

Why School Buses Need Safety Belts

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Originally founded by Carol Fast as the National Coalition for Seatbelts on School Buses, today's National Coalition for School Bus safety was reorganized in 1989. I have included a copy of their mission statement in your package.

I have served as the Quality Manager for Western Extralite Company for the last ten years. I'm a retired US Navy Reserve Chief Petty Officer, having spent 10 years on active duty in the Naval Nuclear Power (Submarine) Program and 16 years in the Naval Reserve.

Are School Buses Safe?

- 400,000 buses
- 23.5 million children
- 8 billion student trips
- 10 to 11 fatalities
- Less than 1 % of all traffic fatalities
- 3 times safer than the family car

If this is the way to measure crash worthiness, why do we have a FIVE STAR rating system for cars, trucks and vans?

During the 44 school days in October and November of 2004 there were 6336 school bus accidents in the United States.



The Record

- The number of school bus fatalities has more to do with the professionalism and dedication of the drivers and the fact that the bus is BIG and YELLOW than the safety system known as compartmentalization.

School buses make up only 0.17% of all registered vehicles and are on the road only 180 days a year but they account for .33% of all traffic fatalities.

Crash Performance

- School bus safety should focus on one thing -

How well does a bus protect our children during an accident?

Surviving a bus accident above 30 miles per hour involves five things

- (1) your age and size
- (2) whether or not you are seated in an optimum location
- (3) whether or not you are seated perfectly in the seat
- (4) the “compartmentalization” of the bus and
- (5) how lucky are you today.

Star Rating System

- If the big yellow bus were crash rated like a minivan - it wouldn't even get 1 star!

History of FMVSS 222

- The Federal government commissioned UCLA to conduct bus crash testing in 1967
- The number of injuries and the number of fatalities was considered high

UCLA Findings

- Poor seat design is a major contributor to injuries and fatalities
- Seat backs should be high and well padded
- Left and right interior side panels should be well padded
- An well padded aisle panel should be installed
- Lap belts were suggested to keep children within the "compartment"

UCLA envisioned a fully padded box or compartment around the passenger with a lap belt to keep them within the compartment.

Lap belts were the accepted restraint system of the day.

FMVSS 222 1977

- Seat backs were 8" shorter
- No left and right side padding
- No aisle panel
- No lap belts

When UCLA coined the term "compartmentalization" this isn't what they had in mind.

The NSTA was instrumental in weakening the requirements of FMVSS 222!

FMVSS 222 Didn't Work

- It didn't reduce injuries
- It didn't reduce fatalities
- Ask anyone who claims that compartmentalization is an effective safety system for *PROOF* in a before and after data format.

The average number of fatalities took more than 20 years to dip below pre 1977 levels, hardly a ringing endorsement for the system.

Crash Data Prior to FMVSS 222

- 1967 to 1983
- There were 18 major accidents
- 115 fatalities
- The average was 8 fatalities per year

By 1983 the majority of public school buses (90 plus %) in use were pre-1977.

Crash Data After 1977

- 1983 to 1993
 - 41 fatalities per year
 - 11 passengers / 30 pedestrians
- 1988 to 1998
 - 30 fatalities per year
 - 9 passengers / 22 pedestrians
- 1993 to 2003
 - 22 fatalities per year
 - 6 passengers / 16 pedestrians

These numbers have some degree of error. We still tend to count only to and from accidents (ignoring field trips and sports trips). Although the trend is downward, the difference between prior and post in 2003 is only 2 fatalities per year – hardly a ringing endorsement for compartmentalization.

NTSB/SIR-99/04 Sept 21, 1999 – page 61 paragraph 2: Table 9 presents the results of a comparison of Safety Board and FARS reporting on fatalities and fatal ejections by body type. For the 32 accidents shown in this table, the Safety Board and FARS reported different numbers of accidents for each body type. In addition, FARS identified 14 fewer fatal ejections for all body types combined than the Safety Board. In the motorcoach category, FARS identified 34 fewer fatal occupant ejections than the Safety Board. Given such discrepancies in data, the Safety Board concludes that FARS is not a reliable source for identifying the number of fatal occupant ejections in motorcoaches.

FARS data is unreliable. Carol Fast 1987 ...

An example of how bad the reporting system is in this country is the fact that California claims that there were only 5 deaths in the last 10 years in Calif.. What about the 29 who died at Martinez, Calif. in 1976 in one bad accident? I guess because they were on their way to sing in another school they are not REAL school children. They didn't even make California's statistics for deaths related to school bus accidents.

