



Safety Restraints on School Buses

**A report by the
NC Child Fatality Task Force
May 2008**

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**A report to the
NC General Assembly
by the
North Carolina Child Fatality Task Force**

May 2008

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The Honorable Bob Atwater, NC Senate
The Honorable Stan Bingham, NC Senate
The Honorable Julia Boseman, NC Senate
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GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2007

SESSION LAW 2007-191
SENATE BILL 812

AN ACT TO DIRECT THE CHILD FATALITY TASK FORCE TO STUDY ISSUES
RELATING TO REQUIRING THE INSTALLATION AND USE OF PASSENGER SAFETY
RESTRAINT SYSTEMS ON SCHOOL BUSES.

The General Assembly of North Carolina enacts:

SECTION 1. The North Carolina Child Fatality Task Force shall study and analyze the feasibility of the use of safety restraints by passengers on school buses and school activity buses. In conducting the study, the Task Force shall consider:

- (1) A determination whether safety restraints are necessary to enhance the safety of passengers on school buses;
- (2) An evaluation of the cost of requiring passenger restraint systems on buses to be purchased, leased, or contracted for use on or after July 1, 2009;
- (3) An evaluation of the cost of installing passenger restraint systems on buses currently owned and operated by local boards of education; and
- (4) The manner by which the local boards of education may enforce the use of safety restraints by passengers on school buses and school activity buses.

The Task Force shall report its findings and recommendations, including recommended legislation to the 2008 Regular Session of the 2007 General Assembly on or before May 1, 2008.

SECTION 2. This act is effective when it becomes law.

In the General Assembly read three times and ratified this the 28th day of June, 2007.

s/Beverly E. Perdue
President of the Senate

Executive Summary

- School buses are already by far the safest way for students to get to and from school. Many factors, including size and color of the vehicles, as well as “compartmentalized” seating, serve to protect passengers.
- In 1991, there were two student deaths in a single bus crash with a gravel truck in Mecklenburg County. Death scene reports indicated that the crash was so catastrophic that it is unlikely that seat belts would have saved these students. There have been no school bus passenger deaths in North Carolina since that time.
- Likewise, school bus passenger injuries have been minimal, with only nine serious injuries in the period 2000-2006.
- A series of national reports and studies over the past two decades have concluded that the addition of lap/shoulder belts on school buses has the potential to make buses safer, but since buses are already very safe, the potential benefit is small.
- Parents tend to underestimate how safe school buses are, since the buses do not have seat belts. Many parents do not put their children on school buses for this reason, thus transporting their children by a less safe means. It is not possible, however, to estimate how many of these parents would put their children on school buses if seat belts were added.
- The industry indicates that retrofitting existing buses with belts is not recommended or safe. Lap/shoulder belts would need to be ordered on newly-purchased buses, with an additional cost of approximately \$10,000 per bus. There is a schedule by which the state is responsible for replacing the existing fleet. Under that schedule, new buses equipped with seat belts would cost an estimated additional \$6.7 million to \$10.5 million per year for the foreseeable future.
- Local school districts are responsible for adding new buses to their local fleets to address growth issues in their communities. Thus, there are likely to be substantial increases in local costs if seat belts are required.
- Seat belt requirements would also raise liability issues. A demonstration of buses with seat belts in 13 local districts indicated that the use of the belts by students is quite variable, and drivers cannot easily check on usage.
- In summary, the introduction of lap/shoulder belts on school buses has the potential of improving the protection of student passengers, but only marginally so, because school buses are already the safest method of transportation to and from school. The costs of introducing belts would be substantial, and these costs would compete with other related safety needs, such improving the safety of students waiting for the buses, and reducing the still enormous problem of vehicle passing stopped buses that are picking up or dropping off students. The Child Fatality Task Force is committed to studying school bus safety issues further in preparation for the 2009 legislative session.

