

**A Study about the Necessity for and Feasibility of the Use of
Safety Restraints (Seat Belts) on School
Buses in Nevada**

**As Mandated by the 2005 Session of the Nevada Legislature
Assembly Bill 411**

**Submitted by the Nevada Association of School Boards
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Introduction

This research study and report are provided by the Nevada Association of School Boards in response to the legislative mandate contained within Assembly Bill 411 enacted by the 2005 Session of the Nevada Legislature. The Association is grateful to school district superintendents, administrative staff, and transportation directors from all seventeen counties for their contributions and for their attention to detail in providing cost estimates included within the report.

Legislative Background

In 1985, the Nevada Legislature exempted public means of transportation, including school buses, from State law requiring vehicle occupants to wear seat belts (Chapter 678 *Statutes of Nevada* 1985). This decision was based largely on findings from the National Highway Traffic Safety Administration (NHTSA) regarding the design, construction, and use of school buses. Following this exemption, the legislature required the Superintendent of Public Instruction to conduct a study to determine the feasibility of requiring seat belts for passengers on school buses (Chapter 480 *Statutes of Nevada* 1987). While the superintendent did not make a recommendation, the report concluded by citing NHTSA's recommendation that states and school districts not require safety belts on school buses.

In 1997, the Nevada Legislature rejected the provisions of Assembly Bill 205 which would have required lap-type seat belts for each passenger on all school buses put into operation after July 1, 1999. This was rejected largely because of findings from NHTSA along with findings from the National Academy of Sciences (NAS) and the National Transportation Safety Board (NTSB) showing little, if any, added occupant protection from the use of seat belts on school buses. The 2005 Nevada Legislature again considered requiring safety restraints on school buses. Assembly Bill 411 originally required safety restraints on all school buses in operation after July 1, 2006. In its final form, this bill now requires the Nevada Association of School Boards (NASB) to study the feasibility and necessity of safety restraints for use by pupils on school buses (Chapter 300 *Statutes of Nevada* 2005).

The remainder of this report presents the Nevada Association of School Boards' (NASB) findings, conclusions, and recommendations.

School Bus Safety

According to the NHTSA, school buses are one of the safest forms of transportation in the United States. Each year, approximately 450,000 school buses travel about 4.3 billion miles transporting 23.5 million children to and from school and school related activities. Yet, NHTSA statistics show an average of just six school-age children nationwide die annually in school bus crashes as passengers. In comparison, more than 40,000 people are killed each year in traffic crashes across the United States.

School buses are nearly eight times safer than passenger cars and light trucks. NHTSA statistics show the school bus occupant death rate of 0.2 fatalities per 100 million vehicle miles traveled is significantly lower than the passenger vehicle fatality rate of 1.5 deaths per 100 million vehicle miles traveled.

In 2002, the Transportation Research Board of the National Academy of Sciences determined that approximately 815 school-aged children are killed annually in motor vehicle crashes during normal school travel hours. This estimate represents fourteen percent of the 5,600 child motor vehicle crash deaths annually and about two percent of the national total of 40,000 motor vehicle deaths annually. Of these 815 fatalities, two percent or twenty deaths are school-bus related. Of these twenty deaths five are school bus passengers and fifteen are pedestrians. The vast majority, ninety eight percent, of these school-aged deaths happen in passenger vehicles or to pedestrians, bicyclists or motorcyclists. Even more dramatic, is the Transportation Research Board's finding that over half, 450 of these 815 fatalities, occur when a teenager is driving. This study also found only four percent of non-fatal injuries during normal school travel time are school-bus related.

The same NAS-sponsored study found that school buses have the lowest injury and fatality rate of all forms of student transportation. The school bus fatality rate per 100 million student miles was 0.1. This rate is significantly lower than those for passenger vehicles with adult driver (0.3), passenger vehicles with teen driver (2.4), bicycles (12.2), or walking (8.7). School travel injury rates follow the same pattern. The injury rate for all forms of student transportation is 130 per 100 million student miles compared to a rate of 20 per 100 million student miles for school buses.

These statistics all lead to the same conclusion: school buses are very safe. Several factors are responsible for the high level of school bus safety including Federal Motor Vehicle Safety Standards; school bus construction; extensive and specialized training for bus drivers; and the use of special lighting and traffic-control devices.

