



Seat Belts on School Buses

Recent Developments



Josh Davis
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Henrico County

Seat Belt Options



2-point Lap Belts



3-point Lap/Shoulder Belts

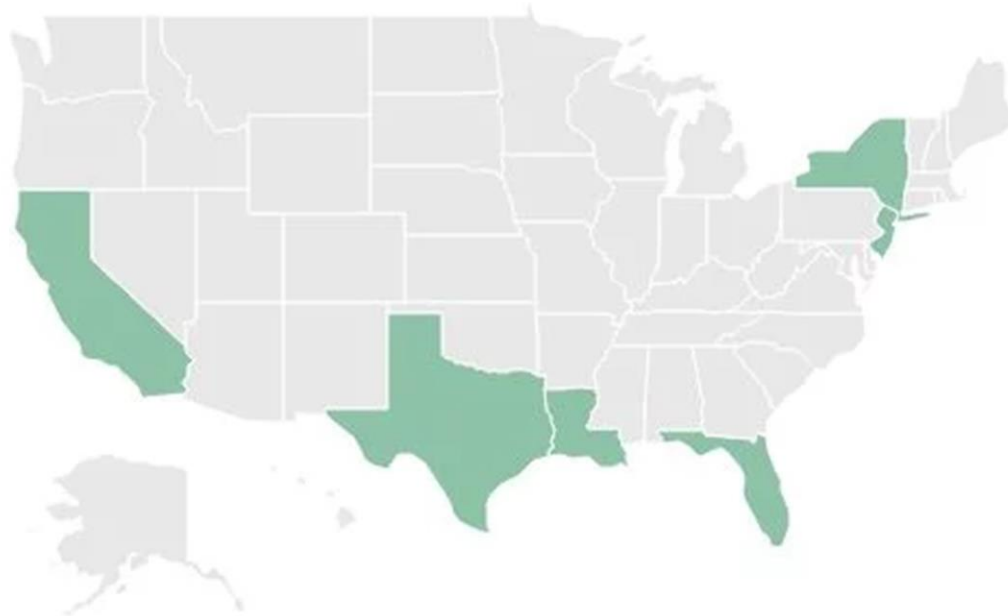
Existing Seat Belts

- HCPS buses for students with special needs and purchased since 2008 equipped with 2-point lap belts.
- Traditional buses do not have seat belts, but about 200 of these buses have seats that are “seat-belt ready.” Lap belts could be installed without major renovation.

Virginia Laws/Specifications

- Legislators have discussed/studied the issue for at least 30 years
- 2017 General Assembly bill (HB1561)
 - Require seat belts in every seat on newly purchased school buses
 - All buses would have belts by 2027
 - Did not specify 2-point or 3-point belts
 - Bill was tabled in committee

School Bus Seat Belt Requirements



(Now seven states)

Just ~~six~~ states require seat belts on full-size school buses, but not all of them have provided funding to meet the mandate, according to the National Conference of State Legislatures.

State Laws

- California, Florida, Louisiana, New Jersey, New York, Nevada, Texas
- LA and TX depend on non-existent funding
- CA, NV, LA require 3-point belts
- CA and FL give elementary students priority
- NY allows local school boards to decide

