

Rural Versus Urban Crashes in Texas

A Fact Sheet for Law Enforcement Officers



THE PROBLEM:

Large Truck Crashes in Texas



Texas is one of the top 10 states for the number of fatal truck and bus crashes.¹

Rural roadways carry an increased risk for fatal and serious injury (KA)



crashes because compared to urban roadways, the posted speed limits are higher, congestion is lower, and the roadway design safety features and traffic controls differ.



Overall, in Texas, crashes on rural roads are nearly 4 times more likely to be fatal compared to urban roads.²

Over 50 percent of Texas truck miles are traveled on rural roadways based on 2019 and 2020 estimates.



The heavy weight of trucks can increase crash severity.

The full scale of rear-end collisions with trucks on rural roads in Texas is greater than previously shown by data. On average, approximately 20.4% of all two-vehicle crashes involving a large truck are rear-end crashes.³



Freeways account for almost half of all two vehicle rear-end crashes involving a heavy truck, although the proportion of fatal and suspected serious injury crashes are highest on two-lane and multi-lane undivided roadways.

PROJECT OVERVIEW:

To address rear-end collisions involving a heavy truck (HT)⁴ in Texas, this project conducted an in-depth data analysis of two-vehicle rear-end crashes involving an HT, followed by the production and dissemination of outreach and educational materials. The outreach and educational materials include factsheets, tip cards and videos for improving employer and truck driver knowledge of rear-end crashes and their prevention, improving crash data collection among law enforcement officers, and generating recommendations for increased truck conspicuity.



CRASH YEAR	NO. OF PC HIT HT	% KA	NO. OF HT HIT PC	% KA	NO. OF HT HIT HT	% KA	TOTAL HT INVOLVED REAR-END	% KA
2017	3,293	7.2%	2,741	3.0%	483	5.2%	6,517	5.3%
2018	3,366	6.5%	3,000	2.1%	499	3.4%	6,751	4.4%
2019	3,672	6.1%	2,958	2.1%	520	4.4%	7,150	4.3%
2020	3,125	7.0%	2,270	2.3%	445	4.7%	5,840	5.0%
2021	3,497	7.8%	2,815	2.2%	562	5.2%	6,874	5.3%
TOTAL	16,953	6.9%	13,670	2.3%	2,509	4.6%	33,132	4.8%

PC: Passenger Car; HT: Heavy Truck; KA: Crash resulting in death or serious injury

¹ FMCSA. 2019 CMV Traffic Safety Fact Sheet. Available at: <https://w2958www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/safety/data-and-statistics/473411/cmvttrafficsafetyfactsheet2018.pdf>

² TxDOT. (2022). Rural and Urban Crashes and Injuries by Severity. Available at: https://ftp.txdot.gov/pub/txdot-info/trf/crash_statistics/2022/11.pdf

³ Based on all 2017-2021 TxDOT reportable two-vehicle crashes involving a truck tractor or truck, and excluding pedestrian or pedalcyclist involved crashes.

⁴ Defined as a truck tractor or truck with a gross vehicle weight of 10,001 pounds or more.



PROJECT DATA:

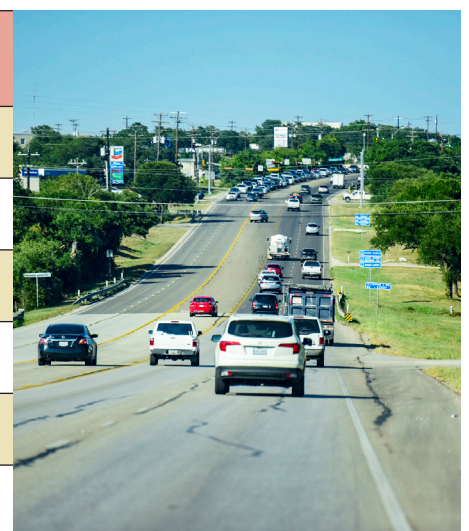
This project compared rear-end crashes involving an HT, by the vehicle at-fault^{5,6} and driver behavioral factors. It also looked at geographic area as a factor to compare rural, fringe⁷, and urban crashes that were defined based on population size^{8,9} and extraterritorial jurisdictions.¹⁰

Generally, in Texas, rear-end crashes involving heavy trucks (4.8%) are more severe (fatal or suspected serious injury denoted by the letters KA) than rear-end crashes overall (1.8%). The severity of rear-end crashes varies by vehicle at-fault: the proportion of KA crashes is 6.9% when a passenger car (PC) hits an HT compared to 2.3% when an HT hits a PC. Rear-end crashes in rural and fringe areas are more severe compared to urban areas, regardless of vehicle at fault. When a PC hits an HT, the proportion of KA crashes is 12.6% in rural areas versus 4.8% in urban areas. When an HT hits a PC, the proportion of KA crashes is 6.9% in rural areas versus 1.4% in urban areas.

Compared to rear-end crashes for all vehicle types, the percentage of fatal and suspected serious injury crashes is about four times higher when the crash involves a passenger car hitting a heavy truck.

