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Development of a Traffic Records System for Local Jurisdictions

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A traffic records system for small and medium-sized cities and counties has been developed. The system is designed for maximum utilization of manual record-keeping procedures and for use as a supplement to existing criminal justice records. Three basic components are included in the system: input data, a filing system, and output reports. Recommendations for specific elements to be included within each component are included. The suggested system includes three levels of record keeping. The recommended level for a specific agency depends on the volume of traffic records and the capabilities of each jurisdiction. A discussion of the format used in the preparation of a manual that describes the system is included. Future plans for presenting seminars and providing technical assistance in the use of system methods are described.

Reducing the number of injuries and fatalities on the nation's streets and highways remains a major challenge for transportation safety officials. To achieve the goal of improving highway safety requires a comprehensive approach that includes analysis of a multitude of factors such as driver behavior, vehicle performance, enforcement practices, engineering techniques, judicial responses, and legislative activities. A key element in this comprehensive approach is the establishment of a traffic records system to provide information to decision makers. The data provided in this system will help in determining the extent of the accident problem, formulating programs needed to reduce accidents, and evaluating the effectiveness of these programs.

In recent years, the emphasis in traffic records systems has been placed on the development and refinement of computerized records systems for large urban areas and for statewide application. Continual improvement of these larger systems is certainly needed. But the problems of maintaining adequate records systems are particularly acute in small and medium-sized cities and counties. These jurisdictions, some of which have extensive traffic safety responsibilities, often have limited data collection capabilities and may lack the trained personnel to effectively develop, store, and use the pertinent information.

Agencies that maintain traffic accident and citation records often assign low priority to the maintenance of traffic records because of their limited enforcement staffs and heavy work loads. For example, Tennessee

officials have noted that many enforcement agencies are not meeting their legal obligation to forward accident reports to the state department of safety in Nashville.

The Tennessee Governor's Safety Program sponsored the study reported here to meet the needs of local jurisdictions for improved methods of traffic record keeping. The objective of the study was to develop a manual traffic records system for use by local jurisdictions. The establishment of a generalized framework that could be used to formulate individualized records systems for agencies of various sizes was considered to be a primary factor in the development of the system. The methods described do not require the use of computers or sophisticated data-processing techniques. They can be implemented by improving existing manual filing procedures.

ORGANIZATION OF THE STUDY

To develop a records system that would provide the basic data necessary to make traffic safety decisions, the study was conducted in two parts:

1. A survey of existing traffic records systems in use in Tennessee and a review of the literature on development of traffic records systems and
2. The development of a complete records system and the preparation of a manual that describes the components of the system and their use.

SURVEY OF RECORDS SYSTEMS

The survey of traffic records systems consisted of two components: a survey of literature on manual traffic records systems and a review of current record-keeping practices among cities and counties in Tennessee.

The literature survey revealed that the majority of recommended manual traffic records systems contain common elements (1-7). These elements include maintaining accident files by location, using spot maps, and establishing supplementary files of citations and other pertinent data including records of alcohol in-

volvement. Most systems described in the engineering literature included instructions on the techniques used in analyzing records data, such as constructing collision diagrams. Only limited attention was devoted in these engineering studies to the relation between the traffic records system and the broader criminal justice records kept by enforcement agencies.

Conducting a survey of current practices in traffic record keeping among local agencies in Tennessee was the next important step. To perform this survey, a special investigator who had experience in police traffic work was hired. He was chosen because of his expertise in the enforcement area and his ability to relate to local police officials in interview situations. Because of the sensitivity involved in asking local agencies questions about their record-keeping practices, the ability to relate well to local officials was felt to be a very important factor.

Safety planners for the development districts were consulted to assist in selecting enforcement agencies to be included in the survey. In each of the nine Tennessee development districts, 8 to 10 agencies were selected. These agencies were chosen on the basis of their interest in the project and their current efforts in maintaining traffic records. The practices of each agency were summarized, and samples of their traffic records forms were collected.

An additional survey of state agencies and their traffic records needs was conducted. This survey was concentrated within the state departments of safety and transportation. Existing state regulations that pertain to the traffic records responsibilities of local jurisdictions, as well as problems encountered by state agencies in obtaining local cooperation, were surveyed.

The results of the surveys completed in this phase of the study were used as a basis for development of the recommended traffic records system.