Federal Motor Vehicle Safety Standards

In 1974, Congress amended the 1966 National Traffic and Motor Vehicle Safety Act to include school bus safety requirements. The NHTSA has since issued 35 Federal Motor Vehicle Safety Standards (FMVSS) that apply to school buses. Collectively, these standards require that school buses be structurally and mechanically safe and apply to structural components, equipment, and occupant protection. Included in these standards is FMVSS 222 *School Bus Passenger Seating and Crash Protection*. This standard applies to construction of school bus seating areas and creates a construction concept called *compartmentalization*. As a result of congressional and federal agency action, all large school buses (those with a gross vehicle weight more than 10,000 pounds) built after April 1, 1977 must meet stringent federal safety standards.

Compartmentalization

In determining how to make large school buses safer, NHTSA recognized that school buses are generally heavier than impacting vehicles, impart lower crash forces to occupants, and distribute crash forces differently than passenger vehicles. NHTSA has also found that most serious injuries to school bus passengers occur in frontal impact crashes.

Based on these facts established by researchers at the University of California-Los Angeles and the NTSB, NHTSA determined the best way to protect children on large school buses was through compartmentalization. This method of school bus construction creates a protective pocket consisting of strong, closely-spaced high-backed seats with well-padded energy-absorbing seatbacks. According to NHTSA, compartmentalization along with other special safety features makes school buses the safest vehicles on the road.

Research and Testing on School Bus Safety Restraints

In the mid-1980s, Transport Canada crash tested three different sizes of school buses. In addition, the agency constructed and tested several types of seats each with a seat belt system. Transport Canada researchers concluded from the data that compartmentalization functioned well during frontal impacts and that lap-type seat belts could increase occupant injuries. According to the Canada Safety Council, this and other research conducted in the United States has led the Canadian government to not require seat belts on school buses.

The National Transportation Safety Board (NTSB) conducted a safety study of large school buses in 1987. NTSB investigated 43 serious school bus crashes including frontal impacts, side impacts, and rollover accidents. Investigators found most injuries and fatalities occurred because passengers were in direct line with crash forces. Researchers then analyzed the possible benefits of seat belts in these crashes. NTSB concluded seat belts would not have prevented most of the serious injuries and deaths from occurring in these accidents. Investigators further determined compartmentalization worked well to protect passengers in all types of crashes.

In 1989, the National Academy of Sciences (NAS) completed a study of methods to improve school bus safety. Based on its investigations, NAS concluded the possible benefits of seat belts on school buses were insufficient for the federal government to mandate the installation of seat belts on large school buses. NAS also found children are at greater risk of being killed in bus loading zones than on a school bus. This led the agency to recommend that funds intended to purchase seat belts might better be spent on bus safety programs and other safety devices to reduce injuries and save more lives.

The NTSB conducted a special investigation on school bus crashworthiness in the late 1990s. This investigation analyzed six school bus accidents and conducted computer

simulations to evaluate various passenger crash protection systems. The study, released in 1999, could not determine whether the seat belt restraint systems analyzed would have reduced the risk of injury to school bus passengers. The report stated that while compartmentalization works well to protect passengers, it is incomplete because occupants do not always remain inside the seating compartment in certain types of accidents.

At the request of Congress, the NHTSA conducted a comprehensive analysis of the benefits of installing safety belts on school buses. This investigation, completed in 2002, analyzed 31 school bus crashes involving 35 buses, performed two full-scale crash tests of school buses, and conducted 25 laboratory tests on various safety belt seating systems. Overall, the study found no safety benefit for lap belts. On the contrary, like previous studies, researchers found lap belts could increase the incidence of serious neck and abdominal injuries. Researchers also found the use of lap-shoulder belts could provide some benefit unless misused. NHTSA testing showed an increased risk of serious neck and abdominal injuries if lap-shoulder belts are misused. The agency also warned that installing lap-shoulder belts would lead to increased capital costs, reduced seating capacities, and other unintended consequences which might result in more children using alternative forms of school transportation. NHTSA concluded that because all other forms of school transportation are less safe than school buses, even the smallest reduction in children riding buses could result in more children being killed or injured.

