Florida Department of Transportation Research

Large Truck Crash Analysis for Freight Mobility and Safety Enhancement in Florida

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Current Situation

Trucks have been a critical link in the delivery of U.S. goods for over a hundred years. Whether carrying freight between cities or distributing freight delivered by trains, planes, or ships, trucks are moving day and night. With Florida's large population and very active ports, semis are common on Florida highways. Unfortunately, with so many vehicles on Florida's roads, large trucks are involved in collisions from time to time. Even a minor incident with a large truck can cause significant delays, with ripple effects on hundreds of homes and businesses. A more serious incident can magnify this effect many times. Understanding where and how these incidents occur and finding ways to prevent them and mitigate their effects is a priority concern for the Florida Department of Transportation (FDOT).

An incident on an interstate highway can result in significant backups with delays for hundreds of drivers.

Research Objectives

Florida Institute of Technology and University of Florida researchers collaborated on a statewide analysis of crashes involving large trucks with the goals of recommending measures to reduce these incidents and developing better methods of measuring the economic impact of incidents.

Project Activities

The researchers conducted a comprehensive statewide crash analysis focusing on large-truck-involved crashes in the period 2007 to 2016. Three approaches were used to analyze the crash data to address three aspects of the issue: the critical factor that caused the incident; factors that contributed to the severity of the incident; and locations where incidents tended to happen. A framework was developed to identify the critical reason for individual crashes. The impacts of contributing factors on severity outcomes were investigated through random parameter ordered logit (RPOL) models. An ArcGIS Spatial Analyst extension, the Kernel Density tool, was used to visualize the spatial pattern of large truck crashes and identity problematics areas.

The three-way analysis identified behavioral factors and critical locations related to large-truck-involved-incidents. The researchers then developed data-driven and evidence-based countermeasures. Many of the factors and locations had commonalities that could be addressed by specific sets of countermeasures. Targeted countermeasures were recommended for 35 priority locations for Florida incidents, including 15 areas rated as hotspots by kernel density ranking and 20 intersections rated as high priority due to high crash severity or high crash rate.

Last, an economic appraisal approach was recommended that considers the economic impacts of enhanced freight safety and mobility in the project evaluation process. The Large Truck Crash Cost Estimator, a spreadsheet-based tool, was developed to estimate the benefits of preventing crashes for trucks in various size classes.

Project Benefits

The knowledge and tools developed in this project will help planners, designers, and engineers reduce roadway incidents involving large trucks.

For more information, please see www.fdot.gov/research/.