

This topic is “practice ready.” Yes No

Understanding the Impacts of Work Zone Activities on Traffic Flow Characteristics

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Abstract

In general, most of the road maintenance work starts with installation of work zones on the roadway, and all types of work zones have some form of adverse impact on traffic causing delays and congestion. The magnitude of the impact varies from one work zone to another based on a range of factors. These factors include geographical differences, demand differences (daily traffic volumes, hourly distribution of traffic), type of work activity, capacity reduction, lane closure configurations and others. Existing traffic impact analysis tools can incorporate the demand and geometric effect of work zones. However, there is little understanding on which specific work activities under different physical and operational constraints interfere with traffic flow and lead to significant user costs. The impact on traffic due to work zones can be assessed with macroscopic models of traffic flow. Understanding capacity and speed-flow plots for work zones with different activities and lane closure configurations is essential to planning and scheduling work zone operations effectively.

To address this research problem, the present study is conducted to understand the cause and effect relationship between type of work activity and traffic mobility in a work zone, and to develop traffic

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flow characteristic curves (speed-flow curves) using real-world traffic flow and work activity data. For development of speed-flow curves, three steady state traffic flow models were calibrated using real-world loop detector data. The models were calibrated for all selected study locations with different work zone activities, and the performance of each model was evaluated to decide which model provided the best fit. In addition, speed flow curves were also developed for non-work zone days to estimate capacity reduction factors and free flow reduction factors due to different work activities. This research complements the work zone analysis approaches recommended by the latest edition of the Highway Capacity Manual.

Keywords: Work zone activity — traffic stream models — car following models — calibration