabama, November 20, 2006, adopted November 2009.

<sup>23</sup> These newly-developed seating systems have lap/shoulder belts and are reconfigurable to accommodate either three smaller students or two larger students.

school bus pupil fatalities in Alabama occur outside the buses, in or near loading/unloading zones. The authors concluded that if funding is to be spent on school bus safety, more lives could be saved by investing in enhanced safety measures in loading/unloading zones.

NHTSA believes that the Alabama study reinforces the view that a Federal mandate requiring seat belts on large school buses would be an overreaching venture for the agency. States such as Alabama have decided that more lives would be saved in the State if its resources were spent on safety measures other than the installation of seat belts. Given the limited safety need at issue, we are not convinced there is merit for NHTSA to override a State's conclusions.

The petitioners were unsatisfied that only six States have laws requiring seat belts on large school buses. We do not view this low number as an indicator that the States have "failed." Instead, we see it as a reflection of a stance taken by the States that their efforts and monies are better spent trying to keep children safe other than by the installation of seat belts on vehicles that are already very safe. For States such as Alabama, it is a decision taken after a thorough consideration of the issue.

#### *NHTSA Analysis on the Changes in School Transportation Fatalities Due to a Seat Belt Requirement on Large School Buses*

NHTSA conducted an analysis of accident data to estimate, in a manner not previously explored, how a National lap/shoulder belt requirement for large school buses might affect the current pupil transportation arena as it is today. The analysis illustrates that a National lap/shoulder belt requirement could result in more children's lives lost than saved.

The 2002 NAS study described earlier in this document indicated that the safest means for students to get to school<sup>24</sup> is by a school bus. Among school-aged children killed annually in motor vehicle crashes during normal school travel hours, only 0.5 percent were passengers on school buses and 1.5 percent were pedestrians involved in school bus-related crashes. Seventy-five percent of the annual fatalities were to occupants in passenger vehicles and 24 percent were to those walking or riding a bicycle.

Yet, there are many ways to get to school. If a school bus is not used to transport a child to school, other means

<sup>24</sup> By "school," we mean to or from school or related events. See 49 CFR 571.3, "school bus."

will be used to get to school. Those other means of getting to school are associated with higher safety risks.

In previous documents, NHTSA has expressed concern that, when making regulatory decisions on possible enhancements to school bus safety, the agency must bear in mind how improvements in one area might have an adverse effect on programs in other areas. The net effect on safety could be negative if the costs of purchasing and maintaining the seat belts and ensuring their correct use results in non-implementation or reduced efficacy of other pupil transportation programs that affect child safety. For example, if school bus service were reduced because of the costs to purchase and operate large seat belt-equipped school buses, more children would have to get

to school using alternative, less safe ways to get to school.

NHTSA has analyzed accident data to estimate possible consequences on overall school transportation fatalities and injuries if a Federal requirement for seat belts on large school buses were adopted.<sup>25</sup> NHTSA used data from the School Bus Fleet, 2010 Fact Book, the 2009 National Household Travel Survey,<sup>26</sup> and the Fatality Analysis Reporting System (FARS). To analyze the effects of lap/shoulder belts on the demand for school buses, we applied the theory of elasticity of demand. Elasticity is an economic term that measures responsiveness of one economic variable to a change in another economic variable. In this case, we are examining the change in demand for school buses when there is an increase in the cost of a bus.

FARS data files for the period 2000 to 2008 were analyzed to determine the number of school-age children killed in motor vehicle crashes during the time of school transportation to and from school (Monday to Friday between 6 AM to 9 AM and 2 PM to 5 PM) of the school year (September 1 to June 15). As shown in Table 1 below, the analysis showed that among 6,869 fatalities of school-age children (5–18 year olds), 0.5 percent were occupants in school buses, 78.6 percent were in passenger vehicles, 12.1 percent were pedestrians, 4.9 percent were motorcycle riders and occupants of other vehicles, and 3.5 percent were pedalcyclists. Only 3.8 percent of the 6,869 fatalities were in school bus-related crashes<sup>27</sup> among which a majority were passenger vehicle occupants and pedestrians as shown in Table 1.

