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ABSTRACT

Volume 10 of the 19-volume Highway Safety Program Manual (which provides guidance to State and local governments on preferred highway safety practices) focuses on traffic records. The purpose and specific objectives of a traffic records program are discussed. Federal authority in the area of highway safety and policies regarding a traffic records program are outlined. Program development and operations (a records system concept, a State traffic records committee and agency, goals of the records system, assessment of resources and constraints, and development of a systems plan) are presented. Criteria for program evaluation and different types of reports (management, program evaluation, and National Highway Traffic Safety Administration) are explained. Local government participation and approval criteria for 402 traffic records subelement plans are reviewed. Appendixes contain the Highway Safety Program Standard 10, Traffic Records; a glossary of definitions; references; guidelines and specifications for describing information interchange formats; a list of resource organizations; data potentially available on-scene and off-scene form; a chart of selected traffic safety decision makers and decision opportunities; and an elaboration on the topics of causes and contributing factors. (NH)

Highway Safety Program Manual NO. 10

Traffic Records

MARCH 1975

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

HIGHWAY SAFETY PROGRAM MANUAL

VOLUME 10

TRAFFIC RECORDS

This manual is designed as a guide for States and their political subdivisions to use in developing highway safety program policies and procedures. It does not supersede the requirements of Highway Safety Program Standard No. 10.

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FOREWORD

As part of the Highway Safety Program Manual, this volume is designed to provide guidance to State and local governments on preferred highway safety practices. Volumes comprising the Manual are:

0. Planning and Administration
1. Periodic Motor Vehicle Inspection
2. Motor Vehicle Registration
3. Motorcycle Safety
4. Driver Education
5. Driver Licensing
6. Codes and Laws
7. Traffic Courts
8. Alcohol in Relation to Highway Safety
9. Identification and Surveillance of Accident Locations
10. Traffic Records
11. Emergency Medical Services
12. Highway Design, Construction, and Maintenance
13. Traffic Control Devices
14. Pedestrian Safety
15. Police Traffic Services
16. Debris Hazard Control and Cleanup
17. Pupil Transportation Safety
18. Accident Investigation and Reporting

The volumes of the Manual supplement the Highway Safety Program Standards and present additional information to assist State and local agencies in implementing their highway safety programs.

The content of the volumes is based on the best knowledge currently available. As research and operating experience provide new insights and information, the Manual will be updated.

The volumes of the Highway Safety Program Manual deal with preferred highway safety practice and in no way commit the Department of Transportation to funding any particular program or project.

Many expert organizations and individuals at all levels of government and in the private sector contributed heavily in the preparation of the volumes of the Manual. The Department appreciates greatly this help in furthering the national program for improving highway safety for all Americans.

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III. Specific Objectives

I. INTRODUCTION

Four classes of information, most of which is amenable to routine collection at State or local levels, comprise the data base for all aspects of a coordinated Federal, State and local traffic safety program: (a) data pertaining to drivers, their licensing, violation records, and financial responsibility, (b) vehicle data such as make, model, and serial number, (c) highway data on a milepost basis on bridges, structures, tangents, curves, intersections, and traffic control devices, and (d) collision data linked to the involved drivers, vehicles, and highway locations.

The Traffic Records Program deals with all aspects of this information base. Its fundamental importance to the entire highway safety effort is emphasized in House of Representatives Report No. 1700:

> ". . . . Uniform, complete, and accurate accident reports, stored in one center in every State, subject to rapid retrieval and analysis, and compatible with a national record system at the Federal level, can tell us not only how many accidents we have, but what kind of accidents they are, where and when they occur, their physical circumstances and the people, injuries, death and damage they involve, what emergency services and enforcement agencies responded and how, and what judicial actions resulted, to mention only the most obvious possibilities.*

*H. Rept. 1700, 89th Congress, 2d Session, pp. 10 and 11.

". . . . No other part of the State program is as basic to ultimate success, nor as demanding of complete cooperation at every jurisdictional level . . . ."*

II. PURPOSE

The purpose of the Traffic Records Program is to assure that appropriate data on traffic accidents, drivers, motor vehicles, and roadways are available for planning and implementing at State and local levels safety improvements in the motor vehicle transportation system of the State and its local jurisdictions.**

III. SPECIFIC OBJECTIVES

A. The specific objectives of a State records program should be directed to:

1. Upgrading all aspects of the accident and corollary information system, starting with the collection of raw data, followed by its encoding, storage, retrieval, analysis, and ultimate dissemination to users.

2. Assuring compatibility without duplication among the data systems of agencies at the State level responsible for different functional program areas in highway safety (e.g., driver licensing, motor vehicle registration), and between local data systems.

3. Assuring that adequate and accurate information for reliable statistical analyses are available to assist State and local officials in safety program planning, prioritization, implementation, and program evaluation.

B. As stated in an introduction to the Standard, objectives of the program are:

"To assure that appropriate data on traffic accidents, drivers, motor vehicles, and roadways are available to provide:

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*H. Rept. 1700, 89th Congress, 2d Session, pp. 10 and 11.
**For the definition of "motor vehicle transportation system" as used in this volume, see Appendix B.

a. A reliable indication of the magnitude and nature of the highway traffic accident problem on a national, State, and local scale.

b. A reliable means for identifying short-term changes and long-term trends in the magnitude and nature of traffic accidents.

c. A valid basis for:

(1) The detection of high or potentially high accident locations and causes.

(2) The detection of health, behavioral, and related factors contributing to accident causation.

(3) The design of accident, fatality, and injury countermeasures.

(4) Developing means for evaluating the cost effectiveness of these measures.

(5) The planning and implementation of selected enforcement and other operational programs.

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Chapter 4 of Title 23, United States Code (hereinafter referred to as the Highway Safety Act of 1966) states in Section 402(a):

> ". . . In addition such uniform standards shall include, but not be limited to, provisions for an effective record system of accidents (including injuries and deaths resulting therefrom). . ."

In accordance with Title 23, the Department of Transportation issued Program Standard 10, Traffic Records, which is contained in Appendix A.

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II. Specific Policies

I. GENERAL POLICY

The general policy of the Department of Transportation is to support the development within each State of a modern, efficient traffic records system that meets State and local safety data needs.

The effort at the national level is to be directed largely to upgrading State systems and assuring interstate compatibility to facilitate interstate comparisons and the aggregation of data at the national level.

II. SPECIFIC POLICIES

This general policy at the national level leads to certain State program policies, such as:

A. Central policy and operational responsibility in planning the development of traffic records systems within each State is preferred to divided responsibilities among the various user agencies at State and local levels.

B. Compatibility in traffic records systems requirements among all agencies within each State at State and local levels should be a fundamental goal.

C. States should cooperate with each other and exchange information to assist in the implementation of the national policy.

D. Each State should eliminate duplicative data files among different user agencies by encouraging use of and access to common data banks.

E. Each State should establish equitable procedures for reimbursing or otherwise providing services in kind to local jurisdictions that are requested to provide information for Statewide statistical totals.

F. Traffic records systems should be planned with sufficient flexibility to incorporate changes in equipment, procedures, or content without major redesign.

G. Each State should establish priorities for the acquisition or lease of expensive computers and associated data handling equipment, with careful attention to its economies of scale and the cost/benefit consideration of whether it can afford the price of higher levels of service.

H. Each State should have a traffic records system that will aid in reducing the on-scene data collection responsibilities of the enforcement officer through increased use of off-scene data sources, such as driver licensing and motor vehicle registration files.

I. Each State should have a traffic records system that will aid in ensuring that the public highways and streets are being used legally by qualified drivers and vehicles.

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I. DEFINITION OF A TRAFFIC RECORDS SYSTEM

A traffic records system is the personnel, equipment, facilities, information, and procedures necessary to correlate collision data with vehicle, driver, and/or highway data to:

A. Identify primary causative factors of highway collisions.*

B. Identify significant trends in highway collisions and their causes.

C. Evaluate new programs or techniques for the prevention of highway collisions.

D. Determine those areas where further emphasis, research, and development are required to reduce highway fatalities, injuries, and damages.

II. TRAFFIC RECORDS SYSTEM CONCEPT

A. A State must organize into a coherent total system the relevant data inputs and outputs from a number of operating agencies at the State level as well as local jurisdictions. The agency that

*See Appendix H for a discussion of causative factors of highway collisions.

is the "supplier" into the "system" of some item of information for one purpose might be the user of another item of information supplied to the "system" by some other agency.

B. Contributors as well as users of traffic records systems include many different local, State, national, and private groups. The following is a partial list of areas of interest to the groups which provide and use traffic records data:

1. Law enforcement.
2. Driver and vehicle licensing.
3. Highway engineering.
4. Traffic engineering.
5. Vehicle engineering and manufacturing.
6. Driver education.
7. Motor vehicle inspection.
8. Public health.
9. Commercial fleet operations.
10. Legislation.
11. Insurance.
12. Legal/judicial/court.

C. In addition to the data inputs from a multiplicity of operating State and local agencies, each with its own functional objective, mode of operation, and jurisdiction, the Statewide traffic records system must provide for bringing all of the diverse inputs into mutual compatibility. It also must provide for the necessary outputs required by the user groups.

D. Exhibit I depicts the relationship of the traffic records system to the four major data bases.

E. Critical to the success in building a Traffic Records System is the requirement that each data base provide an identification

element which will be the medium for linkage. The accident identification data to be collected, stored and retrieved must include identical identification that is contained in the driver, vehicle, highway and other data bases. Specifically, linkable files must contain the driver identification (which may be operators' license numbers and/or social security numbers, human identification elements, or combination of these); vehicle identification number (VIN) and vehicle descriptive data; roadway identifiers and location descriptors; and accident descriptors.

F. For detail procedures concerning the development of a State Traffic Records System, including system concepts, subsystems, data elements and codes, the NHTSA Design Manual for State Traffic Records Systems is recommended. The Manual was created specifically to assist State personnel who manage traffic safety programs and develop statewide traffic records systems to support these programs. It provides the recommended content and operational concepts for a comprehensive traffic records system incorporating a totally integrated data base which addresses the many traffic safety program areas. The Manual contains two volumes: Volume I contains a complete description of the concepts, organization and operation of an integrated traffic records system. The data base structure for the integrated traffic records system is comprised of eight data subsystems. Detail data content of these subsystems are described in Volume II. Each of these data systems is oriented toward a functional area of the total highway traffic safety program. Often these several functional areas are administered by, or are the responsibility of different agencies within the State and local governments. To facilitate the use of this Manual by the various separate agencies and by traffic records program analysts responsible for implementation and/or maintenance of individual data subsystems, the sections describing each of the subsystems have been produced as separate documents. The documents comprising Volume II include:

Section 1 - Driver Data Subsystems
Section 2 - Vehicle Data Subsystems
Section 3 - Roadway Environmental Data Subsystem
Section 4 - Accident Data Subsystem
Section 5 - Emergency Services Data Subsystem
Section 6 - Traffic Law Enforcement and Adjudication Data Subsystem
Section 7 - Educational Services Data Subsystem
Section 8 - Safety Program Management Data Subsystem

These publications are available for purchase from the Superintendent of Documents, Government Printing Office, Washington, D.C. Detailed information concerning the current edition and prices will be announced periodically.

III. STATE TRAFFIC RECORDS COMMITTEE

A. As an initial step, each State should form a permanent traffic records committee, unless a State organization with comparable membership and responsibilities is already in existence. The committee should be capable of providing both administrative and technical guidance to the State for:

1. Adopting the requirements of the Traffic Records Standard.

2. The assessment of present capabilities, resources, and constraints.

3. Establishing the goals of the State traffic records system.

4. Establishing the State traffic records agency.

5. Evaluating the traffic records system.

6. Reporting progress to the Governor's Representative/ Program Manager and the National Highway Traffic Safety Administration (NHTSA).

7. Developing, on a continuing basis, local and private participation, cooperation, and support.

8. Assuring that records will be available only to authorized persons and used for authorized purposes.

B. Administrative and technical responsibility in the following areas should be represented on the committee:

1. Law enforcement.

2. Motor vehicle inspection.

3. Driver and vehicle licensing.

4. Highway engineering.

5. Traffic engineering.

6. Driver education.

7. Legal/judicial/court.

8. Public health and medical.

C. There should be a permanent staff to carry out the directives of the committee as the result of its periodic meetings and to conduct later evaluation assignments.

D. The committee should be assisted by an interdisciplinary team of management, systems, and highway safety experts in planning and implementing a traffic records system.

E. The committee should report to the Governor's Representative/ Program Manager.

IV. PROGRAM ADMINISTRATION

A. Traffic Records Agency

1. Each State should identify the agency having primary responsibilities for the functions, effective management, and coordination of the traffic records system. Procedures should be established to ensure coordination, cooperation and exchange of information among State and local agencies that are information areas or that have management information responsibilities.

2. Statewide uniform procedures for the definition, classification, analysis, interpretation and use of traffic records data should be established. The State Traffic Records Agency, through the traffic records committee, should establish uniform procedures for the collection and entry of data into the systems, including:

   a. Use of uniform source documents.

   b. Use of standard data elements, definitions, classifications, and codes.

   c. Use of Standard identification and common descriptive elements to ensure the integration of all subsystems.

3. Policies should be developed and implemented to ensure timely transmission and entry of data to the records systems of:

   a. Driver and vehicle data.

   b. Traffic law enforcement and adjudication (convictions)

   c. Police, driver/owner crash reports.

   d. Other data as required such as Emergency Medical Services and Driver Education.

B. Traffic Records Personnel

1. There should be full-time personnel employed by State and local agencies to develop and administer the traffic records program.

2. Some States have centralized the traffic records system under a single operating agency. Others use an approach of coordinating and interfacing the separate records systems of the various agencies. The design of the State system is determined by that State. Effective administration of a Statewide traffic records program requires a professional staff of traffic records systems analysts for both centralized and decentralized distributed concepts. They may be employed by the centralized records agency in States where they exist or perhaps by the Highway Safety Coordinator's office or other appropriate agency in other States. In either situation they are persons with the knowledge, training and experience to operate or coordinate the system so as to provide complete, accurate, consistent and understandable information on a timely basis to all users of traffic records.

3. Organizational Structure of Statewide Traffic Records Program

   a. Traffic records organizational structure is depicted as Exhibit II.

