

Understanding Oversize/Overweight Industry Freight Flow and Safety in Kansas Using the Kansas Truck Routing and Intelligent Permitting System (K-TRIPS)

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Introduction

Oversize and overweight (OSOW) trucks are an integral part of traffic movement throughout the state of Kansas and the United States as a whole, along with the freight they haul. The unique dimensions (length, width, height, and weight) of these loads makes the movement of them more challenging, and less safe for all on the road. With key east-west and north-south interstate access, Kansas is often a required pass-through point for these OSOW trucks.

Project Description

The Kansas Department of Transportation (KDOT) developed an automated permitting system called the Kansas Truck Routing and Intelligent Permitting System (K-TRIPS) to issue permits for all OSOW trucks. Using four years of data from K-TRIPS (2014–2017), the research team developed a series of heat maps using ArcGIS to help visualize the routes OSOW trucks were using to travel through the state of Kansas. It was found that around 87 percent of the approximately 72,000 annual OSOW trips in Kansas were taken by five industries (general construction equipment, general freight, agriculture equipment/implements, wind energy, and oil and gas equipment), and that the majority of fluctuation in the consistency of routes travelled came from two industries (wind energy and oil and gas equipment).

The four years of K-TRIPS data, along with three years of crash data (2014–2016, provided by KDOT), were used to develop a logistic regression to determine factors that increased the odds of a fatal/injury (F/I) crash occurring among OSOW crashes. This was warranted due to the fact that the mass action areas (or areas found to have more than one crash) aligned with the routes with the highest travel density, along with the discovery of two separate locations in the state with multiple crashes with the same sequence of events.

Project Results

It was found that three separate first harmful event (FHE) categories (other non-collision, motor vehicle in-transport, and fixed object) were significant and all increased the odds of an F/I crash occurring, if they were the FHE. The odds of an F/I crash were higher for an asphalt road than a concrete road. Lastly, the later into the day it was, the lower the odds are to be in an F/I crash.

The research team found a unique and important connection between yearly heat maps of OSOW truck routing and OSOW crashes. The mass action areas were found to have similar locations where K-TRIPS recorded the highest-travelled routes during the three years of the dataset. These findings were similar to previous research that indicated through statistical analyses that when the percentage of trucks increased on a roadway, the amount of predicted crashes increased. This finding could be a primer for the state of Kansas to upgrade safety measures on known truck corridors that experience a high number of OSOW trucks. The ability to reduce fatal or serious injury crashes involving OSOW trucks or vehicles would have a positive net benefit for the state of Kansas, however, considerable investment will be needed by the state to address all OSOW crash concerns.

Project Information

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