In 2005, the Canada Safety Council reviewed school bus safety studies conducted by various Canadian and American transportation agencies. The Canada Safety Council stated with regard to seat belts on school buses, "Surprisingly no safety benefit has ever been proven. In fact, crash tests have shown seat-belts could create more drawbacks than advantages."

Conclusions from School Bus Safety Research

Federal government agencies in Canada and the United States (the only countries which use school buses for student transportation) have failed to find sufficient evidence that seat belts on school buses increase passenger safety. Transportation agencies in both countries have declined to issue federal mandates for the installation of seat belts on large school buses. Through extensive research, testing and crash investigations, NAS, NTSB, NHTSA, and Transport Canada have all concluded the current system of compartmentalization works well to protect passengers on large school buses. While some evidence supports possible safety benefits from lap-shoulder belts it is far from conclusive and as the Canada Safety Council concluded, "There is still no scientific evidence that lives would be saved." All of these agencies have determined that a reduction in school bus service would potentially result in more serious injuries and deaths, offsetting the potential safety benefits of seat belts.

National Association of State Directors of Pupil Transportation Services Findings

In a review of recent school bus safety research, the National Association of State Directors of Pupil Transportation Services (NASDPTS) noted that “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.” The NASDPTS also agrees with the concerns raised by government agencies, namely that seat belts on school buses would result in unintended consequences which may increase the risk of injury and death to school children. Specifically NASDPTS is concerned about increased capital costs, the reduction in seating capacity, and the misuse and/or nonuse of seat belts by students. In the first two situations, a likely result is more students using less safe forms of student transportation resulting in more deaths and serious injuries. In addition, the misuse or nonuse of seat belts has also been shown to increase risk of serious injuries and possibly fatalities in school bus accidents.

In echoing the recommendations from numerous federal agencies, NASDPTS suggests funds intended for purchasing and installing seat belts can be used in other areas of school bus safety and pupil transportation with greater potential safety benefits.

Cost for Requiring Seat Belts on Nevada’s School Buses

In determining the financial impact to Nevada’s school districts of mandatory seat belt use on large school buses, NASB considered three cost components: the cost to install new seats fitted with lap-shoulder seat belts on all existing school buses currently in service; the cost to purchase new school buses needed because of the lost seating capacity on existing buses when seats are installed having seat belts; and the additional operating costs for these new buses. Transportation directors advise that it is simply not possible to install new three-point lap-shoulder seat belts on seats in existing buses because the frames of those seats have not been manufactured for this purpose.

The table on the next page provides the anticipated approximate total capital cost for all school districts as well as the capital cost to each district. The total initial statewide capital cost for new school buses and to purchase as well as to install new seats with lap-shoulder three-point seat belts would be about \$150,425,060—keeping in mind the several qualifications explained in the notes below the chart. Of this estimated total capital cost for all school districts, the estimated minimum amount of \$77,136,060 would be needed to purchase additional school buses equipped with the appropriate seat belts, while \$73,289,000 would be needed to purchase new seats with three point lap-shoulder belts and install those seats in existing buses.

CAPITAL COST OF SCHOOL BUS SEAT BELTS

Name of School District	Number of Pupils Transported Daily	Number of Existing Buses	New Buses Needed	Cost For Purchasing New Seat Belts to Retrofit Existing Buses*	Anticipated Cost for Installation @\$11,000 per Existing Bus	Cost of New Buses @113,770**
Carson City	2,300	40	14	920,000	440,000	1,479,010
Churchill County	2,491	51	17	1,173,000	561,000	1,934,090
Clark County	140,000	1,240	413	28,520,000	13,640,000	46,987,010
Douglas County	3,000	66	19	1,518,000	726,000	2,161,630
Elko County	2,850	77	25	1,771,000	847,000	2,844,250
Esmeralda County	78	10	0	230,000	0	0
Eureka County	170	13	0	299,000	0	0
Humboldt County	1,100	33	11	759,000	363,000	1,251,470
Lander County	169	17	2	391,000	187,000	227,540
Lincoln County	360	27	9	621,000	297,000	1,023,930
Lyon County	4,594	104	34	2,392,000	1,144,000	3,868,180
Mineral County	189	8	3	184,000	88,000	341,310
Nye County	3,411	100	33	2,300,000	1,100,000	3,754,410
Pershing County	469	19	6	437,000	209,000	682,620
Storey County	128	13	4	299,000	143,000	455,080
Washoe County	19,855	302	75	6,946,000	3,322,000	8,532,750
White Pine County	748	43	14	989,000	473,000	1,592,780
Total	181,912	2,163	679	49,749,000	23,540,000	77,136,060