4. Traffic Records Coordinator (Systems Analyst) - There should be a traffic records systems analyst on the staff of the highway safety coordinator, central traffic records

agency, or other appropriate agency wherever applicable. He should be assisted by an analysis group capable of establishing a coordinated traffic records system designed to provide planning, management and functional use of traffic records. A sample job description appears as Exhibit III.

5. Traffic Records Program Analysts - Because of the involvement of many State and local agencies in the maintenance of traffic records, the personnel designated or functioning as traffic records program analysts may exist in a number of agencies. The specific functional responsibilities and duties of the various traffic records program analysts differ among the various agencies in a State. The role of a traffic records program analyst within an individual State operating agency is strongly influenced by the organization and operation of the State Traffic Records System. Primary differences will depend on whether the State is operating with a centralized or non-centralized system configuration.

   The role of the traffic records program analyst at the local agency may differ only slightly from that of the analyst at a State operating agency, or it may differ greatly depending upon the nature of the State system and the jurisdictional responsibilities of the local agency. It is possible that a State may implement a traffic records system designed to serve the needs of the local agencies as well as those of State agencies. In the case of cities and large municipalities or counties, the local traffic records system may be fully or partially automated. In this situation the traffic records program analyst is responsible for identification of the data to be contained in the system and its design and operation. He is also required to coordinate with State analysts as to the compatibility with the State system and the processes for information exchange between the local and State system. A sample job description for a traffic records program analyst appears as Exhibit IV.

C. Personnel Training

1. To adequately perform their functions, both the program analysts and the systems analysts must have extensive training in subjects such as computer sciences, applied

mathematics, statistics, operations research, and systems analysis. They also must be familiar with many types or generations of computers and ancillary equipment and be capable of working closely with computer programmers as well as people of various disciplines. Advancement to higher positions requires supervisory, management, and administrative capabilities and training. A baccalaureate degree is a basic requirement and additional training is beneficial to all analysts due to the rapid changes in the electronic data processing field.

2. Analysts should have an understanding of the current and potential uses of traffic records at the national, State, and local levels. Several universities and national professional organizations are identified in Appendix E, Volume 10, Highway Safety Program Manual; Traffic Records.

3. The National Highway Traffic Safety Administration has produced curriculum materials for a training course in traffic records. This training package includes the course planning guide, instructor's lesson plans, and trainee study materials required for a short in-service course to prepare traffic records program analysts. These training publications were correlated with substantive literature on traffic records developed by NHTSA and with other similar sources of information relevant to the subject area. The principal source of course content material was the Design Manual for State Traffic Records Systems. The Course Guide is intended to provide a generalized picture of the Traffic Records Course, to describe the student population for whom it is intended and to guide the course administrators and potential instructors in preparing for its presentation. The Instructor Guide is intended to provide the instructor with a step-by-step presentation of the course content while the Student Guide will assist the student in developing an understanding of the course content.

V. GOALS OF THE STATE TRAFFIC RECORDS SYSTEM

A. A critical step in the development process is to clarify the goals of the State traffic records system. A traffic records system should be thought of as an information-decision system. The principal objective of such a system is to supply information that will assist:

1. Managers of the motor vehicle transportation system such as those in State police, highway, traffic, or motor vehicle departments.

2. Managers of relevant support systems such as those in State education and health organizations.

3. System users, both public and private, in arriving at rational and compatible decisions for the effective performance of the overall motor vehicle transportation system.*

B. In order to supply information for informed decision making, the traffic records system must (at a minimum) be designed to:

1. Provide the required and essential information.

2. Provide inherently accurate information.

3. Provide timely information for decisions.

4. Provide information in usable formats.

C. The information essential to a records system describes the driver, the vehicle, the highway, and the collision. Much information pertaining to the collision is potentially available from off-scene data sources such as motor vehicle and driver licensing agencies and highway departments. Every effort should be made to use information from these sources in order to reduce the demands on the police at the scene of a collision.

D. The volume of data in most States and certain rapid retrieval requirements make electronic information processing an essential goal toward which the States should be working.

VI. ASSESSMENT OF RESOURCES AND CONSTRAINTS

A. The State traffic records committee, assisted by the necessary interdisciplinary staff of management, systems, and highway safety experts, should be responsible for the assessment of the present resources, capabilities, and constraints of the State.

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*Examples of selected decision makers and decision opportunities are included in Appendix G.

B. The committee should develop a plan outlining the resource areas to be evaluated, the survey and evaluation procedures, and a schedule for accomplishing the initial assessment.

C. The results of the evaluation and any recommendations should be made by the committee to the Governor or the Governor's Representative/program manager.

D. The following procedures or steps will be useful for developing an assessment program:

1. Review existing State legislation which will in any way influence the implementation of the traffic records program.

2. Identify present organizations, departments, agencies, etc. (both State and local) that will be part of the State traffic records system.

3. Identify and categorize available personnel, their qualifications, capabilities, salary structures, etc.

4. Identify data files that are available in the present records system.

5. Identify and classify presently available equipment which can be utilized for:

   a. Data collection.

   b. Data input including coding, punching, reading or scanning, verifying, editing, etc.

   c. Data storage.

   d. Data retrieval, including formatting of data for presentation.

   e. Data analyses.

6. Identify and classify available facilities at both State and local levels which need to be combined and/or linked to the traffic records system, including the data files maintained, the type of data, the accuracy of the data, and the volume of data in the files.

7. Determine monetary resources available for the operation of all individual components of the traffic records system.

E. Since the conduct of such an in-depth study requires cooperation at all organizational levels and during all phases, procedures for establishing the necessary degree of participation and interest must be developed early in the evaluation program. Such procedures are essential if resources are to be increased and system limitations removed or reduced.

VII. DEVELOPMENT OF A SYSTEMS PLAN

A. A systems plan should relate the goals of the records system to available resources in each State. Priorities and resource allocations should be clearly established. In addition, the plan should contain recommendations or procedures for reducing or eliminating present and potential constraining factors relative to the establishment of a State traffic records system.

B. The implementation plan should consider:

1. The identification of all components of the proposed State traffic records system.

2. Administrative and procedural steps necessary for establishing the proposed system based on resources available.

3. Identification of the priorities and performance specifications for each program area in the traffic records system.

4. A proposed schedule and future resource requirements for implementing the plan.

5. Procedures for incorporating future resources, new technology, and research findings.

6. Proposed procedures for periodic reevaluation of the initial plan.

7. Procedures for maintaining and increasing public and private support for the effective functioning of the State traffic records system.

C. A framework for developing a useful plan for implementing the traffic records program should provide for identification of:

1. All users of the records system, including originators and receivers of information and their corresponding uses of information.

2. Specific information items required by users and the types of decisions for which these data are relevant.

3. Data retrieval procedures required for handling inquiry and processing.

4. Data correlation and summation procedures to be used in providing meaningful analysis for system users.

5. Controls necessary for monitoring the flow of data to ensure that no relevant information is lost or changed, or that no other information is added unnecessarily during transmission, processing, storage, etc. In addition, control procedures should be instituted to alleviate "bottlenecks" and eliminate unnecessarily redundant operations.

D. Any changeover requires detailed planning. In order to be effective, the implementation plan should include detailed procedures for facilitating the Statewide phasing-out and phasing-in of various components of the traffic records system.

E. Personnel will be a key element for the effective functioning of the traffic records system; therefore, competitive salaries and training should be provided. Of particular importance are the training and capabilities of accident investigators and other specialists required for manning the information processing systems.

F. The accuracy and completeness of input data should be given special consideration in the design of data collection systems. This aspect of the system development effort should be given special consideration.

1. Data relevant to the collision investigation can be collected at the scene and from off-scene sources. Every effort should be made to limit the data collection responsibilities

of the investigating officer. The officer generally has a variety of other responsibilites at the scene, such as the administering of first aid and facilitating the resumption of normal traffic flow. If needed data are available both on- and off-scene, off-scene sources, such as motor vehicle registration and driver licensing records, should be used whenever feasible.*

2. The use of a uniform collision investigation form within each State will increase data usefulness by facilitating the combination of data collected from different levels of government.

3. In addition to the use of a uniform collision investigation form, uniform investigation procedures within each State are essential for data uniformity.** Training and supervision in the use of the forms and manual are necessary to ensure complete and valid traffic collision investigation. The training of investigation personnel, as recommended by the Police Traffic Services Standard, is a prerequisite to the use of investigation forms and manuals.

4. The use of other aids for data collection, such as mark-sense forms, credit-card type driver licenses, and scannable report forms, should be explored. For example, automated cameras, which require a minimum of skill in their use, should become part of the investigation of selected fatal and personal injury collisions.

5. The uniformity of the data collection process can be facilitated by establishing uniform criteria for the reporting and investigation of traffic collisions. Any operator involved should be required to promptly report to the nearest and most convenient police station or officer those collisions involving:

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*Potentially useful data and their off-scene sources are listed in Appendix F.

**An investigation manual, A Traffic Collision Management and Investigation Manual to Accompany the Standard Police Traffic Collision Report, is listed in Appendix C of this volume.

a. A fatality.

b. A personal injury.

c. Damage to the vehicle to the extent that it cannot be driven from the scene under its own power, in its customary manner, without further damage or hazard to itself, other traffic elements, or the roadway and, therefore, requires towing.

6. The uniformity of the data collection process can be facilitated by the use of the most current edition of the Manual on Classification of Motor Vehicle Traffic Accidents.

7. Although some States may have considered or established procedures for transferring information directly from the investigation form to the processing equipment, much of the data will still need to be coded, transcribed, and verified. The use of a uniform manual within each State, in this case a data encoding manual, can facilitate system uniformity.

8. Procedures for editing source data for invalid or inconsistent data entries should be developed.

G. Traffic records usage output reports required from the records system will vary due to the diversity of users and their respective information needs. Two catagories of output should be provided by the system.

1. Routine and repetitive types of reports with specified format requirements.

2. Special inquiries (e.g., information needed for research or for intermittent monitoring of specific programs).

3. There are many output reports critical to the success of highway safety programs. They are generated from an effective Statewide Traffic Records Program. Some reports assist in planning programs, some are directly operational, and others serve as evaluating tools. In addition to the operational programs, such as determining driver and/or vehicle status for traffic law enforcement, a number of reports should be available routinely for a variety of users.

4. To emphasize the importance of designing Traffic Records Systems around the user concept, Exhibit V represents an example of outputs derived from comparative analyses of driver, vehicle, highway, and accident data to traffic safety program managers on a routine or periodic basis. These outputs are listed by Highway Safety Program Standard order for emphasis only. They are not to be construed as benefitting only the Standard area as given. Most influence the broad spectrum of highway traffic safety programs.

H. The traffic records system should be reliable and may require backup system components or procedures which can be readily placed on-line.

I. Procedures for periodically updating the files of the system should be clearly specified.

J. Retention periods for each file type should be determined and procedures for purging should be established.

K. A method of periodically upgrading the records system should be provided to respond to changes in the:

1. System goals and objectives.

2. Nature and magnitude of the traffic safety problem.

3. State of technology, notably in characteristics of automatic data processing systems. The system upgrading will be enhanced through the development of system modification plans which specify the estimated system inputs, outputs, storage, manpower, equipment, costs, etc., for one, three, and five-year intervals. These plans should then be reviewed and updated periodically.

L. Systems Description Documentation

1. The plan should include a traffic records systems description. It should provide a broad view of the entire system and should be supported by a flow chart which establishes parameters for the system and serves to introduce the more detailed system description.

2. Data Elements Standards Statement - A statement indicating whether or not the minimal data elements as prescribed or needed to support planning, management and evaluation functions in the Highway Safety Program have been included or planned as part of the State's system.

3. Input - Identify and describe the input data (reports, forms, origin points), the media in which received, quantitative volume and frequency.

4. Software Standard Documentation - For each system, subsystem, file and/or data base, describe the maintenance procedure, major interval data processing operations, and the files physical and logical characteristics. Attached as Appendix D is the March 1, 1972 version of Federal Information Processing Standards Publication 20, Guidelines For Describing Information Interchange Formats. These guidelines are intended as a reference only and are recommended for general use as a check list for preparing effective documentation of formatted information interchange.

M. Special Studies and Data Sampling

1. To measure the populations of drivers, vehicles, highway features and accidents; detect their hazardous attributes and evaluate the effectiveness of applied countermeasures, sampling procedures should be developed by the State Traffic Records Coordinator.

2. Special files consisting of linkable new data or data from existing driver, vehicle, roadway and accident files should be created to serve special research as base for evaluation of specific countermeasures programs. An example of this type of file is a Fatality Analysis File which would be created yearly/monthly and contain records of all driver, occupant and pedestrian traffic accident deaths within the State. Some major purposes of the file would be to provide data concerning the blood alcohol content of those fatalities, motor vehicle defects, and driver behavioral influences. Data can be drawn from such sources as autopsy reports of the deceased, State accident reports, driver history records, files of roadway characteristics and motor vehicle registrations records. This same format could be used to sample other populations of accidents with cause of death

and autopsy information being notable exceptions. Otherwise the structure of the system would remain intact.

3. Special studies should be undertaken to determine driver and vehicle exposure to properly relate other basic traffic records data on drivers, vehicles and roadways to specific highway safety programs and resultant evaluations.

4. In-depth Accident Investigation data collection, storage and analysis should provide the basis for program development and evaluation of countermeasures.

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CHAPTER V. PROGRAM EVALUATION	March 1975

Par. I. Introduction
II. Purpose of Evaluation
III. Organizational Responsibility
IV. Criteria for Evaluating System Effectiveness
V. Evaluation Feedback

I. INTRODUCTION

The Traffic Records Standard states that:

> "The program shall be periodically evaluated by the State and that the NHTSA shall be provided with an evaluation summary."

II. PURPOSE OF EVALUATION

The purpose of program evaluation is to measure the extent to which the goals of the traffic records system are being met and to determine those aspects of the program which require additional emphasis and management attention.

III. ORGANIZATIONAL RESPONSIBILITY

The traffic records committee, reporting directly to the Governor or the Governor's Representative/program manager, should:

A. Be responsible for periodically evaluating the State's traffic records system.

B. Institute an ongoing evaluation program to monitor the development and implementation of the system, level of performance, and system responsiveness to the needs of the users.