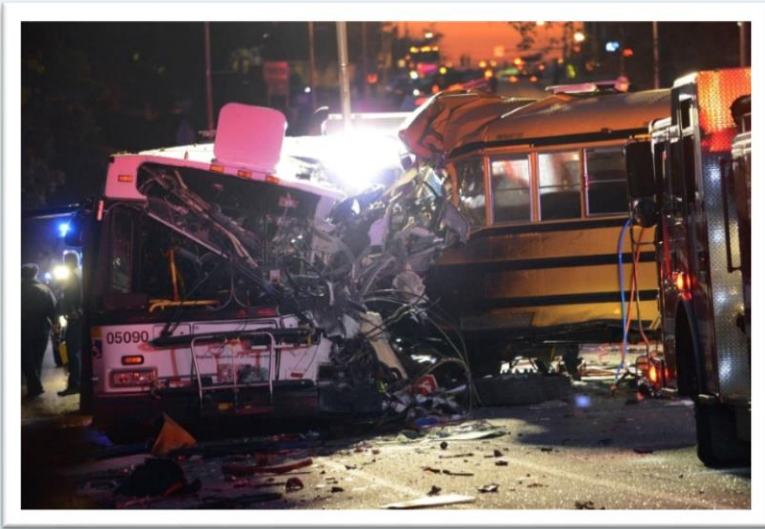
Baltimore, Maryland Bus Crash

November 1, 2016

School Bus Driver:

- Guilty of assault in 2012
- CDL expired August 31
- History of crashes
- Suffered seizures
- Killed in the accident

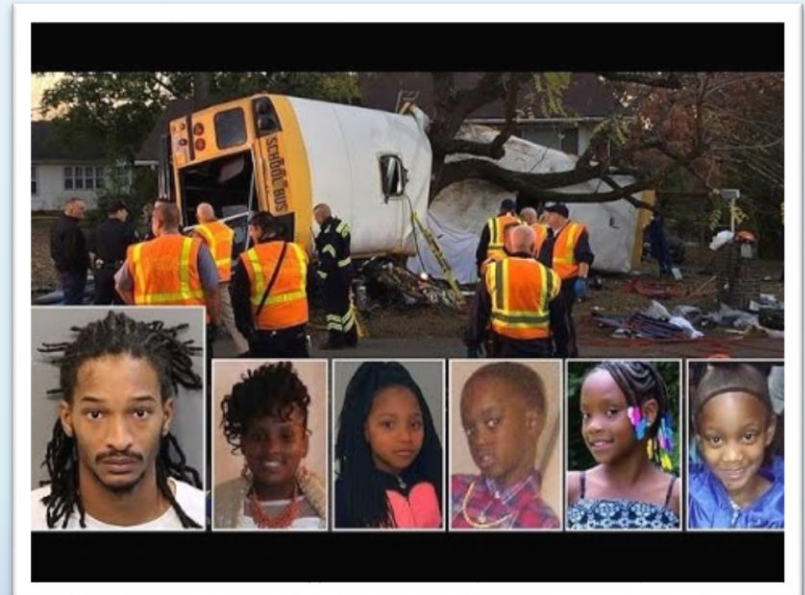
5 in transit bus killed, including driver



Chattanooga, Tennessee School Bus Crash

November 21, 2016

- Bus off authorized route
- Bus traveling 50-52 MPH in 30 MPH zone
- Driver had previously alarmed students with reckless driving
- 6 children killed
- Dozens injured



Proposed Laws

- Lawmakers in at least 29 states introduced mandatory seat belt bills in 2017.
- Only Nevada passed such a bill.
- Arkansas passed a bill allowing residents to petition school boards to determine size of tax increase needed to afford seat belts on new buses.