DEVELOPMENT OF THE TRAFFIC RECORDS SYSTEM

Traffic records systems are maintained for several reasons, a major one being to provide information to

improve the traffic safety program. For this system to be useful, the total flow of information must be considered. The information flow consists of the data elements that individually or collectively delineate traffic safety problems and can be used to develop solutions to these problems.

Information Flow

The pattern of information flow in the traffic records system is shown in Figure 1. This system consists of three major elements: input data, filing system, and output reports. The basic input begins with the data contained in individual records.

Individual reports provide information of limited use in the safety program. The material on a specific accident, for example, is of use to legal and judicial personnel in identifying the cause of the accident but, because of the chance occurrence of each individual case, it cannot be used alone to address the overall accident problem. A filing system is required that provides the means for grouping individual records so that the information needed to analyze accident problems can be retrieved. A spot map represents one element of a filing system that illustrates the overall accident picture in a city or county and pinpoints locations that have high accident rates.

The filing system is the second major element in the records system, an element that concentrates the information that is available. The third element in the system is the preparation and distribution of output reports.

Output reports are prepared to summarize specific data elements in prescribed formats to be used by traffic safety decision makers. These reports may serve many purposes: to illustrate the scope of the traffic safety problem to public officials and local administrators; to inform the public of the nature of the traffic safety problem; and to provide data for specific users, such as transportation engineers, who are responsible for designing safety projects. The formats may vary depending on whether the report will be used at the local, state, or federal level.

The pattern of information flow shown in Figure 1 applies to records systems maintained by any agency, from a department of less than five individuals to large city police departments.

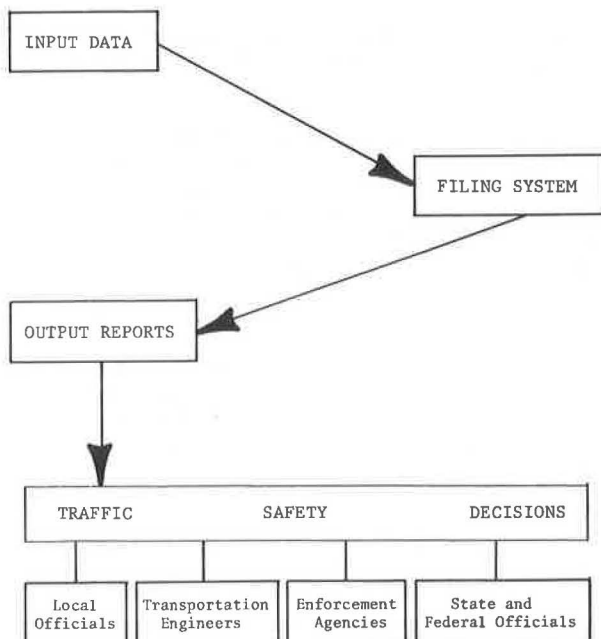
System Elements

Individual components to be included in the traffic records system were identified and grouped according to the three major sections of the system—input data, filing system, and output reports. In reviewing the organization and content of each of these sections, it must be remembered that the records systems of many agencies are currently inadequate. This research is focused on raising the competency of all agencies to provide the minimum level of record keeping necessary to satisfy the needs of the local agency and state agencies.

Because of variations in staff size and the volume of records handled, some agencies may not have the capabilities or the need to include every item mentioned within their individually designed system. In addition, the use of each component will vary because of the need of larger agencies to perform analyses that are more extensive and more frequent than those performed by smaller departments.

A brief description of each of the system elements is included below. The items that must be included in any records system are identified as mandatory. Additional elements that may be included, if data are avail-

Figure 1. Information flow in the traffic records system.



able and the files can be maintained, are recommended. The ability to include the recommended element depends on the size of the agency and the amount of records.