Table of Contents

	PAGE
Current School Bus Safety Standards	6
• ‘Compartmentalization’	
• Seat Belt Requirements	
• National Highway Traffic Safety Administration (NHTSA)	
• Position Statement (2007)	
Injury and Fatality Research	8
• National Data	
• North Carolina Data	
Cost and Capacity	10
• Cost	
• Capacity	
• The Cost of Addressing Capacity Issues	
Implications for Local Boards of Education	12
Use of Seat Belts on School Buses – results from a North Carolina pilot	13
• Evaluation	
• Parents’ Reactions	
• Discipline	
• Additional Findings	
National Studies	15
Laws in Other States	18
References	19
Acknowledgements	20

Current School Bus Safety Standards

In NC, over 13,900 school buses transport approximately 750,000 of 1.4 million students to and from school for at least 180 days of instruction each year, and drive over 1,000,000 miles per day.

COMPARTMENTALIZATION

Since 1977, school buses have been equipped with seating systems that include strong, high-backed, well-padded, strongly anchored, evenly spaced seats – a passive protection system called ‘compartmentalization’. According to the National Highway Traffic Safety Administration (NHTSA), “School bus crash data show that compartmentalization has been effective at protecting school bus passengers.”

Source: National Highway Traffic Safety Administration, (2006). *Seat belts on school buses*.
www.nhtsa.dot.gov.

CURRENT SEAT BELT REQUIREMENTS

There is no current requirement that large school buses be equipped with seat belts. Small school buses (with a gross vehicle weight rating of 10,000 pounds or less) must be equipped with lap or lap/shoulder belts at all designated seating positions. Since the sizes and weights of small school buses are closer to those of passenger cars and trucks, seat belts in those vehicles are necessary to provide occupant protection. North Carolina complies with these regulations.

Source: National Highway Traffic Safety Administration, (2006). *Seat belts on school buses*.
www.nhtsa.dot.gov.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION (NHTSA) POSITION STATEMENT (2007)

“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. NHTSA has been repeatedly asked to require belts on buses, and has repeatedly concluded that compartmentalization provides a high level of safety protection that obviates the safety need for a Federal requirement necessitating the installation of seat belts. Further, 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 belt-equipped vehicles regardless of whether seat belts would 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, persons responsible for school transportation might want to consider other alternative investments to improve their pupil transportation programs which can be more effective at reducing fatalities and injuries than seat belts on large school buses, such as by acquiring additional new school buses to add to their fleet, or implementing improved pupil pedestrian and driver education programs. Since each of these efforts competes for limited funds, the agency has maintained that those administrators should decide how their funds should be allocated.”

Source: . National Highway Traffic Safety Administration 49 CFR Part 571 Docket No. NHTSA - 2007-0014 RIN 2127-AK09 *Federal Motor Vehicle Safety Standards; Seating Systems, Occupant Crash Protection, Seat Belt Assembly Anchorages, School Bus Passenger Seating and Crash Protection.*



Injury and Fatality Research

NATIONAL DATA

The National Highway Traffic Safety Administration (NHTSA) reports an annual average of six school bus passenger fatalities nationally, “most of which result from catastrophic crashes...it is likely that seat belts of any kind would not prevent fatalities in the most extreme crashes such as collisions with trains, heavy trucks, etc.”

NHTSA crash testing has shown that there is a potential for saving one life per year nationally if all buses were equipped with lap/shoulder belts and if all students wore them properly.

Research has shown that school buses are safer than other types of vehicles for school age children. Each year across the United States approximately 800 school-aged children are killed in motor vehicle crashes during normal school travel hours. More than half of these fatalities and injuries occur when a teenager is driving a passenger vehicle.

Source: . Transportation Research Board, (2002). *Special Report 269. The relative risks of school travel: a national perspective and guidance for local community risk assessment*. Washington, DC.

School Transportation Injury Data

Annually there are, on average, 815 student deaths and 152,250 injuries related to school travel during normal school travel hours. (These data are underestimates, because they do not include school-related trips or school bus crashes outside of school hours, and reporting is voluntary.)

- Two percent of the deaths and 4 percent of the injuries occurred in school buses.
- Seventy-five percent of the deaths and 84 percent of the injuries occurred in passenger vehicles.

