A REVIEW OF VIRGINIA'S TRAFFIC RECORDS PROJECT AND SOME RECOMMENDATIONS FOR ACTION

by

William E. Kelsh
Research Analyst

(The opinions, findings, and conclusions expressed in this report are those of the author and not necessarily those of the sponsoring agencies.)

Virginia Highway & Transportation Research Council
(A Cooperative Organization Sponsored Jointly by the Virginia Department of Highways & Transportation and the University of Virginia)

Charlottesville, Virginia

June 1979
VHTRC 79-R61

SAFETY RESEARCH ADVISORY COMMITTEE

MR. R. W. DUVAL, Chairman, Deputy Director,
Virginia Department of Transportation Safety

MR. FRANK ALTOBELLI, Regional Administrator,
National Highway Traffic Safety Administration

MAJOR C. M. BOLDIN, Investigation and Planning Supervisor,
Virginia Department of State Police

MR. WALTER E. DOUGLAS, Assistant Director,
Virginia Department of Transportation Safety

MR. WAYNE S. FERGUSON, Assistant Head,
Virginia Highway and Transportation
Research Council

MR. J. L. HAZELWOOD, JR., Driver Services Administrator,
Virginia Division of Motor Vehicles

MR. C. P. HEITZLER, JR., Program Manager, Division of Management
Analysis and Systems Development

MR. JULIAN K. HICKMAN, VASAP Evaluator,
Virginia Department of Transportation Safety

MR. BILLY G. JOHNSON, Supervisor, Driver Education,
State Department of Education

MR. HIRAM R. JOHNSON, Management Information Systems Director,
Office of Secretary of Transportation

MR. DAVID O. MCALLISTER, Traffic Engineer,
Virginia Department of Transportation Safety

MR. R. F. MCCARTY, Safety Program Coordinator,
Federal Highway Administration

MR. R. M. MCDONALD, Project Director, Highway Safety Training Center,
Administration of Justice and Public Safety

MR. A. L. THOMAS, Assistant Traffic and Safety Engineer,
Virginia Department of Highways & Transportation

MR. AMBROSE WOODROOF, Assistant Attorney General,
Division of Motor Vehicles

ABSTRACT

In an attempt to increase the utility and efficiency of Virginia's traffic records system the Commonwealth has conducted several studies of its activities related to the collection, processing, storage, distribution, and use of accident data. Collectively these efforts are referred to as Virginia's traffic records project. This report reviews the history of the state's traffic records project, outlines the major findings of the various phases of the project, and presents a framework for initiating new activity in this area.

EXECUTIVE SUMMARY

In an attempt to increase the utility and efficiency of Virginia's traffic records system the Commonwealth has conducted several studies of its activities related to the collection, processing, storage, distribution, and use of accident data. Collectively, these efforts are referred to as Virginia's traffic records project.

In response to prompting by the federal government, Virginia initiated the traffic records project in 1970 with the formation of the Traffic Records Committee. The Committee appointed an interagency feasibility study team to study, evaluate, and make recommendations for the improvement of Virginia's traffic records system. The feasibility study team outlined seven major deficiencies in the state's system which included, among others, that the state lacked a central authority with responsibility for the development and maintenance of a traffic records data base; the state had no uniform accident locator system; accident reports were not uniformly administered; accident data were not being processed and distributed in an efficient manner; and certain traffic safety agencies and localities had no access to traffic records data. The feasibility study team made 16 recommendations aimed toward eliminating these deficiencies and outlined a design for a new system which it felt would be operationally and technically feasible.

With the work of the Traffic Records Committee as a foundation, Virginia initiated the Traffic Records Information System (TRIS) project in August 1974. A Management Review Committee chaired by the Secretary of Transportation and Public Safety, and consisting of heads from the state's major transportation safety agencies was formed to oversee the project. A project team composed of technical experts and traffic safety managerial personnel from the involved agencies was set up to describe the existing system, document the information needs of state and local traffic safety agencies, propose system alternatives, and, eventually, develop and implement the new system. In their initial report the project team noted that 837 (73%) of 1,149 data element needs identified in the course of their work were unavailable from Virginia's system. The team pointed out 9 areas of duplicative effort in the flow, maintenance, storage, and use of accident data among the major state traffic records agencies. The team also estimated that $600,000 were spent annually on these duplicative activities.