IV. CRITERIA FOR EVALUATING SYSTEM EFFECTIVENESS

The effectiveness of the traffic records program is its ability to produce the information needed to support decisions for effective management of the total traffic safety program.

A. In developing criteria for assessing the effectiveness of the State program, the goals of the traffic records program must be related to the information produced to support the decisions and programs related to highway safety.

B. Final decisions on system components or system alternatives should be based on both cost and level of effectiveness anticipated or achieved.

C. Suggested questions for use in evaluating a traffic records system are:

1. Source data collection.

   a. What data are collected from what sources(s)? By whom?

   b. Can identical information be obtained from other sources as reliably and accurately at equal or less cost?

   c. Are the source data formats useful primarily to the collector, or the ultimate receiver(s), or both?

   d. Are specific data elements identical when obtained in different formats?

   e. Can the source data required be collected with available resources?

   f. Can the data be objectively and reliably collected by existing means?

   g. Are the data accurate?

   h. Can the data be collected in required time periods?

2. File updating.

a. Have procedures been established for controlling the accuracy of the data? What kind?

b. Are backup systems available? How quickly? How often have they been required for what period of time?

c. How long does it take to preprocess or enter specified data into the file? What are maximum volume limits?

3. Information storage.

a. Are the data stored in a sequence which permits rapid and flexible inquiries?

b. Are the data stored in hard copy in manual files or are they on card, disc, tape, or some combination? Are duplicate files required? Are they compatible? How much do they cost to maintain?

c. If presently in a manual file, when will an automatic data processing system be implemented?

d. Have future volume requirements by type of data been estimated? Are present storage capacities adequate?

e. Are duplicate files being maintained for added system flexibility?

f. For what periods of time are specific data stored?

g. Relative to the specific data records, has the cost of storing these records been substantiated in relation to the need for the data?

h. How often are files purged?

4. Information retrieval.

a. Are information retrieval processes sufficiently flexible to respond to both routine and special (possible one-time) inquiries?

b. Are adequate retrieval processes available for multiple storage systems? Are all required data rapidly accessible? What are the service times for various inquiries? What are the accompanying retrieval costs?

c. Are certain data uniquely formatted? What range of different formats are required by users?

d. Are verification procedures being used?

5. Information use.

a. Is the required and essential information presented to and used by decision makers who can review and modify the performance of the motor vehicle transportation system?

b. Are the data timely for decision making purposes?

c. Can the data formats, tabulations, etc., be interpreted differently by different people? If so, can guidance be furnished so that interpretations will be identical? At what cost?

D. Effectiveness Measures

Previously issued guidance stressed measurements of operational goals and objectives of the Traffic Records System. The true effectiveness of traffic records is measured by the content and capability of the system to serve highway safety program managers. The expenditure of funds for traffic records programs cannot be directly related to the reduction in automobile crashes involving fatalities, injuries, and property damage. Proxy, volume and/or coverage measures will serve as indicators of the effectiveness of the Traffic Records Program.

E. Proxy, Volume, and Coverage Measures

Listed below are several representative measures that indicate degrees of effectiveness of a Statewide Traffic Records System.

1. Percent of accidents reported and entered into the Statewide System.

2. Percent of driver convictions, suspensions, and revocations reported and entered into the State Traffic Records System.

3. Percent of all highways (State and local; urban and rural) with completed inventory data of physical and operating characteristics (geometrics, traffic characteristics such as patterns, flow and ADT's; traffic control devices, lighting) that permit accurate analyses of accidents as related to highway features.

4. Percent of registered vehicles with recorded vehicle crash, stolen or abandoned history and motor vehicle inspection defects included in the vehicle data base.

5. Accident data base able to reference the additional data in the driver, vehicle, and highway files either by linkages which are completed only for a given inquiry or by adding the driver, vehicle, and highway information to the consolidated accident record at regular intervals.

6. Percent of State and local law enforcement agencies furnished rapid (on-line) response to requests for driver and vehicle status.

7. Percent of local political subdivisions receiving high accident location reports for enforcement and engineering corrective programs from the State Traffic Records System or from their own Traffic Records System.

8. Availability of high accident location reports for enforcement and engineering programs for State agencies.

9. Availability to highway safety program managers of routine or periodic reports that provide summary listings, cross tabulations, trend analyses, and other statistical treatments of all appropriate combinations and aggregations of data items of driver files, vehicle files, highway files, and accident files for the planning, operation, and evaluation of their particular program responsibility. Exhibit V, of Highway Safety Program Manual Volume 10, Traffic Records provides a general listing by Standard area which could serve as a benchmark of the effectiveness of the traffic records program.

V. EVALUATION FEEDBACK

As part of the evaluation process, the State traffic records agency should report significant activities, trends, conclusions, etc., to the agencies within the traffic records system. This feedback of information should:

A. Increase the acceptance of the traffic records system concept by the agencies within the system.

B. Aid decision making at all levels by informing decision makers of the goals and accomplishments of the traffic records system.

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

HIGHWAY SAFETY PROGRAM MANUAL

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CHAPTER VI. REPORTS	March 1975

I. PURPOSE OF REPORTS

Reports should be produced to provide management of the traffic records system with the information needed to:

A. Ensure the efficient functioning of the system, and that it is being used fully and effectively.

B. Periodically evaluate the system.

C. Facilitate planning for updating or expanding the system.

II. MANAGEMENT INFORMATION REPORTS

A. The traffic records agency should require reports from the agencies responsible for the various functional areas within the system:

1. Each agency within a functional area of data collection should report on its ability to enter source data into the system by the fastest, most efficient, and most accurate means possible. A typical report from such a unit would include:

a. Volume of input by type.

b. Manpower available.

c. Estimated overstaffing or understaffing.

d. Machine utilization problems (if any) encountered.

e. Typical service time (time for entry into system).

f. Changes in data format or coding schedules.

g. Future plans.

2. Each agency within a functional area of summarization and correlation of data should report on its ability to produce accurate, readable, and timely output. A typical report would include:

a. Brief descriptions of outputs, including frequencies for regular reports or approximate number of occurrences for inquiries and special reports.

b. Manpower available.

c. Estimated overstaffing or understaffing.

d. Machine utilization.

e. Problems encountered (solutions either in use or suggested should be stated).

f. Suggestions received from users of traffic records data.

g. Service time for given users of traffic records data.

h. Future plans.

B. The traffic records agency should require from each user of information provided by the traffic records system a report of their utilization as well as suggested improvements to the service provided to them by the system. Included in a typical report would be:

1. Types of reports received.

2. Frequency of reports.

3. Suggested improvements in present report format or content.

4. Suggested new reports.

5. Statement of utilization for each output, i.e., what the report was used for.

6. Problems encountered.

III. PROGRAM EVALUATION REPORTS

A. The traffic records agency should produce an annual general evaluation of the traffic records system, using the reports described in Chapter VI, paragraph II, as the major references.

B. This report should outline:

1. The existing traffic records system, highlighting problems, solutions, and changes since the previous report.

2. Those functional areas to which immediate resources should be committed for the improvement of the system.

3. How the present system and proposed changes are inherent parts of a plan to achieve the long-range goals of the traffic records system.

IV. REPORTS OF THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

A. The NHTSA intends to request the submission of certain information about the traffic records programs in each State in order to:

1. Facilitate the exchange of information between Federal, State, and local agencies.

2. Develop future highway and motor vehicle safety standards.

3. Provide a foundation for meaningful analysis and research.

4. Satisfy reporting requirements established by law.

B. The NHTSA intends to ask for submission of the annual general evaluation report, discussed in paragraph III above, on an annual basis.

C. To provide a basis for research into the causative factors of collisions, the NHTSA recognizes the need to acquire certain collision records.

1. Summary reports. To build an initial data base quickly with a minimum of expense, the NHTSA requested each State to provide copies of periodic accident summaries.

2. Sample data/special reports. From time to time, the NHTSA intends to ask the States for data on specific collision elements, such as:

   a. Type of vehicle involved.

   b. Roadway or environmental conditions.

   c. Use of safety equipment.

   d. Crashes associated with pursuit by law enforcement agencies.

   e. Fatal collision reports.

3. Data analysis and evaluation reports. On an annual basis, NHTSA intends to ask the States for data analysis and evaluation reports from the traffic records system. Exhibit V, of Highway Safety Program Manual, Volume 10, Traffic Records, provides an example of the types of reports desired. Other program information relatable to traffic records will also be requested from time to time.

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CHAPTER VII. - LOCAL GOVERNMENT PARTICIPATION	March 1975

I. INTRODUCTION

Since the responsibility for the safe operation of a major portion of the nation's roadways is in the hands of local government, the highway safety standards issued by the Federal Government and transmitted to the States ultimately are applied, to a great extent, at the local level. Local agencies, through participation in a State traffic records program, should experience an improved understanding of their highway safety problems by studying the problems and solutions of other communities in the State.

II. LOCAL ORGANIZATIONS, AGENCIES, PERSONNEL

Any local organizations or their respective personnel, having either responsibility for or need of traffic records information, should participate in the development and operations of the State traffic records system. These include, but are not necessarily limited to, the following:

A. County highway departments.

B. County coroners.

C. County sheriffs.

D. Circuit courts.

E. City police departments.

F. City traffic engineers.

G. City transit authorities.

H. City managers.

I. City planners.

J. Public works departments.

K. Hospital administrators and other medical personnel.

L. Boards of education.

M. Traffic safety commissions and bureaus.

III. LOCAL PARTICIPATION IN TRAFFIC RECORDS DEVELOPMENT

A. Representatives from relevant local agencies should be appointed to serve on the traffic records committee for the initial study of the system and for subsequent evaluation functions.

B. While participating in the system development phase, local agencies should specify:

1. In detail, their traffic records data needs, including:

   a. Data that are required for local purposes and programs.

   b. Report formats for each agency and/or program.

   c. Report frequency.

   d. Report quantities.

   e. Data or report transmission procedures.

2. The services to be expected from the State traffic records system, including routine services such as regular reports characterizing the collision experience in the community with comparisons to adjacent and comparable local communities, and expected types of specialized services.

C. Since portions of the State traffic records system will depend upon full local participation and cooperation, especially in the

area of data input to the State system, it is clear that in the system development phase local agencies should identify present available resources and capabilities. This should include:

1. A review of relevant legislation and executive orders or directives of respective departments which would influence the functioning of the traffic records system, as well as a description of how the functioning of the records system would be affected by such actions.

2. An identification of all local agencies that presently provide and require specific types of traffic data. This should include, but not be limited to, an exact description of each agency and its function, its corresponding data needs, and its data input to the records system.

3. A report on the ability of each local agency to handle the present and anticipated volumes of data, including the number and types of personnel engaged in data collection, processing, storage, dissemination, etc., as well as their qualifications, specifying education/training, experience, etc. In addition, the report should indicate:

   a. The various equipment and procedures required for these functions, together with the necessary costing information.

   b. The ability of the local agencies to conform to the Standard.

IV. LOCAL PARTICIPATION IN TRAFFIC RECORDS OPERATIONS

A. To effectively coordinate the operation of the State traffic records system, the State traffic records agency should periodically review the operation of local organizations supplying and using traffic records data. Suggested review topics and questions are discussed in Chapters V and VI.

B. The State traffic records system will be continually reviewed and refined to include:

1. Improvements in data handling equipment, training methods, etc.

2. New users and uses of traffic records data.

C. The local agencies involved in the traffic records system should therefore be informed of:

1. Technological advances in the methods and equipment used for data handling.

2. The quantity and quality of local labor pools from which personnel could be recruited.

3. Possible additional suppliers, users, or uses of traffic records data.

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CHAPTER VIII. - APPROVAL CRITERIA FOR 402 TRAFFIC RECORDS SUBELEMENT PLANS	March 1975

Par. I. Introduction
II. Activities and Functions Eligible For 402 Funding
III. Funding Limitations

I. INTRODUCTION

These criteria will be used by NHTSA personnel in evaluating the Traffic Records Subelement Plans of the State Annual Work Programs.

II. ACTIVITIES AND FUNCTIONS ELIBIGLE FOR 402 FUNDING

A. Staff Costs - To provide proper administration, supervision, and coordination of a Statewide traffic records system, there should be adequate staff of qualified personnel to plan, develop, research, and operate the system. Traffic records personnel necessary to the system and eligible for funding are:

1. Traffic Records Committee.
2. Traffic Records Coordinator (Systems Analyst).
3. Traffic Records Program Analyst.
4. Programmers and Machine Operators.
5. Analysis group including research analysts, statisticians, mathematicians, etc.
6. Records classifiers and coders.
7. Clerical support.

B. Training Costs - Training programs should be developed for traffic records personnel in the classification, analysis, interpretation, and use of traffic record data.

Specialized training in systems design, programming, and machine operations may be offered to traffic records personnel.

C. Systems Design and Development Costs - The following activities represent some specific functions that should be included in the systems design, development and implementation of a traffic records plan:

1. Statewide Traffic Records Study and Plan.

2. Traffic Records Systems Design Subsystems.

   a. Driver.

   b. Roadway environment.

   c. Accident.

   d. Vehicle.

   e. Special files including Fatality Analysis File, driver and vehicle exposure studies, and other case data on a sampling basis.

   f. Highway safety management data.

   g. Educational services.

   h. Traffic law enforcement and adjudication.

   i. Emergency services.

3. Implementation and Operations.

   a. Data collection and conversion.

   b. Software development.

   c. Programming.

   d. File maintenance and operations.

D. Data Processing Equipment Costs.

1. Facilities Development.

2. Computer and Communication Capability Development.

a. Data collection conversion equipment.

b. Computer hardware.

c. Communications line rental.

d. Communications terminals.

e. Other appropriate equipment.

III. FUNDING LIMITATIONS

A. Federal funds will be used to fund only that portion of State information and data systems that are directly relatable to traffic records and highway traffic safety. Methods of factoring costs should be developed where computer systems and facilities are not dedicated solely to traffic records and highway traffic safety.

B. Computer hardware, peripheral equipment, and associated computer service support facilities will be required of each component for the processing of data files. These services and facilities and their requirement will vary from State to State depending on needs and capabilities. Federal funding of computer hardware and peripheral equipment will be limited to:

1. Lease/rental agreements - not to exceed three years.

2. Outright purchase - Federal funding toward the purchase price cannot exceed the lease/rental costs specified in 1 above.

