Identifying The Most Important Factors Associated With Severe CMV Crashes

Improving CMV Crash Reporting And Training Of Law Enforcement Officers

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Identifying The Most Important Factors Associated with Severe CMV Crashes

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Project Goal

• Combine safety data sources
• Evaluate top crash factors
• Compare oilfield & non-oilfield locations
• Visualize CMV crash risk
• Inform safety efforts
Crash severity measures...

• Based on reported injuries/fatalities
  • Estimated Crash Cost
    • Using National Safety Council economic impact values
  • KABC/O
‘Stacked’ data…

1. Physical context – Location, geographic setting
2. Roadway properties – Infrastructure, management, administration
3. Driving environment
4. Driving apparatus – Vehicle characteristics
5. Driver characteristics
6. Driver behaviors
7. Crash parameters
Driver behaviors considered...

<table>
<thead>
<tr>
<th>Variable Group</th>
<th>Variable</th>
</tr>
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<tbody>
<tr>
<td>Contributing factors</td>
<td>Backing-related</td>
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<td>Parking-related</td>
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<td></td>
<td>Passing-related</td>
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<td>Lane use-related</td>
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<td>Stopping-related</td>
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<td>Turning-related</td>
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<td>Distracted driving-related</td>
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<td>Speed-related</td>
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<td>Failure to yield right-of-way (FTYROW)</td>
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<td>Driver fatigued, ill, or impaired</td>
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<td>Dangerous driving-related</td>
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<td>Load securement or size-related</td>
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<td>Other moving contributing factors</td>
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<td>Vehicle defects-related</td>
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<tr>
<td>Citations</td>
<td>Alcohol or drugs</td>
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<td></td>
<td>Unsafe backing</td>
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<td></td>
<td>Disregarded sign or signal</td>
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<td></td>
<td>Driving where prohibited</td>
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<tr>
<td></td>
<td>FTYROW - Driveway, intersection, stop sign, or signal</td>
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<tr>
<td></td>
<td>FTYROW - Turning-related</td>
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<tr>
<td></td>
<td>FTYROW - Other</td>
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<td></td>
<td>Intoxicated assault</td>
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<td></td>
<td>Load securement, size, or weight</td>
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<td></td>
<td>Other moving violations</td>
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<tr>
<td></td>
<td>Passing or lane use-related</td>
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<tr>
<td></td>
<td>Speed-related</td>
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<tr>
<td></td>
<td>Vehicle or equipment defects</td>
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</tbody>
</table>

- Contributing factors, vehicle defects, and citations from crash reports
- Grouped by frequency and type/similarity
- Vehicle defects grouped in one category (low individual frequencies)
- Also used for at-fault assignment
Results: Significant Driver Behaviors

**DRIVER FATIGUE Impacts on At-Fault CMV Crashes**

In single vehicle, non-intersection crashes, driver fatigue...
- was a contributing factor in 15% of crashes
- resulted in 30%+ higher estimated cost\(^*\) per crash
- resulted in 70% higher injury/fatality risk\(^*\) per crash

In multi-vehicle, non-intersection crashes, driver fatigue...
- was a contributing factor in 4% of crashes
- resulted in 130%+ higher estimated cost\(^*\) per crash
- resulted in 270% higher injury/fatality risk\(^*\) per crash

\(^*\)compared with crashes where driver fatigue not a contributing factor.
Results: Significant Driver Behaviors

IMPROPER STOPPING Impacts on At-Fault CMV Crashes

- In intersection crashes, stopping problems...
  - were a contributing factor in 18% of crashes
  - resulted in 60%+ higher estimated cost* per crash
  - resulted in 170% higher injury/fatality risk * per crash

*compared with crashes where stopping problems were not a contributing factor.

IMPROPER LANE USE Impacts on At-Fault CMV Crashes

- In single vehicle, non-intersection crashes, improper lane use...
  - was a contributing factor in 31% of crashes
  - resulted in 30%+ higher injury/fatality risk per crash
Results: Significant Driver Behaviors

OVERTURNS/ROLLOVERS in At-Fault, CMV, Single-Vehicle Crashes...