Practice in Virginia

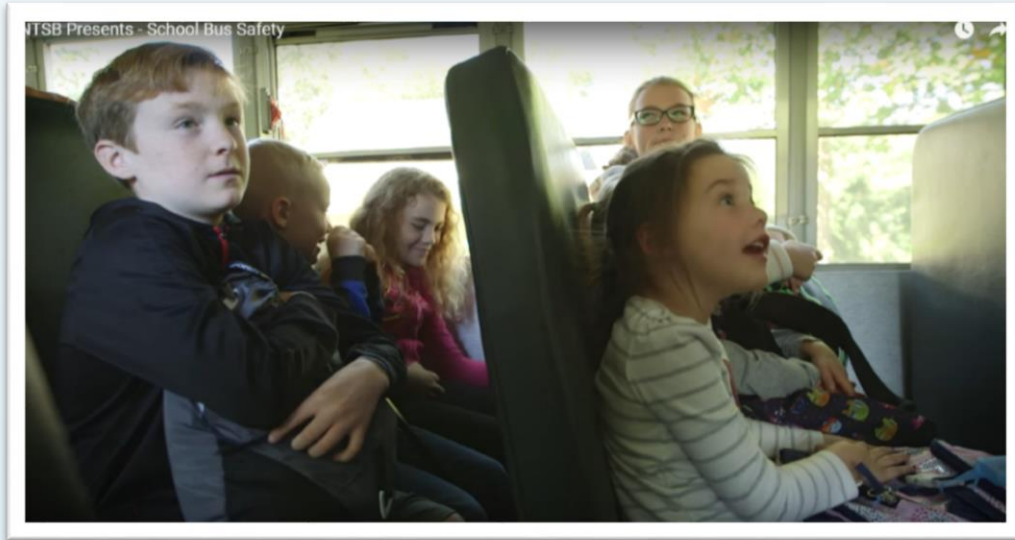
At this time, no Virginia localities have a substantial number of regular route buses equipped with seat belts.
– Kerry Miller, VDOE



How are Students Protected without Seat Belts?

- School buses are tall, heavy vehicles. Students are subject to substantially less impact forces during collisions.
- Compartmentalization – (high seat backs, padding to absorb impact, strong anchorage, closely spaced) minimizes impact on students during collisions, dispersing it throughout the entire body

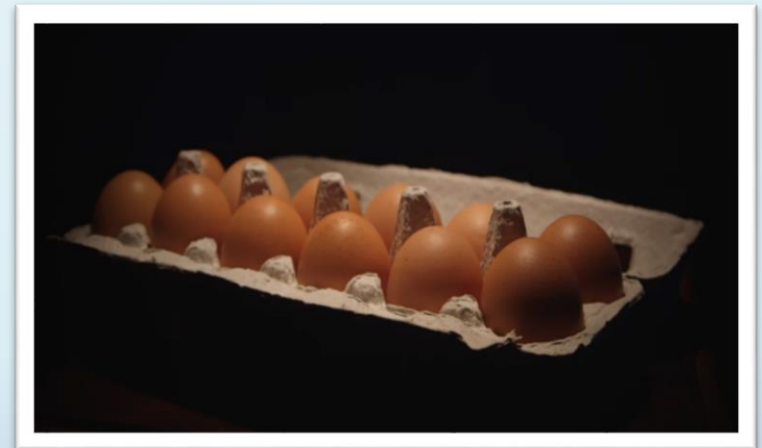
National Transportation Safety Board (NTSB) - Compartmentalization



Compartmentalization contributes to the outstanding safety record of school buses.

Analogy:

Compartmentalization protects students similar to how eggs are protected in crates.



National Highway Safety Administration (NHTSA) policy

Until November 2015:

- Multiple reassessments *“concluded that a seat belt requirement for large school buses has not been shown to be warranted.”*
- *“After considering all views [including a recommendation by the NTSB - H-99-46], we could not agree with those asking us to propose to require seat belts in large school buses. We assessed the safety need for seat belts. Since school buses are the safest mode of school transportation, a seat belt mandate would result in very few benefits.”*
- Similar public rulemaking statements by NHTSA, including Final Rule published in 2011.

NHTSA Administrator @ NAPT Summit (Richmond, VA Nov 2015)

“NHTSA’s policy is that every child on every school bus should have a three-point seat belt. NHTSA will seek to use all the tools at our disposal to help achieve that goal, and today I want to launch a nationwide effort to get us there.”