The fatality rates descend in the following order:

- (1) passenger vehicles with teen drivers, 55 percent;
- (2) passenger vehicles with adult drivers, 20 percent;
- (3) walking (pedestrians), 16 percent;
- (4) bicyclists, 6 percent; and
- (5) school and other buses, 2 percent.

The injury rates descend in the following order:

- (1) passenger vehicles with teen drivers, 51 percent;
- (2) passenger vehicles with adult drivers, 33 percent;
- (3) walking (pedestrian), 6 percent;
- (4) bicycles, 5 percent; and
- (5) school and other buses, 5 percent.

Source: Pediatrics, Vol. 120 No. 1 July 2007, pp. 213-220 (doi:10.1542/peds.2007-1278). *Policy statement: School transportation safety*. Committee on Injury, Violence, and Poison Prevention and Council on School Health.

NORTH CAROLINA DATA

According to the North Carolina Department of Public Instruction, the most recent fatality of a child passenger on a school bus was in Mecklenburg County in 1991 when a gravel truck ran into a school bus killing two 12-year-olds and one 13-year-old.

In North Carolina, there have been no fatalities of child passengers on school buses since the State Child Fatality Prevention Team began tracking this data in 1999.

Source: . State Child Fatality Prevention Team (2007). Office of the Chief Medical Examiner: University of North Carolina at Chapel Hill.

Injuries of Child Passengers on NC School Buses

The following school bus passenger injuries were reported in North Carolina for the years 2000-2006:

- Type A Injury (disabling)
Injury obviously serious enough to prevent the person injured from performing his normal activities for at least one day beyond the day of the collision. Massive loss of blood, broken bone, and unconsciousness of more than momentary duration are examples.
Number of Type A injuries to NC school bus occupants ages less than 16: nine
- Type B Injury (evident)
Obvious injury, other than killed or disabling, which is evident at the scene. Bruises, swelling, limping, soreness, are examples. Class B injury would not necessarily prevent the person from carrying on his normal activities.
Number of Type B injuries to NC school bus occupants ages less than 16: 151
- Type C Injury (possible)
No visible injury, but person complains of pain, or has been momentarily unconscious.
Number of Type C injuries to NC school bus occupants ages less than 16: 2,223
- No Injury
Number of NC school bus occupants ages less than 16 involved in a crash but with no reported injury: 33,576

Source: UNC-CH Highway Safety Research Center

Cost and Capacity

COST

In 2008, the cost of a single new school bus was \$76,800. According to Thomas Built Buses, the estimate for a new bus with the three-point restraint seats would cost at least \$10,000 more than a bus with traditional seats.

Estimated Costs of School Buses with Lap/Shoulder Belts FY 2008-2017

Fiscal Year	Estimated Number of Buses to be Replaced	Estimated Bus Replacement Costs (using 2008 cost per bus: \$76,800)	Additional Cost of Lap/Shoulder Belts (\$10,000* per bus)	Total Projected Cost of New Buses with Lap/Shoulder Belts
2008	675	\$ 51,840,000	\$ 6,750,000	\$ 58,590,000
2009	835	\$ 64,128,000	\$ 8,350,000	\$ 72,478,000
2010	925	\$ 71,040,000	\$ 9,250,000	\$ 80,290,000
2011	817	\$ 62,745,600	\$ 8,170,000	\$ 70,915,600
2012	668	\$ 51,302,400	\$ 6,680,000	\$ 57,982,400
2013	717	\$ 55,065,600	\$ 7,170,000	\$ 62,235,600
2014	1052	\$ 80,793,600	\$ 10,520,000	\$ 91,313,600
2015	963	\$ 73,958,400	\$ 9,630,000	\$ 83,588,400
2016	954	\$ 73,267,200	\$ 9,540,000	\$ 82,807,200
2017	845	\$ 64,896,000	\$ 8,450,000	\$ 73,346,000
			*\$10,000 per bus may be a low estimate	

Source: Graham, D. (2008). NC Department of Public Instruction: Transportation Services.