**TABLE 1—SCHOOL-AGE CHILDREN (5–18 YEAR-OLD) KILLED IN MOTOR VEHICLE TRAFFIC CRASHES DURING NORMAL WEEKDAY SCHOOL TRANSPORTATION HOURS (MONDAY–FRIDAY, 6 A.M.–9 A.M. AND 2 P.M.–5 P.M.) OF THE SCHOOL YEAR (SEPTEMBER 1–JUNE 15) CATEGORIZED BY MODE OF TRANSPORTATION AND WHETHER THE CRASH WAS SCHOOL BUS-RELATED. FARS 2000–2008**

School-age children (5–18 year-old)	Not school bus-related		School bus-related		Total	
	Number	Percent	Number	Percent	Number	Percent
Occupant in School Bus Body Type Vehicle or Vehicle Used as School Bus .....	** 1	0.0	37	0.5	38	0.55
Occupant of Other Bus Type .....	2	0.0	0	0.0	2	0.0
Passenger Vehicle Occupant .....	5268	76.7	131	1.9	5399	78.6
Motorcycle Rider .....	128	1.9	3	0.0	131	1.9
Occupant of All Other Vehicle Types .....	198	2.9	5	0.1	203	3.0
Pedestrian .....	748	10.9	81	1.2	829	12.1
Bicyclist .....	233	3.4	6	0.1	239	3.5
Other/Unknown .....	27	0.4	1	0.0	28	0.4
<b>Total .....</b>	<b>6605</b>	<b>96.2</b>	<b>264</b>	<b>3.8</b>	<b>6869</b>	<b>100.0</b>

\*\* A van-based school bus that was not functioning as a school bus at the time of the crash.

Table 2, below, shows the student miles traveled in the different school transportation modes, obtained from the 2009 National Household Travel

Survey. Among 123,266 million miles traveled annually by school-age children to and from school, 69.5 percent was in passenger vehicles, 25.3

percent was in school buses, 2.1 percent was walking and 0.4 percent was riding a bicycle.

**TABLE 2—DISTRIBUTION OF STUDENT MILES TRAVELED TO-AND-FROM SCHOOL AND SCHOOL-RELATED ACTIVITIES BY TRANSPORTATION MODE**

[Source: National Household Travel Survey—2009]

Mode of travel	Million miles traveled			
	Morning	Afternoon	Total	Percent
School Buses .....	15407.6	15793.7	31201.3	25.3
Other Buses .....	868.8	977.5	1846.4	1.5
Passenger Vehicles .....	39752.7	45975.3	85728.0	69.5
Pedestrian .....	904.6	1629.4	2534.0	2.1
Bicycles .....	137.0	320.2	457.2	0.4
Other (Motorcycle, Other Vehicles) .....	429.5	816.2	1245.7	1.0

<sup>25</sup> "Changes in School Bus Travel by Requiring Lap/Shoulder Belts and the Effect on Fatalities." National Highway Traffic Safety Administration, February 2011. A copy has been placed in the docket for today's document.

<sup>26</sup> 2009 National Household Travel Survey: U.S. Department of Transportation, Federal Highway Administration, February, 2011, <http://nhts.ornl.gov/download.shtm>.

<sup>27</sup> A school bus-related crash is a crash which involves, either directly or indirectly, a school bus body vehicle, or other type of bus functioning as a school bus, transporting children to or from school or school-related activities.

TABLE 2—DISTRIBUTION OF STUDENT MILES TRAVELED TO-AND-FROM SCHOOL AND SCHOOL-RELATED ACTIVITIES BY TRANSPORTATION MODE—Continued

[Source: National Household Travel Survey—2009]

Mode of travel	Million miles traveled			
	Morning	Afternoon	Total	Percent
Unknown .....	236.0	18.1	254.1	0.2
Total .....	57736.2	65530.3	123266.5	.....

In order to determine the number of fatalities per 100 million miles traveled by school-age children to and from school and school-related activities, the fatality data for the years 2000–2008 (Table 1) were used along with the estimates of student miles traveled to

and from school in 2009<sup>28</sup> shown in Table 2. An estimate of annual fatalities for each school transportation mode was determined by dividing the number of fatalities in 2000–2008 (from Table 1) by 9. The school-age child fatalities per 100 million miles traveled to and from

school was determined by dividing the average annual fatalities for each transportation mode by the corresponding total miles traveled in that mode (Table 2). This analysis is shown in Table 3.