EXHIBIT I

OPERATING PROGRAM ENVIRONMENT

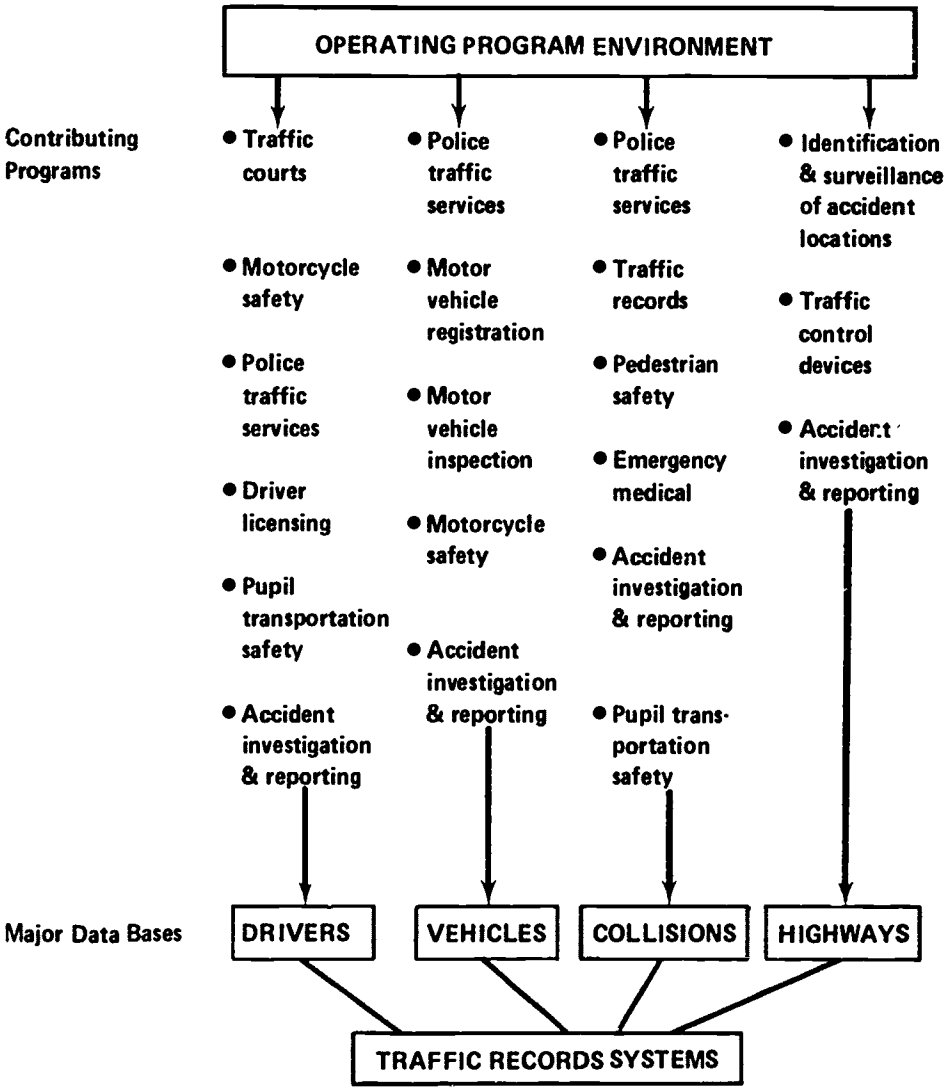

EXHIBIT II

ORGANIZATIONAL STRUCTURE OF STATEWIDE TRAFFIC RECORDS PROGRAM

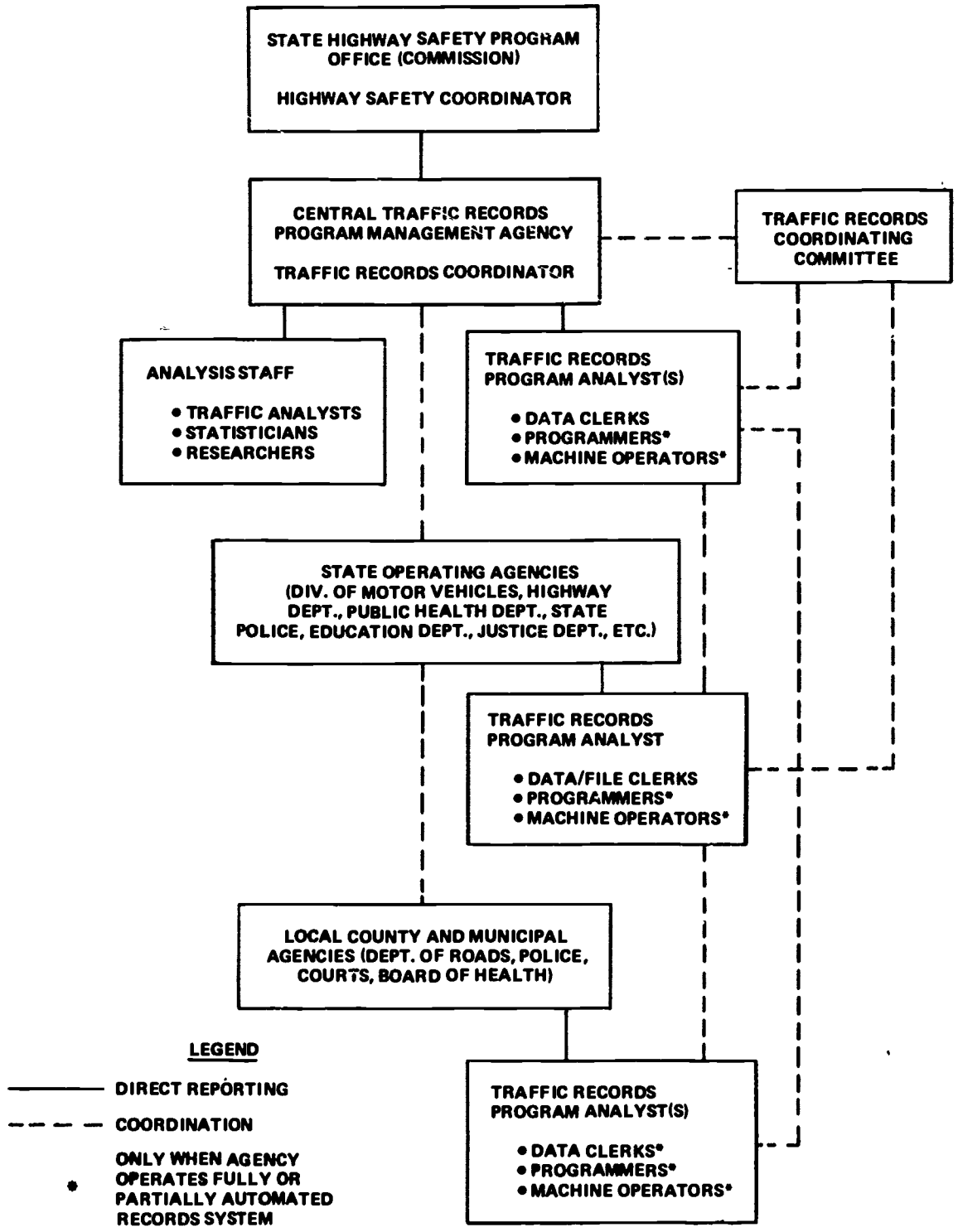

EXHIBIT III

TRAFFIC RECORDS COORDINATOR
(TRAFFIC RECORDS SYSTEMS ANALYST)

JOB DESCRIPTION

Plans, coordinates, operates, and/or directs the overall traffic records system of a State.

NATURE OF THE WORK

The nature of the work of the traffic records systems analyst requires him to:

1. Identify all of the components of the State traffic records system;

2. Develop an overall plan for the traffic records system in a State based upon defined goals and available resources, an implementation schedule, and an estimate of the future resources required;

3. Develop compatibility among the components of the system in data formats, software, and hardware;

4. Work with personnel of local and other State agencies in the determination of hardware requirements and the design of their data processing systems;

5. Monitor system operation to increase efficiency, maintain accuracy, and assure that the data needs of all users are being met;

6. Coordinate the traffic records system with other data processing operations of the State;

7. Coordinate the State's system with the national system;

8. Work with personnel of other agencies to improve and develop new methods of planning, operating, and evaluating traffic safety programs of the agency including:

EXHIBIT III (Cont)

TRAFFIC RECORDS COORDINATOR
(TRAFFIC RECORDS SYSTEMS ANALYST)

a. The identification of problem drivers for corrective action by administrative and enforcement officials;

b. The rapid identification of drivers whose license have been denied or withdrawn to aid license control programs and enforcement, administrative, and judicial actions involving these drivers;

c. The identification of high or potentially high accident locations for corrective action by engineering and enforcement agencies and other governmental units;

d. Determination of deficient highway elements to provide a guide for improved roadway design;

e. Identification of significant factors of the operational traffic safety problem so police administrators can make an intelligent and effective use of their manpower and facilities;

f. Development of sound traffic laws and administrative policies and regulations;

g. Development of public understanding and support for effective official policies and programs;

h. Development of public safety education programs that are designed for and directed to the specific needs of the many diverse areas and population groups in a State;

i. Development of material related to identified operational problems for use in the education and training of new drivers in school and public safety education.

QUALIFICATIONS

Qualifications for entry into this position vary widely. However, the following are typical minimum requirements:

EXHIBIT III (Cont)

TRAFFIC RECORDS COORDINATOR
(TRAFFIC RECORDS SYSTEMS ANALYST)

1. Bachelor's degree or its equivalent, preferably in administration, computer sciences, or other related areas from an accredited college or university;

2. Graduate or undergraduate courses in computer science, operations research, or systems analysis;

3. Experience in the design and operation of computerized records systems;

4. Knowledge of electronic data processing and associated equipment; and

5. A talent for innovative approaches toward a constant definition of the current and potential uses of traffic records at the national, State, and local levels.

EXHIBIT IV

TRAFFIC RECORDS PROGRAM ANALYST

JOB DESCRIPTION

Develops techniques and procedures to utilize data on drivers, motor vehicles, highways, and traffic accidents for the improvement of highway safety programs.

NATURE OF THE WORK

The Traffic Records Program Analyst, depending upon the centralization of the traffic records system in a State, performs the following tasks for a single agency or for all agencies:

1. Identifies and formally structures the traffic records and safety information requirements of an agency.

2. Reviews, analyzes, evaluates, and revises the operating techniques, procedures, and methods, including:

   a. The input of data into the records system;

   b. The storage and retrieval of data;

   c. The processing of data;

   d. The conversion of existing operations to electronic processing techniques;

   e. The optimization of equipment, programmer and ancillary personnel usage.

3. Improves and develops new techniques to prepare meaningful statistical measures of the traffic accident problem to show magnitude, changes and trends, and to identify areas in which further research is needed;

4. Works with analysts in other agencies to facilitate the transfer, merging, and utilization of data;

5. Coordinates the traffic records function with the other data processing activities of the agency;

6. Assists in the determination of the hardware, software, and data processing personnel requirements of the agency;

7. Assists in the design of proposed electronic data processing systems;

8. Assists in the training and orientation of agency personnel in new procedures.

QUALIFICATIONS

Minimum qualifications for the entry level are:

1. Bachelor's degree, or its equivalent, preferably in administration, computer sciences, or other related areas from an accredited college or university;

2. Graduate or undergraduate courses in computer science, operations research, or systems analysis;

3. Knowledge of techniques of systems analysis, programming, and electronic processing equipment;

4. Experience in systems analysis supported by documentation of systems projects worked on.

EXHIBIT V

EXAMPLES OF USER OUTPUT REPORTS FROM A STATE TRAFFIC RECORDS SYSTEM

STANDARD 1 PERIODIC MOTOR VEHICLE INSPECTION

1 - 1 Motor Vehicle Inspection and Accident Involvement Comparative Summary by Type, Year, Make, and Model

1 - 2 Comparative Analysis of Motor Vehicle Defects Reported at Inspection and at Accident

STANDARD 2 MOTOR VEHICLE REGISTRATION

2 - 1 Summary of Registered Motor Vehicles by Type, Year, Make, Model, and Body Style

2 - 2 Summary of Stolen Motor Vehicles by Type, Year, Make, Model, and Body Style

STANDARD 3 MOTORCYCLE SAFETY

3 - 1 Motorcycle Size in cc vs. Number of Accidents

3 - 2 Motorcycle Operator Age vs. Accident Severity

3 - 3 Safety of Motorcycle Operators vs. Type of Collision Object

STANDARD 4 DRIVER/PUBLIC EDUCATION

4 - 1 Driver Education vs. Accident Involvement

4 - 2 Driver Education Program Types related to Accident Involvement

4 - 3 Driver Accident Involvement by Age, Sex, Driver Education, and Environment Driving Condition

EXHIBIT V (Cont)

EXAMPLES OF USER OUTPUT REPORTS FROM A STATE TRAFFIC RECORDS SYSTEM

STANDARD 5 DRIVER LICENSING

5 - 1 Age Group in order by Accident Involvements as a Percent of State Licensed Drivers

5 - 2 Individual Driving Histories of Accident Involved Drivers by Age/Group (Detail Followup to 5 - 1)

5 - 3 Accident Involved Drivers by Age with Related Driving Histories

5 - 4 Population of Licensed Drivers with Previous Driving Histories

5 - 5 Problem Driver Identification

STANDARD 6 CODES AND LAWS

6 - 1 Traffic Convictions by Class of License and Violation Type

6 - 2 Traffic Convictions in Percent by Age of Violators and Violation Type

6 - 3 Traffic Citations and Resultant Convictions

STANDARD 7 TRAFFIC COURTS

7 - 1 Traffic Violation Convictions by Type of Violation

7 - 2 Time Lag Between Offense and Conviction in Court

7 - 3 Changes in Violations when Cited and Convicted

7 - 4 Driver History Reports for Traffic Court Judges

EXHIBIT V (Cont)

EXAMPLES OF USER OUTPUT REPORTS FROM A STATE TRAFFIC RECORDS SYSTEM

STANDARD 8 ALCOHOL IN RELATION TO HIGHWAY SAFETY

8 - 1 Summary of Driver/Passenger/Pedestrian Fatalities in Accidents with Alcohol Involvement