Basic Input Data

Input data sources are those items that relate to individual occurrences such as accidents, citations, driving while intoxicated (DWI) tests, or specific enforcement activities. The following elements should be included in the traffic records system under this category:

1. The accident report form (mandatory)—The accident report form is the most important element of the traffic records system. Care must be taken to ensure that the form is filled out properly and that all pertinent information is recorded.
2. Supplemental accident-related reports (mandatory)—Supplemental data may be collected for some accidents. Examples of additional reports that may have been completed are (a) fatality report, (b) detailed follow-up investigations, and (c) witness reports.
3. Citation records (mandatory)—Copies of all citations issued for moving violations should be part of the traffic records system.
4. Alcohol influence reports (mandatory)—Records on all chemical tests performed and observations on the influence of alcohol should be maintained.
5. Complaint reports (recommended)—Many police agencies maintain records of all complaints as they are received and record them on complaint cards. These cards should be filed in the complaint file that is maintained for all criminal justice record-keeping activities.
6. Enforcement records (recommended)—Records of saturation enforcement should be part of the total records system.

Filing System

The second major element of the accident records system is the development of filing procedures to be used in storing information so that it can be retrieved at a later date. The filing system must be capable of handling all forms that relate to traffic safety, it must be compatible with the existing criminal justice records system (if one is used), and it must allow for efficient data entry and retrieval.

Filing systems may vary in complexity, depending on the size of the jurisdiction and the number of records contained in the system. The filing method should be fitted to the needs of each community. For small communities, the system does not need to be complex or require hours of filing time, but it should be designed so that the pertinent information needed by the local agency and state and federal personnel can be obtained without difficulty.

The elements of the filing system are as follows:

1. Accident report files (mandatory)—Copies of basic accident reports are the foundation of the records system. These forms, properly reviewed for accuracy, should be filed in chronological order.
2. Spot map (mandatory)—A key element in every agency's traffic records program should be an accident spot map. This visual display aids in identifying locations that could be considered by engineers for redesign or corrective treatment.
3. Driver record file (recommended)—A driver record file that contains records of all drivers involved in accidents and of those drivers who receive citations

for moving violations can be maintained.

4. Location file (recommended)—A primary purpose of the traffic records system is to provide data that can be used by engineers and enforcement personnel to analyze and monitor locations that have high accident rates. The spot map provides the initial data required to provide a preliminary review of locations that merit an in-depth review. For larger cities and counties that have heavy accident experience, additional information is needed. This information should be contained in the location file. The recommended procedure for developing this file is to use copies of accident report forms filed by location. Traffic engineers feel that this file is necessary. In smaller jurisdictions, however, a spot map can provide the engineer with a visual guide to high-accident-rate locations. A manual search of the chronological file would not be excessively time consuming in these cities.

5. Complaint file (recommended)—If complaint records are kept, they should be maintained in chronological order.

6. Enforcement file (recommended)—If enforcement activities are monitored, they should be kept in a separate file, arranged either by month or by location.

7. Alcohol influence report (mandatory)—It is important that accurate records be kept on the results of all chemical tests performed and on observations by officers of the influence of alcohol or drugs.

Output Reports

The third major segment of the traffic records system is the generation of output reports that can be used in the analysis of the traffic safety program. Output reports are valuable in performing the following tasks:

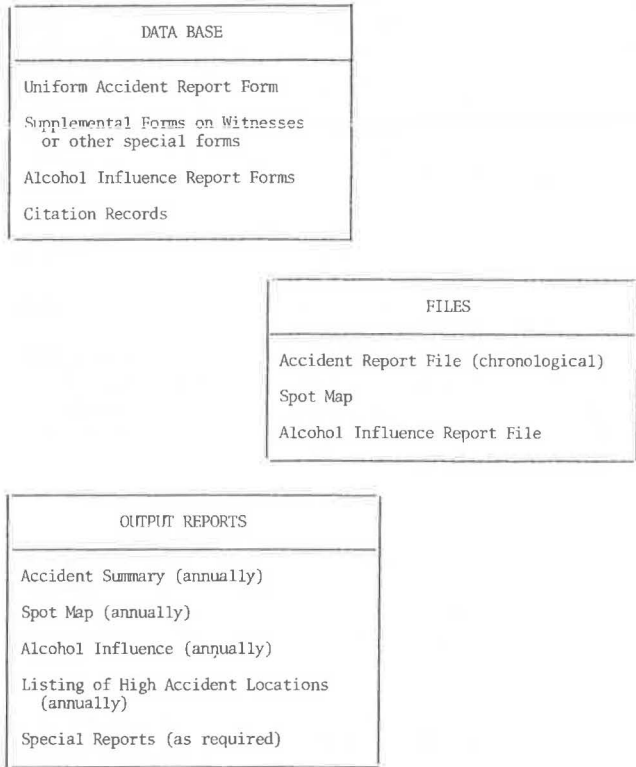
1. Comparing accidents or enforcement statistics;
2. Analyzing locations that have high accident rates;
3. Communicating with the public and elected officials;
4. Preparing requests for local, state, and federal agencies;
5. Evaluating the success of special programs, such as selective enforcement; and
6. Reviewing and measuring the cooperation received from the courts in the conviction of traffic offenders.

