Risk Factors for Bus Travel: Potential Areas for Rural ITS Solutions

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Overview

- NTSB and highway safety
- Mexican Hat, UT, tour bus accident
- What the bus accident data tell us
- Where ITS can contribute
NTSB and transportation safety

Mission

– Conduct objective, precise accident investigations and safety studies;

– Advocate and promote NTSB safety recommendations

– Promote transportation safety by maintaining our congressionally mandated independence and objectivity;

– Assist victims of transportation accidents and their families
NTSB and transportation safety

• Independent agency
  – Created in 1974
  – 4 Modal Offices
    • Highway
    • Aviation
    • Rail, Pipeline & Hazardous Materials
    • Marine
  – Research & Engineering
    • laboratories
    • safety research
  – HQ and 6 regional offices
    • 5 board members, 400 staff
Office of Highway Safety

- Total of 27 staff, 5 technical areas
  - Vehicle factors
  - Operational factors
  - Human performance
  - Survivability
  - Highway design

- Selects specific accidents to investigate
  - High profile commercial accident
  - Issues of interest
  - Uneven application of safety regulations
  - Support safety research studies
NTSB Investigation

NTSB Investigative Staff

Modal Office Senior Management

Core Investigative Team

IIC

Group Chair$_1$

Group Chair$_2$

Group Chair$_k$

Investigators

Investigators

Investigators

Party Members
Regulators
Manufacturers
Operators
Unions

External Resources
Other Agencies
Laboratories
Consultants
Mexican Hat, UT, Bus Accident

• Scenario
  – Return trip from Telluride, CO to Phoenix, AZ as part of a 17-motorcoach ski trip, January 8, 2008
  – Driver plus 52 passengers
  – Southbound on Utah Route 163, a 2-lane rural road
  – Failed to negotiate a left-hand turn traveling at high speed (88 mph)
  – Rolled once, shearing off roof, ejecting all but 2 occupants
  – 9 fatalities and 44 injuries
Mexican Hat, UT, Bus Accident

Lizard Head Pass

Accident location

Missed turn
Mexican Hat, UT, Bus Accident

Guardrail impact

Off roadway
Important Accident Facts

• Bus was not on planned route
• Accident notification took almost 1 hour
  – No cell phone coverage in area
  – Accident occurred at 8:02 pm
  – First call to 9-1-1 occurred at 8:38
  – 1st responder arrived at accident site at 8:56
Important Accident Facts

• EMS required complex coordination of resources across 4 states
  – Utilized 12 hospitals, 1 clinic
  – Closest hospital was 75 miles; closest trauma center 190 miles
  – Requested helicopters grounded by weather
  – All transport done by 20 ground ambulances
  – Injured transported from scene for 4+ hours
  – 2 people died en route many hours after accident
Important Accident Findings

• Accident Notification
  – Lack of notification capability
  – Uncertain magnitude and severity of accident

• EMS response
  – Mass casualty event
  – Required complex coordination
  – Weather grounded helicopter EMS resources
  – Long distance ground travel to critical care
What Accident Data Tells Us

• Focus on large buses: 2000 - 2007
  – Motorcoaches
  – Transit and city buses
  – Specialty/medium-sized buses (GVWR 10K-26K pounds)

• Passenger-carrying operations
  – Tours and charters
  – Scheduled service
  – Commuter service
  – Shuttle service
Fatal Accident Data Analysis

• Results: 2000 - 2007
  1,093 fatal accidents
  1,315 fatalities
  3,471 nonfatal injuries
• Travel risk found to be higher than previously reported
## Travel Risk Higher Than Expected

### Bus Occupant Fatality and Injury Accidents 2000 - 2007

<table>
<thead>
<tr>
<th></th>
<th>Rural</th>
<th>Urban</th>
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<tbody>
<tr>
<td>Fatal Injury Accidents</td>
<td>19%</td>
<td>5%</td>
</tr>
<tr>
<td>Nonfatal Injury Accidents</td>
<td>61%</td>
<td>35%</td>
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Tour & Charter Rural Travel Risk

Rural Fatal Accidents Involving Large Buses
2000 - 2007

![Bar graph showing the number of accidents involving large buses in rural areas from 2000 to 2007. The graph indicates that tour/charter buses have the highest number of accidents, followed by scheduled and commuter buses.]
All Bus Occupants Are At Risk

Rural Fatal Accidents Involving Large Buses
2000 - 2007

Fatalities

Nonfatal Injuries
Large Bus Rural Travel Risk

- Rural fatal accidents involving large buses are dominated by tours and charters
- Almost all are motorcoaches
- Accidents can produce a large number of nonfatally injured bus occupants
- Accidents can place considerable demands on rural EMS resources
- Comprehensive analysis required to characterize rural travel risk for large buses
NTSB Helicopter EMS Hearing

• Rural EMS response dependent on helicopter EMS due to closing of regional trauma centers

• Two types of helicopter EMS services
  – Commercial non-hospital based
    • Market-driven, and not always well integrated with local or regional EMS planning or oversight organizations
  – Hospital-based
    • Often subsidized by hospitals, and typically well integrated into hospital patient care and transport

• Triage and dispatch are critical to rural EMS
  – Patient injury data and critical care requirements
  – Transport requirements and coordination
NTSB Recommendations

• Accident Notification
  – Enhance rural road wireless communication

• EMS response
  – Guidelines for rural transportation mass casualty events
  – Contingency plans for rural EMS when helicopters not available

• Rural travel risk for tour and charter buses
  – Establish criteria for collecting data describing tour and charter bus rural activity

• Vehicle Recorders
  – Require all interstate commercial vehicles to install on-board vehicle recorders
How ITS Can Contribute

• Accident Notification
  – Provide means to automatically notify police & EMS
  – Provide data about bus, occupants, and severity of the accident

• EMS response
  – On-site voice and data communication
  – Support for identifying and dispatching EMS resources
  – Weather data and forecasting for both air and ground EMS travel and coordination
  – Systems for optimizing EMS response
How ITS Can Contribute

- Tour and Charter Bus Activity
  - Locating and monitoring bus travel
  - Capturing and recording bus routes and travel patterns
  - Capturing and recording passenger data
  - Registering bus, driver, and operator data
Thank You

Please contact: couryb@ntsb.gov