8 - 2 Fatality and Injury Summary by Reported BAC of Driver and Pedestrian, Time and Day

8 - 3 Fatality and Injury Summary by Reported BAC of Driver, Time, Day, Highway, and Type of Fatal Crash

8 - 4 Alcohol and Drug Related Citation/Reduced Charge/ Conviction Summary

STANDARD 9 IDENTIFICATION AND SURVEILLANCE OF ACCIDENT LOCATIONS

9 - 1 High Accident Location by Roadway Segment/ Intersection and Point Location

9 - 2 High Violation Location by Roadway Segment/ Intersection and Point Location

STANDARD 10 TRAFFIC RECORDS

STANDARD 11 EMERGENCY MEDICAL SERVICE

11 - 1 Ambulance Data Listing (Every Vehicle Identified) by Municipalities

. . - 2 Ambulance Activity by Ambulance Type, Time of Day, and Day of Week

11 - 3 Emergency Medical Service Vehicles Involved in Accidents

11 - 4 Standard Requirements Concerning Ambulance Equipment

EXHIBIT V (Cont)

EXAMPLES OF USER OUTPUT REPORTS FROM A STATE TRAFFIC RECORDS SYSTEM

STANDARD 12 HIGHWAY DESIGN, CONSTRUCTION, AND MAINTENANCE

12 - 1 Accident Analysis by Design Characteristics by Municipalities

12 - 2 Accident Analysis by Design Characteristics vs. Roadway Segment

12 - 3 Roadway Defects Inventory Summary

STANDARD 13 TRAFFIC CONTROL DEVICES

13 - 1 Maintenance Schedules as an Operational Function

13 - 2 Accident Analysis vs. Intersection/Type/Device

STANDARD 14 PEDESTRIAN SAFETY

14 - 1 Pedestrian Involvements in Accidents by Time and Location

14 - 2 Pedestrian Accident Involvement by Age, Condition, and Pedestrian Action

STANDARD 15 POLICE TRAFFIC SERVICES

15 - 1 Accident Location Frequency by Municipality

15 - 2 Accidents within Municipalities by Time/Day

15 - 3 Violations Location Frequency by Municipality

15 - 4 Driver and Vehicle Status

15 - 5 High Accident Locations - State/Local

EXHIBIT V (Cont)

EXAMPLES OF USER OUTPUT REPORTS FROM A STATE TRAFFIC RECORDS SYSTEM

STANDARD 15 POLICE TRAFFIC SERVICES (cont'd)

15 - 6 High Violation Locations - State/Local

15 - 7 Manpower Utilization

STANDARD 16 DEBRIS HAZARD CONTROL AND CLEANUP

16 - 1 Accident Involvement with Debris on Roadway

STANDARD 17 PUPIL TRANSPORTATION SAFETY

17 - 1 Summary of School Bus Registrations

17 - 2 Fatality and Injury Summary for School Bus Accidents by Highway, Vehicle, and Accident Type

STANDARD 18 ACCIDENT INVESTIGATION AND REPORTING

18 - 1 Summary of Statewide Accidents

18 - 2 Summary of Accidents Investigated by Police Jurisdiction/Special Teams

APPENDIX A

PURPOSE

To assure that appropriate data on traffic accidents, drivers, motor vehicles, and roadways are available to provide:

1. A reliable indication of the magnitude and nature of the highway traffic accident problem on a national, State, and local scale.

2. A reliable means for identifying short-term changes and long-term trends in the magnitude and nature of traffic accidents.

3. A valid basis for:

   A. The detection of high or potentially high accident locations and causes.

   B. The detection of health, behavioral, and related factors contributing to accident causation.

   C. The design of accident, fatality, and injury countermeasures.

   D. Developing means for evaluating the cost effectiveness of these measures.

   E. The planning and implementation of selected enforcement and other operational programs.

STANDARD

Each State, in cooperation with its political subdivisions, shall maintain a traffic records system. The Statewide system (which may consist of compatible subsystems) shall include data for the entire State. Information regarding drivers, vehicles, accidents, and highways shall be compatible for purposes of analysis and correlation. Systems maintained by local governments shall be compatible with, and capable of furnishing data to, the State system. The State system shall be capable of providing summaries, tabulations, and special analyses to local governments on request.

The record system shall include (a) certain basic minimum data, and (b) procedures for statistical analyses of these data.

The program shall provide as a minimum that:

I. Information on vehicles and system capabilities includes (conforms to motor vehicle registration standard):

A. Make.

B. Model year.

C. Identification number (rather than motor number).

D. Type of body.

E. License plate number.

F. Name of current owner.

G. Current address of owner.

H. Registered gross laden weight of every commercial vehicle.

I. Rapid entry of new data into the records or data system.

J. Controls to eliminate unnecessary or unreasonable delay in obtaining data.

K. Rapid audio or visual response upon receipt at the records station of any priority request for status of vehicle possession authorization.

L. Data available for statistical compilation as needed by authorized sources.

M. Identification and ownership of vehicles sought for enforcement or other operational needs.

II. Information on drivers and system capabilities includes (conforms to driver licensing standard):

A. Positive identification.

B. Current address.

C. Driving history.

D. Rapid entry of new data into the system.

E. Controls to eliminate unnecessary or unreasonable delay in obtaining data which are required for the system.

F. Rapid audio or visual response upon receipt at the records station of any priority request for status of driver license validity.

G. Ready availability of data for statistical compilation as needed by authorized sources.

H. Ready identification of drivers sought for enforcement or other operational needs.

III. Information on types of accidents includes:

A. Identification of location in space and time.

B. Identification of drivers and vehicles involved.

C. Type of accident.

D. Description of injury and property damage.

E. Description of environmental conditions.

F. Causes and contributing factors, including the absence of or failure to use available safety equipment.

IV. There are methods to develop summary listings, cross tabulations, trend analyses, and other statistical treatments of all appropriate combinations and aggregations of data items in the basic minimum data record of drivers and accident experience by specified groups.

V. All traffic records relating to accidents collected hereunder shall be open to the public in a manner which does not identify individuals.

VI. The program shall be periodically evaluated by the State and the National Highway Traffic Safety Administration shall be provided with an evaluation summary.

APPENDIX B

GLOSSARY OF DEFINITIONS

This glossary defines those terms whose meanings may be unclear in the context in which they are used. These definitions are meant to apply only to the usage of these terms in this volume.

Authorized Sources - All Federal, State, and local governmental organizations plus any additional sources designated by the State involved.

Availability to Public - The Highway Safety Act of 1966, Public Law 89-564, Section 106, states in part as follows:

> "All facts contained in any report of any Federal department or agency or any officer, employee, or agent thereof, relating to any highway traffic accident or the investigation thereof conducted pursuant to Chapter 4, Title 23 of the United States Code shall be available for use in any civil, criminal, or other judicial proceeding arising out of such accident and any such officer, employee, or agent may be required to testify in such proceedings as to the facts developed in such investigation. Any such report shall be made available to the public in a manner which does not identify individuals. All completed reports on research projects, demonstration projects, and other related activities conducted under Sections 307 and 403 of Title 23, United States Code, shall be made available to the public in a manner which does not identify individuals."

The restrictions as imposed by this section are meant for that data gathered by or for the Federal Government. The quoted statutory language was not intended to change current State and local policies, rules, regulations, or laws with regard to the availability of accident investigation reports to those parties having an interest therein.

Centralization - An attempt to obtain a central focal point where input and output will be coordinated and administration and analysis will be controlled. The means of achieving centralization is discussed more thoroughtly in Chapters IV and V.

Description of Injury and Property Damage - Definitions as found in the National Safety Council's Manual on Classification of Motor Vehicle Traffic Accidents.

Driving History - Licensing data, collision records, driving violations, administrative actions taken (warning letters), driver improvement activities, court actions, and special restrictions.

Environmental Conditions - Two conditions: (1) that which pertains to the the roadway and (2) that which pertains to the locale of the collision. See Roadway, Metropolitan, Other Cities, Rural, and Suburban.

Roadway - That portion of a trafficway which is improved, designated, or ordinarily used for vehicular travel, exclusive of the shoulder.

Metropolitan - Statistical areas that are generally made up of an entire county or counties having at least one core city of 50,000 or more inhabitants, the whole area having certain metropolitan characteristics. The New England "town" instead of "county" is used to describe Standard Metropolitan Statistical Areas.

Other Cities - Urban places outside Standard Metropolitan Statistical Areas. Most of these places of 2,500 or more inhabitants are incorporated.

Rural - Generally, the unincorporated portion of a county outside of Standard Metropolitan Statistical Areas. Small incorporated communities are characteristically more rural than urban when they do not have their own police and fire services.

Suburban - Areas consisting of cities with 50,000 or less population together with counties which lie within a Standard Metropolitan Statistical Area. In this use of suburban, the core city is excluded. These metropolitan areas are not rural in nature, yet neither are they comparable to large cities.

Motor Vehicle Transportation System - Includes the drivers, passengers, pedestrians, motor vehicles and cargo, highways, traffic controls, signs, lighting facilities, service stations, restaurants, rest areas, etc. In addition, it includes the laws and regulations, insurance, and the organizations responsible for the coherent functioning of all elements of the system.

Name of Current Owner - Full name (first, middle, last).

Positive Identification - Full name (first, middle, last), complete date and place of birth, Social Security number, driver license number, and sex.

Rapid Entry - Entry into the record system within 48 hours of the receipt of the data.

Rapid Response - No more than one minute for turnaround time and less if possible.

Type of Accident - Designated as fatal, personal injury, or property damage and type according to the guidelines in the National Safety Council Manual on Classification of Motor Vehicle Traffic Accidents.

APPENDIX C

REFERENCES

The following is a selected list of recognized authoritative references which may be helpful in implementing the programs specified in this volume. This list is not meant to be a bibliography of all documents available in this field.

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D7.1-1968	Inspection Requirements for Motor Vehicles, Trailers and Semi-Trailers Operated on Public Highways
D7.2-1968	Station Requirements for Inspection of Motor Vehicles, Trailers, and Semi-Trailers in Stations Owned and Operated by Regulatory Authority
D7.3-1968	Station Requirements for Inspection of Motor Vehicles, Trailers, and Semi-Trailers in Stations Appointed and Licensed by Regulatory Authority
D8.1-1967	Railraod Highway Grade Crossing Protection, Practices for
D10.1-1966 (R1970)	Adjustable Face Vehicle Traffic Control Signal Heads
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D15.1-1968	Recording and Measuring Motor Vehicle Fleet Accident Experience, Method of

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D16.1-1970	Classification of Motor Vehicle Traffic Accidents, Manual on
D20	States' Model Motorist Data Base (Proposed)
X3.1-1969	Synchronous Signaling Rates for Data Transmission
X3.2-1970	Print Specifications for Magnetic Ink Character Recognition
X3.4-1968	Code for Information Interchange (FIPS 1)*
X3.5-1970	Flowchart Symbols and Their Usage in Information Processing
X3.6-1965	Perforated Tape Code for Information Interchange (FIPS 2)*
X3.9-1966	FORTRAN
X3.10-1966	Basic FORTRAN
X3.11-1969	Specification for General Purpose Paper Cards for Information Processing
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X3.15-1966	Bit Sequencing of the American National Standard Code for Information Interchange in Serial-by-Bit Data Transmission (FIPS 16)*

*Federal Information Processing Standards Publication

X3.16-1966	Character Structure and Character Parity Sense for Serial-by-Bit Data Communication in the American National Standard Code for Information Interchange (FIPS 17)*
X3.17-1966	Character Set for Optical Character Recognition
X3.18-1967	One-Inch Perforated Paper Tape for Information Interchange
X3.19-1967	Eleven-Sixteenths Inch Perforated Paper Tape for Information Interchange
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X3.21-1967	Rectangular Holes in Twelve-Row Punched Cards (FIPS 13)*
X3.22-1967	Recorded Magnetic Tape for Information Interchange (FIPS 3)*
X3.23-1968	COBOL
X3.24-1968	Signal Quality at Interface Between Data Processing Terminal Equipment and Synchronous Data Communication Equipment for Serial Data Transmission
X3.25-1968	Character Structure and Character Parity Sense for Parallel-by-Bit Data Communication in the American National Standard Code for Information Interchange (FIPS 18)*
X3.26-1969	Hollerith Punched Card Code (FIPS 14)*
X3.27-1969	Magnetic Tape Labels for Information Interchange

*Federal Information Processing Standards Publication

X3.28-1971	Procedures for the Use of the Communication Control Characters of the American National Standard Code for Information Interchange in Specified Data Communication Links
X3.29-1971	Specification for Properties of Unpunched Oiled Paper Perforator Tape
X3.30-1971	Representation for Calendar Date and Ordinal Date for Information Interchange (FIPS 4)*
X3.31	Identification of Counties of each State of the United States for Information Interchange (FIPS 5-1)*
X3.34	Interchange Rolls of Perforated Tape for Information Interchange (FIPS 6-1)*

*Federal Information Processing Standards Publication

APPENDIX D

Federal Information Processing Standards Publication 20 1972 March 1

ANNOUNCING THE

GUIDELINES FOR DESCRIBING INFORMATION INTERCHANGE FORMATS

Federal Information Processing Standards Publications are issued by the National Bureau of Standards under the direction of the Office of Management and Budget in accordance with the provisions of Public Law 89-306 and Office of Management and Budget Circular A-86.

Name of Standard. Guidelines for Describing Information Interchange Formats.

Category of Standard. Software Standard, Documentation.

Explanation. These Guidelines identify and describe the various characteristics of formatted information that should be considered whenever formatted information is interchanged. The objective is to clarify and improve the documentation necessary to effectively provide, process or use the information involved.

Approving Authority. Office of Management and Budget.

Maintenance Agency. Department of Commerce, National Bureau of Standards (Center for Computer Sciences and Technology).

Cross Index. None.

Applicability. These Guidelines are intended as a reference document only, and are recommended for general use throughout the Federal Government as a check list for preparing effective documentation of formatted information interchange. Its use is encouraged, but is not mandatory.

