

Status of NHTSA's Motorcoach Safety Efforts

Informal document GRSG-102-27
(102nd GRSG, 16-20 April 2012
agenda item 2)



April 17, 2012
GRSG 102nd Session
Nha Nguyen



DOT Motorcoach Safety Action

Plan November 16, 2009

- **August 2007 – NHTSA’s Approach to Motorcoach Safety**
 - Priority items – seat belts, roof strength, emergency egress and fires
- **April 30, 2009 -- Secretary LaHood directs development of Motorcoach Safety Action Plan**
- **Goals:**
 - **Identify actions addressing outstanding safety problems**
 - Comprehensive look across agencies
 - Consider NTSB recommendations
 - **Develop aggressive and integrated multi-agency implementation schedule**
 - Outline additional steps to improve motorcoach safety
- **Agencies: FMCSA, NHTSA, FHWA, PHMSA, FTA**

DOT Motorcoach Safety Action Plan

- **Based on a two-pronged approach:**
 - **Address the root causes of *crashes***
 - Driver fatigue, distraction, health, and risky behavior
 - Vehicle maintenance
 - Operator Oversight
 - Crash avoidance measures
 - **Address the root causes of *fatalities and injuries***
 - Vehicle rollover
 - Occupant ejection
 - **Other issues:**
 - Fire Safety, Emergency Egress, Event Data Recorders

Priority Action Items in DOT Plan

- **FMCSA**
 - **Initiate rulemaking to require electronic on-board recording devices on all motorcoaches**
 - **Initiate rulemaking to prohibit use of cellular phones and other devices by motorcoach drivers**
 - **Enhance oversight of carriers and other unsafe motorcoach companies**
 - **Establish minimum knowledge requirements for people applying for authority to transport passengers**
- **NHTSA**
 - **Assess the safety benefits of stability control on motorcoaches**
 - **Initiate rulemaking for the installation of seat belts**
 - **Evaluate and develop roof crush performance requirements**

NHTSA's Motorcoach Safety Priorities

- **Priority Strategies**
 1. **Seat Belts**
 2. **Stability Control Systems**
 3. **Rollover Structural Integrity**
 4. **Emergency Evacuation**
 5. **Fire Safety**
 6. **Glazing and Window Retention**
 7. **Event Data Recorders (EDRs)**
 8. **Tires and Crash Avoidance Systems**

Seat Belts on Motorcoaches

- **NPRM published on August 18, 2010.**
- **Objective: Reduce occupant ejections and mitigate injury during motorcoach crash events**
- **NPRM proposes definition of motorcoach as a bus with the following characteristics**
 - **Gross vehicle weight rating of 26,000 pounds or greater,**
 - **16 or more designated seating positions,**
 - **At least 2 rows of passenger seats that are forward facing**
 - **Is not a school bus or an urban transit bus**



NPRM for Seat Belts on Motorcoaches

- Proposes requiring lap/shoulder belts at all seating positions in NEW motorcoaches
- Proposes requiring motorcoach seat belt assembly anchorages to meet strength performance requirements of FMVSS No. 210
 - specifies that anchorages withstand a force of 3,000 lbs applied simultaneously to the lap and shoulder belts
- Lead time of 3 years
- More than 130 comments received on NPRM

NEXT ACTION:

- Final Rule in 2012



Stability Control Systems for Heavy and Light Vehicles

- **Motorcoaches, Trucks**

- **High CG**
- **Generally roll unstable**
- **Roll Stability Control**
- **Yaw (Directional) Stability Control**
 - Limit over/under steer

- **Light Vehicles (FMVSS No. 126)**

- **Low CG**
- **Yaw unstable**
- **Yaw (Directional) Stability Control**
 - limit over/under steer
- **Roll Stability Control (Not Required)**



Stability Control for Motorcoaches

- **Objective: To reduce rollovers and enhance the stability of commercial vehicles – heavy trucks and motorcoaches.**
- **Test track research on stability control for motorcoaches**
 - **Evaluated different steering maneuvers**
 - **Examined roll stability and yaw stability**
 - **Identified equipment requirements**
 - **Developed performance test maneuvers**
 - **Identified performance metrics**
- **NEXT ACTION – NPRM in 2012**