Several types of recommended output reports and suggested formats are

1. Accident summary (mandatory)—Each agency should maintain a statistical summary of the accident experience during specified reporting periods.
2. High-accident-rate location summary (mandatory)—A valuable tool in determining which locations may require safety improvements is a list of locations that have experienced the highest number of accidents.
3. Spot map (mandatory)—The spot map, in addition to providing a method of filing, presents a summary of accident experience. Concentrations of pins show at a glance the locations that have high accident rates.
4. Selective enforcement summary (recommended)—A continuous record of the results of selective enforcement programs should be maintained. Summaries of these activities should be prepared periodically.
5. Alcohol influence summary (mandatory)—The results of chemical tests for alcohol and drugs should be summarized and included in the series of output reports that are prepared.
6. Special reports (recommended)—An enforcement agency may need special reports to summarize critical

elements of their traffic safety program. Examples of information that could be included in these special reports include (a) graphs or charts of accidents or citations on a month-by-month basis and (b) written descriptions of special traffic safety programs undertaken.

Figure 2. Level 1—basic traffic records systems.



Levels of Record Keeping

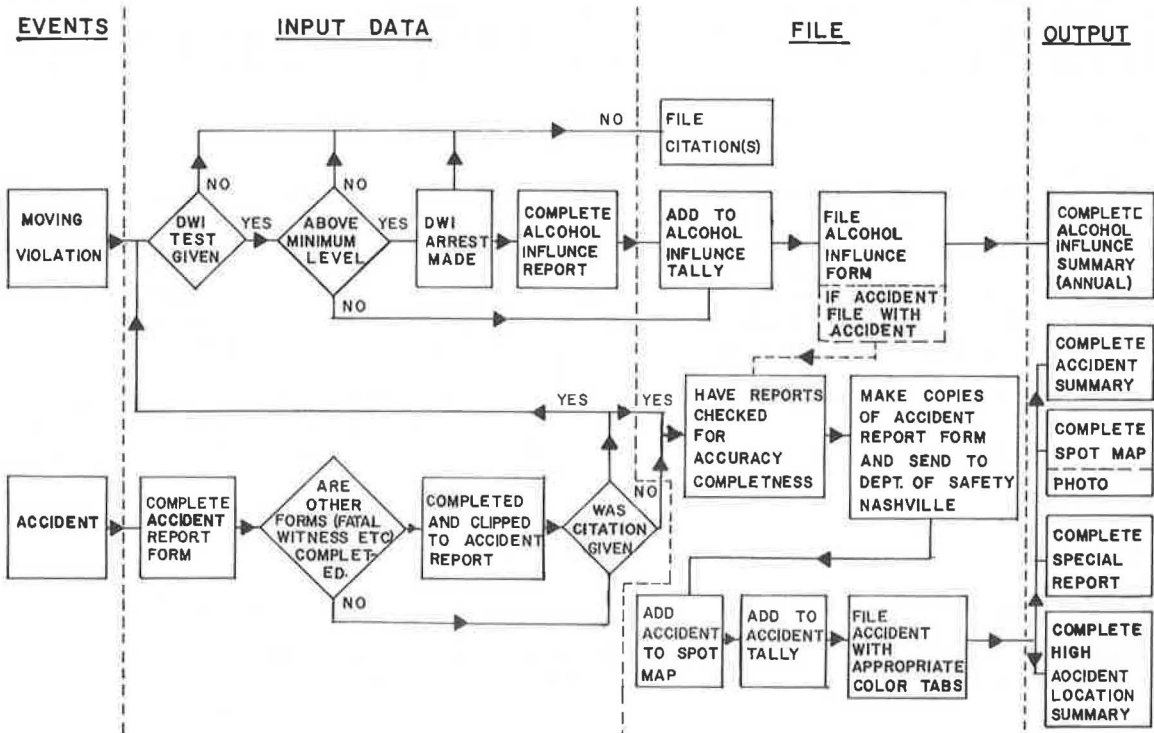
The ability to maintain a traffic records system varies from agency to agency depending on the manpower available and the number of accidents in the system. To account for these variations, three levels of record keeping are recommended. Since the number of accidents is related to city size, the following guidelines are suggested in determining which level of effort should be undertaken by a given agency:

