

Inventory Systems for Traffic Control Devices

An inventory of signs and markings is a critical element for effective governmental transportation management practices. The investment in signs and markings is significant when considering all the assets of a government agency. The ideal inventory system would track signs and markings from initial installation, through inspections and maintenance, and until removal from the system.



Rural highway with signs and pavement markings

A traffic control device inventory can be a valuable asset in tort liability cases. This inventory can provide documentation of the condition of specific signs and markings in place for any given period. In addition, pertinent inspection and maintenance activities would be noted in the inventory and available for use by the agency.

An inventory system can be used for many activities. It can identify signs for replacement based on criteria such as age or condition. Recording and evaluating maintenance and replacement history can help an agency to identify high-vandalism areas or sign locations with visibility or operational deficiencies. In addition, planning and budgeting for sign replacement or expansion of new development areas is much easier to accomplish with inventory records identifying existing signs and required maintenance activities. A sign inventory can be used to manage personnel and maximize production by combining work orders and scheduling routine maintenance activities. The system can track responses to requests and complaints, resulting in an improved level of service to the public.



Urban street with signs and pavement markings



Stop sign in poor condition
Note: Street sign is improperly placed.



Vandalized Speed Limit sign



Vandalized sign

A critical element of a successfully operating inventory is the involvement of all staff whose job requires an interest in traffic control devices. This staff may include engineers, transportation planners, accountants, office managers, enforcement officers, administrators, and most important, installation and maintenance staff. This involvement is particularly important for the staff responsible for collecting the original data, maintaining traffic control devices, and keeping the inventory system current. An efficient inventory system results from involvement of all interested parties.

Choosing a System

Inventory systems range from very basic to quite sophisticated depending on the resources available to and the needs of an agency. A very basic inventory system might consist of manual records, such as paper files of activities or a card system, to maintain the system and keep it current.

Many transportation agencies use an automated or computerized system. Each agency should consider several factors before making a selection between one of the many computer programs available:

- agency requirements
- computer capabilities
- availability of trained staff to support the system and keep it current
- improved accuracy and production with use of laptop computers for field operations

When selecting an inventory system, the following issues should be addressed:

- Does the system match the selected data elements? Are all data elements recorded?
- Is there an understanding of the basic features of a software program as compared to data elements?
- Do the hardware and software requirements of computer programs match the existing computer system?
- Have user support and references been reviewed?
- What does the initial cost include?
- Are there maintenance costs with the program?

Software that provides basic inventory features has been developed and is available at minimal cost to local agencies. These programs can be effectively used as a low-cost supplement to a sign management system.

Developing the System

Development of the system should involve key personnel, including management representatives, office staff, work crew supervisors, sign

workers, and other affected offices within the agency. The development of an inventory system should also include all critical tasks: selecting and purchasing software, collecting initial data, daily operations, and reporting procedures, along with ancillary tasks such as enforcement and risk management.

Choosing a Reference System

Several reference systems can be considered to locate traffic control devices for the inventory. The chosen reference system should be compatible with other systems within the agency and use the same reference points. The most common references used are shown in the following list:

- route/milepost/distance
- route/mile point/distance
- link/node/distance
- route/intersection/direction/distance
- global positioning systems, which may offer additional location options for the future
- linear referencing systems

Each of these reference methods has particular advantages to consider, but the most important factors are compatibility with other agency systems, staff buy-in, and ease of use.

Determining Elements of the Inventory

Inventory data elements are selected to provide most appropriate information to meet agency needs. These elements can be divided into three categories: core, critical, and desirable.

Core Elements. Core data elements reveal location, description, condition, and inspection and maintenance history. Core elements are essential to an inventory. These elements identify replacements, provide documentation in tort liability, and furnish benefits in management and budgeting.

Core elements typically include the following:

- location
- position
- sign code (*MUTCD* designation)

- sign condition
- maintenance activities
- installation, inspection, and maintenance dates

Critical Elements. Critical data elements provide more information about devices. These elements are valuable in keeping proper inventories in stock and can provide additional information that supports the agency in tort liability issues. With data from the following critical element list, an agency can document that traffic control devices comply with established standards and guidelines.

Critical elements normally include the following:

- dimensions
- sheeting type
- sign blank type
- post/support type and condition
- sign orientation
- posted speed limit at the time activities were conducted

Desirable Elements. Desirable data elements can provide additional information about sign installation that can help with maintenance and replacement activities. Desirable elements include the following:

- offset
- height
- retroreflectivity (documentation will be more important when minimum standards are adopted nationally)
- inspector name
- sign identification number, if different from *MUTCD*
- images of the sign
- comments
- other reference numbers

Collecting the Data

The most formidable task after selecting an inventory management system, whether manual or computerized, is the collection of initial data. In addition to a significant investment in staff time, collection costs can range from \$2 to \$5 per sign. To reduce initial cost and staff time, phased data collection can be considered. A

systematic approach should be developed that completes the task within a reasonable time, i.e., four years or less. Data may be collected by area or sign type. Regular agency staff, temporary employees, or consultants can be used to collect this data, but all should be properly trained. It is very important that initial information be accurate.

When the initial data collection effort is organized, the following recommendations should be considered and/or followed:

- Select a standard approach that matches other data bases within the agency, if possible.
- Decide whether to use route names or route numbers for location.
- What signs should be included? All or one specific type, such as regulatory signs?
- How do we determine whose sign is it?
- Train personnel to collect and enter data.
- Determine the area to be inventoried (do only a section each year until the initial data collection is completed.)
- Decide whether to use manual data collection, laptop computers, or photo/video logging to gather initial data.

Maintaining the Inventory

After an inventory system has been adopted and initial data collection activities are completed, the next critical task is keeping the system current. If the inventory is not up to date, much of the value and the investment in resources will be lost in a relatively short time.

A work order process is a common method of keeping inventories current. With this procedure, work orders are completed at the time any activity is finished. Usually, the field crews that perform the work are best qualified to record the data. Pen-based computers have been used successfully for this purpose in some agencies. It is important to enter this information into the database on a regular schedule, daily if possible. Documentation of important daily activities should be a key factor in software selection.

Inventories of traffic control devices can be a very valuable asset for any transportation agency. However, development and establishment can involve a significant investment in staff time and funding. Continued maintenance of the system is mandatory for efficient and effective operation.

Please refer to the following sources for more in-depth information:

Institute of Transportation Engineers, *Traffic Signing Handbook*.

Institute of Transportation Engineers, *The Traffic Safety Toolbox: A Primer on Traffic Safety*.

The Center for Transportation Research and Education, a center of Iowa State University.