Rollover Structural Integrity Tests

- **School bus procedure – FMVSS No. 220**
 - Uniform load applied on roof = 1.5 UVW
 - All emergency exits should be operable during and after the test
 - Roof crush measured – should not exceed 130 mm
- **European procedure - ECE R.66**
 - Motorcoach is tipped over on its side from a 800 mm raised platform.
 - Requirement – survival space during and after test is unharmed



NHTSA Research Test Results

- Tested two 40 ft. motorcoach models (1991 Prevost and 1992 MCI models) to the requirements in FMVSS No. 220 and ECE R.66 and a 45 ft model (2000 MCI 102EL3).
- Older bus models failed to meet the FMVSS No. 220 and ECE R.66 requirements
- In addition:
 - The roof emergency exits opened during the test on all three buses
 - Luggage rack inboard hangers in the 1991 MCI bus broke during impact
 - Emergency exit windows of the Prevost bus unlatched during impact
 - Seats on non-struck side of the Prevost bus detached from their anchorages
 - Windows on the opposite side broke free of its mounting in the 2000 MCI
- ➤ NEXT ACTION: NPRM in 2012



Emergency Evacuation Research {Egress, signage, illumination}

- Identify studies from other modes/countries
 - Determine applicability to motorcoaches
- Conduct human evacuation studies & simulations
 - Various emergency exit scenarios
- Examine minimum strength requirement to open emergency exits
 - Consideration for young & elderly occupants
- Examine illumination and signage effects on egress rates
- Completed assessment in 2010
 - Report in NHTSA-2007-28793-0024



Emergency Egress Research Results

- **Emergency egress rates from a motorcoach:**
 - **Front and side door - Fast and safe means of egress**
 - **Wheelchair door, roof exit – Moderate egress rates – some ergonomic issues**
 - **Window exit – Low rate of egress, with potential for injury.**
- **Ergonomics of operating and using emergency exit windows:**
 - **Current allowable exit operating force limit too high**
- **Emergency signage and markings:**
 - **Motorcoach signage are small/insufficient compared to school bus signage**
- **Emergency lighting and illumination**
 - **Reduction in occupant egress rates with diminishing lighting conditions**
- **NEXT ACTION: Evaluating new requirements/costs**

Fire Safety Research

- **National Institute of Standards & Technology (NIST)**
 - Completed in 2011 – Examined the propagation of wheel well fires and evaluated fire hardening materials to mitigate fire propagation into the passenger compartment.
 - Report in NHTSA-2007-28793-0026
- **NEXT ACTION – Follow-up research to:**
 - Develop candidate test procedures and performance requirements for exterior motorcoach material and fire detection systems.
 - Evaluate fire suppression systems



Glazing and Window Retention

- **NHTSA and Transport Canada's joint research in 2006 identified:**
 - **Effectiveness of advanced glazing in preventing ejections depends on the structural integrity of the bus**
- **Since the motorcoach rollover structural integrity NPRM is expected in 2012, the agency resumed research on glazing and window retention.**
- **Status of research:**
 - **Completed test procedure evaluation based on the Transport Canada approach using a motorcoach section**
 - **Feasibility test on multiple motorcoach glazing designs to establish performance requirements is underway**



EDRs, Tires, and Crash Avoidance Systems

- **EDRs:**
 - Agency decision on installation and performance characteristics of heavy vehicle EDRs on motorcoaches is expected in 2012.
- **Tires:**
 - September 2010 - Issued NPRM to upgrade performance requirements for tires used on commercial vehicles which included a more stringent endurance test and a new high speed test.
 - Follow-up research and final rule development is underway
- **Crash Avoidance:**
 - Completed testing to characterize forward collision warning (FCW) and collision mitigation braking (CMB) systems for motorcoaches.
 - Agency will initiate research to characterize lane departure warning systems
 - Development of objective test procedures and performance requirements is underway.



Thank you for your attention!

Questions?