Implementation. As new systems are being developed or current systems revised, the use of these Guidelines should be considered. Also whenever new information interchange requirements are developed, this FIPS PUB may be useful in the development of format specifications and forms design. It is not the intent to change existing format descriptions. However, the use of this FIPS PUB as a basis for assessing the adequacy of present documentation methods is encouraged.

Specifications. Federal Information Processing Standard 20 (FIPS 20), Guidelines for Describing Information Interchange Formats, (affixed).

Qualifications. The characteristics provided in the Guidelines are based upon many years of information interchange experience and reflect current technologies. As new techniques and equipments become available in the future which effect current practices, these Guidelines will need to be modified accordingly. As experiences are gained through the future use of these Guidelines they may become a basis for the adoption of standards. In this regard, where these Guidelines are used in the development of procedures or forms, it is requested that copies of these be provided to the National Bureau of Standards, Center for Computer Sciences and Technology, Washington, D.C. 20234.

Where to Obtain Copies of the Standard.

a. Copies of this publication are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (25 cents a copy: SD Catalog Number

C13.52:20). There is a 25 percent discount on quantities of 100 or more. When ordering, specify document number, title, and SD Catalog number. Payment may be made by check, money order, coupons, or deposit account.

b. Microfiche of this publication is available from the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22151 at a cost of 95 cents. When ordering refer to Report Number NBS-FIPS-PUB-20 and title. Payment may be made by check, money order, coupons, or deposit account.

SPECIFICATIONS FOR

GUIDELINES FOR DESCRIBING INFORMATION INTERCHANGE FORMATS

1. Name of Standard. Guidelines for Describing Information Interchange Formats.

2. Category of Standard. Software Standard, Documentation.

3. Explanation. These guidelines identify and describe the various characteristics of formatted information that should be considered whenever formatted information is interchanged. The objective is to clarify and improve the documentation necessary to effectively provide, process or use the information involved.

4. Specifications

4.1. Contents. These specifications are presented in three sections with an appendix that provides a glossary of terms as follows:

4.2. Introduction

4.3. Physical Characteristics

4.4. Logical Characteristics

Appendix A—Glossary

4.2. Introduction. There is a requirement for a clear understanding of the information content whenever information is interchanged. Failure to adequately address this aspect of information interchange has resulted in misinterpretations and needless hours spent in attempting to process the information by both men and machines. These Guidelines are provided to assist personnel directly involved in the documentation of information systems and information interchange.

When information is collected and interchanged, there are many techniques utilized. These techniques vary depending upon the requirements of each system. Some of these techniques are as follows:

1. The collection of information using manual forms which are subsequently converted to machine processable form.

2. The collection of information using machine-readable forms as in mark sensing or optical character recognition.

3. The interchange of information using removable machine sensible media such as punched cards, magnetic tape, magnetic disks, cassettes, or perforated tape.

4. The direct on-line entry of information from a keyboard terminal to a computer or other terminal.

5. The direct on-line interchange of information between computers.

Regardless of the technique employed, there must be a complete understanding between the sender and receiver or the requestor and furnisher of the information involved.

These Guidelines were prepared primarily considering the interchange of information on magnetic tape as the base. These can be readily adopted to other forms of information interchanged by appropriate reference to the characteristics peculiar to the particular interchange medium or technique.

In the interchange of information, there are usually three places where the information is described: 1) on an external label which is affixed to the cover or container (e.g., the adhesive label that is fastened to a reel of tape); 2) in an internal machine sensible form that is part of the interchange information (e.g., a magnetically recorded label on a reel of tape and/or file description); and 3) in a document that either accompanies the information or is specified prior to the interchange. The characteristics identified in these Guide-

lines may appear in any of these three places. (Sometimes the same characteristic may be identified or described in more than one place).

It is not the intent of these Guidelines to specify at which place a certain characteristic must be described as this is better done by the systems personnel due to the differences in various systems. However, it is important that the Guidelines be used as a check list to assure that the applicable characteristics are provided for in one or more of these three areas. In this regard, it is recommended that all applicable characteristics be described in the external documentation in order to facilitate processing due to the differences in equipment reading techniques. The characteristics of the information are divided into two sections, physical and logical. The physical section identifies those characteristics having to do with the manner and form of the physical recording and media. The logical section identifies those characteristics of information that are independent of the media or recording technique and are applicable to the definition, representation, and structure of the information.

4.3. **Physical Characteristics.** In this section the physical characteristics of information are identified and described. Some characteristics do not apply in all cases of information interchange.

4.3.1. **ADP Coordinator.** Indicate the organization that produced the information in machine readable form. Provide name, address, and telephone number of person(s) to contact for clarification or further information concerning technical aspects of the recording.

4.3.2. **Type of Medium.** Indicate magnetic tape, punched cards, cassettes, perforated tape, on-line transmission, or other media information.

4.3.3. **Length of Medium.** Indicate the length of tape on the reel or cassette or the number of cards in the deck. (e.g., 600, 1200, 2400, 3600 feet or the number cards). If multiple reels, cassettes, or card boxes are used, indicate the number involved.

4.3.4. **Width of Medium.** Indicate the width of the tape, the number of columns in the cards, or the width of the perforated tape (e.g., ½, ¾, 1 inch or 80, 96 columns).

4.3.5. **Number of Tracks.** Indicate the number of recording tracks and track-bit assignments for magnetic or perforated tape or the number of rows in punched cards (e.g., 6, 7, 8, 9 tracks or 12 rows).

4.3.6. **Recording Density.** Indicate the number of bits or characters recorded per inch (BPI) or (CPI) for magnetic tape. (e.g., 200, 556, 800, 1600 BPI).

4.3.7. **Recording Method.** Indicate the particular recording method used (e.g., non return to zero (NRZI) or phase encoded).

4.3.8. **Character Code.** Indicate the character code used to record the information (e.g., ASCII, Hollerith, EBCDIC, BCD, binary or other). If there are variations to these established conventions or if a subset of these are used (e.g., upper case letters only), these variations need to be described. If floating point binary representation is used, describe its structure.

4.3.9. **Parity.** Indicate the framing and/or blocking technique used for the parity bit. (e.g., even, odd, or mixed) If mixed, describe the particular method(s) used.

4.3.10. **Recorded Label.** Indicate if a recorded label is used. If used, describe the labeling technique, standard, or procedure used. (e.g., American National Standard X3.27-1969).

4.3.11. **Control Characters.** If tape marks or control characters are used to signify beginning or ending of files or for other purpose(s), identify the characters, their codes, their use and location.

4.3.12. **Record Size.** Indicate the type size of the records (e.g., fixed, variable, or mixed). If fixed, indicate size in number of words, characters, or bytes. If variable or mixed, describe techniques used to control and indicate size. If known, indicate the maximum, minimum, and modal (average) size of the variable length record. When indicating size in terms of number of words, also indicate word size.

4.3.13. **Block Size.** Indicate the type size of the blocks (e.g., fixed, variable, or mixed). If fixed, indicate size in number of words, characters, or bytes. If the block is variable or mixed describe control techniques and indicate maximum, minimum and average (modal) sizes. When indicating size in terms of words, also indicate word size.

4.3.14. **Blocking Factor.** Indicate the relationship between the physical block and the record. (e.g., multiple records contained in a single block or a single record contained in multiple blocks.) Also describe padding techniques employed.

4.3.15. **Recording Equipment and System.** Indicate the manufacturers' model numbers of the terminal, computer (CPU), tape drives, or other devices used to record the data. If computer generated, indicate the operating system, version, and level or type. For magnetic tape, describe the characteristics of the interrecord gap.

4.3.16. **Creation Date.** Indicate the date that the information was created or last updated. This date may or may not be the same as the recording date.

4.3.17. **Recording Date.** Indicate the date that the information on this particular medium was generated. This may or may not be the date of the information (i.e., If a tape is copied, the date of the copy is the recording date not the date of the information).

4.3.18. **Obsolescent Date.** If the information is of a terminal nature, indicate the date after which it should be retired or replaced.

4.3.19. **Single or Multiple File.** Indicate if more than one file is recorded on the reel, if multiple files are recorded on a single reel or if multiple reels are used to record a single file. If multiple files are recorded on a single reel, the number of files, their relative position, and any specialized access information should be described.

4.3.20. **Number of Records.** Indicate the number of records in the file, if known.

4.3.21. **Privacy (Security Classification).** Indicate any restrictions (release limitations) on the use of the information and/or its security classification.

4.4. **Logical Characteristics.** In this section the logical characteristics of the information are identified and described. Some characteristics do not apply in all cases of information interchange.

4.4.1. **File Characteristics**

4.4.1.1. **File Name.** Indicate the name used to identify the file (e.g., Payroll Master).

4.4.1.2. **File Identification Number.** Indicate the number or symbolic tag used to identify the file.

4.4.1.3. **File Date.** Indicate the "as of date" of the information in the file. For files that contain information extending over a period of time, indicate the beginning and ending dates of the included period.

4.4.1.4. **File Structure.** Indicate and describe the data organization method or methods of the file (e.g., sequential, random, or list organization). If file is made up of different types of records, each type needs to be identified.

4.4.1.5. **Sponsor of the File.** Indicate the organization that sponsored the establishment of the file and is aware of its contents. Provide name, address, and telephone number of person(s) to contact for clarification or further information. This may differ from the ADP Coordinator (paragraph 4.3.1.) who is responsible for its processing.

4.4.1.6. **Documentation.** Identify the documentation (e.g., procedure, instruction, systems manual and/or other documents) that describe the file and its uses.

4.4.1.7. **Primary Subject of the File.** Identify the data element(s), (field name(s)) that are the primary subject of the file.

4.4.1.8. **Collating Sequence.** Indicate how the records are sorted to form the particular record arrangement of the file. If a special sort key is derived for sequencing, explain how this is accomplished. If sorting is performed using character values other than those assigned in recognized character codes (paragraph 4.3.8),

provide a table of the characters and values assigned to each.

4.4.1.9. Related Records and Processes. If the records in the file are produced from or are used to produce other files/records indicate these and the processes involved.

4.4.1.10. Hash/Control Total Information. If hash counts or control totals are incorporated in the file, these should be identified and explained.

4.4.1.11. Subset File. If the information on the file is a subset of a larger file, describe how the subset was derived.

4.4.2. Record Characteristics. (Each different record type should be described).

4.4.2.1. Record Name. Indicate the title or name used to identify the record.

4.4.2.2. Record Identification Number. Indicate the number or symbolic tag used to identify the record (e.g., form number, transaction number or code, or other type number).

4.4.2.3. Originator of the Record. Identify the source of the information in this record.

4.4.2.4. Record Date. If the record contains a date used to identify when it was added to the file or last updated, describe method utilized.

4.4.2.5. Obsolescent Date. If the information in the record is of a terminal nature, indicate the date after which the information should be retired or replaced.

4.4.2.6. Privacy (Security Classification). There may be different restrictions on different records in a file. If this is the case, this needs to be indicated and explained.

4.4.2.7. Record Layout. Provide a layout that locates the position of each field and the identification of the data elements contained therein. Also, indicate the abbreviations or symbols used to identify the elements on associated forms or listings.

4.4.2.8. Record Index. If this technique is used provide a description of the index and its use.

4.4.3. Data Elements

4.4.3.1. Data Element Name. Indicate the name of the element (field name).

4.4.3.2. Data Element Abbreviation. If used, indicate the abbreviation of the element.

4.4.3.3. Data Element Tag. If used, indicate the symbolic tag or code used to identify the element.

4.4.3.4 Composite/Variable Name Data Element. If this element is a composite or variable name data element, identify and define its items. The items may also have abbreviations and tags, if so these should be indicated.

4.4.3.5. Relationship Element. Indicate whether the element is a primary element or attribute element. If an attribute element, identify the associated element(s).

4.4.3.6 General Definition. Provide a concise definition using non-technical terms to describe the meaning of the element.

4.4.3.7. Context Dependent Definition. Provide a definition of the element used by specialists or those skilled in the subject area.

4.4.3.8. Data Element Source. Indicate the source or provider of this particular data element.

4.4.3.9. Data Element Update. In some applications the date and/or time that certain elements are changed (added or modified) is indicated. If this technique is employed, this should be explained.

4.4.4. Field Characteristics

4.4.4.1. Location of Field. Indicate card columns, character positions in tape record, or other means for locating the field (beginning and ending positions). If the data items in the field are of a composite or variable name element, the location of each item needs to be specified.

4.4.4.2. Field Separators. If these are used in the record, specify the character(s) or byte(s) used and the technique employed.

4.4.4.3. **Field Length Type and Size.** Indicate whether the field is fixed or variable in length and its size in number of words, characters, or bytes. When indicating size in number of words, also indicate word size.

4.4.4.4. **Character Type.** Indicate the type of characters or representation used to express the data item(s) i.e., alphabetic, pure alphabetic, numeric, pure numeric, alphanumeric, pure alphanumeric, binary, packed numeric, other.

4.4.4.5. **Justification.** Indicate whether the value (data item) representation is left or right justified in the field.

4.4.4.6. **Implied Attributes.** If the value represented has implied measure (e.g., dollars, thousands of dollars, degrees, etc.) or other attributes that need to be defined before full understanding can be obtained, these attributes should be indicated.

4.4.4.7. **Level of Accuracy.** Indicate the level of accuracy of the data element (e.g., validated or unvalidated).

4.4.4.8. **Truncation/Rounding.** If the value or representation has been shortened in any way, the technique used should be indicated.

4.4.4.9. **Form of Representation.** Indicate the form of representation used to express the data item(s) (i.e., name, abbreviation, code or numeric value.)

4.4.4.10. **Names.** If the representation is a name, indicate its structure or syntax rules used.

4.4.4.11. **Abbreviations.** If the representation is an abbreviation, indicate the abbreviation construction rules used or cite the source or reference of the abbreviations.

4.4.4.12. **Codes.** Indicate the characteristics of the code and cite the source or reference of the codes.

4.4.4.13. **Significance.** Indicate whether the code is significant or nonsignificant. If significant explain the type of significance.

4.4.4.14 **Dependency.** If the code has dependent segments, indicate the structure and dependence of the segments.

4.4.4.15. **Self-checking code.** If a self-checking code is appended to the code, indicate its position and method of derivation.

4.4.4.16. **Source.** Indicate the reference or source of the codes used.