One year in NJ in the very early 70's the Senate Education Dept. claimed there were 13 minor injuries for the year and said, "why worry - only scraped knees... Physicians For Automotive Safety found that in one accident alone there had been 48 children taken to the hospital - 6 with fractures. It had been a roll-over. When PAS members went to the State Ed Dept. they were told that those children didn't count - they were on a field trip.

I'm not the first to notice this. Carol Fast said this in testimony to the Ohio legislature in 1987:

"Here we should take a look at your Ohio accident statistics. You will note that the new Federal Standards (compartmentalization) have not changed the injury rates in Ohio"

YEAR / #OF ACCIDENTS / OF PUPILS INJURED		NUMBER
*1976	1,535	320
1977	1,902	211
1978	2226	199 (1978 NSC records shows 243)
1979	1793	214
1980	1569	217
1981	2203	406
1982	1892	319
1983	1343	350
1984	1665	225
*1985	1354	*318

University of Texas, School of Public Health, January 1985 – December 1985

- University of Texas, School of Public Health, January 1985 – December 1985 - reported it would be cost effective to install lap belts on buses in Texas. According to the study, \$13.5 million dollars were spent on school bus occupant injuries in Texas from Jan. '85 to Dec. '85, "a law mandating safety belts in Texas school buses would be cost-beneficial in the long run."

Actual Crash Data

- In 2004 I found 10 bus accidents involving speeds above 35 MPH
- There were 178 passengers
- 2 of the 10 involved buses with seat belts
- 7 of the 10 rolled over

While it may not be an apples-to-apples comparison, restraint systems are reducing injuries and preventing fatalities in actual school bus accidents.

Look at the Snyder, OK accident where 9 passengers were involved in a rollover. Four died, eight were ejected and one (who had not been trained and was not required to wear the belt) who was belted with a lap belt received minor injuries.

Actual Crash Data - Belted

- 1 crash was a 420 degree rollover
- There were 11 passengers
- There were no injuries
- There were no fatalities

I couldn't find any compartmentalization only 420 degree rollover accidents that didn't have injuries, fatalities and ejections.

Actual Crash Data - Unbelted

- 6 crashes involved a flip or rollover
- the injury rate was 83 % (139 of 168)
- The fatality rate was 3 % (5 of 168)
- The permanent disability rate (estimated because the settlements prevent disclosure) 3 to 6 %

While your child's chances of being in a bus accident are extremely low, their chances of being injured, disabled or not surviving if they are in an accident at greater than 35 MPH are surprisingly and unacceptably high.

The GES estimates that 8,500 students are injured every year; 7285 are minor, 885 are moderate and 350 are serious to critical. That's 1235 moderate to critical injuries every year!

Remember this is based on the fatality rate – most physicians think the injury estimates are way too low.

NTSB

- In 1999 the NTSB issued a report that concluded compartmentalization was ineffective in 6 typical school bus accidents. Here is a part of that report:

"From 1968 through 1973, the Safety Board issued 11 recommendations to the Federal Highway Administration (FHWA), NHTSA, or both, concerning restraints, including requiring that seat belts be installed in buses, none of which have been implemented. "

Source: NTSB H-99-45 November 2, 1999

Reference H-99-45 November 2, 1999. In this same report NTSB questions the accuracy of the GES system for estimating school bus injuries.

NTSB

Table 9. Fatalities/fatal occupant ejection by body type

Body Type	No. Accidents		Fatalities		Fatal Ejection	
	Safety Board	FARS	Safety Board	FARS	Safety Board	FARS
Motorcoach	24	12	134	46	54	20
School Bus	5	3	45	34	8	5
Transit Bus	1	3	1	19	0	2
Other Bus	2	11	7	82	1	20
Unknown Bus	0	3	0	6	0	2
Total	32	32	187	187	63	49

Table 9 presents the results of a comparison of safety Board and FARS reporting on fatalities and fatal ejections by body type. For the 32 accidents shown in this table, the Safety Board and FARS reported different numbers of accidents for each body type. In addition, FARS identified 14 fewer fatal ejections for all body types combined than the Safety Board. In the motorcoach category, FARS identified 34 fewer fatal occupant ejections than the Safety Board. Given such discrepancies in data, the Safety Board concludes that FARS is not a reliable source for identifying the number of fatal occupant ejections in motorcoaches.

2002 School Bus Safety Report

- Base data
- Sled Testing
- Results

Source: REPORT TO CONGRESS, School Bus Safety: Crashworthiness Research April 2002

Reference REPORT TO CONGRESS, School Bus Safety: Crashworthiness Research April 2002

2002 School Bus Safety Report

- Base data
 - Full scale frontal impact at 30 MPH.
 - Full scale side impact.
 - 4 of 6 compartmentalized test dummies would have died in the frontal crash.
 - 1 of 6 compartmentalized test dummies would have died in the side crash.

