

NTSB

National
Transportation
Safety Board

National History of School Bus Crashes and Lessons Learned

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NTSB – Who We Are & Mission

Independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant crashes in other modes of transportation – railroad, transit, highway, marine, pipeline, and commercial space.

- Determine probable cause of crashes and issue safety recommendations aimed at preventing future crashes.
- Carry out special studies concerning transportation safety and coordinate resources of the federal government and other organizations to provide assistance to victims and their family members.



Mission

Making transportation safer by conducting independent investigations, advocating safety improvements, and deciding pilots' and mariners' certification appeals.

Presentation Outline

- School bus safety overview
- NTSB school bus crash investigations and recommendations
- Changes to federal regulations for school bus occupant protection
- More NTSB school bus crash investigations and updated recommendations
- Conclusions

Why School Buses are Safe

- Vehicle Design
 - Large, bright yellow, lights
 - Roof strength, sidewall strength
 - Compartmentalization
 - Emergency exits
- Operation
 - Driver training, requirements
 - Vehicle inspections, maintenance
 - Rules for other road users
 - Safe routes



Source: buspatrol.com



School Bus Safety Statistics: 2012-2021

- Fatalities in school transportation crashes
 - Inside the school bus
 - 5 driver fatalities per year
 - 6 passenger fatalities per year

Source: NHTSA DOT HS 813 477, June 2023

Safe Systems

Collision
Avoidance

Crashworthiness

Post-Crash
Factors

Large school buses are safe with or without passenger seat belts.

Large school buses are safer with properly worn passenger lap/shoulder belts at all seating positions.

School Bus Compartmentalization



Source: CAPE

School Bus Compartmentalization is Incomplete



1999 Bus Crashworthiness Issues Report

Safety Recommendations to NHTSA:

- H-99-45: In 2 years, develop performance standards for school bus occupant protection systems that account for frontal impact collisions, side impact collisions, rear impact collisions, and rollovers.
- H-99-46: Once pertinent standards have been developed for school bus occupant protection systems, require newly manufactured school buses to have an occupant crash protection system that meets the newly developed performance standards and retains passengers, including those in child safety restraint systems, within the seating compartment throughout the accident sequence for all accident scenarios.

Conasauga, Tennessee: March 28, 2000



Conasauga, Tennessee: March 28, 2000



Conasauaga, Tennessee: Passenger Injuries



- Driver and 3 passengers ejected
 - Driver – minor injuries
 - 2 seriously injured, row 1
 - 1 fatal, row 12
- Four passengers remained inside bus
 - 2 fatal, area of impact
 - 1 seriously injured, across from impact, row 6
 - 1 minor injuries, lap belted row 2

Milton, Florida: May 28, 2008

- Lap belts keep occupants in the seating compartment
- Prevent ejection



Milton, Florida: Passenger Lap belts
2 complete rolls
No ejections



Flagstaff, Arizona: No belts
1 ¼ roll
5 students ejected

NHTSA Testing



Source: NHTSA

NHTSA Testing



Source: NHTSA

2008 NHTSA Final Rule: FMVSS 222

- Small school buses: required to have passenger lap/shoulder belts
- Large school buses:
 - Enhanced compartmentalization (+ 4" to seat back height)
 - Voluntary performance standards for passenger lap belts
 - Voluntary performance standards for passenger lap/shoulder belts
- Final rule effective in 2011

