ABSTRACT

Smith, William Benjamin M.S.C.E., Purdue University, May 2014. Signalized Corridor Assessment. Darcy Bullock.

Traffic engineers are often required to investigate the operation of a corridor and determine if there are any areas for improvement. Typical performance measures used to aid in the analysis are volume-to-capacity ratio and average delays based on the Highway Capacity Manual method. Signal timing software might also be used to adjust the split timings in effort to improve the corridor. This thesis discusses procedure to implement split timing optimization and delay analysis to enhance the current process of corridor assessment.

This study examined the newly opened US-231 bypass corridor outside of West Lafayette, IN. Initially, all intersections were operating free. The first step was to create optimal coordination plans for the corridor. A new method was generated to create split timings using 85^{th} percentile volumes over an extended period of time. The critical path of these volumes in the ring diagram was used to allocate the split percentages on each side of the barrier. Then, Link Pivot was used to create offsets for the timing plans across the corridor.

After timing plans were established, corridor travel time and intersection delays were studied. Corridor travel time was determined using MAC address matching and found that all travel times improved while intersections were coordinated. Delay on the side street minor phases was calculated using a new “maximum vehicle delay” method. Maximum vehicle delay is the longest wait time during a cycle of any vehicle that used a

specific phase. All maximum vehicle delays increased during coordination. Total delay, both before and after coordination, was calculated for the coordinated phases using the input-output method and found that mainline delay decreased during coordination. Finally, maximum vehicle delays were converted to total delay and the corridor performance was determined using travel time and the total delays. The results showed that AM Peak and PM Peak timing plans should remain coordinated, and the rest of the time of day should go back to operating free.