

# Risk Factors Associated with Crash Injury Severity Involving Trucks

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## Introduction

Motor Trucks are classified as heavy vehicles with large weight and more difficult maneuverability characteristics than passenger cars. These characteristics make trucks susceptible to severe safety challenges. The 2020 “Freight Transportation Forecast” report projected a 36% increase in freight volume by 2031. An increase in the number of trucks to serve freight and commerce on highways affects the safety performance of roads due to complex interactions with other vehicles.

Nearly 499,000 motor vehicle crashes involving trucks were reported across the United States in 2018, out of which 22% resulted in fatalities and injuries. Given the growing economy and demand for trucking in the future, identifying the risk factors is crucial to understand where, when, and why the likelihood of getting involved in a severe or moderate injury crash with a truck is higher. Identifying these potential risk

factors associated with various injury levels of truck crashes enables practitioners and planners to better allocate resources for the overall safety improvement of highways

## Study Methods

Mecklenburg County in the state of North Carolina was considered as the study area for this research. Motor vehicle crash data from the Highway Safety Information System (HSIS) for the years 2013-2017 was considered for the analysis. The parcel-level land use and traffic analysis zone (TAZ)-level demographic characteristics were integrated with the crash data to identify potential risk factors.

A 0.50-mile circular buffer around each crash was used to capture the land use and demographic characteristics for analysis and modeling. A partial proportional odds model with backward

elimination was adopted for computing the potential risk factors associated with various truck crash injury severity levels at a 90% confidence level.

### Findings

Some of the key findings:

- Dark lighting condition and inclement weather condition both have a negative effect on injury severity of crashes involving trucks.
- The presence of double yellow or no-passing zone, road sections with speed limit >40 mph, and curves negatively affect the injury severity of crashes involving trucks.
- Driver characteristics like fatigue, impairment, and inattention have a significant association with the severe and moderate injury crashes involving trucks.
- The presence of commercial, industrial, and resource land uses impact severe and moderate injury truck crashes, possibly due to the substantial trucking activity (both in-house and external trips).
- The presence of office land use negatively affects truck crash injury severity, accrediting to the lower trucking activity rates in areas like business parks.

### Policy Recommendations

The findings and the risk factors could be proactively used in identifying countermeasures and policy decisions for improving overall traffic safety. The findings associated with land use and demographic characteristics could be used in identifying areas within counties/cities for prioritization, planning, design, and implementation of safer transportation systems. The proposed framework is transferable and applied to other counties/cities.

### About the Authors

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### To Learn More

For more details about the study, download the full report at [transweb.sjsu.edu/research/2017](https://transweb.sjsu.edu/research/2017)



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