Vehicle At Fault & Geographic Area in Severe Crashes

DRIVER AT-FAULT * / DRIVER BEHAVIORAL FACTOR	PASSENGER CAR DRIVER	HEAVY TRUCK DRIVER
% DISTRACTION that are KA in rural vs fringe vs urban	17% vs 10% vs 5%	9% vs 3% vs 2%
% FATIGUE that are KA in rural vs fringe vs urban	12% vs 10% vs 7%	16% vs 23% vs 10%
% IMPAIRMENT that are KA in rural vs fringe vs urban	26% vs 29% vs 18%	33% vs 50% vs 17%
% IMPROPER LANE CHANGE that are KA in rural vs fringe vs urban	6% vs 5% vs 5%	0% vs 0% vs 1%
% IMPROPER TURN that are KA in rural vs fringe vs urban	9% vs 0% vs 0%	0% vs 0% vs 1%
% SPEEDING that are KA in rural vs fringe vs urban	14% vs 12% vs 7%	7% vs 3% vs 1%



*Excludes crashes involving two heavy trucks

⁵ Defined as a vehicle that rear-ends the other vehicle.

⁶ About 8% of crashes also involve a heavy truck that rear-ends another heavy truck.

⁷ Fringes are buffer areas between rural and urban areas.

⁸ U.S. Census. Geography Tools. Retrieved from <https://www.census.gov/programs-surveys/acs/geography-acs/geography-tools.html>

⁹ U.S. Census. 2013-2017 ACS 5-year Estimates. Retrieved from <https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes/2017/5-year.html>

¹⁰ Extraterritorial Jurisdiction of Municipalities. Local Government Code. <https://statutes.capitol.texas.gov/Docs/LG/htm/LG.42.htm>

Vehicle At Fault & Roadway Construction Status in Severe Crashes

VEHICLE AT-FAULT *	PASSENGER CAR	HEAVY TRUCK
FACILITY TYPE		
% FREEWAY that are KA in non-work zone vs work zone	7% vs 8%	3% vs 2%
% MULTI-LANE DIVIDED that are KA in non-work zone vs work zone	10% vs 7%	3% vs 1%
% MULTI-LANE UNDIVIDED that are KA in non-work zone vs work zone	8% vs 5%	2% vs 3%
% TWO-LANE that are KA in non-work zone vs work zone	10% vs 6%	4% vs 2%
% OFF SYSTEM that are KA in non-work zone vs work zone	4% vs 2%	1% vs 0%

Approximately 11.2% of rear-end crashes involve a work zone. The proportion of work zone crashes that are fatal and suspected serious injury varies by vehicle at-fault: 7% when a PC hits an HT and 2% when an HT hits a PC.

*Excludes crashes involving two heavy trucks

Significant Variables that Contribute to Increased Crash Severity

Heavy Truck At-Fault*

HEAVY TRUCK DRIVER VARIABLES	PERCENT OF TRUCK DRIVERS	PROBABILITY OF A SEVERE CRASH OUTCOME	COMPARATIVE RISK
Alcohol/Drug Impaired	0.2%	29.4%	15.5x higher vs. non-impaired HT driver
Fatigued	0.6%	4.3%	2.3x higher vs. non-fatigued HT driver
ENVIRONMENT AND ROADWAY FACTORS	PERCENT OF CRASHES	PROBABILITY OF A SEVERE CRASH OUTCOME	COMPARATIVE RISK
Rural Area	12.5%	2.2%	1.8x higher vs. non-rural areas
Nighttime	14.5%	3.4%	2x higher vs. daytime

*Excludes crashes involving two heavy trucks

Passenger Car Driver At-Fault*

PASSENGER CAR DRIVER VARIABLES	PERCENT OF PASSENGER CAR DRIVERS	PROBABILITY OF A SEVERE CRASH OUTCOME	COMPARATIVE RISK
Alcohol/Drug Impaired	5.0%	10.3%	2.4x higher vs. non-impaired PC driver
Speeding	53.0%	6.2%	2.3x higher vs. non-speeding PC driver
ENVIRONMENT AND ROADWAY FACTORS	PERCENT OF CRASHES	PROBABILITY OF A SEVERE CRASH OUTCOME	COMPARATIVE RISK
Rural Area	19.8%	5.6%	1.8x higher vs. non-rural areas
Nighttime	25.3%	5.7%	2x higher vs. daytime
Non-Intersection Related	75.9%	4.7%	1.1x higher vs. intersection related
Multi-Lane Undivided Roadway	9.9%	7.6%	1.8x higher vs. all other roadways
Two-Lane Roadway	11.1%	5.5%	1.3x higher vs. all other roadways

*Excludes crashes involving two heavy trucks



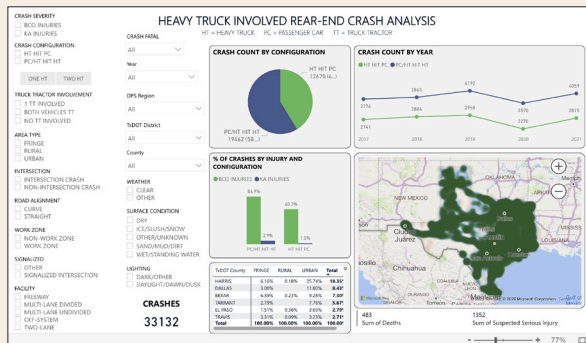
UNDERSTANDING REAR-END CRASHES INVOLVING LARGE TRUCKS: Rural Versus Urban Crashes in Texas Enforcement and Large Truck Drivers



Center for Transportation Safety

A SOLUTION:

- Crash Data Dashboard
- Fatal Crash Diagrams
- Map Tools to Identify High-Risk Roads for Truck Crashes
- Web-based version (users can filter roadways by amount of truck travel and risk level)
- Google Earth Map version



Website

<https://cts.tti.tamu.edu/heavy-truck-involved-rear-end-crash-analysis-dashboard/>

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