4.4.4.17. **Numeric Value.** Indicate how the value was derived (i.e., measured (describe measurement technique), counted, estimated, computer (describe method) or other means). If the numeric value is signed (+ or −), describe the location of sign and its representation.

4.4.4.18. **Permissible Values.** If only certain values or range of values are allowed, indicate these.

4.4.4.19. **Null State Condition.** In some applications, certain values, such as all blanks, are used to indicate that no value has been reported for this field (null state). If this technique is employed, this needs to be explained.

GLOSSARY OF TERMS

This Glossary provides definitions of terms used in these Guidelines where it was felt that these would be helpful to the reader. The terms and definitions are either from established vocabularies or have been developed for purposes of these Guidelines.

ASCII--American Standard Code for Information Interchange (FIPS 1).

Attribute data element—A data element that is used to qualify or quantify another data element (e.g., "Date of Birth" and "Mailing Address" would be attribute data elements in a personnel file where the primary element(s) is/are used to identify the person).

Character type—An indication of the type of characters or bytes to represent a value (i.e., alphabetic, numeric, pure alphabetic, pure numeric, binary, packed numeric, etc.).

Alphabetic—A representation which is expressed using only letters and punctuation symbols.

Alphanumeric—A representation which is expressed using letters, numbers, and punctuation symbols.

Binary—A representation of numbers which is expressed using only the numbers 0 and 1, e.g., 5 is expressed as 101.

Numeric—A representation which is expressed using only numbers and selected mathematical punctuation symbols.

Packed numeric—A representation of numeric values that compresses each character representation in such a way that the original value can be recovered, e.g., in an eight bit byte, two numeric characters can be represented by two four bit units.

Pure alphabetic—A representation which is expressed using only letters.

Pure alphanumeric—A representation which is expressed using only letters and numbers.

Pure numeric—A representation which is expressed using only numbers.

Composite data element (data chain)—A data element that has an ordered string of related data items that can be treated as a group or singly e.g., a data element named "Date of Birth" could have the data items, "Year", "Month", and "Day of Month".

Context dependent definition—A statement of meaning that relies upon a situation, background, or environment for proper interpretation.

Data code—A coded representation used to identify a data item. Usually codes are designed according to established rules and criteria, and only by chance form a phonetic word or phrase.

Data element—A basic unit of identifiable and definable information. A data element occupies the space provided by fields in a record or blocks on a form. It has an identifying name and value or values for expressing a specific fact e.g., employee name, employee number, date of birth, mailing address, color of eyes, height and weight.

Data element abbreviation—An abbreviated form of the data element name.

Data element definition—A statement of the meaning of a data element.

Data element name—A name used to identify a data element.

Data element source—An identification of the source or provider of the particular data element, i.e., individual, organization, sensor, computation, etc.

Data element tag (data element code)—A symbolic tag used to identify a data element.

Data item—The expression of a particular fact of a data element e.g., "Blue" may be a data item of the data element named "Color of eyes".

Data item abbreviation—An abbreviated form of the data item name

Data item definition—A statement of the meaning of a data item.

Data item name—A name used to identify a data item.

Dependent code—A code that has segments which are dependent upon other segments in order to provide unique identification of the coded item. Usually, codes having classification significance are dependent codes.

EBCDIC—Extended Binary Coded Decimal Interchange Code.

Field—In a record, a specific area used for representing a particular category of data, e.g., a group of card columns used to express a wage rate.

Field length—A measure of the length (size) of a field, usually expressed in units of characters, words, or bytes.

Field length type—An indication of whether the field of a record is a fixed or variable in length.

Fixed length field—A field whose length does not vary.

Variable length field—A field whose length varies. Usually, the boundaries of this type of field are identified by field separators.

Field separator—A character or byte used to identify the boundary between fields.

File structure—The manner in which data are organized (arrangement and interrelationship) in a file.

Sequential organization—The arrangement of records in a file according to a specified sequence.

Random organization—The arrangement of records in a file based on a predictable relationship between one of the elements of the record and the address of the location where the record is stored.

List organization—The arrangement of data in a matter that divorces the logical organization from the physical organization through the use of pointers. There are three basic types of list organizations: simple lists, inverted lists and rings.

Filler character—A specific character or bit combination used to fill the remainder of a field after justification.

Formatted information—An arrangement of information into discrete units and structures in a manner to facilitate its access and processing. Contrasted with narrative information that is arranged according to rules of grammar.

General definition—A statement of meaning that can be interpreted without regard to a specific situation, background, or environment.

Information interchange—The transfer of data representing information between or among two or more points (devices, locations, organizations, or persons) of the same or different (dissimilar) information system or systems.

Justification—To adjust the value representation in a field to either the right or left boundary (margin).

Left justify—Adjustment of a value representation to the left boundary (high order) of a field.

Right justify—Adjustment of a value representation to the right boundary (low order) of a field.

Non-significant code—A code that provides for the identification of a particular fact but does not yield any further information, e.g. random numbers used as codes. Contrasted with significant code.

Numeric value—The expression of a data item which denotes a measurement, count, or mathematical concept, usually represented by numerals and a limited number of special characters (i.e., plus (+), minus (−), decimal point (.), comma (,), asterisk (*), and slant (/)).

Padding—A technique used to fill a field, record, or block with dummy data (usually zeros or spaces).

Primary data element—A data element or elements that is/are the subject of a record. Usually the other elements, called attribute data elements, qualify or quantify the primary data

element (e.g., in a personnel field, the element(s) that is/are used to identify the individual are primary; other elements such as "Date of Birth" and "Mailing Address" are attribute data elements).

Radix point—A character, usually a period, that separates the integer part of a number from the fractional part. In decimal (base 10) notation the radix point is called the decimal point.

Record—A collection of related elements of data treated as a unit.

Record index—An ordered reference list of the contents of a record together with keys or reference notations for identifying and locating the contents.

Record layout—A description of the arrangement and structure of information in a record, including the sequence and size of each identified component.

Record length—A measure of the length (size) of a record, usually expressed in units of characters, words, or bytes.

Record length type—An indication of whether the records of a file are fixed or variable in length.

Fixed length record—Pertaining to a file in which the records are uniform in length.

Variable length record—Pertaining to a file in which the records are not uniform in length.

Rounding (Roundoff)—To delete the least significant digit or digits of a numeral, and to adjust the part retained in accordance with some rule.

Self-checking code—A code that is appended to another code to provide for validity checking. A self-checking code is derived mathematically from the characteristics of the base code.

Significant code—A code which in addition to identifying a particular fact also yields further information, e.g., catalog numbers in addition to identifying a particular item also often indicate the classification of the item. Contrasted with non-significant code.

Time of observation—The date and/or time of the actual occurrence or reporting of the fact(s).

Truncate—To delete characters from a character string, usually from either end of the string.

Type of code significance—An indication of the type of significance that a particular code yields.

Collating significance—A code designed in such a way that it facilitates ordering of the coded item.

Mnemonic significance—A code designed in in such a way as to facilitate thehuman recall of the name of the coded items.

Classification significance—A code designed in such a way as to facilitate the classifying of the coded items into classes and sub-classes.

Type of observation—An indication as to how the data was collected or reported i.e., estimated, immediate observation, measurement technique, etc.

Variable name data element—A data element that identifies a set (array) of similar values (data items). By varying certain identifiers in the name the entire set (array) of values can be identified. For example, a set of values that give population by State and Year could be identified by the data element "Population of (State) in (Year)" where State and Year are variable names. The variable names are used to identify particular values in an array (e.g., "Population of (New Jersey) in 1970)" was 7,168,164.) In this example "New Jersey" and "1970" are variable names used to identify a specific value "7,168,164" in an array.

APPENDIX E

RESOURCE ORGANIZATIONS

The following organizations are actively studying the highway safety problem and are knowledgeable regarding traffic records programs. They are presented here as sources of technical information to aid the States in developing and maintaining their traffic records programs.

American Association of Motor Vehicle Administrators
1828 L Street, N. W., Suite 500
Washington, D. C. 20036

American Association of State Transportation Officials
341 National Press Building
Washington, D. C. 20004

Insurance Institute for Highway Safety
2600 Virginia Avenue, N. W.
Washington, D. C. 20037

International Association of Chiefs of Police
11 Firstland Road
Gaithersburg, Maryland 20760

National Highway Traffic Safety Administration
U. S. Department of Transportation
Washington, D. C. 20590

Traffic Records Committee
National Safety Council
425 North Michigan Avenue
Chicago, Illinois 60611

Institute for Computer Sciences and Technology
National Bureau of Standards
Washington, D. C. 20234

Traffic Records Committee
Transportation Research Board
2101 Constitution Avenue, N. W.
Washington, D. C. 20418

American National Standards Institute
1430 Broadway
New York, New York 10018

APPENDIX F

DATA POTENTIALLY AVAILABLE ON-SCENE AND OFF-SCENE

(a) Pre-crash Phase

Data items	On-scene police report *	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Human															
Operator: name	x	x		x			x	x			x	x			
Operator: address	x	x		x			x	x			x	x			
Operator: sex	x	x		x			x	x				x			
Operator: date of birth	x	x		x			x	x				x			
Operator: license no. and state	x	x		x			x	x			x				
Operator: type & status of license		x													
Operator: license expiration date		x													
Operator: date first licensed in state		x													
Operator: date first licensed		x													
Operator: place of birth		x													
Operator: race															x
Operator: nationality															x
Operator: marital status															x
Operator: residence summary (i.e., local, in-state, etc.)															x
Operator: principal occupation (or industry)		x													x
Operator: trip purpose															x
Operator: trip distance															x
Operator: trip origin/ destination															x

* Selected data available through operator's accident report when filed in those States requiring such a report.

(a) Pre-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Operator: height		x													x
Operator: weight															x
Operator: eye color		x													
Operator: hair color															x
Operator: previous accident history		x													
Operator: violation/conviction record		x													
Operator: other records (education, occupation, family)		x													x
Operator: driving experience per vehicle		x													x
Operator: state/country of previous license		x													
Operator: date driver education program completed												x			
Driver education program: type		x										x			
Operator: driving taught by		x										x			
Driver education instructor identification & certification												x			
Operator: date of last driving exam		x													
Operator: test scores		x										x			x
Operator: highest level of education attained		x													
Operator/pedestrian: medical record		x													x
Operator/pedestrian: physical condition (acute/chronic)		x													x

(a) Pre-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplement -- form or special study data
Operator/pedestrian: medical treatment (previous)		x													x
Operator: physical restrictions		x													
Operator: eye level from ground															x
Operator: condition prior to accident				x	x								x		x
Operator: alcohol (indication & tests)	x														
Operator: time last medication /drugs consumed															x
Operator: visibility obscured by															x
Operator: intended movement															x
Operator: emergency maneuver(s)/tactics															x
Operator: familiarity with accident location															x
Passenger: name	x														
Passenger: address	x														
Passenger: age	x														
Passenger: sex	x														
Passenger: occupation/industry															x
Passenger: relation to operator															x
Passenger: race															x
Passenger: nationality															x
Passenger: drivers license & state (if any)															x

(a) Pre-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/ coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Pedestrian: name	x			x											
Pedestrian: address	x			x											
Pedestrian: age	x			x											
Pedestrian: sex	x			x											
Pedestrian: race															x
Pedestrian: nationality															x
Pedestrian: marital status															x
Pedestrian: occupation/industry															x
Pedestrian: residence summary															x
Pedestrian: driver license no. & state (if available)															x
Pedestrian: ever licensed to drive															x
Pedestrian: color of clothing															x
Pedestrian: familiarity with accident location															x
Pedestrian: visibility obscured by															x
Pedestrian: condition prior to accident				x	x								x		x
Pedestrian: alcohol (indication & tests)	::														
Pedestrian: time last medication/drugs consumed															x
Pedestrian: intended movement															x
Pedestrian: emergency maneuvers/tactics															x
Vehicle/trailer: owner's name			x					x			x				

(a) Pre-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplemental study data
Vehicle/trailer: owner's address			x					x			x				
Is operator the owner of vehicle			x					x							
Vehicle: lien holder			x												
Operator: financial security		x													
Operator insured								x							
Operator's insurance co.								x							
Policyholder: name/address								x							
Policy number								x							
Policy period								x							
Vehicle															
Vehicle: type			x					x	x		x				
Vehicle: ownership (type of)			x					x			x				
Vehicle: make	x		x					x	x		x				
Vehicle: model	x		x					x	x		x				
Vehicle: model year	x		x					x	x		x				
Vehicle: color(s)			x					x	x		x				
Vehicle: body style	x		x					x	x		x				
Vehicle: identification number	x		x					x	x		x				
Vehicle: motor number			x						x						
Vehicle: I.C.C./P.U.C. number(s)			x												
Trailer: identification no.			x						x						
Vehicle: license plate no. & state	x		x				x	x			x				
Trailer: license plate no. & state	x		x								x				

(a) Pre-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Vehicle/trailer: year of registration			x												
Vehicle/trailer: date first registered in state			x												
Vehicle: title no. & state			x												
Trailer: title no. & state			x												
Vehicle: purchase date			x												
Trailer: type			x						x						
Vehicle: tire data (name, type, position, condition, etc.)			x						x		x			x	x
Vehicle: environmental controls									x						x
Vehicle: type of other controls (brakes, steering, transmission, etc.)			x						x						
Vehicle condition											x				x
Vehicle: odometer reader	x		x								x				
Vehicle: speed estimates															x
Vehicle: skidmark data															x
Tire: imprint(s) location															x
Tire: tread wear indicator											x				x
Vehicle: lubrication sticker mileage & date															x
Vehicle inspection station identification											x				
Inspector identification											x				
Vehicle: inspection certificate no.											x				
Status of vehicle inspection											x				

(a) Pre-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/ coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary forms for special study data
Vehicle: date of last inspection											x				
Vehicle: inspection frequency															x
Vehicle: use class			x												
Commercial vehicle: registered gross laden weight			x						x						
Vehicle: rated horsepower			x						x						
Vehicle: defects (specify)			x					x			x				
Vehicle: optional equipment (specify)			x						x		x				x
Vehicle: modification (customizing, etc.)			x								x				x
Vehicle/trailer: accident history			x						x						
Roadway/environment															
Accident: date	x			x				x							
Accident: time	x			x				x							
Roadside: type of development										x					
Roadside: type of area (rural, urban)										x					
Road: conditions	x														
Road: surface condition	x														
Roadway: type of surface										x					
Weather condition	x														
Light condition															x
Traffic flow: direction (normal)										x					
Roadway: speed zones										x					