* This calculation cannot be absolutely accurate because some school districts may discover that there are buses in their fleets that cannot be retrofitted with new seat belts due to liability issues. In such cases, new buses would be required which would, in turn, raise the cost of new buses and the overall total anticipated. For example, for Washoe County, it is estimated that potentially 34 of the existing 302 buses may not qualify for retrofit. This would, as a result, raise the estimated number of new buses required and further the cost for those buses.

**This calculation is based upon the estimated 2007 cost for a new 90-passenger bus at \$113,770 configured to meet new EPA standards and fitted with factory-installed three-point lap-shoulder seat belts. The cost could be higher for three different reasons:

(1) Some school districts purchase buses that include upgraded light systems, braking or engine retarders, or heavy-duty air-conditioning, heavy-duty suspensions, along with tires and wheels to support such units. Clark County, for example, uses the 90-passenger bus with heavy-duty additional features at a cost of approximately \$125,000 per unit. That higher cost would raise the overall impact on Clark County to an estimated \$51,625,000 for the purchase of new units rather than the estimate above.

(2) This calculation is further complicated by the fact that some school districts may need to purchase buses that will carry fewer than 90 passengers for specific purposes, further raising the number and accompanying cost of new buses factory-equipped with three-point lap-shoulder seat belts.

(3) When retrofitting occurs, as briefly mentioned above, it is possible that some buses may not qualify for new seats that are equipped with three-point lap-shoulder seat belts. A potential problem is that removing the existing seats and replacing them with new seats equipped with three-point seat belts may not be a feasible retrofit because of the federal safety requirements in place. For example, the floor of an older bus may not be able to withstand the strain of numerous holes drilled in new places and the weight of the new seats and belts. In such cases, the buses could not be certified with coverage by appropriate liability insurance. Just one accident in an uncertified and/or uninsured bus could have a disastrous fiscal impact upon a school district. As a result of this factor, during implementation of such a project, the costs for purchasing new buses could increase while the costs for new seats and installation could decrease. This is a factor that must be recognized, although its impact cannot be projected with certainty at this time.

Source: NASB School Bus Seat Belt Survey, information provided by school district transportation directors, and the Nevada Department of Education Annual Transportation Report.

These cost figures were calculated by using \$23,000 per unit to purchase new seats equipped with three-point lap-shoulder type seat belts. As noted, it is projected that the cost to install new seats equipped with such belts is estimated at approximately \$11,000 per bus. This cost may vary, depending upon the number of seats to be installed per unit, as the cost would be less for buses designed for fewer passengers.

The next table shows the cost estimated by some of Nevada's seventeen school districts to operate the new buses that will be needed because of the reduced seating capacity that will result from installing seat belts on existing school buses. These costs include personnel costs necessary for additional drivers, maintenance staff, etc. It should be pointed out that all school districts are experiencing difficulties hiring qualified bus drivers. These anticipated operating costs could rise considerably if the salaries and benefits needed to hire and retain qualified bus drivers had to be increased in order to attract more individuals to drive the increased number of required buses.

ESTIMATED ANNUAL OPERATING COSTS OF NEW BUSES	
Name of School District	Estimated Cost
Carson City School District	\$330,000
Clark County School District	\$21,277,619
Douglas County School District	\$347,000
Elko County School District	\$120,000
Lander County School District	\$20,000
Washoe County School District	\$3,037,500
Source: NASB School Bus Seat Belt Survey and information provided by school district transportation directors.	

In addition to the annual operating cost shown in this table, both Clark County and Washoe County have determined that new bus yards would be needed to house additional buses required for the implementation of such requirements. Clark County estimates that the cost for an additional bus yard would be approximately \$40,000,000. It is estimated that the cost for Washoe County would be slightly less than this. With a new bus yard come accompanying costs for staffing, maintenance, utilities, and other operational expenses.