Since that time the state has made some attempts to improve the performance of its traffic records system albeit in a sometimes uncoordinated manner. New accident report forms, reporting procedures, and data processing procedures were introduced in January 1978 in an attempt to accelerate the flow of data through the

system. To date this scheme has not worked as smoothly as originally expected. It takes up to 4 months (or more) before the data for most accidents are entered in the state's accident file. Sources of delay are: police officers in the field are not required to submit accident reports promptly; some localities hold back accident reports until they accumulate a sufficient number to send in to the DMV; and present data processing procedures involve coding and processing of accident data by personnel employed by three agencies in two locations. Further, problems are being experienced with the accuracy of the data. Incomplete or inaccurate reports are being submitted to the state for processing. Since the state lacks uniform error correction procedures to deal with these substandard reports state accident files are being updated nevertheless with incomplete or inaccurate data.

Virginia's accident data base is currently being reviewed and evaluated by the National Highway Traffic Safety Administration. Once this study is completed it is anticipated the findings will be useful in future attempts to improve the state's system.

The Virginia Department of Transportation Safety has sponsored two projects to provide accident and highway safety programming and planning data to state and local agencies. Mini-crash facts reports containing annual crash data in selected areas of interest were sent to each locality in the summer of 1978. The reports will undergo annual revision to meet the changing information needs of their users. The Master File project is an attempt to develop an information system to provide each of Virginia's local highway safety commissions and state traffic safety agencies with annual planning and programmatic data in a broad range of highway safety program areas by bringing together information from a variety of existing automated and manual files.

The Virginia Department of Highways and Transportation has developed the software to produce automated collision diagrams for specific sites; however, the system has been used only sporadically because the accident data collected are not sufficiently accurate. The Department has also taken some preliminary looks at the development of a statewide accident locator system, but the implementation of such a system is years off.

It is recommended that a detailed cost study of the current traffic records system be undertaken to examine the economic feasibility of consolidating the state's accident record-keeping activities. If the results of this study indicate that significant cost savings and efficiencies could be achieved by this consolidation, then it is recommended that the state reinitiate its traffic records project. Additionally, it is recommended that the Governor should be involved throughout the life of the project to lend it importance

and credibility. Further, the state should start the project from scratch, taking best advantage of the work already accomplished, and adopt, in concept, the ARDI approach to management information system development. The ARDI approach calls for a project organizational and task structure similar to that of the old TRIS project. This approach allows for the integration of previously completed work wherever possible and accommodates the use of consulting services for specific subtasks if necessary.

A REVIEW OF VIRGINIA'S TRAFFIC RECORDS PROJECT AND SOME RECOMMENDATIONS FOR ACTION

by

William E. Kelsh
Research Analyst

INTRODUCTION

The passage of the Federal Highway Safety Act of 1966 was the first attempt to attack the nation's highway safety problems in any broad based, coordinated manner. The Act established the National Highway Safety Bureau (NHSB) (now the National Highway Traffic Safety Administration [NHTSA]) and granted it regulatory and policy-making responsibilities. In particular, the NHSB was given the task of promulgating a set of uniform highway safety standards with which the states were to comply. One of the 18 standards eventually issued by the NHSB was that for traffic records (Standard 310). It states in part that:

> 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 issuance of Standard 310 was the catalyst for the Commonwealth of Virginia's examination of its activities related to the collection, processing, distribution, analysis, and use of accident data. Collectively, these efforts are referred to as Virginia's traffic records project.

The NHTSA no longer specifically emphasizes the importance of implementing its 18 Highway Safety Standards in each state. Instead, the federal emphasis is on the identification of highway

safety problems as an integral part of the total highway safety planning process. In order to properly identify these problems each state must have an information system which provides the raw accident data needed for analysis. Virginia lacks a system with the capabilities prescribed by the NHTSA. So while strict compliance with the letter of the Traffic Records Standard is not as important a concern to the NHTSA as it was several years ago, compliance with its spirit is still expected of the states.

PURPOSE

This report has been prepared in response to a request by the Safety Research Advisory Committee for a review and evaluation of the state's traffic records project. The report documents the major findings of the various phases of the project, summarizes the most recent developments, and presents a framework for initiating new activity in the traffic records area.