– Dr. Mark Rosekind



NHTSA Current Project

On December 7, 2016, NHTSA announced a project and associated data collection effort. *“The current project seeks to understand the decisions that states and local agencies use....to implement seat belts on school buses and the funding mechanisms....to pay for seat belt installation. Model policy and a best practices guide will be developed to assist jurisdictions.....obtain data related to distraction and whether seat belts aid in managing behavior....”*

NAPT Response

- Parents will demand “safer buses,” but should have strong confidence in the safety of their child’s existing school bus. Other means of transport have far greater risk.
- Will OVERALL student fatalities increase if localities reduce bus service and more students do not ride school buses?
- NTHSA should study whether or not seat belts will impede student evacuation in the event of a fire or water emergency, or rollover with incapacitated driver.

USA Today - May 11, 2017

'Hero' bus driver saves students before bus catches fire

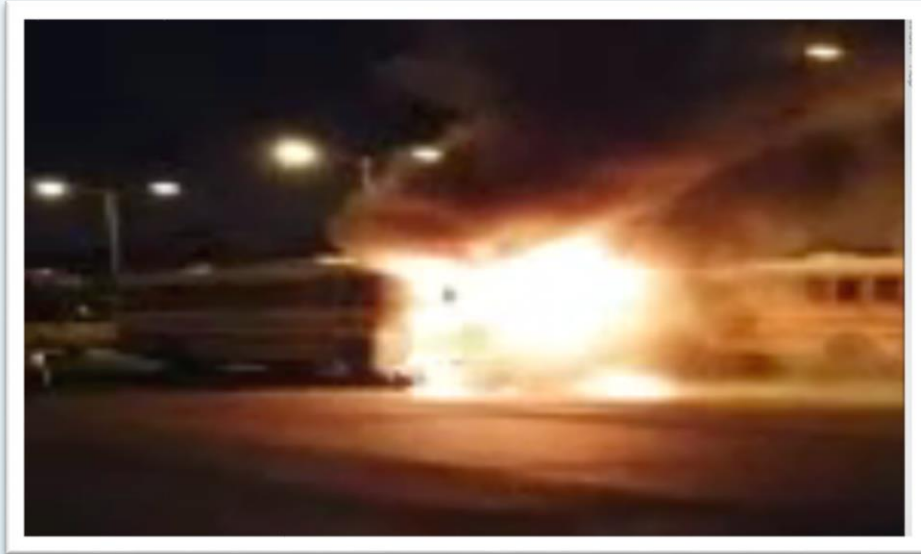


District Five of Spartanburg County, driver Teresa Stroble evacuated bus in less than one minute after students smelled smoke.



HCPS Bus 64

November 17, 2014, 6:00 a.m.



During pre-trip inspection after starting the bus at Hermitage High School.

Electrical fire
No students on board – yet.....



Liability – Virginia Seat Belt Law

VAC 46.2-1095 says that anyone driving a vehicle must ensure that any child up to age 8 is “*properly secured in a child restraint device...*”. It also says that anyone transporting a person under age 18 must “ensure that such person is provided with **and properly secured by an appropriate safety belt system.** This same statute makes clear, however, that “*[n]othing in this section shall apply to ... school buses....*”

Liability Issues

In Virginia, the law specifically provides that failure to wear a seatbelt *“shall not constitute negligence, be considered in mitigation of damages of whatever nature, be admissible in evidence or be the subject of comment by counsel in any action for the recovery of damages arising out of the operation, ownership, or maintenance of a motor vehicle,”* Va. Code Ann. § 46.2-1094 (West).

The Case for 3-Point Lap/Shoulder Belts

NTSB analysis of fatal crashes shows students using a 3-point belt fared significantly better than those wearing lap belts or no belts at all. In particular, students in high impact collisions are more susceptible to violent head and neck movement and injury if not wearing 3-point belts.

