
6 GUIDELINES FOR DETECTION DEVICE SELECTION

6.1 Overview

The preceding sections analyze the main factors affecting the selection of non-intrusive vehicle detectors for signal actuation at intersections, and the capabilities of non-intrusive vehicle detectors currently available. When we select particular vehicle detectors to replace the intrusive vehicle detector to restore the traffic signal actuation, both of the two aspects should be considered fully. In this section, the guideline summarizes the general procedure to select particular vehicle detectors at intersections under construction.

First, all the non-intrusive vehicle detectors that could be selected for use in signalized intersections must be able to collect the data their manufacturers claim they can collect and satisfy the specification and standard of non-intrusive detectors of Florida DOT. However, satisfying these conditions is not enough to be selected to maintain traffic signal actuation because, under some conditions, just some inductive loops would be replaced at signal intersections. So the detection devices must also be:

- Compatible with the existing traffic signal controllers and storage systems used by the particular signalized intersections.
- Capable of communication with decision making apparatus.

Secondly, when choosing a particular type of vehicle detection device to replace the existing detection system at signalized intersections, there are many questions about the particular intersections that first need to be answered.

- What type of detection at the intersection under construction should be restored with non-intrusive detectors?
- What type of data should be collected?
- What are the traffic characteristics of the site? (heavy or light traffic, speed limit, urban or suburban setting, etc.)
- What are the expected weather conditions when the intersection is under construction?
- What are the geometric characteristics of the intersection (grade, sight, special objections on the shoulder)? Do these characteristics hamper the installation or affect the performance of some non-intrusive vehicle detectors?
- What are the construction characteristics of the intersection (construction period, radiation emitted, special tall objections on the site)? Do these characteristics hamper the installation or affect the performance of some non-intrusive vehicle detectors?
- What is the budget for the vehicle detection installation?
- What level of skill is required for installation of the devices?
- Can the chosen device be integrated into the signal controller system(s)?
- How does the installation of a non-intrusive detection device interrupt the traffic flow?

The answers to these questions will lead to the selection of the best vehicle detection device for the particular site application. For example, if the device is to be installed with minimal installation cost needs and very little interruption of traffic flow under inclement weather conditions, a device such as a microwave radar detector, mounted in the side-fire capability might be most appropriate. If, however, the construction at the intersections will emit some radiation and interrupt the performance of microwave detector, a microwave device may not be a good choice for this intersection.

6.2 Implementation Procedure

The preceding questions can be revised into guidelines for the selection of the best detection device for a particular intersection to maintain traffic signal actuation. The contractors must analyze the characteristics of the particular intersections under constructions and select the best vehicle detector available to them to maintain the traffic signal. The procedure below can be a good procedure for contractor to follow.

1. Determine the detection purpose and type of traffic data to be collected.
2. Determine the requirement accuracy of detection for the purpose.
3. Narrow device alternatives to only those devices that can be integrated into the existing system(s).
4. Narrow device alternatives to only those devices that can provide the data required.
5. According to the particular traffic flow characteristics, narrow device alternatives to only those devices that can satisfy the accuracy requirement to collect the traffic data.
6. According to the expected weather conditions, narrow device alternatives to only those devices that can satisfy the accuracy requirement to collect the traffic data under these kinds of weather conditions.
7. According to the special construction conditions, narrow device alternatives to only these devices that can satisfy the accuracy requirement to collect the traffic data under these kinds of conditions.
8. Review the skill level of the installation personnel for ability to install each device.
9. Conduct cost/benefit analysis on each of the remaining alternatives, the life cycle maintenance costs and the cost of training personnel in maintenance of the device.
10. Ensure that the device is consistent with the overall approach to vehicle detection within the intersection.

Once a selection is made, it is important to go back to the beginning of the selection process to ensure that the device will meet the goals of the project and the supporting agency.

Some testing reports show, in general, the differences in performance from one device to another were found to be more significant than the differences from one technology to another. Moreover, the detection of traffic can be done with a multitude of technologies. So it is recommended to select a good vehicle detector from wide products with the same technology, not just to narrow a selection to a particular technology.

6.3 References for Chapter 6

- [1] Mark D. Suennen, William M. Spreitzer, Joseph K. Lam, " *A Traffic Detection Tool KIT For Traveler Information Systems*", Prepared for 2000 Mentors Program Advanced Surface Transportation Systems, August 2000.
- [2] Minnesota Department of Transportation, SRF Consulting Group, Inc., " *NIT PHASE II, Evaluation of Non-intrusive Technologies for Traffic Detection, Final Report* ", SRF No. 3683, September 2002.