EARLY HISTORY

Virginia's noncompliance with the traffic records standard has been noted in a variety of state and federal documents. The state's 1967 baseline study prepared to estimate the cost of implementing the provisions of the Federal Highway Safety Act cited the separate processing of accident data by the Division of Motor Vehicles (DMV), Department of State Police, and Virginia Department of Highways as a cause of noncompliance with Standard 310.(1) In Virginia's 1968 Highway Safety Program submission to the NHSB it was noted that "there is an immediate need for review of all agencies on a state and local level which require data from the Traffic Records System. After an inventory is made of the available data, and also what is lacking, a program should be developed to correlate the data into a central pool so that this information would be available to those having a need for it. At the present, parts of the limited data and records are in various agencies which have made little effort to develop information that is compatible, interchangeable, or centrally handled by mechanical equipment." In December 1969, Federal Highway Administrator F. C. Turner, in approving the Highway Safety Program submitted by Virginia, expressed "the need for legislative and administrative actions for implementation of the state's safety program, particularly in the areas of alcohol in relation to highway safety and traffic records. In the latter, acceptable progress has not been shown." In the Federal Highway Administration's evaluation summary of the Highway Safety

Program submitted in 1969 it was noted that "traffic records is the one area where acceptable progress is not being made or planned." Finally, in the Governor's Management Study(2) it was pointed out that,"the present procedure for handling highway accident statistics requires separate keypunching and data processing at DMV, State Police, and the Highway Department. Each agency must obtain selective data, which involves unnecessary duplication and severe delay. Early availability of these data is required to promote improved highway safety." This report also recommended both revision of the state accident reporting form (FR-300) and new programming to produce accident statistics from a common data base.

INITIATION OF THE TRAFFIC RECORDS PROJECT

To evaluate the traffic records situation in the Commonwealth, the Highway Safety Division of Virginia (now the Virginia Department of Transportation Safety) voluntarily established the Traffic Records Committee in 1970. In early 1971 this Committee appointed a Feasibility Study Team composed of representatives from the Division of Motor Vehicles, Virginia Department of Highways, Department of State Police, Virginia Highway Research Council and the Henrico County Division of Police for the purpose of —

1. defining the existing traffic records system in Virginia;

2. identifying deficiencies as specifically as possible;

3. suggesting changes to upgrade the system; and

4. determining the operational, technical, and economic feasibility of such an upgraded system.

The work of the Traffic Records Committee and the Feasibility Study Team was the first positive step made toward alleviating some of Virginia's traffic records problems.

The Feasibility Study Team employed a three-part approach to achieve these goals. First, the members identified and interviewed all users and suppliers of traffic records within the Commonwealth. Secondly, they conducted interviews with officials in eight states having particularly sophisticated traffic records systems. Finally, they identified the flow of accident data among the biggest users and suppliers of this information, those being the DMV, Department of State Police, and Department of Highways. The team outlined 7 major deficiencies in the state's traffic records system in its January 1973 report to the Traffic Records Committee. These deficiencies were:

1. Absence of centralization in the collection processing, storage, and retrieval of traffic records;

2. inaccurate and incomplete recording of accident locations;

3. nonuniform accident reporting;

4. lack of a uniform correctional system to deal with substandard execution of accident reports;

5. untimely and inefficient processing and dissemination of accident data;

6. lack of access to traffic records by the Highway Safety Division of Virginia; and

7. failure to provide feedback on accidents to localities.

The study team made 16 recommendations aimed toward eliminating these deficiencies. The major ones were that —

1. a central authority should be designated or established to develop and maintain a traffic records data base;

2. a revised accident report form should be drafted and adopted along with uniform reporting standards;

3. a statewide training program should be instituted to train all law enforcement agencies throughout the Commonwealth in the administration and use of the revised report;

4. the amount of time allowed for an officer to submit the accident report to the entering agency should be reduced to 72 hours from the time of the accident;

5. the data from the uniform accident report should be entered into the traffic records data base through on-line terminals so that all users of accident data will have equal and timely access to the information;

6. an error correction system should be adopted so that errors in accident reports will be brought to the attention of the investigating officer;

7. a uniform statewide accident locator system should be established for the roadway network;

8. a report in graphic or statistical format should be issued monthly to each locality giving the total accident and enforcement figures for that locality;

9. the four basic computer files (driver, vehicle, accident, and roadway) should be integrated to allow file compatibility for cross-referencing and statistical computations; and

10. the four basic computer files should be evaluated to ensure that they include the necessary information as outlined by the NHTSA.

