ACTIVITY
47 Permitted Left Turn Operations

DISCOVERY

Purpose

The purpose of this activity is to give you the opportunity to increase your understanding of permitted left turn phasing.

Learning Objective

- Determine the efficiency of permitted left turn operations under various opposing through traffic volumes

Required Resource

- Movie file: A47.wmv

Deliverable

- Prepare a document that includes your answers to the Critical Thinking Questions

Critical Thinking Questions

As you begin this activity, consider the following questions. You will come back to these questions at the end of the activity.

1. How does the opposing volume affect the quality of the left turn permitted operation for each of the two cases?

2. What change to the phasing plan would you consider, if any, to improve the quality of the operation for case 2?

3. Do the two cases that you observed conform to the queuing model diagrams described in the reading (Activity #45)? Explain your answer.

4. Prepare a brief summary of the performance of the left turn movements for each case. Consider the relative size of the queues that form and the relative delay experienced by the left turn movements.

Information

In this activity you will observe the operation of State Highway 8 and Line Street, focusing on the left turn operations on State Highway 8. An aerial view of the intersection is shown in Figure 163. State Highway 8 has two through lanes in each direction, while Line Street has one through lane in each direction.

The left turn phasing that you will observe is called "permitted," since the left turn traffic is allowed or permitted to complete their turning maneuver only if there is a safe or acceptable gap in the opposing through traffic. If an inadequate number of gaps in the opposing through traffic present themselves, the quality of the left turn operations will deteriorate.

Two cases will be considered here, each with different opposing through volumes. In the first case, the opposing through movement is 800 vehicles per hour. In the second case, the opposing through movement is 1450 vehicles per hour. In both cases, the left turn movements are 100 vehicles per hour. The minor street movements (northbound and southbound through movements) have the same volume, 600 vehicles per hour.

Figure 163. Aerial photograph, State Highway 8 and Line Street

Figure 164 shows the ring diagram for both cases. The permitted left turn movements are indicated with dashed lines.

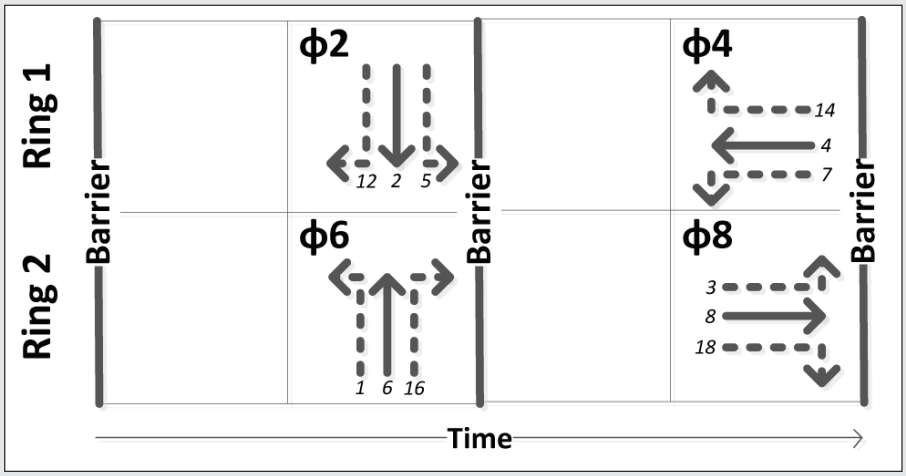

Figure 164. Ring diagram showing permitted left turn phasing

TASK 1

Open the file: "A47.wmv."

TASK 2

Observe the operation of the two cases. (See Figure 165.)

- Observe the relative size of the gaps in the through traffic on State Highway 8
- Observe the eastbound left turn and westbound left turn vehicles as they first wait, and then accept gaps in the opposing through traffic. Note the relative size of the queues that form in both cases.

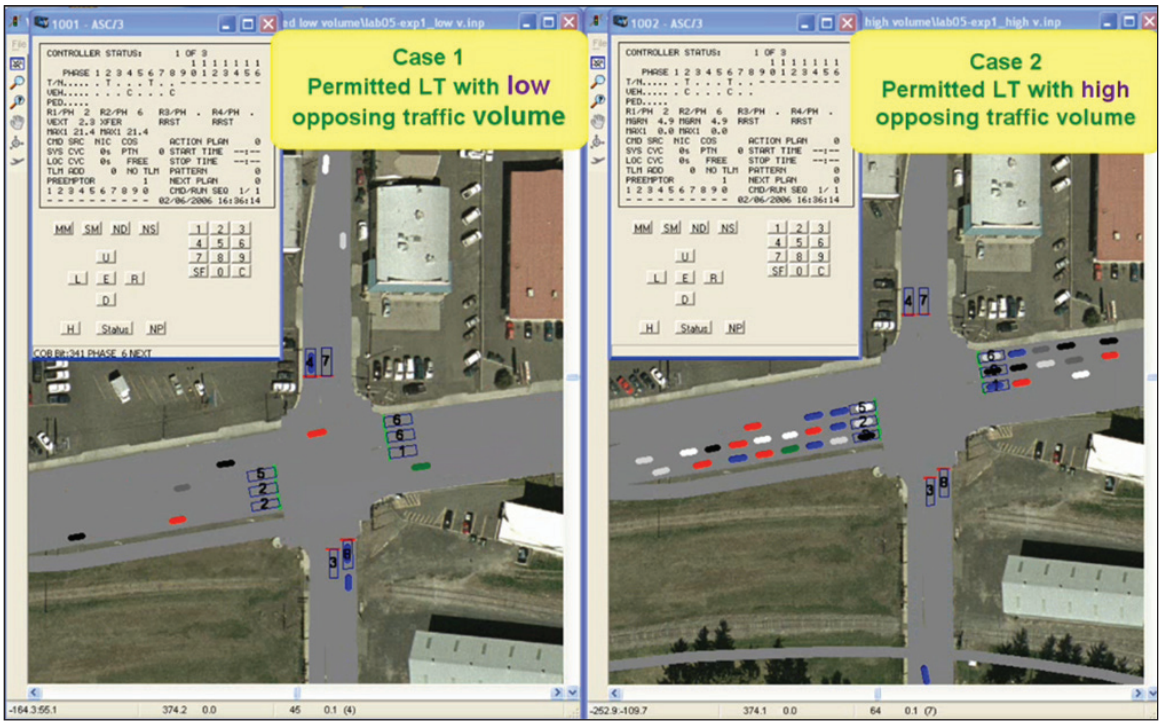

Figure 165. Animation comparing two permitted left turn phasing cases

Student Notes: