

Traffic Flow Characteristics of a Congested Work Zone in Missouri

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ABSTRACT

This paper analyzes the traffic flow characteristics for a typical crossover-type work zone in Missouri. Data were collected at locations upstream and within the work zone in dynamic merge system (DMS) condition and non-DMS condition (standard condition) on two different days each. The traffic characteristics under the two conditions were studied based on the speed-flow relationship, capacity, and time headway parameters. An increase in traffic flow on one of the afternoons resulted in a continuous decrease in the speed of vehicles, leading to congested conditions at certain locations within the work zone. Any causative factor leading to the intermittent queue formations along the work zone is proposed to be studied from the captured data. The oscillation (the unsteady forward movement of traffic with no immediate dissipation in queue) and the propagation of the queue from the downstream exit further upstream under congested conditions is also proposed to be studied. The effects of lane changes that occur before the merge point will be studied to determine the impact on queue lengths. From the cumulative curves of vehicle arrival number versus time, N-curves, individual vehicle information within the queues and upstream of the merge point, will be extracted. Cumulative curves constructed from these observations describe completely and in great detail the evolution of the resulting long queues. Headway distributions for free-flow, moderate-flow, and high-flow conditions will be proposed using statistical distributions that provide the best fit. This study is significant because it would indicate the general behavior of Missouri drivers and help establish parameters that can be used to model and simulate the traffic flow at other work zones and freeways in Missouri.

Keywords: headway distribution—N-curves—queues—work zone