The Feasibility Study Team's report went on to describe a traffic records system which, in the Team's opinion, was technically and operationally feasible. The report proposed that accident data should be entered into the traffic records system through on-line visual display computer terminals housed at the Department of State Police. The Department of State Police would be responsible for all coding and editing of the accident data received. The system would have error checking and editing capabilities at the entry terminals. Police officers in the field would be required to submit accident reports to the Department of State Police within 72 hours of the occurrence of an accident. Data would be entered into the system on the same day they were received. Upon entry, the data would be transmitted to the DMV's computing system, which would automatically update the driver and vehicle files. Data transmission lines would exist between the Department of Highways and the DMV so that the accident file would be updated automatically. With both the accident and roadway files housed at the Department of Highways, collision diagrams could be produced for particular accidents and locations using the Department's flatbed plotter. A predefined statistics file would be developed and updated as data were entered into the system. Periodic statistical reports would be generated by the system. Inquiry terminals at the Department of State Police, Highway Safety Division, and other agencies would allow immediate access to all segments of the data base 24 hours a day.

The Feasibility Study Team concluded that the proposed on-line computerized system was both technically and operationally feasible. It was felt that the state had all the necessary computing facilities and expertise to develop and maintain an up-to-date, working traffic records system. Further, the Study Team noted that there was sufficient need for the products of the proposed system that it would successfully be used. The Traffic and Safety Division of the Virginia Department of Highways, Virginia Highway Safety Division (the last of the major state agencies to receive crash data in the existing system), and the localities were identified as the immediate beneficiaries of the implementation of a revamped traffic records system.

The Feasibility Study Team was unable, however, to properly evaluate the economic feasibility of an upgraded traffic records system because of a lack of useful cost information on the existing system. This is one area still in need of study today.

INITIATION OF THE TRIS PROJECT

With the work of the Traffic Records Committee and the Feasibility Study Team as a foundation, then Secretary of Transportation and Public Safety Wayne A. Whitham initiated the Virginia Traffic Records Information System (TRIS) project in August 1974. A Management Review Committee was formed of agency heads from the Highway Safety Division, Department of State Police, Division of Motor Vehicles, Virginia Department of Highways and Transportation,* and a representative from the Henrico County Police Department along with a project research team composed of individuals from the involved agencies. The TRIS project consisted of four phases. Phase I was to be a functional description of the TRIS which would provide a description of the current system, identify unmet data element requirements, and identify duplicative processes. Once defined and described, the individual data element requirements were to be approved and prioritized by the Management Review Committee and the agencies it represented. Phase II was to proceed with the development of a traffic records system design and an implementation plan showing system alternatives and their costs for implementation, operation, and maintenance. The detailed system and program specifications phase (Phase III) and the final system development phase (Phase IV) were to follow.

The Project Team completed Phase I of the TRIS project in early 1975. Extensive surveys of the traffic records data element needs were conducted with all involved state agencies and selected localities. The team reported in its May 1975 draft summary report to the Management Review Committee that 837 (73%) of 1,149 data element needs** identified in their surveys (see Appendix A for detailed breakdown) were unavailable from the existing traffic records system. ("Unavailable data" were defined as those which were either not captured by the existing system or were captured but not distributed in a timely manner.)

---

*The titles of the Department of Highways and the Virginia Highway Research Council were amended to include "and Transportation" in 1973.

**There is some question about what constitutes a "need." In some cases a data element need represented the lack of an essential piece of information, while in others it was merely a wish.

The TRIS Project Team pointed out nine areas of duplicative effort in the flow, maintenance, storage, and use of accident data among the major state traffic records agencies, echoing the findings of the Traffic Records Committee's Feasibility Study Team. An attempt was made to develop annual cost figures for the duplicative activities. Among the DMV, Department of State Police, and Department of Highways and Transportation an estimated $600,000 were spent annually on duplicative accident data processing. The Project Team was quick to point out that this was a minimal figure because the cost data used for the estimate were incomplete. (See Appendix B for a detailed breakdown by major agency.)