TABLE 3—NUMBER OF SCHOOL-AGE CHILD FATALITIES PER 100 MILLION MILES TRAVELED BY STUDENTS TO AND FROM SCHOOL AND SCHOOL-RELATED ACTIVITIES

Mode of travel	Number of fatalities 2000–2008	Annual fatalities	Miles traveled in 2009 (million miles)	Fatalities per 100 million miles
School Buses .....	* 37	4.1	31201.3	0.01
Other Buses .....	* 3	0.3	1846.4	0.02
Passenger Vehicles .....	5399	599.9	85728.0	0.70
Pedestrian .....	829	92.1	2534.0	3.64
Bicycles .....	239	26.6	457.2	5.81
Other (Motorcycle, Other Vehicles) .....	334	37.1	1245.7	2.98
Unknown .....	28	3.1	254.1	1.22

\* The van-based school bus in Table 1 that was not functioning as a school bus at the time of the crash was put in the category "other buses" in Table 3.

In order to evaluate the change in fatality due to a Federal requirement for seat belts on all school buses, the agency examined different types of bus seats with seat belts, their costs, and any changes in seating capacity in the bus by replacing existing seats with seats with seat belts. In the October 2008 final rule, the agency estimated that the cost of a large school bus (66–72 passengers) without seat belts is \$75,000 and the incremental cost of adding seat belts on large school buses is \$5,485 to \$7,345 per bus. Some State officials have suggested that seats with seat belts cost closer to \$10,296.<sup>29</sup> The agency estimated that these seats with seat belts could result in a loss in bus capacity by as much as 17 percent, depending on the mix of students riding in the buses.

In recent years, flexible school bus seat designs (flex-seats) have emerged in the marketplace where lap/shoulder

belts on these bench seats can be adjusted to provide two lap/shoulder belts for two average-size high school students or three lap/shoulder belts for three elementary school students. These flex-seats with seat belts offer the potential for maintaining the original bus capacity. We do not have cost estimates for flex-seats but expect it to be in the range of the high cost estimate (\$10,296). To estimate the maximum benefit for lap/shoulder belts, we only considered the flex-seat designs which can potentially limit any loss in bus capacity. Therefore, the percentage increase in cost of a large school bus with lap/shoulder belts without any resulting loss in capacity is 13.7 percent (= \$10,296/\$75,000).

For determining the effect on demand for school buses due to an increase in cost<sup>30</sup> of a new bus, we estimated a Price Elasticity of Demand (PED) value

for school buses. PED is a measure of the responsiveness of the quantity demanded of a good or service to the change in its price and is calculated as the percent change in the quantity demanded divided by the percent change in price.<sup>31</sup> In this case, we are assessing the percentage change in the number of new school buses purchased by school districts, for a percentage change in the price of new school buses due to a requirement for lap/shoulder belts.

In economic terms, the overriding factor in determining the PED is the willingness and ability of consumers after a price change to postpone consumption decisions concerning the good and to search for substitutes. A number of factors can thus affect the PED of a good or service including:

1. *The availability of substitute goods and services:* The more easily available

<sup>28</sup> The distribution of student travel modes has not changed by much since the 2002 National Household Transportation survey.

<sup>29</sup> Presentation by Charlie Hood, Director of Student Transportation in the Florida Department of Education at the July 11, 2007 Public Meeting

on the issue of seat belts in large school buses, Docket No. NHTSA–2007–28103–0016, <http://www.regulations.gov>.

<sup>30</sup> This cost does not include operating and maintenance costs (such as additional fuel cost due

to increase in weight of the bus and additional cost to maintain seat belts).

<sup>31</sup> PED = (percentage change in quantity demanded) / (percentage change in price).

the substitute goods and services, the higher the PED is likely to be.

2. *Percentage of Income:* The higher the percentage of the consumer's income that the good or service represents, the higher the PED tends to be.

3. *Necessity:* The more necessary the good or service is, the lower the PED for the good or service.

