Large School Bus Occupant Protection

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Overview

• Crash sequence effect on injuries
• Passenger outcomes
• Lap/shoulder belts
Crash Sequence Effect on Occupant Protection

- 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

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

37 passengers: 6 fatal, 6 serious, 20 minor, 5 uninjured
Roof Crush and Intrusion
Injury Mechanisms

Injury from occupant flailing/impact, ejection, intrusion

Source: Chattanooga Police Department
Chattanooga Crash Passenger Outcomes

- 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
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
Summary

- Compartmentalization inadequate
- Lap/shoulder belts provide best protection
- Users have seen benefits in student behavior