CAPACITY

Until recently, a major concern about introducing seat belts on school buses was the potential seating capacity loss. Many schools share buses, using the same bus to run a high school route followed by an elementary route, for instance. On the elementary route, three students occupy the same seat that is used to seat two older students on the high school route. If the seats were equipped with two lap/shoulder restraints, not as many elementary students would fit onto the bus, creating a capacity issue for local school districts, ultimately requiring additional buses.

The number of additional buses Local Education Agencies (LEAs) may be required to purchase to make up the capacity loss is a function of how and what grade level school buses are shared. A study conducted by NC State's Institute for Transportation Research and Education suggested that the percentage of fleet increase ranges from 5 percent to 15 percent.

Source: . Tsai, J. (2007). *North Carolina experience with lap-shoulder seat belts in large school buses*. Institute for Transportation Research and Education: NC State University.

In 2007 at least two manufacturers unveiled new seats designed to address the capacity issue.



The FlexSeat by Safeguard

The FlexSeat by Safeguard can accommodate either three elementary or two high school students. The estimated cost according to Thomas Bus (April 2008) is comparable to the traditional three-point lap/shoulder belt seat buses. The FlexSeats are new to the industry and there are insufficient experiences with the seats to know definitively if those seats will solve the capacity loss issue.

Source: FlexSeat by SafeGuard, <http://www.safeguardseat.com/>

THE COST OF ADDRESSING CAPACITY ISSUES

If the FlexSeats prove effective, the capacity issue will be addressed. If not, an estimated 41 to 124 new buses may have to be purchased in addition to those estimated in the chart on page 10 of this report. At \$86,800 per bus (2008 pricing is \$76,800 for the bus itself plus \$10,000 for the lap/shoulder belts) the initial cost to increase capacity would be between \$3,558,800 (41 buses) to \$10,763,200 (124 buses).

Source: Tsai, J. (2008). Institute for Transportation Research and Education: NC State University.

Implications for Local Boards of Education

Local school boards are responsible for adding new buses to their local fleets to address capacity issues in their communities. In other words, as a community grows, the local school district must pay for each additional bus needed.

The key to improved safety in a lap/shoulder belt system is proper use. Training for drivers and students will be necessary and essential.

If seat belts are required, certain liability issues must be addressed. As students get on the bus at each stop, it would be difficult and time consuming for the bus driver to make sure that the student is buckled in properly. Current school bus seat belt technology does not allow for the school bus driver to be notified if a seat belt is not being used or is being used incorrectly.

Possible language: No person, school district, school board, or organization, with respect to a public school bus or public school activity bus, equipped with passenger restraint system pursuant to this section, may be charged for violation of this section if a passenger on the school bus fails to use or improperly uses the passenger restraint system.

NC Policies on Bus Replacement

Vehicle Replacement Policy

Each local board of education is authorized to own and operate a school bus fleet under Statute 115C-239. These fleets include school buses for basic to-and-from-school transportation and the service vehicles required for bus maintenance and fuel delivery. These vehicles were originally purchased by the local boards over a period of many years. The state assumed the responsibility of replacing these vehicles in the 1930's under Statute 115C-240(e) (f). The rate at which vehicles are replaced depends on the age and mileage of the vehicles, subject to appropriations from the General Assembly. The State Board of Education has the responsibility of purchasing the vehicles and allocating those vehicles to the local boards fairly and equitably on an annual basis.

School Bus Replacement Criteria

DPI Transportation Services will consider all of the following in determining which buses in the statewide fleet are to be replaced in a given year:

- Age of the bus (Current policy: max 20 years)
- Mileage of the bus (Current policy: 200,000 miles)
- Condition of the bus
- Availability of funds
- Unique circumstances about a given bus
- Buses destroyed by accident or vandalism (total loss)

Capital Outlay Purchases

An LEA may purchase vehicles and increase the size of the fleet that provides school transportation. The need for this action is generally the result of growth, opening/closing of schools or re-districting. An LEA is given this authority under Statute 115C-249(a) and the request for such additions are reviewed by Transportation Services.