Types of High Impact Collisions

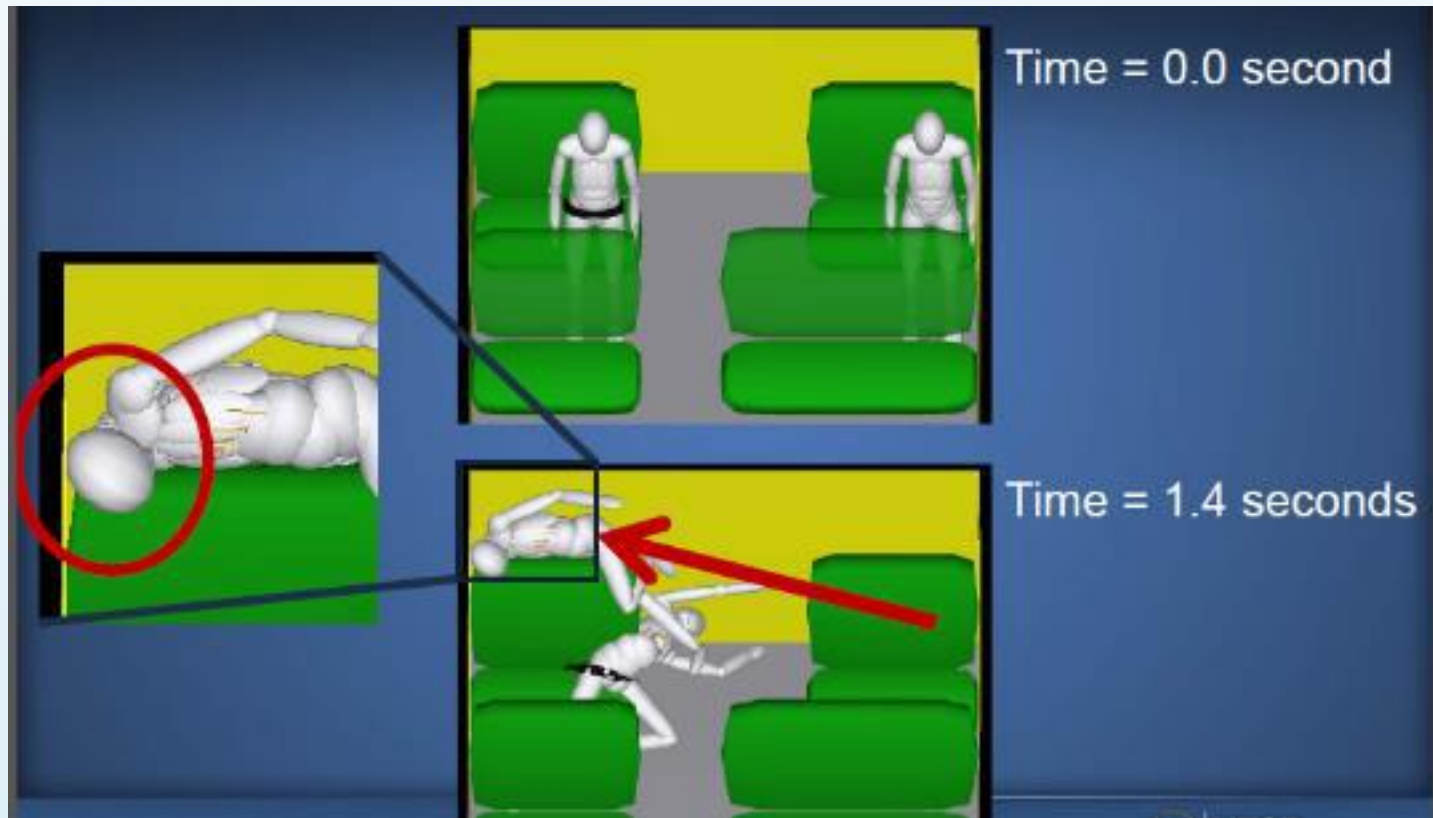
- Front/Rear

Students usually well protected by compartmentalization, but upper body flailing, to include head and neck movement, is more controlled by 3-point than 2-point belts.

- Side (also subject to rollover)

Students are most vulnerable with no seat belts. 2-point belts provide limited protection by preventing students from being violently projected across the vehicle, possibly into the hard metal/glass side of the bus. 3-point belts provide the best protection to most students.