To illustrate the extent of the delay in the dissemination of crash data to state agencies and localities the Project Team reported that the DMV received most accident reports within 1 week of an accident. In turn, the Department of State Police would receive them from the DMV within 45 days. The Virginia Department of Highways and Transportation would receive crash data from the Department of State Police within 6 months of the occurrence of an accident. Other state agencies received data as much as 2 years old. The average Virginia locality never received data on 24% of the accidents occurring within its jurisdiction (those investigated by State Police) even though the information was available in state files.

The Management Review Committee dissolved following the preparation of the TRIS Project Team's draft executive summary report. As a result no major action has been taken on the TRIS project (as originally conceived) for over 3 years. The state's last three Annual Highway Safety Work Program submissions (now the Highway Safety Plans) to the NHTSA have optimistically indicated that the TRIS will soon be implemented, but in fact the project is dormant.

Two studies were conducted and published by the Virginia Highway and Transportation Research Council in conjunction with the efforts of the Management Review Committee's Project Team. The first was entitled Traffic Records Needs of Local Governments in Virginia (May 1975) and the second was Traffic Records Needs of the Highway Safety Division of Virginia (January 1976). Each study examined the traffic records problems of these two important users from the administrative and operational standpoints. The reports were intended to augment the detailed data element needs surveys conducted by the TRIS Project Team. Unfortunately, the usefulness of the findings of these studies was greatly diminished by the dissolution of the Management Review Committee. (A summary of the findings and recommendations contained in these reports is included as Appendix C.)

In mid-1976 the Richmond Division office of the Federal Highway Administration (FHWA) published a report entitled Virginia's Accident Data Collection, Analysis, and Applications System. Accident data collection and analysis procedures were designated as special emphasis areas by the FHWA in fiscal year 1976. The report focused on the activities of the Traffic and Safety Division of the Virginia Department of Highways and Transportation and basically repeated many of the findings from the studies conducted by the Traffic Records Committee Feasibility Study Team and the TRIS Project Team.

RECENT DEVELOPMENTS

Since the release of the FHWA study some efforts have been made in and among some state agencies to improve the performance of Virginia's traffic records system; however, little has been documented in published report form. Many, but not all, of the system's deficiencies noted in earlier traffic records reports persist; however, progress is being made in some areas albeit in a sometimes uncoordinated manner.

Perhaps the most far-reaching change in Virginia's traffic records system in recent years has been the introduction of new accident report forms and reporting procedures (in response, in part, to original recommendations of the Feasibility Study Team). The new forms, which were developed over a period of several years at the DMV, were put into statewide use in January 1978. The FR-300P, the police accident report form, is completed by the attending officer for every accident investigated by any police agency. It must be submitted to the DMV within 24 hours of the close of the officer's investigation. The FR-300P is completed according to directions given in an accompanying instruction manual. The FR-300P, based on the state of New York's Accident Report Form, is more detailed and comprehensive in scope than Virginia's old FR-300, which had been in use for many years without revision. It is now the sole source of detailed accident data for all state and local accident record-keeping agencies. In addition, all drivers involved in accidents with total property damage in excess of $250 or involving any bodily injury are now required to fill out the shorter, simpler FR-300C (citizen) accident report form. This form is to be completed whether or not the accident is investigated by police authorities. The completed FR-300C should be submitted to the DMV within 5 days of the occurrence of the accident. The information taken from this form is used by the DMV chiefly for the administration of state financial responsibility laws. (Both report forms appear as Appendix D.)

The elimination of the requirement for drivers involved in an accident investigated by police to fill out a detailed accident report must be viewed as a positive step toward improving Virginia's traffic records system. Citizen completed FR-300's generally contained many inaccuracies and thus were an unreliable source of accident data. Further, since most accidents of any consequence are investigated by a police officer who must submit a detailed report to the DMV, it seemed an unnecessary duplication of effort for the involved drivers to do the same. This revision in accident reporting procedures also eliminated the matching of police and citizen reports at the DMV, which was a troublesome bottleneck in the old system. The obvious disadvantage is that detailed data on accidents reported to the DMV by citizens but not investigated by police are no longer captured by the system. In general, however, these are relatively minor accidents (regardless, the data submitted by citizens are generally of poor quality as noted above).

