Comparing Adaptive Traffic Control to Optimized Timing Plans:
Simulations of Typical and Extraordinary Traffic Conditions

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Abstract

One of the common questions when evaluating an adaptive traffic control system (ATCS) is how well it compares to recently implemented time of day (TOD) plans. This session presents one such comparison supported by a recent microsimulation study of InSync adaptive control and several optimized TOD plans by Aleksandar Stevanovic, PhD, P.E., an expert in traffic signal control systems and simulation. The study evaluates the traffic signal regimes on the intersection, corridor and network-wide levels—as well as main-street versus side-street performance—for a number of traffic efficiency MOES, including percentages in travel time, intersection delay and stop reduction as well as environmental and safety performance. The study replicates field traffic conditions with a 12-intersection VISSIM model based on multiple sets of field traffic data. Two sets of TOD plans are calibrated to produce optimal traffic flow on the study corridor—a Single Section (SS) approach with all intersections operating under the same cycle length and a Multiple Sections (MS) approach with different cycle lengths. The TOD plan currently operating in the field is also simulated. To test the ATCS’s adaptability, it is critical to evaluate its performance in variable traffic. Data presented includes comparison of the traffic signal regimes in the following situations: a nearby freeway incident, inclement weather, frequent preemption and a sudden surge of traffic. The results of experiments performed in this study show InSync is a versatile, adaptable system that outperformed TOD plans on the studied corridor for both regular and irregular traffic conditions.

Keywords: Adaptive Traffic Control — VISSIM Simulation—Signal Regime Comparison----Irregular Traffic Conditions----Adaptive Performance

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