2002 School Bus Safety Report

- Sled Tests - Head Injury (p. 32)
 - Best performance was lap/shoulder belt system.
 - Second best was compartmentalization.
 - Worst was lap belt system.

Reference REPORT TO CONGRESS, School Bus Safety: Crashworthiness Research April 2002

2002 School Bus Safety Report

- Sled Tests - Neck Injury (p. 33)
 - Best performance was lap/shoulder belt system.
 - Second best was compartmentalization.
 - Worst was lap belt system.

Reference REPORT TO CONGRESS, School Bus Safety: Crashworthiness Research April 2002

Statistical Argument

- Less than 1% of all traffic fatalities involving children 0 to 18 are occupants of a school bus - there are better places to spend the money.
- More students are killed as pedestrians by their own bus – here is the best place to spend more money.

Add quotes from NHSTA officials about how grievous the Firestone 500 incident was.

Statistical Argument

- Between 1991 and 1998 3.8 million cars were equipped with Firestone 500 radial tires.
- There were 21 reports of fatal rollover accidents due to tire failure.
- That's .006 % of all traffic fatalities between 1991 and 1998.

Statistical Argument

- These 21 fatalities prompted the NTSB and NHSTA to begin a full scale investigation
- Firestone was forced to recall 14.5 million tires
- Firestone was fined \$500,000
- in 2001 the final numbers were 174 fatalities and 700 injuries

Statistical Argument

- Between 1991 and 2001 there were more than 260,000 school bus accidents
- There were 132 fatalities (.027 % - 6 times more than the initial Firestone 500 reports)
- There were more than 90,000 injuries

If the big yellow bus were a car tire – it would have been recalled by now!

Injury Argument

- NHSTA and private testing has shown that seat belts would increase the number of injuries and fatalities

Injury Argument

- Until 2002, no impartial and complete study of restraint systems has been undertaken.
- The Canadian 1985 study had serious flaws - NHSTA admits that its results are questionable.

Kids Won't Wear Them

- First, entering K students have been wearing them as mandated by federal law since birth. For many, their first unrestrained trip in a motor vehicle is on the school bus.
- A consistent, administration supported mandatory policy has already proven effective in other school districts.

Note that there have been no lawsuits in the four (soon to be five) states that require restraint systems concerning "seat belt syndrome".

Actual crash data (Snyder, OK: Kansas City, MO: Belleview, IL and many others) doesn't support this supposition.

My preschooler, now 4, can already fasten and unfasten his safety belt. My second grader NEVER needs assistance. This is a discipline / policy issue. It can be done!

NTSB/SS-H-5 Jan 1970

A decision to make available suitable restraints which would reduce injuries is not dependent upon a showing that all passengers would use them, nor should it be limited by the fact that past bus passenger seat designs do not accommodate the lap belt type restraint. The retention of passengers in their seats during the crash phase is clearly desirable, as indicated by this case and others, and making restraints available is a first step in obtaining their use.

Kids Will Need Help

- Most drivers report that the children learn to use them *by themselves* within the first three or four days of school.
- Children with special needs *already* need the driver to assist them.

Most children grow up with restraint systems and take their first unrestrained ride of their life in a school bus.

Emergency Egress

- Bus fires and water emergencies are a rare rarity – only 2 cases in the last 30 years.
- Uninjured passengers are more likely to be able to exit unassisted.
- Unrestrained passengers often end up outside of their compartment, injured and confused – thus they don't know where to find the exit.
- In numerous real world crashes 5 and 6 year old children unfasten their own restraints and exit the school bus unassisted.

In the most infamous fire disaster (a pre-fuel tank cage bus) the accident report states that they had four minutes from the end of the impact to when the bus was fully engaged in the fire. Lack of exits, poor training on escape and a faulty bus design were primary factors – not speed of egress.

NTSB/SS-H-13 Dec 1968

The experience in this case indicates definitely that restraint of drivers and occupants in their seats during rollover conditions is necessary to reduce initial injury, disorientation, and thus ensure more likelihood of timely postcrash escape from the vehicle.

Studies have shown that even a trained rescue diver can't get out of a sinking bus. A bus typically sinks in 30 seconds!

Belts Won't Fit Everyone

- NHSTA tested several restraint systems in 2002

"All of these restraint systems included belt fit systems that allowed the shoulder portion of the belt to be adjusted to comfortably and safely fit a range of occupant sizes."

