ACTIVITY 35

Relating Headway to Unoccupancy Time and Vehicle Extension Time

DISCOVERY

Purpose

The purpose of this activity is to give you the opportunity to learn how to determine the vehicle extension time based on the detection zone length and the desired maximum allowable headway (MAH).

Learning Objectives

- Relate the MAH to unoccupancy time
- Determine the vehicle extension time based on the length of the detection zone and the desired MAH

Required Resource

- Movie file: A35.wmv

Deliverable

- Prepare a spreadsheet that includes the following information:

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

  Tab 2: Answers to the Critical Thinking Questions

  Tab 3: A brief summary of your observations from the tasks which follow. Note any patterns that you see between the headway data and the unoccupancy time data. What would be the basis of a relationship between these two parameters?

  Tab 4: The data that you collected in Table 19

Critical Thinking Questions

As you begin this activity, consider the following questions. You will come back to these questions once you have completed the activity.

1. What is your recommendation for the vehicle extension time, based on your recommended desired maximum headway? Explain your answer.

2. If the detection zone length was longer than 22 feet, would your recommended vehicle extension time value be higher or lower? Explain your answer.

INFORMATION

In Activity #34, you observed the normal variation in headways in a departing queue, and based on these observations, you selected a MAH that represents the longest headway in a departing queue that you are willing to tolerate without terminating the green indication. In this activity, you will relate this headway to its equivalent unoccupancy time. You will then select a vehicle extension time based on this unoccupancy time that, in combination with the detection zone length, ensures both efficient operation and good service quality. In this activity, the detection zone length is 22 feet and the minimum green time is set to 7 seconds. The vehicle extension time is set to 5 seconds.

TASK 1

Open the movie file: "A35.wmv."

TASK 2

Collect data.

- The minimum green time is set to 7 seconds and the vehicle extension time is set to 5 seconds
- Move the simulation time to 66.0
- Run the simulation and observe the operation of the southbound approach
- At t = 66.1 seconds, advance the simulation. Record the following values in Table 19 for phase 4 (serving the SB through movement)
  - Record the simulation clock time that the display changes to green ("Start of green" in the table)
  - Record the clock time that the front of each vehicle enters the zone and the rear of each vehicle exits the zone. The entry time for the first vehicle is noted in the table ("14.0").
  - Record the clock time that the display changes to yellow ("Start of yellow" in the table)
  - Compute the unoccupancy time for each vehicle pair and record the value in the "Unoccupancy time" column. The unoccupancy time is the difference in the clock time that the front of the vehicle enters the zone and the clock time that the rear of the previous vehicle exits the zone. If the value is negative, a zero should be entered.

Vehicle Number	Start of green	Start of yellow	Front of vehicle enters zone	Rear of vehicle exits zone	Headway	Unoccupancy time
1			14.0		1.2	
2					2.4	
3					1.7	
4					1.9	
5					1.8	
6					1.8	
7					1.7	
8					1.9	
9					1.4	
10					1.7	

Table 19. Data collection table

Student Notes: