Utilizing Large Truck Crash Causation Data to Assess Countermeasure Effectiveness

Presented at the

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Define the Crash Problem
Discuss Countermeasures
Crash Causation Philosophies
LTCCS Methodology
LTCCS Analysis
Case Examples
Where to Go from Here
Heavy Truck Fatalities
2006 FARS

Fatalities:
805 - Truck Occupants
3,766 - Other Vehicle Occupants
424 - Non-occupants

11% Noncollision
10% Impact with Non-fixed Object
4% Impact with Fixed Object
1% Other/Unknown Impact with Another MV
15% Rear Impact with Another MV
46% Frontal Impact with Another MV
12% Side Impact with Another MV
Augment Driver Performance
- Forward Collision Warning
- Automatic Braking
- Drowsy-driver monitoring
- Vision Enhancement (Night Vision)
- Lane Departure Warning

Augment Vehicle Performance
- Intervene when driver action would be insufficient to prevent a crash (Stability Control Systems - ESC and RSC)

Augment Other Vehicle Systems
- Vehicle to vehicle communications
NHTSA’s Role

- Continue to Encourage the Refinement and Integration of Advanced Technologies
- Evaluate Technology Effectiveness
- Set Minimum Performance Criteria
- Educate Consumers
- Encourage the Market Where Appropriate
- Regulate Where Appropriate
Crash Causal Factors

90% Driver Related Factors

8% Road Surface

2% Vehicle Related

Crash Causation

- Too Fast for Curve
- Decreasing Radius
- Negative Superelevation
- Cargo Shift
- Defective Leaf Spring Assembly
Crash Causation

- Network of Causes
- Perchonok’s Accident Cause Analysis
  - Systematic framework of crash factors
  - Interrelated events and conditions
- Clinical Method
- Relative Risk Analysis
LTCCS Philosophy and Methodology

- 1070 Heavy Vehicle Crashes
- Capture all Contributing Factors
- On-Scene Investigations
- Data Collected
  - Interviews
  - Vehicle Inspections
  - Scene Documentation
Crash Assessment

Critical Crash Envelope

- Critical Precrash Event
  - Attempted Avoidance Maneuver
  - Pre-Impact Stability
  - Pre-Impact Location
  - Object Contacted (Impact)

Critical Precrash Event

Pre-event Movement

Critical Precrash Event

Critical Reason for The Critical Precrash Event

Critical Precrash Event Associated Factors
Why Did We Collect LTCCS Data?

- To Determine Cause (As in Fault)?
- Who Caused the LTCCS Crashes?
  - Critical Reason was assigned to the passenger vehicle in 56% of the truck vs. light vehicle crashes
Critical Reason <> Cause

Culpability plays NO role in determining the critical precrash event
Why Did We Collect LTCCS Data?

- In 41%* of truck vs. light vehicle crashes, the truck contributed more to the crash
  - In 52%* of truck vs. light vehicle crashes, countermeasures on the truck may have helped to prevent the crash

- In 40%* of the truck vs. nonmotorist crashes, the truck contributed more to the crash
  - In 70%* of truck vs. nonmotorist crashes, countermeasures on the truck may have the potential to help prevent the crash

*Preliminary Results based on engineering analysis of LTCCS cases
Why Did We Collect LTCCS Data?

- To Gain a Better Understanding of Crash Causation
- To Find Countermeasures
- 10% of crashes in LTCCS were not preventable by crash avoidance technologies, public education, or enforcement
  - 64% of the crashes in LTCCS may have benefited from countermeasures on the truck
LTCCS Analysis

- **Objective**
- **Methodology**
  - Case Reviews
    - Summary
    - Scene Diagram
    - Crash Event Assessment Form
    - Photos
Case Reviews – Example
Case Reviews – Example

- Truck Countermeasures
- Light Vehicle Countermeasures
- Other Countermeasures
  - Environment
    - Better Roadway Design
    - Better Signage
- Who “Caused” the Crash
What Can We Do With This

- Focus NHTSA Efforts on Promising Technologies
- Use LTCCS Analysis to Inform our GES and FARS Estimates of Countermeasure Effectiveness and Cost/Benefits Analysis
Disclaimer

- Subjectivity of Case Reviews
- Rich Data Available to All
- Good Luck
Thank you!

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"YEP... GOT MY CELLPHONE, MY PAGER, MY INTERNET LINK, MY WIRELESS FAX, AND THANKS TO THIS NIFTY SATELLITE NAVIGATING SYSTEM, I KNOW PRECISELY WHERE I AM AT ALL TIMES!"

BY LOWE FOR THE SUN-SENTINEL, FLORIDA