



Florida Department of Transportation Research

Development of Recommendations for Arterial Lane Closures to Optimize Traffic Operation

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Though drivers may disagree, traffic signals are timed to optimize throughput at intersections. Timing settings depend on the normal traffic flows, but these flows can be severely affected by work zones, which often block lanes. The 2010 Florida Department of Transportation (FDOT) Design Standards provide information regarding traffic control through work zones on multilane arterials. However, there are currently no quantitative guidelines for optimizing signal control around work zones. Therefore, University of Florida researchers sought to formulate recommendations for development of signal control plans, including phasing, signal timings, and channelization. The research focused on multilane arterial streets.

Researchers developed signal control optimization guidelines for three different situations. In the first, the work zone blocks one or more lanes upstream of the intersection, at some distance from the stop bar. In the second, the lane closure occurs at the stop bar. This situation was broken down into two subcases, one in which the lane closure changes the use of adjacent lanes, for example, a through lane becomes a turn/through lane, and another in which the lane closure reduces the number of lanes, but does not change open lanes' functions. In the third situation, the lane closure is some distance downstream from the intersection of interest. In this case, the work zone area will block some lanes in the middle of an arterial link between two intersections. Detailed guidelines were developed to optimize signal control around each of the three work zone situations.

A combination of field data and simulation was used to evaluate these guidelines and document their effectiveness under different demand conditions. Traffic data were collected at two intersections, with and without work zones. Queuing data for both directions and volume data for all approaches were collected during evening



Efficient traffic flow through a work zone can depend on the timing of signals at nearby intersections.

hours on typical weekdays before the work zone was installed. Once the zone was installed, queuing and volume data were collected for the affected direction. The two sites were replicated using the CORSIM simulation software. Observed queuing data were used to calibrate simulations, with and without work zones. All three work zone situations were simulated for both measured intersections.

Researchers found that, in general, signal retiming around work zones was warranted only when the work zone was expected to significantly impact operations and increase delay. This occurred when demand was high, approaching or exceeding capacity. If that was not the case, the existing signalization plan should be retained. However, for each work zone situation, the researchers developed detailed recommendations, including calculations for signal timing and throughput.

By providing detailed guidance for signal timing near work zones, this project will assure that traffic flows as smoothly as possible through work areas, maintaining roadway effectiveness and reducing driver frustration.