(a) Pre-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Traffic controls (type & location)	x									x					
Traffic signals: operating status	x														
Traffic flow: direction (temporary)	x														
Traffic lanes: reduced width (temporary)	x														
Roadway: access										x					
Roadway: lighting (type & location)										x					
Roadway: width										x					
Roadway: no. of traffic lanes										x					
Roadway: width of travel lane										x					
Roadway: width of transition lanes										x					
Roadway: truck lanes										x					
Roadway: shoulders										x					
Roadway: intersections										x					
Roadway: interchanges										x					
Ramps: entrance/exit (& location)										x					
Roadway: RR crossings										x					
Roadway: bridges										x					
Roadway: medians										x					
Roadway: horizontal curves										x					
Roadway: vertical curves										x					
Roadway: grades										x					

(a) Pre-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Roadway: curb/gutter (type)										X					
Roadway: culverts										X					
Roadside: guardrail (type & location)										X					
Roadway: cross section beyond shoulder										X					
Roadside: rest areas										X					
Roadside: truck weigh stations										X					
Roadway: date of traffic count										X					
Roadway: average daily traffic										X					
Roadway: design hour volume										X					
Roadway: safe stopping distance										X					
Roadway: composition of traffic										X					X
Roadway: traffic density										X					X
Roadway: design speed										X					

(b) Crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Human															
Accident severity	x														
Accident events: (collision, non-collision)	x														
Operator/passenger/pedestrian injury classification	x														
Operator/passenger: ejected from vehicle	x														
Motorcyclist: safety equipment	x								x		x				
Vehicle occupants: number	x														
Occupant: identification & seat location per vehicle	x														
Seat belt availability & use (per seat location)	x														
Seat belt use reported by:	x														
Pedestrian: distance traveled after impact															x
Vehicle															
Accident severity	x														
Accident events: (collision, non-collision)	x														
Collision geometry	x														
Vehicle: make	x														
Vehicle: model	x														
Vehicle: model year	x														
Vehicle: body style	x														
Vehicle: damage areas	x														

(b) Crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Vehicle: area of principal damage	x														
Vehicle: direction of principal impact															x
Vehicle: occupant compartment integrity															x
Vehicle: components damaged (specify)								x							x
Vehicle: damage rating	x														x
Vehicle: distance traveled after impact															x
Estimated impact speed															x
Speedometer reading															x
Vehicle: seat belts installed per seat location	x								x						
Vehicle: seat belt failure	x														
Vehicle: steering column rearward displacement									x						x
Seat failure															x
Head restraints									x						x
Vehicle: windshield penetration															x
Roadway/environment															
Accident severity:	x														
Accident events: (collision, non-collision)	x														
Road: conditions	x														
Road: surface condition	x														
Roadway: traffic density										x					x

(b) Crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary for- or special study data
Roadway: initial point of contact															x
Type of object struck	x									x					
Roadway: cross section beyond shoulder										x					
Roadway median (type & width)										x					
Roadway: culverts										x					
Roadside: guardrails (type & location)										x					

(c) Post-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary forms or special study data
Medical services															
Ambulance service/co. identification						x									
Ambulance attendants: training						x									
Time ambulance called						x									
Ambulance called by						x									
Time ambulance arrived						x									
Time ambulance left scene						x									
Injured: refused medical treatment at scene?						x									
First aid given by?	x					x									
Injured: removed to	x					x									
Injured: removed by	x					x									
Ambulance: type						x								x	
No. of injured transported in ambulance						x									
Ambulance: in-transit first aid or treatment given to						x									
Ambulance: route to hospital						x									
Distance from scene to hospital						x									
Ambulance: transit time (speed) to hospital						x									
Injured: time of arrival at hospital (etc.)						x									
Name of hospital	x					x							x		
Injured or deceased: identification					x	x							x		

(c) Post-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Injured or deceased: sex						x							x		
Date injured admitted													x		
Time injured checked in at hospital													x		
Time medical treatment started													x		
Injury severity scale													x		x
No. days of hospitalization													x		
Cost of hospitalization													x		
Patient's condition at time of report													x		
Patient's future activity status													x		
Date discharged from hospital													x		
Coroner/medical examiner notified					x										
Coroner/medical examiner at scene					x										
Coroner/medical examiner: name					x										
Coroner/medical examiner: certificate no.					x										
Type of death					x										
Cause(s) of death					x										
Time/date of injuries/death					x										
Identification of specific injuries					x										
Description of occurrence of injuries					x										
Time interval between onset of injuries & death					x										

(c) Post-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Autopsy authorized by					x										
Autopsy performed					x										
Special tests performed on victim					x										
Time/date special tests were performed					x										
Results of tests					x										
Scene management															
Time tow truck called															x
Time tow truck arrived															x
Tow truck called by															x
Vehicle: moved before arrival of police															x
Vehicle: driven away															x
Vehicle: towed from scene															x
Vehicle: towed to	x														
Vehicle: towed by															x
Vehicle: towing authorized by															x
Vehicle: repair cost								x							x
Debris identification															x
Debris location															x
Object struck	x														
Location of object	x														
Repair/replacement costs of object										x					x
Driver report form issued															x
Accident reported to other agency															x

(c) Post-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Other agencies notified of hazardous/emergency conditions?	x														
Reason for notification of other agencies	x														
Investigation Data															
Date police notified	x														
Time police notified	x														
Police notified: method used															x
Police notified by															x
Time police arrived	x														
Time police completed at-scene investigation															x
Accident: date	x			x		x	x	x			x				
Accident: time	x			x			x	x							
Roadside: type of area (rural, urban)										x					
Roadside: type of development										x					
Name of state	x					x	x			x					
Name of county	x					x	x			x					
Name of city (town, etc.)	x					x	x			x					
Name &/or no. of highway or street	x					x	x			x					
Roadway classification										x					
Jurisdiction of accident location															x
Milepost no.	x									x					

(c) Post-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/ coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Highway section or control no.	x									x					
Utility pole no.	x									x					
House number(s)	x									x					
Accident location coordinates	x									x					
Roadway: intersection, interchange	x									x					
Name(s) of intersecting street(s)	x									x					
Distance from intersection, interchange, milepost marker, city (town or township) or other permanent landmarks	x									x					
Direction from intersection, interchange, milepost marker, etc.	x									x					
Non-roadway location	x									x					
Roadway: impact point location															x
Roadway: characteristics										x					
Roadway: access										x					
Traffic flow: direction										x					
Roadway: traffic density										x					
Traffic lanes: number										x					
Roadway: width										x					
Road: conditions	x														
Road: surface condition	x														
Weather condition	x														
Light condition															x

(c) Post-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/ coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Accident investigated by police &/or other															x
Accident investigated at/off scene	x														x
Accident narrative	x														
Accident diagram	x														
Pedestrian: final location															x
Occupants vehicle: final location															x
Police photos taken	x														
No. of police photos															x
Photographer identification															x
Tape recordings made?															x
Other methods used to record accident data															x
Witness: name	x														
Witness: sex															x
Witness: address	x														
Witness: phone no.															x
Witness: age															x
Witness: race															x
Witness: nationality															x
Witness: occupation/industry															x
Witness: location at time of accident															x
Witness: statement given to															x
Witness: date statement given															x

(c) Post-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Witness: statement signed															x
Witness: statement on supplementary form															x
Identification of evidence															x
Evidence turned over to															x
Evidence receipt/identification no.															x
Time/date evidence recovered off-scene															x
Police accident investigator training															x
Type of vehicle tests (on/off scene)															x
Speed estimated by															x
Supplementary forms required															x
Investigator recommendations	x														
Individual recommended for retraining/re-examination	x														
Object struck: name/address of owner															x
Object struck: owner notified of accident															x
Time between agency notification & agency action															x
Citations for	x														
Summons/citation no.															x
Citation issued to.	x														
Pedestrian: specific violation(s)															x
Operator: specific violation(s)															x

(c) Post-crash Phase

Data items	On-scene police report	Driver licensing	Vehicle registration	Forensic laboratory (alcohol test)	Medical examiner/ coroner	Ambulance service	Traffic court	Insurance companies	Motor vehicle manufacturers	Highway and traffic engineers	Motor vehicle inspection stations	Driver education	Hospital physician	Tire manufacturers	Supplementary form or special study data
Alcohol test requested	x														
Police agency requesting test	x			x											
Operator/pedestrian condition at time body specimen obtained				x											
Type of body specimen obtained				x											
Type of analysis				x											
Time/date tests administered				x											
Test results/findings				x											
Test administered by				x											
Test analyzed by				x											
Identification of magistrate							x								
When individual arraigned							x								x
Identification of court							x								
Court record no.							x								
Court action taken							x								
Status of investigation															x
Traffic accident case number	x														
Routing information for this report															x
Investigator: identification	x														
Date of report	x			x	x	x	x	x				x	x		
Report approved by	x														
Date report approved	x														
Police: reporting agency/ department	x						x								

APPENDIX G

SELECTED TRAFFIC SAFETY DECISION MAKERS AND DECISION OPPORTUNITIES

	Human	Vehicle	Roadway/environment
Pre-crash Phase	**System Managers:** Police departments Legislative agencies Motor vehicle departments, etc. **Support System Managers:** Traffic courts Research institutions Driver education facilities Public info./support orgs., etc. **System Users:** Vehicle operators/occupants Pedestrians	**System Managers:** Police departments Legislative agencies Motor vehicle departments, etc. **Support System Managers:** Automobile manufacturers/ engineers Tire manufacturers/engineers Motor vehicle inspection facilities Maintenance and repair facilities Industrial/trade associations Research institutions, etc. **System Users:** Personal vehicles Vehicle/trailer leasing organizations Vehicle fleets, such as passenger vehicles, trucks, buses, taxis, etc.	**System Managers:** Highway/traffic engineers and departments Legislative agencies etc. **Support System Managers:** Roadway Maintenance and repair facilities Public utility repair/service companies, such as telephone, electric, water-sewer, etc. Police departments, etc.
Crash Phase	**System Managers:** Legislative agencies, etc. **Support System Managers:** Medico/engineering personnel Driver education facilities, etc. **System Users:** Vehicle operators/occupants Pedestrians	**System Managers:** Legislative agencies, etc. **Support System Managers:** Automobile manufacturers/ engineers Tire manufacturers/ engineers Research institutions, etc. **System Users:** Personal vehicles Vehicle trailer leasing orgs. Vehicle fleets, such as buses, taxis, etc.	**System Managers:** Highway/traffic engineers and departments Legislative agencies, etc. **Support System Managers:** Public utility companies, etc.
Post-crash Phase	**System Managers:** Police departments Legislative agencies, etc. **Support System Managers:** Medical personnel and ambulance services Traffic courts Insurance industry News media and other public info./support orgs., etc. **System Users:** Vehicle operators/occupants Pedestrians	**System Managers:** Police departments Legislative agencies, etc. **Support System Managers:** Vehicle towing/wrecking service Maintenance and repair facilities Fire departments, etc. **System Users:** Personal vehicles Vehicle/trailer leasing orgs. Vehicle fleets such as passenger vehicles, trucks, buses, taxis, etc.	**System Managers:** Police departments Legislative agencies, etc. **Support System Managers:** Highway/traffic engineers and departments Roadway maintenance/repair facilities Public utility companies, etc.

APPENDIX H

CAUSES AND CONTRIBUTING FACTORS

a. The concept of "cause" is controversial and receives varying interpretations.

b. One author (J. S. Baker) states that:

> "It has been customary to ... a single factor as 'the cause of the accident'. Even people who recognize that nearly all accidents have more than one factor may urge us to report only 'the most important' factor . . . Naming a single factor as most important would be like trying to pick out the most important link in a chain or the most important leg on a chair . . . What we mean when we do this is usually that the 'most important' factor is either the easiest factor to discover or the easiest to control."*

c. Another study (A State Accident Investigation Program) concludes that:

> "As a substitute for the identification of cause, (the investigator) is presently required to identify the 'conditions' that contributed to the accident."
>
> "The request for 'contributing conditions' ignores the same logical and procedural difficulties as the request for the cause or causes of an accident. The investigator can identify only those factors that are available to relatively superficial observation and that are close to the accident in time and space."
>
> "The logical difficulty involved in specifying contributing conditions becomes clear if we consider the hypothetical example of investigators finding that ten percent of all drivers involved in accidents during a given Saturday night along a selected highway had been drinking. It seems

*Baker, J. S. Traffic Accident Investigator's Manual for Police (1963, 2nd ed.). Traffic Institute, Northwestern University, Evanston, Illinois.

reasonable to label the drinking in each case as a contributing condition. However, if independent observation of all of the drivers using the highway during the same time period found that ten percent of the drivers had been drinking - with blood alcohol levels similar to those found in the accident-involved drivers - then it would be expected by chance alone that ten percent of the accidents involved drivers who had been drinking. The investigator, without knowledge of the characteristics of the population at large feels free to make inferences about relationships that a researcher would not be logically justified in making. By the same logic, the investigator would miss subtle driver or vehicle design factors that statistical analysis might identify as relevant to the occurrence of the accident.

"If the investigator is not logically or procedurally justified in identifying causes or contributing conditions, then what can he identify? It is our belief that the investigator can 'sample' conditions associated with the occurrence of the event. This is a modest and reasonable requirement which does not confuse observation with inference, nor does it place the investigator in the uncomfortable and, from what we have been told, frequently avoided position of submitting inferences of contributing conditions as facts that may then be challenged in a court of law."*

d. The resolution of the difficulties attendant upon the inference of "causation" or "contributing conditions" from the data derived from a single investigation can be found in the inference of association or correlation following the statistical organization and analysis of appropriately combined data from many accidents.

These statistically derived inferences can then be tested in experimental studies for a validation of the association, which, if successful, some investigators are then willing to describe as a "cause."

*Final Report - A State Accident Investigation Program, prepared under Contract FH-11-6688 for the Department of Transportation, National Highway Traffic Safety Administration by the Travelers Research Center, Inc., Hartford, Connecticut (January 1968)