Updates Regarding NTSB School Bus Bus Investigations

Michele Beckjord
Senior Accident Investigator, NTSB

October 29, 2018
Outline

• Who is NTSB?
• Current Investigations
• Special Investigation Report
  – *Baltimore, MD & Chattanooga, TN crashes*
• Discussion
Independently Advancing Transportation Safety

- 32 Office of Highway Safety staff
- Response Operations Center
- Ready to “launch” 24/7
What types of highway crashes do we investigate?
Board Meeting

- Public meeting in Washington, DC
- Webcast
- Staff presentations
- Board member deliberations
- Official adoption of:
  - Report
  - Findings
  - Probable cause
  - Safety recommendations
Most Wanted List 2018-2019

Require medical fitness

Increase implementation of collision avoidance technologies

Strengthen occupant protection

Eliminate distractions
Current School Bus Investigations

- **Helena, Montana** (November 2017)
  - Side impact crash, rollover
- **Oakland, Iowa** (December 2017)
  - Run-off-road, postcrash fire
- **Mesquite, Texas** (October 2018)
  - Run-off-road, postcrash fire
Helena, Montana

- November 27, 2017 about 7:13 a.m.
- 2011 Chevrolet Express school bus (belt equipped)
- Helena School District (driver, 3 students)
- Stop sign intersection, left side impact
Mesquite, Texas

- October 3, 2018 about 3:56 p.m.
- 2019 IC Bus (lap/shoulder belts)
- Mesquite ISD (driver, 42 passengers)
- Run-off-road, rollover with postcrash fire

Source: Star Telegram
Oakland, Iowa

- December 12, 2017 about 6:52 a.m.
- 17000 Block 480th Street
- 2004 International school bus
  - 74 year-old driver
  - 16 year-old passenger
- 2 fatal
Oakland, Iowa
Oakland, IA

Driver side - rear

Loading door side
Selective Issues in School Bus Transportation Safety

Crashes in Baltimore, Maryland, and Chattanooga, Tennessee
Baltimore, Maryland

- November 1, 2017 @ 6:30 a.m.
- 2015 IC school bus
  - 67-year-old driver, bus aide
  - AAAfordable Transportation LLC / BCPS
- 2012 Ford Mustang
  - 51-year-old driver
- 2005 New Flyer transit bus
  - 33-year-old driver, 13 passengers
  - Maryland Transit Administration
Crash Sequence

Frederick Ave
Crash Sequence

School bus-car impact

Frederick Ave
Crash Sequence

School bus-transit bus impact

School bus-car impact
Crash Scene & Injury Information

- **Fatalities** (2 bus drivers, 4 transit passengers)
- **Serious injuries** (5 transit passengers)
- **Minor injuries** (school bus attendant, 4 transit passengers, car driver)
Chattanooga, Tennessee

- November 21, 2017
- 2008 Thomas Built school bus
  - 24-year-old driver
  - 37 students
- Durham School Services
- Hamilton County Department of Education
• 3:13 pm. departed Woodmore Elementary School
• Traveled south on Talley Road
Crash Sequence
Crash Sequence

Impact Location

Talley Road
Sunset Avenue

Impact Location
Crash Sequence
Video Analysis, Crash Simulation

- Bus at 52-mph
- 30-mph speed limit zone
- On cellphone
- Excessive speed resulted in loss of control

- Students: 6 fatally injured, 26 serious-to-minor injuries
- 5 students and driver uninjured
## Special Investigation Report

<table>
<thead>
<tr>
<th></th>
<th>Baltimore, MD</th>
<th>Chattanooga, TN</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Bus driver oversight</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓ Carrier oversight</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓ Crash prevention</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓ Seatbelts</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Baltimore School Bus Driver

• Seizures since childhood
  – Sudden, unpredictable, neurologic episodes
  – Loss of consciousness, uncontrolled movements

• Incapacitated by a seizure led to crash

• Denied seizures to get medical card

• Fraudulently obtained CDLs

• Additional effort needed to increase referral of medically unfit drivers to MVA
AAAfordable Transportation

- Hired in May 2014 (left in April 2016)
- Reliable Transportation April–May 2016
  - Staff witnessed seizure
- AAAfordable rehired driver in August 2016
  - No background check
- Had seizure October 24 (1 week prior to crash)
  - Witnessed by dispatcher
- Dispatched for 5 days until crash without doctor’s release
Baltimore City Public Schools (BCPS)

- Heavily involved with daily operations
- Maintained all documentation
- 2008–2016 driver worked for 5 contractors
- 5 school bus crashes
  - October 2011 “passed out”
  - No followup or action taken
AAAfordable & BCPS Oversight

• AAAfordable allowed medically unfit driver to operate school bus

• BCPS failed to recognize driver high risk
  - Failed to follow its own SOPs
  - Crash reports incomplete
  - Lacked threshold for crashes
  - Failed to follow COMAR
Chattanooga, TN Driver

- **Driver experience**
  - Hired in 2016, had driven few weeks total before crash
- **Job performance**
  - Previous crashes, numerous complaints