Along with the revision in the accident report form and reporting procedures there has come an effort by the three major state traffic record-keeping agencies to accelerate the flow of data through the system. In late 1977 representatives from the DMV, Department of State Police, and Department of Highways and Transportation agreed to alter the coding and accident data entry procedures substantially. Under the new arrangements the DMV receives all accident reports (from citizens and police officers), codes but a very few items (four) and enters selected data items into its driver and vehicle files. Police accident reports received by the DMV are forwarded to the Department of State Police within 5 days of receipt. All coding of all accident data is performed at the Department of State Police. Accidents are broken into two categories, urban and rural (as in the former system), and monthly crash tapes of all rural accidents are submitted to the Department of Highways and Transportation's Data Processing Division. Additionally, an annual rural crash tape is supplied to the Department of Highways and Transportation. It was hoped that under these procedures the Department of Highways and Transportation would receive tapes containing approximately 80% of the accidents occurring on state maintained roads within 50 days of their occurrence. Up until the first of January 1979 citizen accident reports also underwent these procedures; however, this practice has been discontinued. All citizen accident reports now terminate at the DMV.

To date this scheme has not worked as smoothly as originally expected. Accident data up to 4 months old are being received at

the Department of Highways and Transportation. Further, the data received at the Department of State Police have been found to contain a significant number of errors and omissions. In the fall of 1978 a study of the problem was conducted by personnel from the Department of Highways and Transportation's Traffic and Safety Division. They noted that the data received at the Department of Highways and Transportation were not as timely as originally expected for several reasons:

1. Some local police agencies hold back police accident reports until they have a sufficient number to send into the DMV (presumably this is done to save postage or administrative costs).

2. As previously noted, police reports for an accident are not required to be submitted to the DMV until 24 hours after the close of an officer's investigation. Investigations can be extended for weeks or months following the occurrence of an accident and thus delay the data at the source.

3. In the early months of 1978 coding personnel at the Department of State Police were forced to try to catch up on the backlog of 1977 accident reports as well as learn and implement the new procedures. Some delay stemmed from basic unfamiliarity with the new report form, use of new codes, and general transitional problems encountered by State Police coders. Now that the 1977 report backlog has been eliminated and experience has been gained with the new system there has been considerable improvement in this particular area.

Traffic and Safety Division engineers concluded that, perhaps, the original goal of receiving data on 80% of the accidents by the 20th of the following month was unrealistic. A 60-90 day expected time lag would be acceptable to Traffic and Safety Division personnel, as long as the data were accurate.

However, problems are being experienced with the accuracy of the data. Traffic and Safety Division personnel indicate that significant numbers of errors and omissions are found in the data received at the Department of Highways and Transportation from the Department of State Police. The reasons for this appear to be:

1. Incomplete accident reports are being submitted to the DMV by police officers in the field. Since no formal procedures for correcting errors exist, State Police coders faced with blank entries and/or obvious mistakes are forced to use their judgement or code omissions as "not stated."

2. Apparently the instruction manual designed to help police officers complete their accident reports has some minor flaws which may be causing confusion.

Traffic and Safety Division engineers feel that training of State Police coders to do more complete troubleshooting might help in problem area (1) above. Often errors and omissions in accident reports can be corrected by looking at other parts of the report (particularly the narrative accident description section) and inferring what the correct entries should be.

Both problem areas indicate that local police officers in the field may require training on how to complete the FR-300P (State Police officers already receive this training during their schooling at the State Police Academy).* The extent to which such a training program would improve the quality of the data and its cost effectiveness may be a topic for further study.

While the new traffic records system is not yet functioning as originally planned the cooperation and initiative exhibited by the DMV, Department of State Police, and Department of Highways and Transportation in developing the streamlined accident data processing procedures are commendable. It is clear that these agencies are willing and able to make a reasonable effort to improve the state's traffic records system. Regardless, there remain important users such as the Virginia Department of Transportation Safety, other state agencies, and the localities which do not have timely access to the state's accident data. Much work needs to be done to integrate these users into the state's traffic records system.

---

*The Transportation Safety Training Center at Virginia Commonwealth University in Richmond, in conjunction with the Virginia Department of Transportation Safety, periodically conducts intensive accident investigation courses for local police officers at various locations around the state. Instruction on how to complete the FR-300P accident report form is but a small portion of the total training program.