Source: Graham, D. (2003). *New personnel training*. Transportation Services: North Carolina Department of Public Instruction.

Use of Seat Belts on School Buses – results from a North Carolina pilot

In 2003, 13 school buses equipped with lap/shoulder belts (two per 30-inch seat on the door side of the bus, three per 45-inch seat on the driver side) were introduced in North Carolina and piloted for study in several counties.

Participating counties included:

- Beaufort County Schools
- Brunswick County Schools
- Burke County Schools
- Cabarrus County Schools
- Caldwell County Schools
- Charlotte-Mecklenburg County Schools (two buses)
- Johnston County Schools
- Lee County Schools
- New Hanover County Schools
- Stokes County Schools
- Wake County Public Schools (two buses)

EVALUATION

During the pilot, initial training was provided for students and drivers. There was no requirement for seat belt usage, or enforcement of usage. As part of the evaluation, a survey was conducted by North Carolina State University's Center for Urban Affairs and Community Services one month after the project was piloted.

PARENTS' REACTIONS

Parents were asked how they would describe their view of lap/shoulder belts compared to before their child rode in an equipped bus.

- 56 percent responded "much more positive"
- 18 percent "somewhat more positive"
- 26 percent "about the same"
- None reported more negative perceptions

DISCIPLINE

Using video of the pilot school bus activity, ITRE also conducted a study of passenger behavior on pilot tested school buses and found that elementary students who switched to buses with seat belts experienced a reduction in "out of compartmentalization space" (that is, "out of seat") activities in all study sites (-96 percent, -73 percent, -74 percent) and two out of three groups saw reduction in "partially out of compartmentalization" activities (-21 percent, +19 percent, -45 percent).

ADDITIONAL FINDINGS OF THE PILOT

- There was 50 percent to 75 percent seat belt usage rate among elementary school-age students.
- There was a near 0.0 percent usage rate among high school-age students, who cited “lack of a law requiring use” as the primary reason for not buckling up.
- Drivers were unable to enforce seat belt use en route. If a child was not buckled properly, or if they unbuckled themselves, the driver did not know.
- Seat belts alone did not improve discipline on the bus – the driver still had an important role. However, seat belts did prove to be another tool to help the driver manage discipline.

Source: Tsai, J. (2007). *North Carolina experience with lap-shoulder seat belts in large school buses*. Institute for Transportation Research and Education: NC State University.



National Studies

- In 1987, the National Transportation Safety Board (NTSB) reported on a study of 43 post-standard (manufactured after 1977) school bus crashes investigated by the Safety Board. 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.

Source: NTSB/SS-87/01, Safety Study, Crashworthiness of Large Post-standard School Buses, March 1987, National Transportation Safety Board.)

- A 1989 National Academy of Sciences (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.

Source: Special Report 222, Improving School Bus Safety, National Academy of Sciences, Transportation Research Board, Washington, D.C., 1989

- In 1999, NTSB reported on six school bus crashes it investigated in which passenger fatalities or serious injuries occurred away from the area of vehicle impact. 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, NTSB believed other means of occupant protection should be examined.

Source: NTSB/SIR-99/04, Highway Safety Report, Bus Crashworthiness Issues, September 1999, National Transportation Safety Board

- In 2002, 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 report concluded that each year there are approximately 815 school transportation fatal injuries per year. Two percent were school bus-related, compared to 22 percent due to walking/bicycling, and 75 percent from passenger car crashes, 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, NAS concluded, it is important for school transportation decisions to take into account all potential aspects of changes to requirements to school transportation.

Source: 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

- In 2002, NHTSA issued a Congressional Report that detailed occupant safety on school buses and analyzed options for improving occupant safety. 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 combination lap and shoulder belts have the potential to be effective in reducing fatalities and injuries for not only frontal collisions, but also rollover crashes where 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.