Danger of Side Collisions: A Simulation



Student with no belt violently propelled across bus with head striking opposite wall.

Student with lap belt experiences upper body flailing.

NTSB Video

The NTSB video linked below provides a discussion of the benefits of compartmentalization, 2-point lap belts, and 3-point lap/shoulder belts:

<https://www.youtube.com/watch?v=ksw67zFnuAE&feature=youtu.be>



Kristin Poland, PhD
NTSB Senior Biomechanical Engineer
Mother of students that ride school buses

Cost of Seat Belts

New Buses

Thomas Built C2 77-passenger

- Adding 2-point belts
+\$1,078 (\$14 per belt)
- Adding 3-points belts
+\$9,230



Cost of Seat Belts New Buses

Thomas Built C2 53-passenger
with lift – special needs

- Already equipped with
2-point belts
- Switching to 3-point belts
+\$6,230



Capital Budget Impact

- HCPS FY17-18 capital budget for school bus replacement = \$2.5M
- Can purchase 24 buses with 3-point belts, instead of status quo purchase of 26 buses (8% fewer buses)

Can Seat Belts be Added to Existing Buses?

- About 200 77-passenger HCPS buses purchased since 2008 are “seat-belt ready.” Lap belts can be purchased for \$14 each (\$1,078 per bus) and installed by local shops.
- Retrofitting buses with 3-point belts can be very expensive (up to \$20K per bus)
 - Replace entire seat structure
 - Repair flooring

Student Code of Conduct

- Will seat belt use be mandatory or voluntary if buses are equipped with seat belts?
- If mandatory, HCPS Student Code of Conduct must define the requirement with appropriate consequences for violation.
- If voluntary, seat belt use can be encouraged in “bus rules” and HCPS regulation.
- Student behavior may improve if belts are worn and remain buckled up.

Student Behavior



NHTSA Presentation Dec 1, 2016 – unspecified school district

Responsibilities of School Bus Drivers and School Staff

- Not realistic for a single driver to ensure all students buckled up for entire trips.
- Drivers should not be expected to stop along route or take extra time at bus stops.
 - Remind to buckle up as students enter the bus.
 - Walk the bus and check before leaving school. School staff could assist at schools locations.
- Young students must be taught to independently buckle up and unbuckle (and adjust the fit).

Responsibilities of School Bus Drivers and School Staff

- If belt use is mandatory, bus drivers must exercise a consistent practice for referrals. Will failure to buckle be
 - a primary violation (stands alone) or
 - a secondary violation (also reported with other infractions such as standing up or moving while bus is in motion)?
- If mandatory, bus assistants may be required on every bus. Tommy Kranz (City of Richmond) stated this would add \$2M to his annual operating budget (2-14-17 VAPT Region 1 Directors meeting).