DEVELOPMENTS IN RELATED AREAS

Virginia is currently serving as a pilot state for the NHTSA's accident data improvement program. Recently representatives from the NHTSA and the FHWA held intensive interviews with key personnel in the state's traffic record-keeping agencies. The interviews were conducted for the purpose of examining the quality and quantity of accident information collected in Virginia and the procedures employed to process it. A summary evaluation report on Virginia's accident data base is expected to be published in the near future. It is anticipated that the findings of this study will be useful in future attempts to improve the state's system.

Recognizing its problem with timely access to Virginia's accident records, the Virginia Department of Transportation Safety, through the Virginia Highway and Transportation Research Council, has sponsored two projects to provide accident and highway safety programming and planning data to state and local agencies. The mini-crash facts project, now in its second year, has been developed to distribute annual crash data to individual localities in selected areas of interest (total accidents, motorcycle accidents, pedestrian involvement, etc.). The first mini-crash facts reports were sent to all localities in the summer of 1978. Reaction to the project has generally been good. Mini-crash facts reports will undergo annual revision and expansion over the next few years to meet the changing information needs of their users.

The master file project, still in the initial development stage, is an attempt to develop an automated highway safety program data base which can be used for problem identification as part of the federally mandated highway safety planning process. In the past, planning and programmatic data have been compiled manually for all local highway safety commissions and the state highway safety agencies. This has been a time-consuming and tedious practice requiring considerable expenditure of funds. With the development of a fully, or even partially, automated data base, high quality information will be made available to users in the format they need for the preparation of highway safety plans.

The Virginia Department of Highways and Transportation has been working in two important areas related to the use of accident data. The first is the development and implementation of the software to produce automated collision diagrams for specific accident sites on the Department's flatbed plotter. These diagrams graphically portray the distribution of accidents occurring at a specific site during a given time period according to vehicle maneuver, direction of travel, and location within a travel lane or intersection. Automated collision diagrams are most useful in traffic

and safety site engineering studies. Although the software has been available for several years now, this facility has been used only sporadically. The accident data collected heretofore have not been of sufficient quality to permit use of the system. With the introduction of the new accident report forms and new coding procedures more compatible with the production of automated collision diagrams, it is hoped that more use will be made of them. Vital to the proper usage of this capability is improvement in the accuracy of the crash data collected at the site, a problem discussed in the previous section.

One area examined by Department of Highways and Transportation personnel which is greatly in need of attention is the development of an automated statewide accident locator system. Currently the state uses a paper milepost system (graphic logs) for recording the location of accidents. The interstate and primary road systems are fully logged and mileposted,* but the bulk of the secondary system is not. Roads not maintained by the Department of Highways and Transportation are not uniformly marked at all (some of the larger counties and cities have accident locator systems but they vary according to the referencing procedures used). The Department of Highways and Transportation's Traffic and Safety Division, in cooperation with the Data Processing Division, has taken some preliminary looks at alternative location referencing systems but the development of a comprehensive and widely acceptable system is still in its infancy.

A MANAGEMENT OVERVIEW OF VIRGINIA'S TRAFFIC RECORDS PROBLEM

Over the years Virginia's traffic records system has evolved in an ad hoc fashion. The DMV, Department of State Police, and Department of Highways and Transportation, which functionally constitute the state's traffic records system, have created and modified separate data systems suited to their individual needs. Their information needs were defined by the 1 gislatively determined roles they were to play in administering state laws and programs related to all phases of highway travel. Thus, the DMV concerned itself primarily with the administration of vehicle registration and driver licensing laws, the Department of State Police handled the enforcement of the state's traffic laws, and the Department of

---

*The interstate system is mileposted physically (using milepost markers) while the primary system is mileposted only on the graphic logs.

Highways and Transportation oversaw the development of the state's highway network. Each agency collected and processed data which helped it to fulfill its basic function. Highway safety was considered to be just one aspect of the functions of these agencies.

Along with the passage of the Federal Highway Safety Act of 1966 (and subsequent amendments) has come an emphasis on highway safety planning, administration, and research. In turn, this has led to many new and varied demands on the accident data collected by the state. The data must be more accurate, more timely, more complete, more flexible, and more accessible than ever before. Highway safety planning, administration, and research problems are essentially information problems. If reliable and useful data are available then problem identification, countermeasure development, and program evaluation follow all the more easily and effectively. This statement suggests that if scarce highway safety resources are to be effectively used, considerable emphasis should be placed, now and in the future, on developing the cornerstone of effective planning — good quality information systems.