4. *Duration of price change:* The longer the price change holds, the higher the PED is likely to be since there is more time available to find substitutes.

5. *Who pays:* When the purchaser does not directly pay for the good, the PED is likely to be lower.

Various research methods are used to calculate PEDs in real life, including analysis of historic sales data and surveys of customer preferences. To determine the PED for school bus transportation, the agency examined PEDs associated with public transportation.<sup>32</sup> The bus transit fare PED values, published by the American Public Transportation Association (APTA) and widely used for transit planning and modeling in North America, suggest PED values in the range of 0.36 to 0.43. This APTA estimate was based on a study of the short-term (less than two years) effects of fare changes in 52 U.S. transit systems during the late 1980s. Based on extensive research, Transportation Research Laboratory (TRL)<sup>33</sup> calculated

that bus fare PED values average around 0.4 in the short-run, 0.56 in the medium run, and 1.0 over the long run, while metro rail fare elasticities are 0.3 in the short run and 0.6 in the long run.

We believe that the PED estimates for school bus transportation are likely to be similar to that for transit systems since the alternative services are similar (use of personal car, walking, or biking). Since a mandate for seat belts on school buses would not be a temporary cost increase and would be applicable to all new buses sold after the compliance date of such a rule, we are only considering PED in the long run. The cost of school bus transportation is an indirect cost to the consumer; therefore, we expect the PED for school buses to be a little lower than the estimates of PED in the long run for transit buses and metro rail. We do not expect the PED value for school bus transportation to be equal to 1.0<sup>34</sup> because we expect that school districts will find creative ways to maximize school transportation service in spite of the added cost of new school buses.<sup>35</sup> Therefore, based on the available PED values for transit systems, we estimate PED values for school bus transportation to range between 0.35 and 0.6.

When school district officials are faced with installing lap/shoulder belts in school buses, they will purchase the number of buses according to their budget. If their budget is limited, using PED values from 0.35 to 0.6 for school

buses, a 13.7 percent increase in the price of a school bus would result in a 4.795 (13.7 × 0.35) percent to 8.22 (13.7 × 0.6) percent decrease in quantity demanded. We have assumed that the percentage decrease in the demand for school buses results in a similar decrease in school bus ridership (in this case, decrease in student miles traveled in school buses). The decrease in school bus ridership would result in students taking other modes of transportation to and from school. We assume that the students who no longer can take the school bus would adopt a mode of travel roughly in the same proportion as that being used currently by those who do not use the school bus.

Thus, we distributed the decrease in student miles traveled by school buses among the other modes of travel in accordance with the proportion of vehicle miles traveled in non-school bus travel modes presented in Table 2, above. Based on the redistributed student miles traveled, we estimated the number of fatalities associated with the different transportation modes, using the fatalities per 100 million vehicle miles traveled for the different transportation modes in Table 3, above. Table 4 presents the redistribution of vehicle miles traveled and the resulting number of fatalities for an 8.22 percent reduction in vehicle miles traveled in school buses (corresponding to a PED of 0.6).

TABLE 4—STUDENT MILES TRAVELED AND ANNUAL FATALITIES FOR BASELINE CONDITION (NO SEAT BELTS ON SCHOOL BUSES) AND REDISTRIBUTED VEHICLE MILES TRAVELED AND ASSOCIATED ANNUAL FATALITIES FOR A REDUCTION IN SCHOOL BUS MILES TRAVELED BY 8.22 PERCENT CORRESPONDING TO A PED = 0.6

Mode of travel	Miles traveled (millions)		Annual fatalities	
	Baseline (table 3)	Redistributed <sup>1</sup>	Baseline (table 3)	Redistributed <sup>2</sup>
School Buses .....	31201.3	28636.6	4.1	3.8
Other Buses .....	1846.4	1897.8	0.3	0.3
Passenger Vehicles .....	85728.0	88116.2	599.9	616.6
Pedestrian .....	2534.0	2604.6	92.1	94.7
Bicycles .....	457.2	469.9	26.6	27.3
Other (Motorcycle, Other Vehicles) .....	1245.7	1280.4	37.1	38.1
Unknown .....	254.1	261.1	3.1	3.2
<b>Total .....</b>	<b>123266.5</b>	<b>123266.5</b>	<b>763.2</b>	<b>784.0</b>

<sup>1</sup> School bus miles traveled were reduced by 8.22 percent of the baseline and these miles were redistributed according to the proportion of vehicle miles traveled in non-school bus transportation modes in Table 2. This column represents the student miles traveled to and from school in the various transportation modes when all school buses have seat belts.

