

**National
Transportation
Safety Board**


**Tackling the Challenges in School and
Head Start Transportation in 2021**

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Lifesavers Conference on Highway Safety Priorities


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Overview

- NTSB background
- Investigations of seat belt equipped school buses
- Concussion Study
- Rochester, Indiana investigation



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Our Mission

The NTSB is an independent Federal agency charged by Congress with **investigating** every civil aviation accident in the United States and significant accidents in the other modes of transportation – highway, marine, railroad and pipeline – and **issuing safety recommendations** aimed at preventing future accidents.

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Board Members and Staff

5 Board Members

- Chairman Robert L. Sumwalt
- Vice Chairman Bruce Landsberg
- Jennifer Homendy
- Michael Graham
- Tom Chapman



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Best Occupant Protection

- Compartmentalization
 - Works well for all seated occupants and all occupant sizes
 - Requires no passenger action
 - Designed for longitudinal impacts
- Seat Belts
 - Significantly increases protection for side impacts and rollovers
- Encouraged by the school districts and states who have taken action to equip their school buses with seat belts



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NTSB Investigations of Seat Belt Equipped School Buses



Central Bridge, NY - 1999



Conasauga, TN - 2000



Milton, FL - 2008



Chesterfield, NJ - 2012



Port Saint Lucie, FL - 2012



Anaheim, CA - 2014



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Port St. Lucie, Florida: What Happened



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Occupant Kinematics Simulation Lap/Shoulder Belt Comparison Simulation

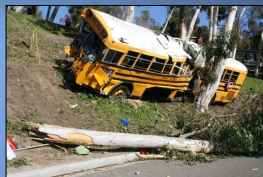
School Bus and Truck Tractor Semi-Trailer
Collision at Intersection

Near Port Saint Lucie, Florida
March 26, 2012
HWY12FH008

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Anaheim, California: What Happened

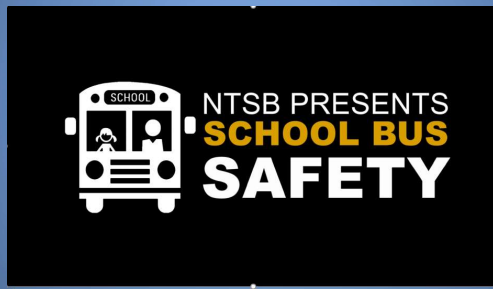
- April 24, 2014, about 3:37 p.m.
- School bus departed roadway at about 43 mph, struck pole and trees climbing a ~30 degree embankment
- Partial roll onto embankment, sliding/lateral impact
- 5 serious injuries, including driver, 5 minor, 2 uninjured
- Lap/shoulder belts
- On-board video



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NTSB School Bus Safety Video



<https://www.youtube.com/watch?v=ksw67zFnuAE>

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Conclusions

- Properly worn lap/shoulder belts reduce injuries related to upper body flailing
- Educate students, parents and school districts about proper belt use on school buses



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Chattanooga, Tennessee: What Happened

- November 21, 2018
- 24-year-old driver and 37 students on-board
- 52-mph in 30-mph speed limit zone
- Excessive speed resulted in loss of control



Source: Chattanooga Police Department



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Chattanooga, Tennessee: What Happened

- Student passengers
 - 6 fatalities
 - 26 serious-to-minor injuries
 - 5 uninjured
- School bus driver
 - Uninjured

Chattanooga, TN Crash Overview



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Chattanooga, Tennessee: What Happened

- Passengers in front of bus vulnerable to ejection
- All vulnerable to secondary impact
- More students thrown into rather than out of intrusion zone
- Loss of benefits of compartmentalization



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Seat Belts on Large School Buses

- NTSB has recommended seat belts on school buses
- Federal Motor Vehicle Safety Standard (FMVSS) 222
 - Established performance standards for voluntary installation of lap/shoulder belts on large school buses
- School districts using seat belts
 - Reduced driver distraction, improved student behavior



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Chattanooga, Tennessee: What Recommended

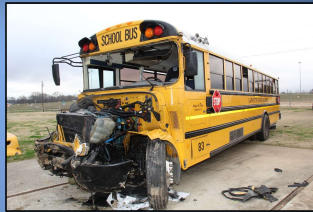
Recommendation to States:

- 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.
- 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.



