MAINTENANCE OF TRAFFIC FOR INNOVATIVE GEOMETRIC DESIGN WORK ZONES AND CALIBRATING HIGHWAY SAFETY MANUAL FOR MISSOURI INTERCHANGES

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ABSTRACT

As the nation’s population continues to grow, the users of highway network face increased safety risks, delays and congestion. This thesis addresses two issues pertaining to roadway safety and capacity: maintenance of traffic for innovative geometric design work zones and calibrating highway safety manual for Missouri interchanges.

The development of construction phasing plans for innovative geometric design projects is a critical component to maintaining safety and mobility on the facility during construction. The goal of this research is to present the state of the practice and providing guidance for transportation practitioners in developing construction phasing and maintenance of traffic (MOT) plans for projects with innovative geometric designs. Several types of innovative geometric designs were studied including the roundabout, single point urban interchange (SPUI), diverging diamond interchange (DDI), restricted-crossing left turn (RCUT), median U-turn (MUT), and displaced left turn (DLT).

The second issue relates to the safety analysis of Missouri interchanges using AASHTO’s Highway Safety Manual (HSM), a nationally accepted manual. This research documents the calibration of HSM for the most vital freeway interchange facility types in Missouri. These facility types include nine freeway interchange terminals, including diamond, partial cloverleaf, and full cloverleaf interchanges. The non-terminal facilities included entrance and exit speed-change lanes, and entrance and exit ramps. The calibrated facilities applied to both rural and urban locations.