City and County		
Level	Population	Number of Accidents per Month
1	< 3000	< 10
2	3000-15 000	10-50
3	> 15 000	> 50

The basic system (level 1) should be used by agencies that have small enforcement staffs (less than 10 officers) and by agencies that are implementing a records system for the first time. Figure 2 shows the elements and the organization of information flow for this basic system. The elements of the intermediate system (level 2) are the same as those shown in Figure 2 for the basic system plus selective enforcement records, a location file, and more frequent output reports. The elements of the full system (level 3) are identical to those of the intermediate system except that summary reports are prepared more frequently.

Population figures for counties should be those that exclude major cities in the county that have their own responsibilities for accident record keeping. For a given agency, it would be advantageous to establish a complete, accurate records system at a lower level of effort rather than to attempt to implement a large system and not be able to maintain it properly. It should be noted that the population levels are only guidelines

Figure 3. Flowchart for the basic system.



and that a particular agency may need a more extensive system than indicated by population alone. For example, a city that contains major state highways that have high traffic volumes and many accidents may have a greater quantity of traffic records than the population guidelines alone suggest.

USE OF THE SYSTEM

Procedures were developed for each of the three system levels to guide users in implementing and maintaining the appropriate records system. For example, to implement the basic system (level 1) requires approximately 4 h/month (1 h/week) at the time the accident reports or citations are filed and one day a year to prepare the required output reports.

The following equipment is needed to set up such a system: (a) one four-drawer, 22 x 28-cm (8.5 x 11-in) filing cabinet; (b) a mounted jurisdiction map; (c) supplies of pins for the spot map; and (d) various office supplies, including felt-tipped pens, 22 x 28-cm file folders, plastic tabs, rubber stamps, and required report forms and cards.

The system should be arranged as follows:

1. The top drawer of the filing cabinet should be labeled "Accident Reports".
2. The second drawer should be labeled "Accident Summaries", "Alcohol Influence Reports", and "Output Reports".
3. The third and fourth drawers should contain miscellaneous related reports and forms.
4. The spot map should be placed in a prominent and easily accessible location.

The filing procedure begins with the accident or citation records being placed into the system. The flowchart shown in Figure 3 shows the information and the tasks required to maintain a basic system. If the system is maintained according to the procedures outlined, the preparation of output reports should not be difficult.

It is recommended that the following output reports be prepared at the specified times:

Report	When to Prepare
Accident summary	Once per year by using tally sheets
Spot map photograph	Once per quarter (change map each year)
Alcohol influence reports	Summary report once per year, prepared from tally sheet
High-accident-location lists	Once per year
Special reports	As needed

All summary output reports and additional related material should be placed in one of the file drawers. The additional information might include charts, graphs, and other data.

Similar procedures are recommended for the other two levels of record keeping. Flowcharts, equipment needs, and frequency of reports are modified to reflect the greater volume of records processed at each level.

PREPARATION OF THE MANUAL

A major objective of this project was to develop a manual that could be used by any local jurisdiction to implement a traffic records system. The manual has two purposes: to be used by cities and counties in organizing and maintaining a records system and to serve as a text for traffic records seminars.

The manual is organized so as to first introduce the user to the traffic records system. This introduction

is followed by detailed discussions of the elements of the records system and specific descriptions of methods for using each of the elements. Example forms for each element are included, and procedures for implementing such items as the spot map and the location file are described. Each of the three levels of record keeping is presented in detail. These presentations include estimates of labor and equipment needs and descriptions of the procedures to be followed when each new piece of data is added to the system. Finally, appendices that include maps and addresses of key state agencies and a glossary of terms are added. Use of a flexible metal strip binding allows for the addition of new forms and page revisions.

FUTURE WORK

The success of a project of this nature is measured by the percentage of local agencies that implement the system. As mentioned previously, increasing the number of jurisdictions that submit properly completed accident reports to the appropriate state agency would improve the statewide records system. The development of the manual must be accompanied by a follow-up campaign of work with cities and counties to explain the importance of establishing a traffic records system and to assist these agencies in organizing their traffic records systems.