- were a contributing factor in 40% of crashes
- resulted in 80% higher estimated cost per crash
- resulted in 110% higher injury/fatality risk per crash

*compared with crashes where overturns/rollovers did not occur.
Results: Significant Driver Behaviors

At-Fault CMV Crashes Involving Multiple Vehicles...

resulted in nearly 50% higher estimated costs compared to single-vehicle crashes
Results: Oilfield Measures

• Oilfield/non-oilfield measures did not retain significant relationships with at-fault CMV crash severity, after accounting for other variables in models
  • Unexpected result
  • Crash frequencies in oilfield areas are higher, but not severity per crash
Other Results
Other Results

- The following were also associated with increased at-fault CMV crash severity (depending on model):
  - Lower socio-economic status of crash location
  - Low/intermediate flex road surface (compared to high flex road surface); load-limited roads
  - Van cargo body style (compared to other styles)
  - Heavier (5+ ton) CMV
  - Dark or nighttime crashes (compared to light/day)
  - Intrastate carrier (compared to interstate)
Application – Mapping example

Atascosa County, Texas

http://www.arcgis.com/home/webmap/viewer.html?webmap=2726a3a6b6ce4607a100c6b486762f9b66&extent=-110.8984,24.9276,-89.2004,37.2227
Improving The Collection And Reporting Of Large Truck Crash Data In CRIS

Eva Shipp, PhD-Principal Investigator and Amber Trueblood, DrPH-Co-Principal Investigator

Project Team: David Bierling, Paige Ericson-Graber, Jon Graber, Ashesh Pant, Marcie Perez, Jena Prescott, Lingtao Wu

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Background

• Potential underreporting was identified in a prior study

• Accurate large truck crash statistics are crucial for resource allocation and determining countermeasures for protecting the general public
Project Goal

• Utilize data from CRIS to examine the degree to which large truck crashes are underreported in Texas

• Obtain information from LEOs, TxDOT and DPS, and third party data service providers on potential barriers to reporting large truck crashes.

• Development a training and communications plan and a tip card addressing large truck crash reporting for law enforcement.
**Project Tasks**

- Develop a review panel composed of large truck stakeholders to guide the project.
- Evaluate crash data to identify large truck crashes.
- Conduct focus groups to identify large truck crash reporting barriers with LEOs, agencies, and third parties.
- Develop a training and communications plan to help improve large truck crash reporting for LEOs, TxDOT, DPS, and other agencies.
- Develop a tip card for LEOs to carry to easily identify large truck crashes.
Crash Analysis Findings: VIN Decoder

- 229,921 crashes identified as potentially involving large trucks
  - 75.7% had a VIN that could be run through the NHTSA Batch VIN Decoder
  - 24.4% were not run through the decoder: no VIN, not TxDOT reportable, or were hit-and-runs.
Crash Analysis Findings: VIN Decoder

Records that were Vehicle Body Style ID=106 (Truck) or Vehicle Body Style ID=0 (Unknown) or Vehicle Body Style ID=92 (Other In Narrative) or Vehicle Body Style ID=94 (Reported Invalid) or Vehicle Body Style ID=95 (Not Reported) with a non-blank VIN (n=164,436)

- GVWR>10,000LBS (n=58,439)
  - Body Class = Glider, Incomplete, Truck (n=53,294)
    - CMV
  - Body Class = Blank (n=547)
- GVWR Mixed (n=56)
- Unknown GVWR (n=18,324)
- GVWR<10,000LBS (n=87,623)
  - Body Class = Bus, school bus, cargo van, incomplete bus, incomplete commercial bus, incomplete school bus, incomplete shuttle bus, truck, pickup, SUV, van, wagon (n=5,910)
  - NOT CMV

UNKNOWN CLASSIFICATION
Crash Analysis Findings: Modeling
Crash Analysis Findings: Modeling
Crash Analysis Findings: Modeling
Focus Group Findings

• Training was identified as a significant barrier
  • What is a CMV?
    • Variations between State DOT, State, and Federal Definitions
  • What is the difference between interstate and intrastate commerce?
  • Where do they obtain the information for the CMV section?
    • How to process rental trucks (e.g., Penske)?
• Improvements to crash reporting forms and electronic systems
• Promotion of data linkage where feasible
Tasks In-Progress

- Develop a training and communications plan to help improve large truck crash reporting for LEOs, TxDOT, DPS, and other agencies.
- Develop a tip card for LEOs to carry to easily identify large truck crashes.
Questions?