Port St. Lucie, Florida: March 26, 2012



Port Saint Lucie, Florida – On-Board Video and Audio System

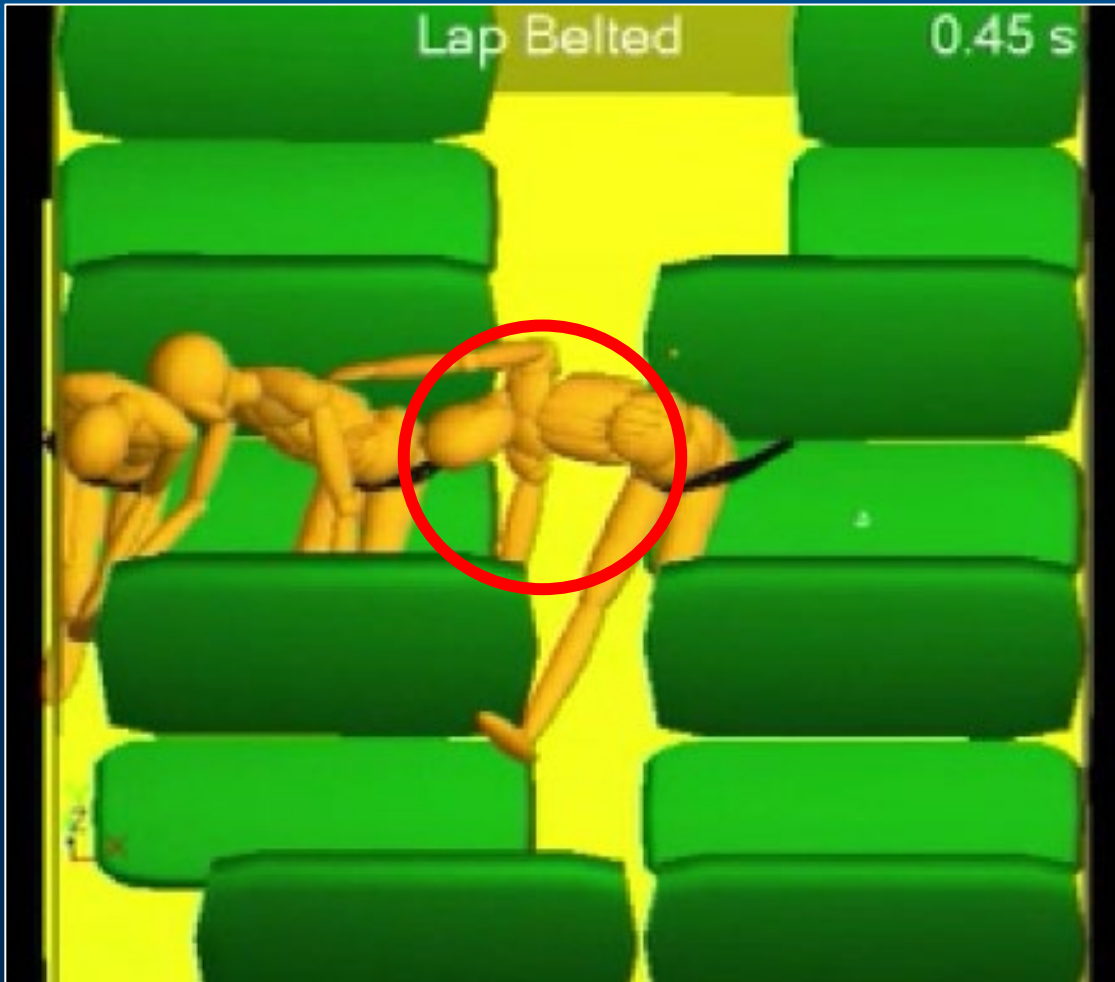


Port St. Lucie, Florida: Injuries

- 30 Passengers
 - All lap belted
 - 1 passenger was fatally injured
 - 4 sustained serious injuries
 - 12 others transported to hospital
- Bus driver sustained minor injuries
- Truck operator refused treatment



Port Saint Lucie, Florida – Loss of Consciousness and Evacuation



- Lap belted passengers experienced less motion but injury due to upper body flailing
- 18 passengers self-evacuated in 60 seconds or less
- Loss of consciousness observed in 7 passengers, none self-evacuated

Centerville, Louisiana: February 15, 2014

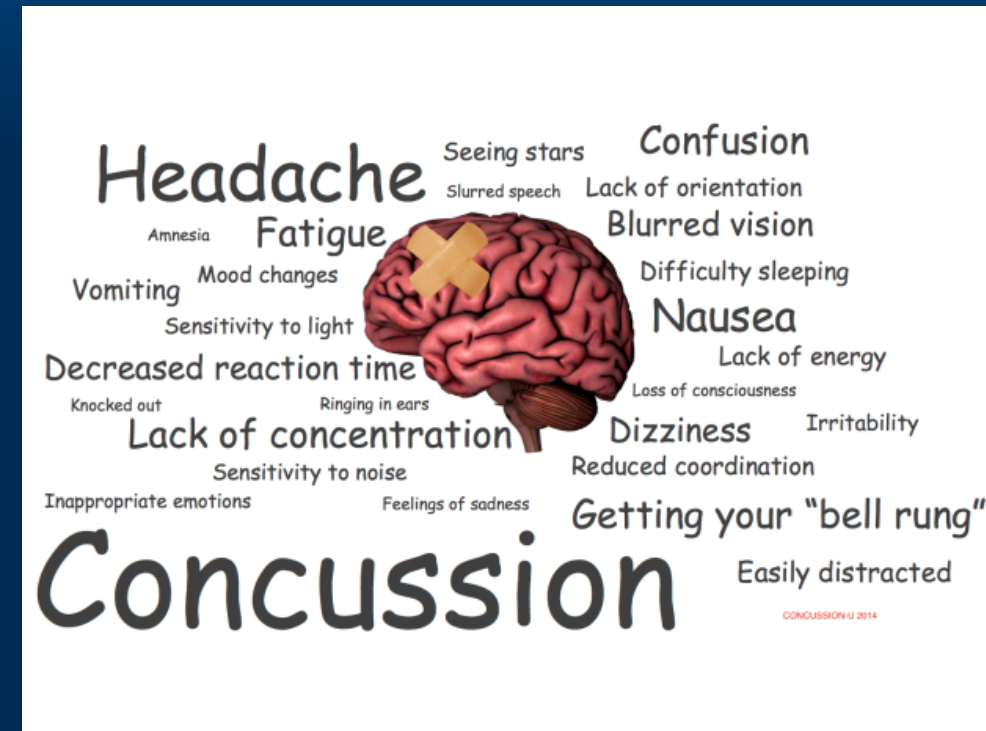


Centerville, Louisiana: February 15, 2014

- Kia: 5 passengers (4 fatal, 1 serious)
- Bus: driver, 4 adults, 30 students, no passenger belts
- Baseball team, male students aged 14 to 18
- Injuries
 - 1 student with serious injuries
 - 28 students with minor injuries
 - 1 uninjured student
- Students in concussion management program