To meet this need, a follow-up project is planned in which a series of seminars on the use of the system will be conducted throughout the state of Tennessee. That project will provide for individual visits to cities that desire assistance in implementing their traffic records systems.

This concerted effort at getting all agencies to understand the importance of traffic records and use a records system will result in establishing an improved data base for making safety decisions.

ACKNOWLEDGMENT

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The contents of this paper reflect my views and do not necessarily reflect the policies or official views of the state of Tennessee, the Governor's Highway Safety Program, or the U.S. Department of Transportation.

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Computerized Street Index for Michigan Accident Location Index System

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Federal highway safety standard 9 provides guidelines to traffic engineers in their identification and surveillance of accident locations. The state of Michigan developed a comprehensive, computerized system of accident inventory called the Michigan accident location index. This system required the coding and computing of the 192 000 km (120 000 miles) of roadway in the state. The procedure for computerizing the roadway network consisted of three tasks: data coding, data entry, and resolution of edit and cross-reference errors. The use of computer programs to assist in each of these tasks resulted in a methodology that proved to be a fast, accurate, and cost-effective approach.

Recent highway accident statistics indicate that the annual number and rate of traffic accident deaths and injuries have declined significantly since the early 1960s. This, along with the fact that vehicle kilometers of travel have generally increased during the last two decades, gives an indication that positive gains are being made by implementing highway safety improvement programs on the highway system.

The implementation of such improvements at selected locations, however, requires a comprehensive procedure for identification and surveillance of locations that have high accident rates. This is the basic theme of federal highway safety standard 9, which provides guidelines to traffic engineers in their identification and surveillance of accident locations.

Highway safety engineers and researchers recognize that in various parts of the country there are serious deficiencies in highway accident record keeping and in the use of such records for safety analysis. These deficiencies include the following:

1. Many states have computerized accident-locating systems on their state and Interstate routes, but most local communities (counties, cities, and villages) do not have access to or use of such a process of accident record keeping—and such communities oversee almost 90 percent of the highway system.
2. Although we are required to maintain records of fatal and personal-injury accidents, many communities stop there and do not record accidents that result in property damage. This reduces the chances that actual highway deficiencies will be recognized when a highway system is analyzed for safety problems.
3. Different communities have different standards for keeping records of the property-damage type of accident. Some record only damages in excess of \$200 whereas others keep records of all property-damage accidents.
4. Although every community uses some procedure

for recording accidents, all too often the means to analyze the accident experience at a particular location or along a segment of roadway does not exist or represents a very time-consuming manual effort.

All of these differences in accident record-keeping practices result in a nonuniform, incomplete accident location system that traffic and safety engineers are forced to use in analyzing safety-deficient highway locations, identifying locations that have high accident rates, and monitoring the accident behavior of these locations.

In recognition of this fact, the Michigan Department of State Highways and Transportation (MDSHT) and the Michigan Department of State Police jointly launched a program to develop a comprehensive, computerized accident inventory system that will keep a record of all accidents that occur in the state. The basic purpose of this system is to identify and analyze hazardous locations on all roadways for safety improvement projects, selective enforcement projects, and other operational practices that will affect accident experience in the state. The Michigan accident location index (MALI) was developed by the Michigan Department of State Police and MDSHT through a Section 402 federal safety grant (under Section 402 of the Highway Safety Act of 1966) secured by the Michigan Office of Highway Safety Planning. The availability of a street index is essential for a computerized accident-locating system. This paper describes the procedure for developing a comprehensive street index for the state of Michigan.

DESCRIPTION OF THE SYSTEM

MALI is a computer-assisted process for storing and analyzing information on traffic accident locations and accident experience at such locations (1, p. 127). The system is designed to generate a computerized description of such locations directly from the physical location information observed and reported by police officers. All local police departments in the state of Michigan are required to report all fatality, personal injury, and property damage accidents in excess of \$200 to the Michigan state police for the central traffic accident system. All accidents are referenced by distance and direction from the nearest cross-street intersection. The ability of MALI to locate accidents by the common or locally known street name reported by the police officer offers a distinct advantage over accident inventory systems that require a manually coded street or intersection code. Additional references, such as freeways, expressways, and