Data in the Driver's Seat:
A Look into CMV Driver Behaviors on Texas Roadways

Texas A&M Transportation Institute | Center for Transportation Safety

Project Overview

The long-term goal of this project is to prevent crashes and reduce crash severity for events involving large truck commercial motor vehicles (CMVs) by reducing high-risk driving behaviors. This goal is addressed by capitalizing on data sources beyond solely using crash data to better understand the magnitude and locations where high-risk driving behaviors occur. Findings from the data analysis is used to improve employer and truck driver knowledge of high-risk behaviors and associated roadway characteristics. Materials like this one are also provided to law enforcement officers to help inform more targeted enforcement to prevent risky behaviors among CMV drivers and the passenger vehicles driving around them.

The Problem in Texas

Top ten state for **highest number of fatal large truck and bus crashes.**[1]

Rural truck crashes impact nearly every part of the state.

>70% of large truck fatal crashes were on rural roads.[2]

24,602 large truck crashes in 2019 alone.[2]

Rural crashes account for a higher share of fatal and serious injury crashes than urban crashes.[2]

Project Data

The project used four data sources to conduct association and statistical analyses between crashes, citations and driving behavior attributes:

- Large truck crashes on state maintained roadways (2017 to 2019 & 2021; 2020 excluded due to COVID-19 pandemic)
- Truck telematics/in-vehicle monitoring system (IVMS) data from 6 oil and gas companies. As you can see in Figure 1, the data is concentrated around the major Texas oil and gas hubs.
- Roadway inventory data
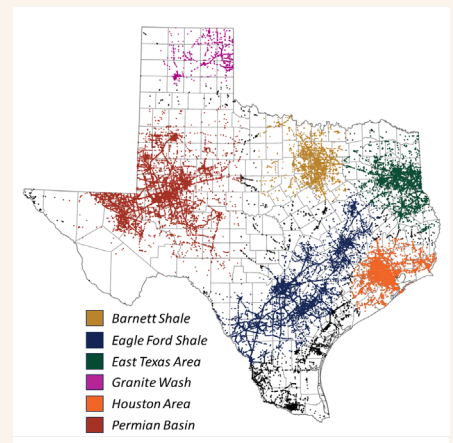- Citation data from the Texas Department of Public Safety

Barnett Shale
Eagle Ford Shale
East Texas Area
Granite Wash
Houston Area
Permian Basin

Figure 1. Texas Map of IVMS Datapoints

1 FMCSA. 2019 CMV Traffic Safety Fact Sheet. Available at:
   https://cms8.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/safety/data-and-statistics/473411/cmvtrafficsafetyfactsheet2018.pdf
2 Data extracted from the Texas Crash Records Information System by TTI on 3/5/2021.

Findings

- **More speeding, more crashes.** The study found that for the most part, when the average truck operating speed is higher than the posted speed limit, the crash rate steadily increases as speeding increases. Once trucks start operating at speeds 20–25 mph over the limit there is a more significant jump, with road segments having a crash rate 37% higher than on segments where the average truck speed is at or below the speed limit.

- **More speeding, more death and serious injuries.** Similarly, speeding over the limit is strongly associated with fatal and suspected serious injury (KA) CMV-related crashes. As the average truck speed exceeds the speed limit, the KA CMV-related crash rate increases exponentially. When the average truck operating speed is 15–20 mph higher than the posted speed limit, KA CMV-related crash rate for that segment is nearly twice as high (95% higher) than on segments where the average truck speed is at or below the speed limit. When the average truck operating speed is above the posted speed limit by more than 20 mph, the KA CMV-related crash rate is almost three times higher.

- **Harsh braking and accelerating also increase crash risk.** For segments with frequent CMV harsh acceleration, the crash rate was almost two times higher than segments with the lowest harsh acceleration rate. When average truck operating speed is greater than 15 mph higher than the posted speed limit and the harsh braking event rate is above the average, the CMV-crash rate is 169% higher than segments where truck operating speed is lower than or equal to the posted speed limit, and no harsh braking events were observed.

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https://ttishiny. shinyapps.io/FMCSA_ CMV_Profile/

A Solution

Check out the interactive large truck driving behavior profile map! It shows the overall spatial distribution of driving behaviors and CMV-related crashes.

The data can be filtered by multiple variables such as Average Annual Daily Travel (AADT), truck AADT, truck harsh braking and acceleration events) in different regions and area types (e.g., rural, urban-large, urban-medium, urban-small, fringe).