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Centerville, Louisiana: What Happened



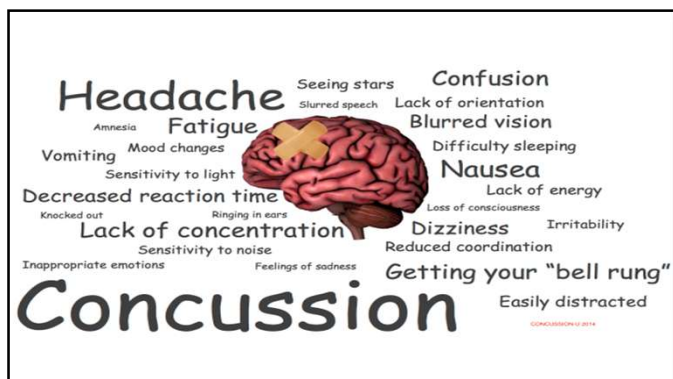
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Purpose

Present changes in baseline concussion assessment scores as a result of school bus crash



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Concussion Management Program

- Immediate Post-Concussion Assessment and Cognitive Testing (ImPact)
 - Pre-Injury testing (established baseline)
 - Post-injury testing
- Program
 - Demographic data
 - Neurocognitive and balance tests
 - Post-concussion symptom scale

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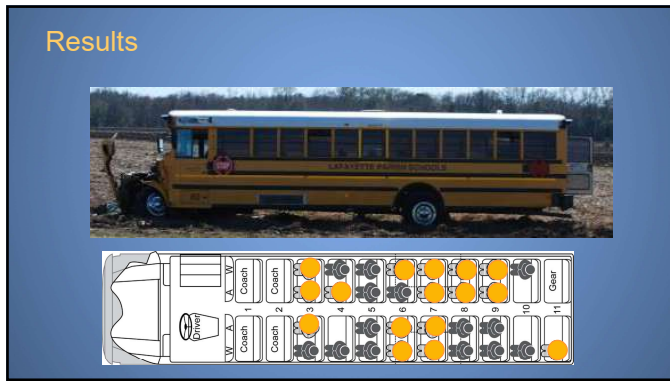
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Results

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

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Changes in Baseline Concussion Assessment Scores Following a School Bus Crash

Kristin Poland, Mary Pat McKay, Mark Zonfrillo, Thomas Barth, Ronald Kaminski

Assoc. for the Advancement of Automotive Medicine
September 19, 2016

(Published in Traffic Injury Prevention, Vol. 17)

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School Bus Transportation: Pedestrian Safety

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Rochester, Indiana: What Happened



- About 7:12 am, October 30, 2018
- School bus was stopped with red lights on and stop arm deployed
- Approaching traffic passed a "WATCH FOR SCHOOL BUS" sign
- No roadway lighting



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Rochester, Indiana: Why it Happened

The pickup truck driver's failure to stop for the school bus for unknown reasons, despite its clearly visible warning lights and stop arm, as well as a roadway warning sign indicating an upcoming school bus stop.

Contributing to the crash was the Tippecanoe Valley School Corporation's

- Inadequate safety assessment of school bus routes that required student pedestrians to cross a 55-mph roadway, increasing the risk of injury during a collision
- Failure to establish a clear policy for bus drivers to follow in determining when it is safe to signal students to cross the roadway



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Rochester, Indiana: Safety Issues

- Deficiencies in establishing safe school bus routes and stop locations
- Failure of other drivers to stop or otherwise respond safely when approach a school bus that is stopped with its warning lights on and stop are extended
- Need for greater use of technologies to prevent collisions with, and mitigate injuries of, student pedestrians, include V2V, pedestrian AEB, and school bus safety-enhancing technologies.



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Transportation Director Training

- Responsible for student safety and route planning
- Transportation 101
 - Not mandatory
 - Less than 2% of all directors have attended



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Student Training

- Conduct
- Emergency evacuation
- Universal crossing signal
 - Horn used as warning signal



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Summary

- Students were required to cross high-speed roadway
- Safety of the route
 - Not evaluated
 - No tracking
- Training deficiencies
 - Drivers
 - Transportation director
 - Students



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Rochester, Indiana: What We Recommended

- 12 new safety recommendations and 3 reiterated recommendations related to:
 - Connected Vehicle and collision avoidance technology
 - Legislation to permit use of stop arm cameras
 - Training for school transportation directors and others on evaluating school bus routes and stop risks
 - Driver and student training



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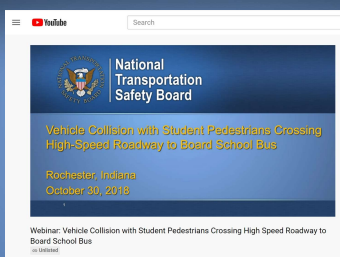
Enforcement Technology

Stop Arm Cameras

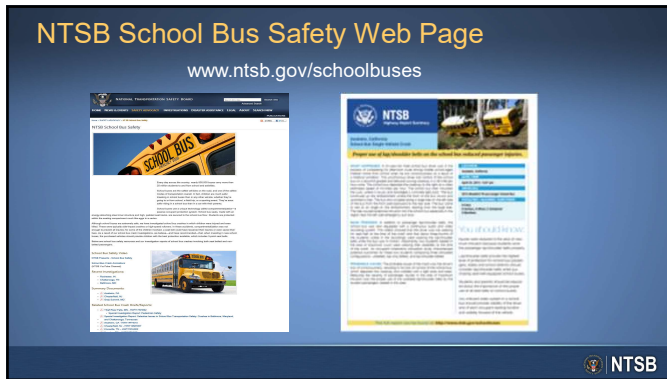


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Rochester, Indiana: Webinar



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