<sup>2</sup> The redistributed annual fatalities were computed by multiplying the fatalities per 100 million miles (last column in Table 3) with the redistributed miles traveled in this table. This column represents the number of fatalities due to a reduction of school bus service by 8.22 percent.

<sup>32</sup> Transportation Elasticities—How Prices and other Factors Effect Travel Behavior, Transportation Demand Management (TDM) Strategies Encyclopedia, Victoria Transport Policy Institute, [http://www.vtpi.org/tdm/tdm11.htm#\\_Toc161022586](http://www.vtpi.org/tdm/tdm11.htm#_Toc161022586).

<sup>33</sup> TRL (2004). *The Demand for Public Transit: A Practical Guide*, Transportation Research

Laboratory, Report TRL 593 (<http://www.trl.co.uk>); at <http://www.demandforpublictransport.co.uk>. This 240-page document is a detailed analysis of factors that affect transit demand, including demographic and geographic factors, price, service quality and the price of other modes.

<sup>34</sup> PED = 1.0 implies that the percentage decrease in the number of school buses bought by a school

district is equal to the percentage increase in the cost of a new school bus.

<sup>35</sup> One such option would be reducing operations to a 4-day school week which is currently under consideration in 13 percent of the school districts nationwide. NAPT School Bus Fleet Magazine, June 2010.

In the October 21, 2008 final rule, the agency estimated that seat belts on school buses would prevent 2 fatalities annually. Therefore, the annual redistributed school bus fatalities in Table 4 are reduced by 2 due to seat belts (*i.e.*,  $3.8 - 2 = 1.8$ ). Similarly, the total number of school transportation fatalities when all school buses are required to have seat belts is 782 (*i.e.*,  $784 - 2 = 782$ ). This total number is 18.8 fatalities more than the baseline when seat belts are not required on school buses. Therefore, for a PED = 0.6 for school buses, the requirement for seat belts on school buses would result in 18.8 more school transportation-related fatalities per year even though seat belts are expected to save 2 lives annually. Using a PED = 0.35 (the lower estimate of the PED range), the number of redistributed fatalities is 775.4. After subtracting the estimated 2 lives saved by seat belts on school buses, the increase in school transportation fatalities when all school buses are required to have seat belts is 10.2 compared to the baseline.

This analysis suggests that there could be an overall increase of 10.2–18.8 school transportation fatalities if seat belts are required on all school buses. The cost estimates used in this analysis assume that there is no loss in capacity. Since school buses are the safest form of school transportation, any reduction in capacity per bus will result in more school transportation fatalities than when there is no loss in capacity. The cost estimates in our analysis also do not account for added fuel costs that would incur due to more fuel being used to operate heavier school buses equipped with seat belt systems.

#### Conclusion

After carefully considering all aspects of the petition, the agency has decided to deny it. In the 2007 NPRM and 2008 final rule documents, we considered but did not agree with NTSB's recommendation H–99–46 to the extent that the recommendation asked NHTSA to require lap/shoulder belts on large school buses. The petitioners have not presented information to suggest that the agency's decision not to require lap/shoulder belts on large school buses was incorrect.

The agency's latest analysis indicates that a requirement for lap/shoulder belts on all school buses may result in an additional 10 to 19 school transportation fatalities than currently where there is no such Federal requirement. A State or local jurisdiction, that is able to, could adjust its budget to avoid impacting its pupil transportation safety program in a

manner that might result in this net increase in student fatalities in the face of a seat belt mandate. However, we believe that the decision to reallocate local resources to account for seat belts should be a matter left to the policymaking discretion of the State or local authorities. Large school buses are already very safe. States or local authorities should continue to have the discretion to decide whether their efforts and monies should be spent on seat belts on large school buses, or on measures that could be more effective in improving pupil transportation safety.

