Evaluating The Quality Of Signal Operations Using Automated Traffic Signal Performance Measures

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September 12, 2019

1 Literature Review

A literature review was performed to gain insight and understanding on Automated Traffic Signal Performance Measures (ATSPM) evaluation as well as methods utilized in other industries for evaluating performance measures[1]. This chapter contains a summary of that literature review with discussion provided on several key topics. First, ATSPMs will be defined and the current practices for using ATSPMs will be explained. Second, each performance measure and evaluation tool currently used by the Utah Department of Transportation (UDOT) will be described. Third, the effects of ATSPMs on intersection and corridor performance will be discussed. Finally, methods for evaluating signal performance measures will be summarized[2].

2 Performance Measures Used Currently by the Utah Department of Transportation

This section will summarize the performance measures and tools for visualizing and evaluating performance measures that UDOT currently uses in their ATSPM system Including the Purdue Phase Termination diagram, Split Monitor, Pedestrian Delay, Preemption Details, Turning Movement Counts,

PCD, Approach Volume, Approach Delay, Arrivals on Red, Approach Speed, Yellow and Red Actuations, and Purdue Split Failure.

Detection	Metric
None	Phase Termination Chart Split Monitor Preemption Details Pedestrian Delay
Lane-by-lane Presence Lane Group Presence	Purdue Split Failure
Lane-by-lane Stop Bar Count	Turning Movement Counts Approach Volume
Advanced Count	Purdue Coordination Diagram Approach Volume
Advanced Speed	Approach Speed

Table 1: UDOT detection and metrics

2.1 Purdue Phase Termination

This section will summarize the performance measures and tools for visualizing and evaluating performance measures that UDOT currently uses in their ATSPM system Including the Purdue Phase Termination diagram, Split Monitor, Pedestrian Delay, Preemption Details, Turning Movement Counts, PCD, Approach Volume, Approach Delay, Arrivals on Red, Approach Speed, Yellow and Red Actuations, and Purdue Split Failure.

2.2 Methodology Equations

This section shows the methodology equation used in this research. The percent on green (POG) can be used to determine the platoon ratio (Rp). The formula is 1

$$Rp = POG/(g/C) \tag{1}$$

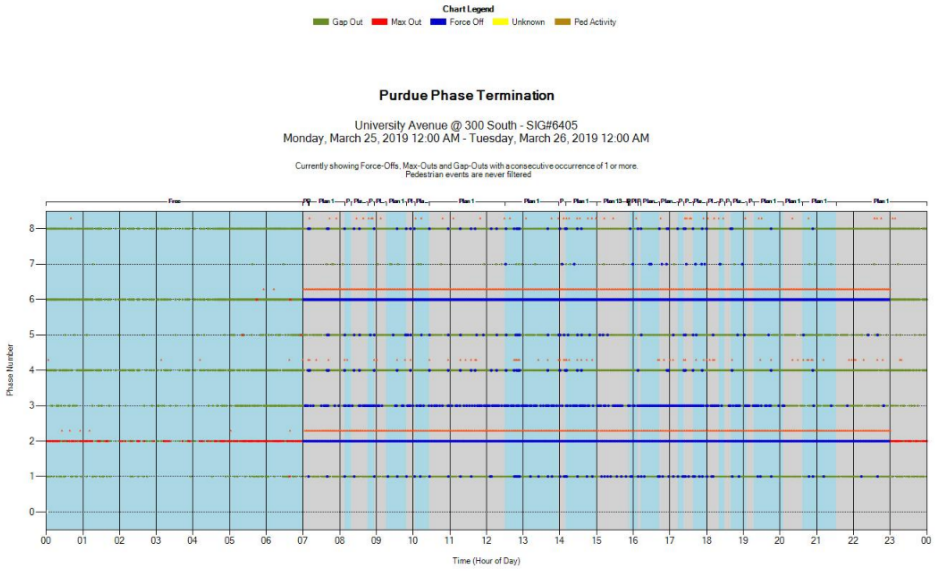

Figure 1: Purdue Phase Termination diagram for 300 South and University Avenue in Provo, Utah

References

[1] Christopher M Day, Darcy M Bullock, Howell Li, Stephen M Remias, Alexander M Hainen, Richard S Freije, Amanda L Stevens, James R Sturdevant, and Thomas M Brennan. Performance measures for traffic signal systems: An outcome-oriented approach. Technical report, 2014.

[2] Christopher M Day, Howell Li, James R Sturdevant, and Darcy M Bullock. Data-driven ranking of coordinated traffic signal systems for maintenance and retiming. *Transportation Research Record*, 2672(18):167–178, 2018.