National Transportation Safety Board

Large School Bus Occupant Protection

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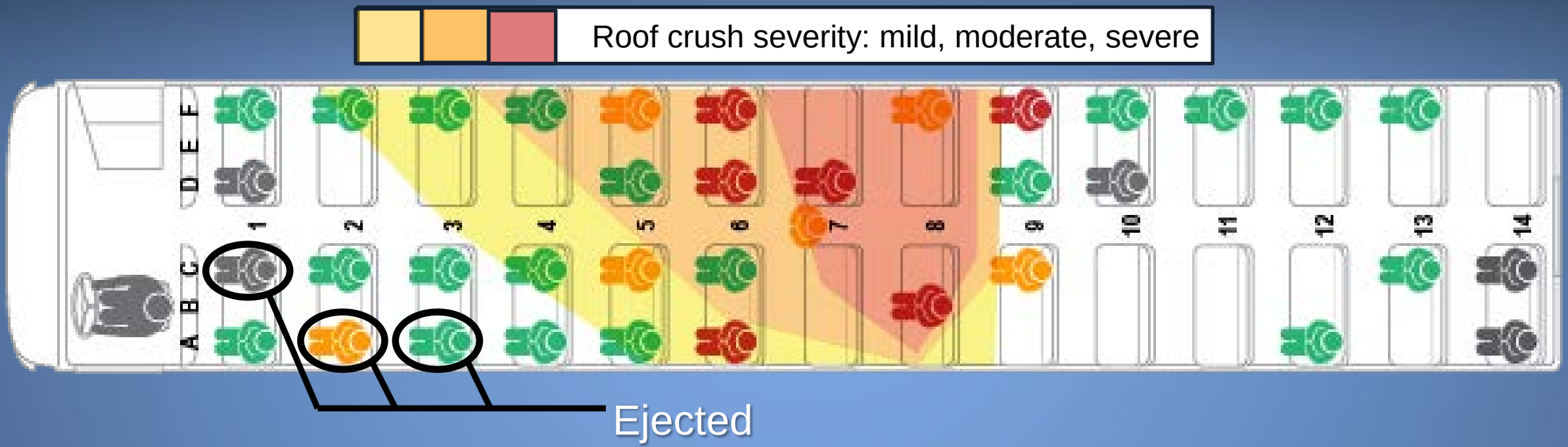
Overview

- 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

Source: Chattanooga Police Department

Injury from occupant flailing/impact, ejection, intrusion

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

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