Report to Congress, School Bus Safety: Crashworthiness Research April 2002

Increased Liability

- This is a scare tactic used by the anti-restraint lobby to dissuade school districts from installing restraints.
- In the school districts that have mandated the use of restraint systems there have been no insurance increases and no successful law suits due to seatbelt induced injuries.

Decreased Liability

- The number of successful law suits claiming negligence by the school board and administration for *NOT* providing restraint systems are growing, as is the amount of damages awarded.
- Providing restraint systems, training on their use and a mandatory use policy more likely reduces overall liability.

Diminished Bus Capacity

- The national average (by NHSTA estimates) is 52 children per bus – or 72% capacity
- Three per seat capacity is only possible with small children – junior high and high school children are already being transported two per seat
- California's five across seating actually increases capacity by 25% for junior high and high school students

Highest settlement thus far - \$27.5 million

Also of note: crash testing is almost never done three per seat. Look at the 2002 large School Bus Crashworthiness report. Not one test was done three across.

IMMI has done at least 70 sled tests. The three across test clearly shows the aisle passenger striking the seat frame and suffering increased injuries.

Medical Community Endorsements

- American Medical Association
- American Academy of Pediatrics
- American Academy of Orthopedic Surgeons
- American College of Preventative Medicine
- Physicians for Automotive Safety
- Center for Auto Safety

Transportation Community Endorsements

- NTSB – Has made numerous attempts to add restraint systems to buses

I read some endorsements from transportation directors who changed their opinion after being forced into a restraint system. Find them!

What Can You Do

- Join the NCSBS
- Read and study the research
- Talk to your neighbors, relatives and friends about school bus safety
- Write your Senator and Congressmen
- Write your Missouri State Representatives
- Write the Governor
- Attend the next School Board meeting and ask for safer buses

Legislative Needs

- Require the installation of three point (lap/shoulder belts) on all public and private school buses.
- Specifically authorize the installation of third party or aftermarket restraint systems.
- Require passengers to use the restraint system.
- Purchase portable school bus driving simulators and require drivers to qualify under crash scenarios

This note is for the Jefferson City Presentation.

Legislative Needs

- Prohibit three across seating.
- Prohibit aisle "standing" passengers.
- Require four point safety belts for all drivers

This note is for the Jefferson City Presentation.

Questions & Answers

School Bus Lobby

- It is ironic that the school bus manufacturers, who were dragged kicking and screaming into the era of compartmentalization and were extremely successful in weakening the FMVSS 222 standard, are now champions of school bus safety and compartmentalization.

This was the old literature on the NSTA web site:
"WHY SHOULD YOU BELONG? ... [to the national contractors, association, NSTA] ... Your business is stronger today because of NSTA's past team effort to secure for you these advantages:

“Defeat of bills before Congress that were detrimental to the industry:

- 28-inch seat backs
- Mandatory seat belts and seat belt anchorages
- Roof Hatches“

This is the new:

The problems facing the student transportation industry can be summed up in a few short words. Short words in capital letters. Words like **FHWA . . . NHTSA . . . EPA . . . NTSB . . . DOT.**

Public relations

NSTA had been the source of numerous positive features in the education trade press, and our Advertising Monitor Program works to discourage ads and articles depicting the industry in a negative way. The National School Bus Safety Road-e-o recognizes the nation's best drivers, and our award programs give outstanding contractors the recognition they deserve.

Bendix Brake Recall

In June of 2000 Bendix sent notice to Freightliner that there was a defect in the anti-lock brake system. On August 30, Thomas Bus (a Division of Freightliner) informed the school districts.

This may have been the quietest recall in the history of bus transportation.

The Silence is Deafening

The school bus industry have often self-righteously proclaimed that the safety of the children is their first concern. The hypocrisy of this statement should be evident in just how information concerning the present brake defect has become available to parents.

According to the AP story, the defect was discovered by the brake manufacturer, Bendix and was told to Freightliner (Thomas Bus parent company) in June. Thomas then informed school districts on August 30.

I have just completed checking the following web sites:

School Bus Fleet Breaking News - Nothing
e-mail News dated 9/1 - Nothing

School Transportation News Headline News -
Nothing

Thomas Built Buses - Nothing

Freightliner (Latest Press Release 8/31) -
Nothing

Bendix - Nothing

Enough said.

Art

My Child's Bus Has No Belts

- Teach your child NOT to ride in the front row of seats
- Teach your child to remain seated whenever the bus is in motion
- Ensure your child that the bus is a safe way to get them to school
- Teach your child how to enter and exit the bus properly
- Make sure that your child's bus stop has an adult volunteer to monitor the children