Centerville, Louisiana: Concussion Outcomes

- 16/30 athletes (53.3%) had significant post crash cognitive changes suggestive of a concussion
- Mean symptom duration: 26 days
- Range: 6 – 101 days



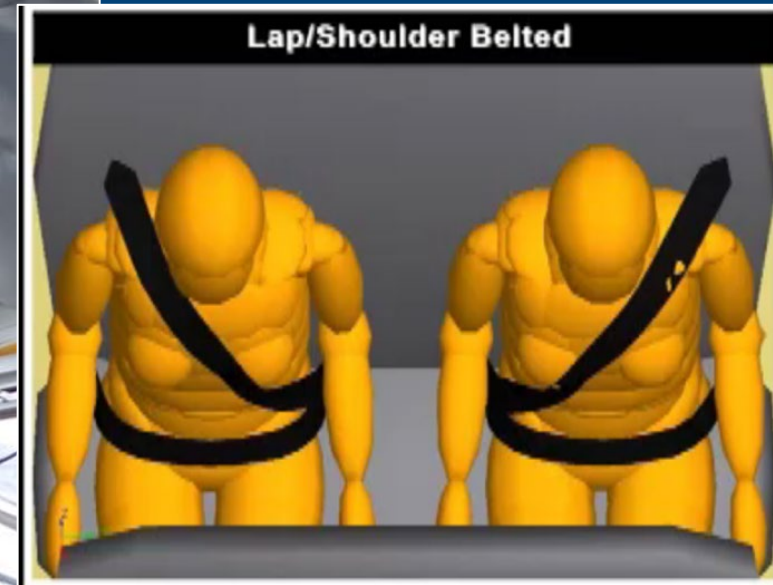
Anaheim, California: April 24, 2014

- About 3:37 p.m.
- School bus departed roadway at about 43 mph, struck pole and trees climbing a ~30 degree embankment
- Partial roll onto embankment, sliding/lateral impact
- 5 serious injuries, including driver, 5 minor, 2 uninjured
- Passenger lap/shoulder belts
- On-board video



Anaheim, California: April 24, 2014

Proper use of lap/shoulder belts reduced injury in intrusion area



Chattanooga, Tennessee: November 21, 2016

- Single-vehicle school bus crash, rolled onto right side, impacted tree
- 2008 Thomas Built school bus
 - 6 students killed, 26 serious to minor injuries
- School bus equipped with multiple recording systems
- No passenger belts



Chattanooga, Tennessee: November 21, 2016



ejected

Injury severity: **fatal (red)**, **serious (orange)**, **minor (green)**, none (gray)

37 passengers: 6 fatal, 6 serious, 20 minor, 5 uninjured

Chattanooga, Tennessee: November 21, 2016

New recommendation to States to install lap/shoulder belts

- H-18-9: Amend your statutes to upgrade the seat belt requirement from lap belts to lap/shoulder belts for all passenger seating positions in new large school buses in accordance with Federal Motor Vehicle Safety Standard 222.
- H-18-10: Enact legislation to require that all new large school buses be equipped with passenger lap/shoulder belts for all passenger seating positions in accordance with Federal Motor Vehicle Safety Standard 222.

Decatur, Tennessee: October 27, 2020



- Increased injury risk due to improper seating in compartment
- Lack of lap/shoulder belts contributed to injury

Conclusions

- Properly worn lap/shoulder belts provide best protection for large school bus passengers in all crash types
 - Keeps children within the seating compartment before and during crash dynamics, prevent ejection
 - Reduces injury, especially to the head, allowing self-evacuation
- Lap/shoulder belts require action
 - Passengers must use the belt properly
 - School and parent engagement

Oakland, Iowa: December 12, 2017



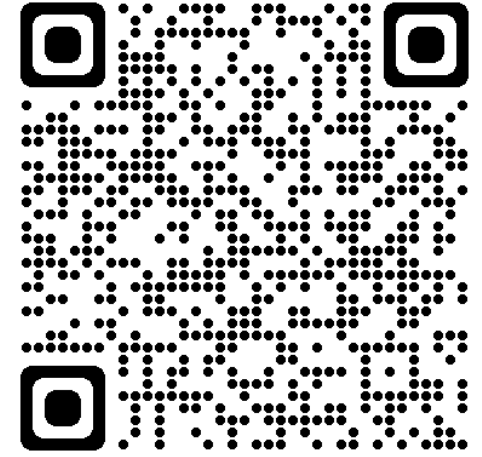
Oakland, Iowa: December 12, 2017



Mesquite, Texas: October 3, 2018



School Bus Safety



School Bus Safety



Topics:

- [Seat Belts on School Buses](#)
- [Illegal Passing of Stopped School Buses](#)
- [Vehicle Technology](#)
- [Presentations](#)

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Decatur, Tennessee: October 27, 2020