In accordance with 49 CFR part 552, this completes the agency's review of the petition for rulemaking.

Authority: 49 U.S.C. 322, 30111, 30115, 30117, and 30162; delegation of authority at 49 CFR 1.50 and 501.8.

Issued on: August 18, 2011.

Christopher J. Bonanti,  
Associate Administrator for Rulemaking.

#### Appendix A: Miscellaneous Issues Raised by the Petitioners

**Question 1.** Why doesn't NHTSA require seat belts on large school buses when NHTSA's April 2002 report to Congress<sup>36</sup> on school bus safety showed that lap/shoulder belts offered the best level of protection compared to lap belts or compartmentalization alone? Didn't the 2002 NHTSA report show that head injury criterion (HIC) measurements were significantly lower for lap/shoulder belts than for compartmentalization and the seat belts kept the dummies in their seats?

**Answer:** NHTSA's 2002 school bus safety study results provided information about potential enhancements to large school bus occupant protection that could be achieved through the use of lap/shoulder seat belts. The study involved simulations of a 48 km/h frontal crash test of a large school bus (Type C) into a rigid barrier using a test sled and various test dummies (representing 50th percentile adult male, 5th percentile adult female, and a 6-year old child) in various seat and restraint configurations. The HIC measurements were low and below the injury assessment reference values (IARV)<sup>37</sup> for all the dummies in all the restraint environments (compartmentalization with low and high seat backs, lap belts, and lap/shoulder belts) except for the unrestrained 50th percentile male dummy in some tests with low seat back height where the dummy overrode the seat and contacted the dummy in front. This issue was addressed in the 2008 final rule by requiring higher seat back heights (increased from 20 inches to 24

inches) to enhance protection through compartmentalization for larger occupants. The neck injury measures were above the IARV in some tests with the unrestrained 6-year-old child and 5th percentile female dummy while they were below the IARVs when restrained by lap/shoulder belts. However, neck injuries are rare in real world crashes so it is unclear how representative the laboratory tests were of the real world condition, *e.g.* how representative the test dummies were of humans, the sled test of an actual vehicle crash, and the magnitude of the crash replicated as compared to real-world school bus crashes. Nevertheless, the agency used these test results to determine the incremental benefits garnered in frontal crashes by the addition of lap/shoulder belts to large school bus seats and is presented in detail in NHTSA's Final Regulatory Evaluation (FRE)<sup>38</sup> accompanying the 2008 final rule. The FRE determined that the addition of lap/shoulder belts in large school buses would save 0.55 lives and 750 injuries (97 percent of which are minor/moderate severity) in frontal school bus crashes for 100 percent correct seat belt use. Using effectiveness estimates for lap/shoulder belts of 74 percent in rollover and 21 percent in side impacts, the FRE estimated that lap/shoulder belts on large school buses would save 1.33 lives in rollover and 0.25 lives in side impacts crashes when all occupants use their seat belts. These benefits are relatively low since school buses (with high back seats for effective compartmentalization) are already very safe and are the safest mode of transportation to and from school. The cost-benefit analysis in the FRE found that installing lap/shoulder belts on all new large school buses would cost \$183–\$252 million annually and save 2 lives and 1,900 injuries per year for 100 percent correct belt use.

Due to the limited funds available for school transportation, a Federal requirement for seat belts on all school buses may reduce school bus service and as a result school bus ridership. We are concerned that the reduced bus ridership may result in more student fatalities, since riding in private vehicles is less safe than riding a large school bus without seat belts. Our analysis presented in this notice shows that a Federal mandate for seat belts on large school buses could result in 10–19 more school children being killed annually while traveling to and from school. Therefore, the agency continues to not support a Federal requirement for seat belts on large school buses. We believe that States and local school districts are better able to analyze school transportation risks particular to them and identify approaches to best manage and reduce these safety risks. The final rule, while not requiring seat belts on large school buses, provides appropriate performance requirements for these systems if school districts determine that seat belt installation is in their best interest.

