Updating the Kansas Department of Transportation's Lane Closure Guide Using TMC Data

Benjamin Nye[1], Eric J. Fitzsimmons[2]

Abstract

Construction and maintenance are important aspects to maintaining existing road infrastructure. Depending on the type of work, lanes of traffic must be shut down to the public to prevent interference with work being done and for the safety of construction personnel. However, when a lane of traffic is shut down on an interstate, negative consequences may occur such as long queues of traffic which often times result in congestion and travel time delay. In order to mitigate disruption to traffic flows through work zones, roadway maintenance and construction projects are typically not permitted during peak hours.

The Kansas Department of Transportation (KDOT) created a lane closure guide in 2010 to assist design engineers, contractors and engineering technicians on when a lane of traffic may be closed down on interstates. The lane closure guide provided information on how many lanes needed to remain open to keep a capacity of 1,500 vehicles per hour, per lane. Original data for this guide included manually collected traffic count data, ATR data for traffic characteristics, and also data from smart work zone systems. The research objective was to update the lane closure guide, specifically for the Kansas City, KS metropolitan area and surrounding suburbs.

To update the lane closure guide with the most recent and relevant traffic information, data were collected from the Kansas City Scout Traffic Management Center (KC Scout). The KC Scout is a network of sensors and cameras that collect traffic volume, speed, and lane occupancy data every 30 seconds. One-hour aggregation levels were used to determine the number of vehicles expected to travel during that hour for a specific segment. The one-hour aggregation levels excluded weekends and holidays. In addition to the data collection, surveys were sent to state highway agencies to determine what capacities are required through work zones.

As a result of this project, an updated lane closure guide was developed. The new guide was found to be different from the original lane closure guide because the data resolution from KC Scout was greater and more consistent. Additionally, new segments were created based on sensor locations and new roadway geometry.

Keywords – Work Zones, TMC Data, Lane Closure

[1]Graduate Research Assistant, Kansas State University, Department of Civil Engineering
2118 Fiedler Hall, Manhattan, KS 66506, Phone: 785-532-0889; Email : nye@ksu.edu

[2]Assistant Professor, Kansas State University, Department of Civil Engineering
2109 Fiedler Hall, Manhattan, KS 66506, Phone: 785-532-0889; Email: fitzsimmons@ksu.edu