## Purpose

The purpose of this activity is to give you the opportunity to learn how the detection zone length affects the operation of a phase.

## Learning Objective

- Relate the length of the detection zone to the duration of the green indication


## Required Resource

- Movie file: A32.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 once you have completed the activity.

1. How do you know when the detector is active and when it is inactive?
2. When does the phase terminate for the southbound direction for each of the two cases?
3. Why does the phase terminate for each of the two cases?
4. Do you think that the phase is operating efficiently or not for the two cases? Why or why not?
5. Do you think that the quality of service provided to the motorist is good or not? Why or why not?
6. If the phase terminates too early or extends too long, what solutions should be considered?

## Information

In this activity, you will consider two cases, one in which the southbound approach has a 22 foot detection zone and another in which the approach has a 66 foot detection zone, each representing a zone length sometimes used in practice. In both cases, the detection zones end at the stop bar. See Figure 115. The vehicle extension time and minimum green time are set to zero. The detectors are both operating in presence mode. You will observe how and when the phase terminates for both cases, and the status of the controller at several points in the simulation.

It is important to understand that both detectors are operating in the presence mode. This means that as long as the detection zone is occupied, a call is sent to the controller for the assigned phase. If a constant call is sent to a phase that is green, it will continue to remain green as long as the phase has not "maxed out."

The vehicle extension time and minimum green time parameters have both been set to zero for phase 4 , the phase serving the southbound through approach movement. This means that you need to focus only on the detection zone length and how it affects the duration of the green indication.
Vehicles are present on the southbound approach on Line Street (phase 4), and the eastbound and westbound approaches on State Highway 8 (phases 2 and 6).


Figure 115. Two detection zone alternatives on Line Street SB approach

## Task 1

Open the movie file, A32.wmv. Pause the playback. The simulation window shows the animation of vehicles traveling through the intersection as well as other data (see Figure 116):

- The current simulation time is noted in the lower left
- The detection zones (and their numbers) are shown in each approach lane as boxes


Figure 116. Features of animation window

## Task 2

Start the movie file. Pause the movie when the simulation time is 49.0 . Observe the conditions at the intersection and in the controller for both cases. See Figure 117.

- For the southbound approach, four vehicles are in queue for both cases
- Point B on the controller status screen shows the status for phases 2 and 6 , the current active phases in rings 1 and 2. The red clearance timer is active, with a current value of 0.7 seconds. And, phases 2 and 6 have gapped out, as noted in the status screen.
- The controller status screen shows that phase 4 has an active call (noted by the "C" at point A) and is in "phase next" status (noted by the " N "). This means that when phase 2 has terminated, phase 4 will be the next phase to be served.


Figure 117. ASC/3 status screen at $t=49.1$ for both cases

## TASk 3

Observe the simulation at $t=49.9$. Record your observations on the status of phase 4 . What is the color of the active indication?

## Task 4

Observe the simulation from $t=54.1$ to 54.3.

- Observe the simulation on the left of the screen (the 22 foot detector case)
- Record your observations of the controller status window, noting in particular the status of any calls, the timing status of phase 4 , and the timing processes and timing parameter values for phase 4
- Also, record the status of the queue being served


## Task 5

Observe the simulation from $t=60.1$ to 61.4.

- Observe the simulation on the right of the screen (the 66 foot detector case)
- Record your observations of the controller status window, noting in particular the status of any calls, the timing status of phase 4 , and the timing processes and timing parameter values for phase 4
- Also, record the status of the queue being served