**Question 2.** In a document submitted after publication of the October 21, 2008 final rule, Public Citizen (PC) submitted a post-final

<sup>36</sup> National Highway Traffic Safety Administration. Report to Congress—School Bus Safety: Crashworthiness Research, April 2002. <http://www.nhtsa.gov/DOC/NHTSA/NRD/Multimedia/PDFs/Crashworthiness/SchoolBus/SBReportFINAL.pdf>.

<sup>37</sup> Injury assessment in accordance with that specified in FMVSS No. 208, "Occupant crash protection".

<sup>38</sup> Final Regulatory Evaluation of the Final Rule to Upgrade School Bus Passenger Crash Protection in FMVSS Nos. 207, 208, 210, and 222, October 2008, Docket No. NHTSA–2008–0163–0002. <http://www.regulations.gov>.

rule comment objecting to NHTSA's decision not to require lap/shoulder belts on large school buses. For a summary of the comment, see 75 FR at 66694. Among other things, PC objected to the cost and benefit analysis of the Final Regulatory Evaluation (FRE). PC raised the question: why didn't the FRE "discuss the effect of 'economies of scale' in reducing the incremental cost of adding belts to the buses \* \* \* Economies of scale and learning by doing can significantly reduce costs, but NHTSA's economic analyses makes no mention of these efforts."

*Answer:* We have evaluated this comment and do not believe that the "economies of scale" and "learning by doing" will significantly reduce the cost of requiring lap/shoulder belts in large school buses. The lap/shoulder belts in large school buses are similar to the lap/shoulder belts that are sold for the many millions of light duty vehicles, so the economies of scale for webbing, buckles, and retractors have already been achieved. There will be little economies of scale by the seat manufacturers; since they are just replacing one seat with one equipped with lap/shoulder belts. Again, they are just installing a different seat and perhaps a different seat track. We also do not agree that "learning by doing" will decrease the cost of installing lap/shoulder belts in large school buses because school bus manufacturers already know how to install lap/shoulder belts in large school buses.

*Question 3.* In its comments to the final rule, PC stated that lap-only belts should not be permitted in school buses. PC stated that in 1999 the NTSB suggested there may be potential for greater injuries in occupants restrained using lap-only belts in side crashes. Why hasn't NHTSA banned lap belts in large school buses?

*Answer:* The agency explained in the final rule that it has studied lap belts in frontal crashes in the school bus research program<sup>39</sup> and analyzed data from States which include side impact and rollovers, and could not determine that lap belts translate to an overall greater safety risk. Our real world data indicates that lap belts are as effective as lap/shoulder belts in rollover crashes, and benefit far side occupants in side impacts involving these vehicles.

PC provided no data to support the implication that lap belts may be harmful in side impacts, and we disagree with its view of the 1999 NTSB study. The NTSB came to the conclusion in the 1999 report that " \* \* \* because injuries occurred for all restraint conditions in the simulated accidents and because injury levels varied depending upon occupant kinematics and seating location, the Safety Board concludes that it cannot be determined whether the current design of available restraint systems for large school buses would have reduced the risk of injury

<sup>39</sup> Report to Congress, School Bus Safety: Crashworthiness Research, April 2002.

to the school bus passengers in these accidents."

The NTSB has since studied two school bus crashes where lap-only belts have been beneficial in mitigating injuries in side impact and rollover crashes. In its review of the March 2000 side impact collision between a school bus and a freight train near the Tennessee and Georgia border<sup>40</sup> and the May 2008 school bus rollover near Milton, Florida,<sup>41</sup> the NTSB concluded that passenger injuries were reduced because of lap belts. We note that the Milton, Florida crash, where the school bus was equipped with lap belts, was cited by the petitioners, among which PC was a signatory, as an exemplar case where seat belts on large school buses were effective in preventing fatalities and serious injuries. Given the available information, the agency declines to change its position on the allowance of lap belts on large school buses in response to PC's comment.

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<sup>40</sup> "Collision of CSXT Freight Train and Murray County School District School Bus at Railroad/Highway Grade Crossing, Conasauga, Tennessee," March 28, 2000; National Transportation Safety Board, HAR 01/03, December 2001.

<sup>41</sup> "School Bus Loss of Control and Rollover, on Interstate 10, near Milton, Florida," May 28, 2008; National Transportation Safety Board, HAB-09-03, November 2009.