Source: "Report to Congress, School Bus Safety: Crashworthiness Research, April 2002," <http://www-nrd.nhtsa.dot.gov/departments/nrd-11/SchoolBus/SBReportFINAL.pdf>

Source: National Highway Traffic Safety Administration 49 CFR Part 571 Docket No. NHTSA - 2007-0014 RIN 2127-AK09 *Federal Motor Vehicle Safety Standards; Seating Systems, Occupant Crash Protection, Seat Belt Assembly Anchorages, School Bus Passenger Seating and Crash Protection.*



The latest national development regarding seat belts on school buses came recently when U.S. Transportation Secretary Mary Peters traveled to Morrisville, NC to announce NHTSA's Notice of Proposed Rulemaking (NPRM) regarding improved occupant protection on school buses. The NPRM includes the following recommended rules:

Requires higher seat backs (already standard in NC, effective 2007)

Proposes standards for lap and lap/shoulder belts for states that voluntarily choose to use them (note: specifications appear to disallow flexible seating described earlier)

Requires lap/shoulder belts on small school buses weighing under 10,000 pounds (in effect in NC)

Acknowledges that Section 402 Highway Funds can be used for the incremental cost of adding belts. In North Carolina, the Governor's Highway Safety Program uses Section 402 Highway Funds (about \$11 million) for programs such as "Booze It and Lose It, " "Click It or Ticket, " and Safe Kids child passenger safety activities. If \$6.7 million to \$10.5 million per year of those dollars were re-appropriated to fund seat belts on school buses, many current safety programs would be cut.

Source: National Highway Traffic Safety Administration 49 CFR Part 571 Docket No. NHTSA - 2007-0014 RIN 2127-AK09 *Federal Motor Vehicle Safety Standards; Seating Systems, Occupant Crash Protection, Seat Belt Assembly Anchorages, School Bus Passenger Seating and Crash Protection.*

Laws in Other States

- In 1987 New York becomes the first state in the nation to require two-point seat belts on large school buses. Use of the lap belts is not made mandatory but is dependent on individual school districts adopting a policy requiring their use.
- In 1992 New Jersey becomes the second state to require use of seat belts on school buses. Use of the belts is mandatory.
- In 1999 Florida enacted a law requiring that new buses purchased after December 31, 2000 be equipped with safety belts or other restraint systems approved by the federal government. This has resulted in lap belts on all school buses purchased since 2001.
- In 1999 Louisiana enacted a law requiring school buses that transport children have occupant restraint systems, pending funding by the state. However, that funding has never been provided.
- In 2004 California passed legislation requiring that all new small buses (16 or fewer passengers) be equipped with three-point lap/shoulder belts. In 2005 the legislation was amended to require all new large school buses be equipped with three-point lap/shoulder belts as well.
- In 2007 Texas passed legislation requiring that all new buses be equipped with three-point lap/shoulder restraint systems on all new school buses including charter and multi-function activity buses. Implementation is pending funding action by the state legislature in 2009.
- Other states who have formally considered school bus seat belt legislation (as of November 2007) include:
 - Kansas
 - Michigan
 - Minnesota
 - Missouri
 - Tennessee
 - Virginia
 - Nebraska

Source: *School Transportation News*. (2007). <http://www.stnonline.com/stn/occupantrestraint/seatbelthistory/index.htm>

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National Highway Traffic Safety Administration 49 CFR Part 571 Docket No. NHTSA - 2007-0014 RIN 2127-AK09 *Federal Motor Vehicle Safety Standards; Seating Systems, Occupant Crash Protection, Seat Belt Assembly Anchorages, School Bus Passenger Seating and Crash Protection*.

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Marilyn Stevens, Administrative Office of the Courts, Guardian Ad Litem Program

Jeff Tsai, NC State University, Institute for Transportation Research and Education

Tom Vitaglione, Action for Children NC

Leanne Winner, NC School Boards Association

Child Fatality Task Force



**Our Children, Our Future,
Our RESPONSIBILITY**

- The General Assembly finds that it is the public policy of this State to prevent child deaths.
- The General Assembly further finds that the prevention of child deaths is a community responsibility.
- It is therefore, the intent of the General Assembly, through this article, to establish a multidisciplinary task force to study the incidence and causes of child deaths and to develop a mechanism fo multidisciplinary child death reviews.

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