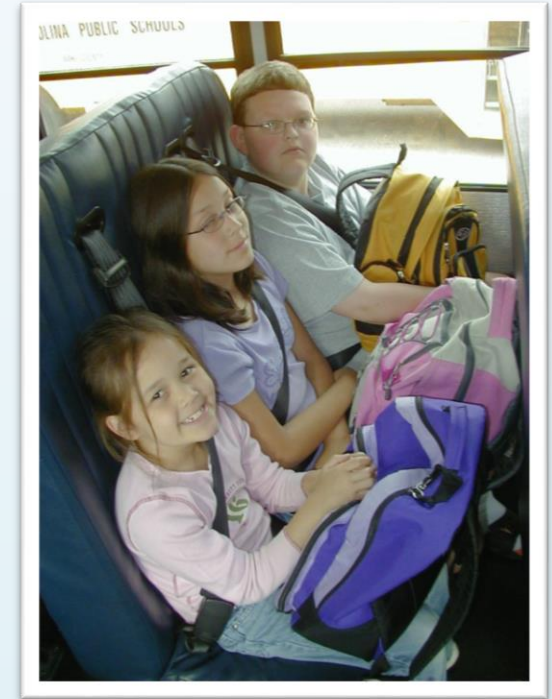
State of Louisiana Task Force

- Louisiana has an unfunded law requiring seat belts.
- Study published in January 2017 with following recommendation: *“If occupant restraints are mandated by an act of the Legislature, the Legislature should appropriate monies for funding for three-point seat belts and for employing a school bus attendant for every school bus so equipped in order to ensure that passengers are properly restrained and to assist restrained passengers during emergency evacuations of school buses.”*
- <http://files.schoolbusfleet.com/louisianaschoolbusreport2017.pdf>

Capacity of School Buses



- Routes designed for three elementary students per seat and two secondary students per seat.
- Larger students may reduce capacity on some routes if seat belts are used.



- Seat belt use must be considered when evaluating student loads and assigning seats.
- One or two additional routes may be required to serve some schools.

Experience in Other States (Orange USD, Anaheim CA)*

- Mixed fleet of traditional buses with and without 3-point seat belts, which have been required by law for new purchases since 2005.
 - They have no policies addressing seat belt use, and their Bus Conduct Regulations simply include the statement, *“If the school bus is equipped with seat belts, pupils must buckle up.”*
 - Seat belt use is addressed during bus evacuation drills.
 - The law states drivers must tell students to wear them but they are not liable if the belts are not worn.

* Director Pam McDonald, interviewed via phone May 15, 2017

Orange USD, Anaheim CA

- Elementary students most compliant, middle school less and high school students least compliant.
- Largest students cannot wear 3-point belts, as they have not installed any extensions.
- Some buses have 2-point lap belts.
 - Students have fastened them across the bus aisle to trip other students.
 - Students suffered facial injuries when buckles are pulled to the end of the belt and swung as weapons.
- Not many discipline issues with students on school buses, even though a large percentage of riders qualify for free/reduced lunches (and bus rides).
- Very few parents have commented on whether or not their child's bus is equipped with seat belts.

Anaheim Crash 2014

Analyzed by NTHSA - one of their buses equipped with 3-point seat belts in 2014 when a bus driver passed out, ran off the road, partially rolling the bus and hit a tree with two distinct impacts.

- 11 students on board - four students and the driver were seriously injured (all wearing the 3-point belts). The bus impacted the tree twice, first in front near the driver, and then on the left side near the four students with serious injuries.
- The district reached a \$10M settlement with the families of the seriously injured students.
- The two students not wearing seat belts were uninjured, but were seated near the back of the bus.



North Carolina Project

- State purchased 82 replacement buses for 11 districts equipped with 3-point lap/shoulder belts in 2016-17.
- NC State Institute for Transportation Research and Education providing technical assistance and researching best practices in US.
- 32-page “Seat Belt Implementation Toolkit”

http://www.ncbussafety.org/documents/LapsShoulderBelts_NC_Toolkit_July2016.pdf

Related Topics

Investment in Bus Replacement and Maintenance

- HCPS fleet is 640 buses, but only replacing 25 per year over nine years (2009-17). Replacement cycle = 25 years.
- Aging fleet is driving up maintenance expenses, spent \$3.5M in 2012-13, \$4.5M in 2016-17. Over \$1M per year outsourced. Bus fleet readiness is 85-90%, but 97% for all other County vehicles.
- Buses, often with students on board, are experiencing more and more breakdowns on a variety of County roads and Interstate highways.

Henrico County Decision

- County Manager specified (April 26, 2017) that the County *“purchase only vehicles, inclusive of buses and large trucks, that are equipped with seat belts from this point going forward.”*
- HCPS Pupil Transportation and the County Automotive Maintenance (CAM) fleet manager concur that 3-point lap/shoulder belts be specified when HCPS purchases school buses equipped with seat belts.



Questions about Seat Belts on School Buses?