<table>
<thead>
<tr>
<th>Date</th>
<th>Complaint</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 11</td>
<td>Speeding</td>
<td>Durham School Services</td>
</tr>
<tr>
<td>August 12</td>
<td>Speeding</td>
<td>Durham School Services</td>
</tr>
<tr>
<td>August 18</td>
<td>Crash in bus (not reported)</td>
<td>Durham School Services</td>
</tr>
<tr>
<td>September 20</td>
<td>Crash in bus</td>
<td>Durham School Services</td>
</tr>
<tr>
<td>September 28</td>
<td>Intentionally makes students fall by erratic driving</td>
<td>Woodmore Elementary School (parents)</td>
</tr>
<tr>
<td>October 27</td>
<td>Speeding</td>
<td>Durham School Services</td>
</tr>
<tr>
<td>October 28</td>
<td>Speeding</td>
<td>Durham School Services</td>
</tr>
<tr>
<td>November 8</td>
<td>Speeding</td>
<td>Durham School Services</td>
</tr>
<tr>
<td>November 16</td>
<td>Erratic driving</td>
<td>Woodmore Elementary School (students)</td>
</tr>
<tr>
<td>November 18</td>
<td>Speeding</td>
<td>Woodmore Elementary School (principal)</td>
</tr>
</tbody>
</table>
Durham, HCDE Oversight

• Hamilton County Dept. of Education
  – Contracted Durham but had limited oversight
  – Forwarded all complaints to Durham

• Durham School Services
  – Lacked systematic complaint tracking
  – Failed to provide adequate driver oversight
Summary

• Durham School Services
  – Lacked systematic complaint tracking
  – Failed to provide adequate oversight

• Durham and Hamilton County School District
  – Lack of documentation and resolution
  – Failed to remove unsafe driver
Crash Prevention Technologies

- Collision avoidance systems mitigate or prevent crashes by detecting vehicles ahead
- Automatic emergency braking intervenes regardless of driver vigilance

Baltimore: with CAS and AEB
- Impact with transit bus would not have occurred, saving lives
Electronic Stability Control (ESC)

- Ensures automatic emergency braking benefits
- Evaluates, intervenes in loss of control events
- 2015 FMVSS 136
  - excludes school buses
- 2017 Canadian CMVSS
  - includes school buses

Chattanooga:
- ESC could have assisted in maintaining control & mitigated crash severity
Crash Prevention Technologies

- Can prevent or mitigate crash severity
- Requirement is long overdue
- Some manufacturers installing technologies
- Can industry adopt ahead of a mandate
Crash Sequence Effect

- Evidence from roadway, witnesses, video system
- Loss of control over 300 feet prior to impact
- Bus beginning to roll prior to impact with utility pole
- Bus overturned onto passenger side
- Passengers thrown from seats prior to rollover/impact
Chattanooga School Bus

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

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

Roof crush Severity: mild, moderate, severe
Roof Crush, Intrusion, Injuries

Injury from occupant flailing / impact, ejection, intrusion
Chattanooga Crash Outcomes

- Passengers in front of bus vulnerable to ejection
- All vulnerable to secondary impact
- More students thrown into not out of intrusion zone
- Loss of benefits of compartmentalization
Seat Belts on Large School Buses

• Federal Motor Vehicle Safety Standard 222
  – Established performance standards for voluntary installation of lap/shoulder belts on large school buses

• Compartmentalization inadequate

• Lap/shoulder belts provide best protection

• Recommend states require lap/shoulder belts

• Recommend manufacturers install lap/shoulder belts as standard (not optional) equipment
Positive Actions

• Code of Maryland Regulations modified
• Durham and National Express
  – Improved driver monitoring (camera systems, training)
  – Database for complaint resolution
• Tennessee
  – Law enacted for oversight of contracted transportation service providers by local education authorities and school districts
  – Annual training for transportation supervisors
  – Formal policy for bus safety complaint resolution
July 2018 News Reports

“Electronic Stability Control Now Standard on IC School Buses”
New CE and RE Series diesel buses with air brakes feature ESC and collision mitigation technology as standard. ESC will be available for IC’s propane and gasoline buses with air brakes in 2019.

“Thomas Built Buses Makes Electronic Stability Control a Standard Feature”
ESC will be standard on all new Saf-T-Liner C2 diesel and CNG school buses produced on or after July 23
Positive Actions

• States, school districts with lap/shoulder belts
  – Reduced driver distraction, improved student behavior

• NHTSA to study additional benefits of seatbelts
  – Reduced driver distraction, improved student behavior

School Bus Safety Act, H.R. 6773

September 2018 - Senator Tammy Duckworth and Representative Steve Cohen introduced legislation to require the U.S. DOT to issue rules that require all newly manufactured and purchased school buses to not only be equipped with standard three-point seat belts but also automatic emergency braking systems, event data recorders and electronic stability control (ESC).
New Jersey Law to Require 3-Point Seat Belts on New School Buses

Gov. Phil Murphy signs a law that upgrades the requirement for seat belts on new school buses from lap-only belts to lap-shoulder belts. The law applies to school buses manufactured on or after 180 days of Murphy’s signature.
Conclusions

• School buses are still the safest means of transportation to and from school
• There is always room for improvement, and more can be done

"From tragedy we draw knowledge to improve the safety of us all."
Questions?

Contact Information:
Michele.Beckjord@NTSB.gov
303-373-3510 (office)
202-285-8233 (cell)