

# Research Summary

## Alternate Merge Sign Configuration

Improving work zone road safety is an issue of great interest due to the high number of crashes observed in work zones. Departments of Transportation (DOTs) use a variety of methods to inform drivers of upcoming work zones.

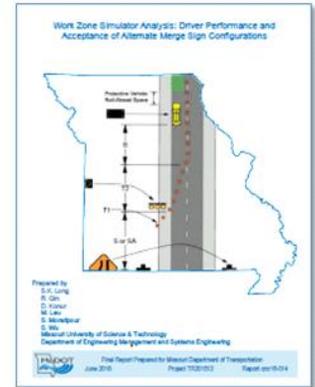
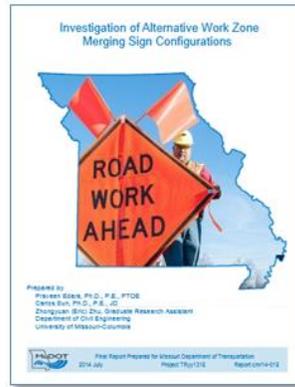
One method used by DOTs is work zone signage configuration. It is necessary to evaluate the efficiency of different configurations, by law, before implementation of new signage designs that deviate from national standards.

**Phase I** of the research investigated the effect of an **alternative merge sign configuration within a freeway work zone**. In this alternative configuration, the graphical lane closed sign from the MUTCD was compared with a MERGE/arrow sign on one side and a RIGHT LANE CLOSED sign on the other side.

The study measured driver behavior characteristics including speeds and open lane occupancies. The measurements were taken at two identical work zones on I-70 in Missouri, one with the new test sign and the other with the standard MUTCD sign.

The study found that the open lane occupancy upstream of the merge sign was higher for the test sign in comparison to the MUTCD sign. The test sign had 11% more traffic in the open lane upstream of the merge sign. The analysis of speed characteristics did not reveal substantial differences between the two sign configurations.

In terms of safety, it is desirable for vehicles to occupy the open lane as far upstream from the



taper as possible to avoid conflicts due to the lane drop. Thus, the test sign proved to be a good alternative to the MUTCD sign.

**Phase II** of the research consisted of a **driving simulator based study that evaluated a driver's response to work zone sign configurations**. This study compared the Conventional Lane Merge (CLM) configurations against MoDOT's alternate configurations in order to better quantify the differences between the two sign configurations. This research evaluated the effectiveness of the alternate merge sign configuration with respect to age and merge direction.

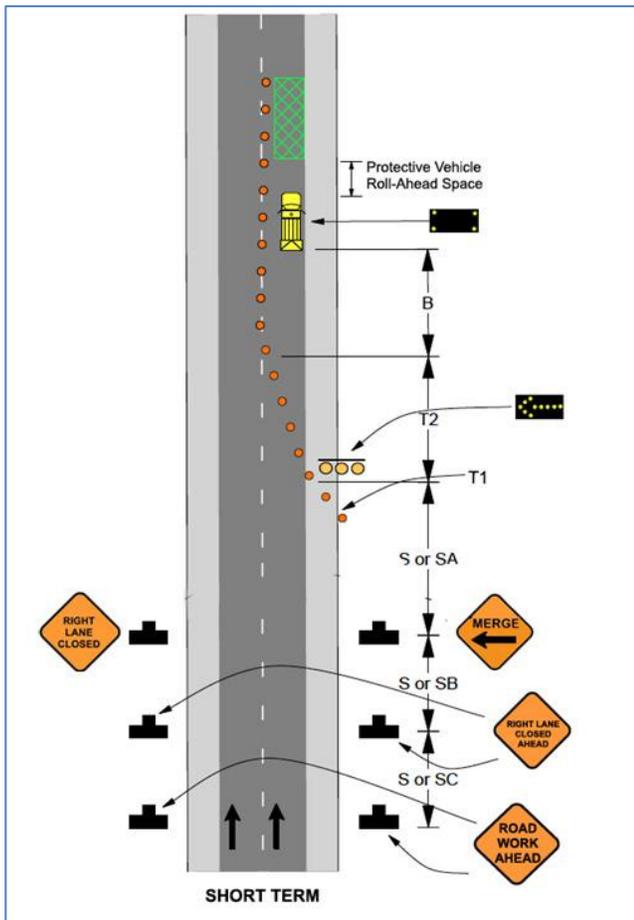
Study participants within target populations, chosen to represent a range of Missouri drivers, attempted four work zone configurations as part of a driving simulator experience. The test scenarios simulated both right and left work zone lane closures for both the CLM and MoDOT alternatives. The results of this study were compared to the Phase I study results.

Based on the data analysis, the researchers did not observe a noticeable, statistical difference between the MoDOT alternate signs with MUTCD signs in work zone.

As expected, the results showed that age had a significant effect on travel time. An increase in the age of the participant, increased the travel time. Similarly, the data showed a significant effect on travel time due to gender. The female travel time tended to be more than male drivers.



Researcheders concluded that the type of the sign did not have an effect on driving behavior.



Missouri Alternate Merge Right Configuration

*"The test sign proved to be a good alternative to the MUTCD sign."*

## Project Information

**PROJECT NAME:** Work Zone Merge Configurations (Phase I); Alternative Work Zone Merge Simulation (Phase II)

**PROJECT START/END DATE:** September 2012-June 2016

**PROJECT COST:** \$12,348 (Phase I); \$120,237 (Phase II)

**LEAD CONTRACTOR:** University of Missouri-Columbia Missouri (Phase 1); University of Science and Technology (Phase 2)

**PRINCIPAL INVESTIGATOR:** Praveen Edara (Phase I); Suzanna Long (Phase II)

**REPORT TITLES:** Investigation of Alternative Work Zone Merging Sign Configurations ([cmr 14-018](#), July 2014)

Work Zone Simulator Analysis: Driver Performance and Acceptance of Alternate Merge Sign Configurations ([cmr 16-014](#), June 2016)

## Project Manager

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