ACTIVITY 43 Setting the Maximum Green Timing Parameter for All Approaches of an Intersection

DESIGN

Purpose

The purpose of this activity is to set the maximum green time for your intersection such that the delay is optimized for all approaches and for the intersection as a whole.

Learning Objective

- Set the maximum green time for both approaches of an intersection, balancing the performance of both the minor street and the major street

Required Resource

- VISSIM file from Activity #37

Deliverable

- Prepare a spreadsheet that includes the analysis and reporting requirements listed in the tasks below:

  Tab 1: Title page with activity number and title, authors, and date completed

  Tab 2: Delay analysis for range of maximum green times

  Tab 3: Prepare a brief report that summarizes your conclusions, your recommended maximum green times, and the data that support your conclusions and recommendations. Include a plot of delay vs cycle length for the results that you generated.

Information

Consider this question: How do you set the timing parameters to balance the risks of early termination of green and inefficiently long green time? Consider the following criteria that could be used to produce efficient phase operations:

- The phase is not extended inefficiently for a very short queue
- The phase extends long enough to clear the standing queue
- The phase doesn't extend beyond the time that it takes for the queue to clear

In addition to these three criteria, the following criteria could also be considered to achieve intersection operational efficiency:

- The major street green time should be extended to serve vehicles arriving after the queue clears without causing excessive delay to the minor street traffic
- The maximum green time should be increased in case of phase failure when a phase consistently terminates by maxing out

Your objective in this activity is to determine the maximum green times such that the phases generally gap out (and not max out) balanced by making sure the cycle times are not excessive and long delay times are produced.

Task 1

Make a new copy of the folder that includes your VISSIM files from Activity #37. Rename this folder "a43". Use this VISSIM file as the basis for your analysis and design of the maximum green time.

Task 2

Set the maximum green time to 60 seconds for all approaches of your intersection. Use the settings for the minimum green time and the vehicle extension time that you determined in Activity #37. Collect delay and queue length data for each approach and for the intersection as a whole based on one simulation run of 3900 seconds (collecting data beginning at 300 seconds to account for network build-up). Observe the operation of the network for this time period and record the number of max outs and gap outs for each approach.

Task 3

Based on your results from Task 2, reduce the maximum green times by 10 seconds and run the simulation again. Again, collect the delay and queue length data for each approach and for the intersection as a whole based on one simulation run of 3900 seconds. Observe the operation of the network for this time period and record the number of max outs and gap outs for each approach.

Task 4

Continue iterating (reducing the maximum green by increments of 10 seconds and re-run the simulation) until you've reached a value of maximum green time that meets the objectives listed previously.

Task 5

Based on the results from Tasks 2, 3, and 4, select your design value for the maximum green time.