

Evaluation of Mobility Impacts of Temporary Ramp Metering in Work Zones

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ABSTRACT

Road maintenance has been growing in the United States and brings a variety of challenges to the transportation profession. Work zone congestion is one of the most important factors contributing to the delay and safety of freeways. Many control methodologies have been applied to work zones in order to reduce freeway congestion and delay. One means of control is ramp metering, which has been deployed since 1963 in the United States and has proven to be successful. This thesis' objective is to evaluate and simulate the effect of ramp metering on freeway work zones; traffic performance measures such as delay, speed, and number of stops are used for the evaluation. A literature review showed that a main factor contributing to the freeway work zone delay is a high percentage of commercial trucks. Due to the role of truck percentage in work zone performance, effectiveness of ramp metering in work zone control is evaluated with different truck percentages. The lane configuration for all the studied sites work zones was 2 lanes to 1 lane, because it's frequency in real-world applications. In the evaluation of ramp metering in work zones, the traffic volumes investigated were less than, equal to, and more than capacity (650vph, 1240vph, and 1854vph). Mainline (a link used for through traffic) truck percentage and ramp truck percentage varied from 10% to 40%, and 10% to 20%, respectively. As a result, a total of 8 cases were created and simulated using VISSIM traffic simulation software.