It is important to note that special buses are already in use for students with disabilities having Individualized Educational Plans that require safety vests, car seats, lap belts, or other adaptations. For students with special needs, these buses are equipped with the appropriate child safety restraint systems as directed by the team determining the student's Individualized Educational Plan.

Timetable for School Bus Seat Belts

If the Nevada Legislature acts to require seat belt use on school buses, it has been estimated that it will take school districts from six months to four years to complete installation on existing vehicles and purchase new buses. School transportation directors in the State's two largest school districts (Clark and Washoe Counties) indicated it will take a minimum of six months to one year after funding becomes available to purchase new school buses with seat belts and to retrofit existing buses. School transportation officials in other school districts cited a longer time frame of between one and four years to complete this process. In addition, Nevada's school districts will need between three and twelve months to develop the necessary seat belt use and disciplinary policies, if seat belt use becomes mandatory on school buses.

Seat Belt Use Enforcement and Disciplinary Procedures

School district officials would enforce the use of seat belts by students on school buses primarily in two ways. First, assign a driver's aid to each bus to monitor and enforce student seat belt use. Second, officials will develop and disseminate seat belt use and disciplinary policies to parents and students. Some districts indicated this

would be done through student handbooks and parental notification letters. Other districts suggested developing a contract between the district and the student rider. This contract would specify use requirements and outline penalties for violation of these requirements.

Disciplinary procedures for violations of school seat belt use policies would consist of a system of warnings followed by a loss of riding privileges. Most districts suggested a system where students would receive up to three verbal and/or written warnings. Failure to follow seat belt use rules after these warnings would result in short (typically one to five day) suspensions from bus transportation. Students who habitually violate seat belt use policies despite warnings and suspensions would then lose bus riding privileges for the remainder of the school year.

The hidden costs for handling such disciplinary procedures for violations of school seat belt use have not been included in the anticipated operating costs in the second chart above. The fact that such administrative costs cannot be calculated accurately does not mean that they will not exist. Moreover, administrative time spent in handling such disciplinary procedures reduces the time that administrators can dedicate to the important responsibility to serve as instructional leaders within their schools.

Nevada Association of School Boards' Conclusions

Safety for the children in Nevada who are transported on school buses to and from school or to and from school activities is of critical importance for all of the State's 107 elected school board members. When we turn to national experts, as noted in this document, federal government agencies in Canada and the United States have failed to find sufficient evidence that seat belts on school buses increase passenger safety. It continues to be the case that transportation agencies in Canada and the United States have declined to issue federal mandates for the installation of seat belts on large school buses. While some evidence does support possible safety benefits from lap-shoulder belts, it is far from conclusive.

In addition to the above, it is imperative to reiterate the finding established by researchers at the University of California-Los Angeles and the NTSB that the best way to protect children on large school buses is through compartmentalization. As noted, this method of school bus construction creates a protective pocket consisting of strong, closely-spaced high-backed seats with well-padded energy-absorbing seatbacks. According to NHTSA, compartmentalization—along with other special safety features—makes school buses the safest vehicles on the road.

Moreover, at an initial anticipated implementation cost of more than \$150,000,000 and associated on-going operational costs in excess of \$25,000,000 annually, the investment required to implement such a requirement would necessitate full funding from the Nevada Legislature. Interestingly, the total cost for the first year's implementation of such a mandate represents 15% of the FY07 Distributive School Account (\$1,198,000,000). Without full funding provided in accordance with NRS

354.599, each of the State's seventeen school districts would be placed in the untenable position of reducing instructional programs or cutting school activities in order to purchase new buses and retrofit existing buses with the required seat belts.

Nevada Association of School Boards' Recommendations

The Association appreciates the opportunity to provide this information to the 2007 Session of the Nevada Legislature. The Association recommends research from national transportation experts continue to be monitored by the Legislative Counsel Bureau or another appropriately designated, responsible, and funded entity in the event the research leads to different conclusions in the future. The Association does not recommend implementation of school bus seat belt requirements until the national research conclusively supports the mandatory use of such seat belts and full funding can be provided by the Nevada Legislature to implement such mandates and the on-going operational costs necessary.

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Other Information Sources

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