In recent years highway safety has come to be considered as a "systems" problem requiring a broad based (systems) approach to its solution. In Virginia, the Department of Transportation Safety has been established to coordinate all transportation safety related activities throughout the state, including those which traditionally have been the specific function of individual agencies along with those which fall across or in between agency boundaries. The Department of Transportation Safety and all of the state and local organizations it attempts to coordinate need timely and accurate accident data to fulfill their function. However, to date it has been impossible to obtain the needed information from state files in a timely and efficient manner.

The Commonwealth's overall traffic records problem seems to be, how can the state best organize and manage its accident data collection, processing, and distribution activities so that as many agencies and localities as possible have timely access to the traffic records information they require within a set of clearly defined economic, operational, and technological constraints?

A SUGGESTED APPROACH TO SOLVING THE PROBLEM

If the traffic records project is going to be revived it appears that the Commonwealth must choose from among three basic approaches. The first and most obvious approach is to pick up on the old TRIS project where it was left off. The Management Review Committee and Project Team would be reformed, the project documentation now scattered among various agencies would be reassembled and updated, and activity would resume in the design phase. While this

is an appealing solution on the surface, it is doubtful that a resurrected TRIS project (as originally conceived) would be successful. It has been almost 4 years since there has been any activity on the TRIS project. While some of the original documentation may still be of value, it seems likely that the bulk of it may not. To assemble, review, and update all of this information may require considerable expenditure of time and effort. Additionally, the TRIS project may be stigmatized as a failure which could doom it from the very start.

A second approach might be to bring in a consultant to study Virginia's traffic records problems from an impartial perspective and to design and implement a new system. While a consultant will certainly provide a solution, the state would run the risk that the proposed system will not be acceptable to all users and would never be implemented. There may be a place for a consultant in Virginia's traffic records future, but it would seem wiser for the state to articulate its own needs first (rather than have them articulated for it by the consultant), and then seek outside help if needed.

The third approach, the one advocated in this report, is to start the traffic records project from scratch, salvaging the best of the work already completed and discarding the rest. Specifically, it is proposed that the state should employ a modified version of the ARDI (for Analysis, Requirements Determination, Design and Development, and Implementation and Evaluation) approach to planning and developing a management information system.* The total ARDI approach involves four phases: 1) feasibility study, 2) system analysis and design, 3) system development, and 4) system implementation and evaluation. Only the first two phases of the ARDI approach, the initial planning and design phases, will be discussed in any detail in this report. To fully discuss the latter two phases may be premature at this point.

The ARDI approach to management information system development has at least one significant shortcoming. The planning, design, development, and implementation of a revamped traffic records system employing the ARDI project organizational structure and task

---

*It is a "modified version" because ARDI was developed for application in the private sector (i.e., large corporations). Some changes have been made by the author to mold the ARDI approach to the problem at hand.

sequence outlined in this report will be a long-term project, probably spread out over a period of several years. Although the bulk of the monetary costs of a new traffic records project may be borne by the NHTSA, a thorough traffic records effort will be costly to project participants in terms of time.

While the need for improvement in the accuracy and timeliness of Virginia's accident data has been expressed by the NHTSA, FHWA, Department of Transportation Safety, Department of Highways and Transportation, and Virginia's localities, among others, traffic records is currently not considered to be a top priority area by the state's upper level management. Clearly, top management will not support a large-scale, time-consuming traffic records project which is directed toward alleviating problems which are not perceived as having a high priority. Since it is absolutely critical that a renewed traffic records effort have the backing of high level management some preliminary research will be required to demonstrate that traffic records is an area in need of attention.

In a time of financial belt tightening the most appealing argument for undertaking a major state project must focus on economics. One of the great stumbling blocks in the path of the traffic records project has been speculative reasoning that a revamped traffic records system would be prohibitively expensive. A determined and thorough effort should be made to prove or disprove this hypothesis so that speculation can be laid to rest. It is proposed that prior to initiating an ARDI-like approach to developing a solution to Virginia's traffic records problems a detailed cost study of the current system should be undertaken. This study would provide answers to the following questions:

1. What is Virginia's traffic records system?

2. How does the current system operate?

3. How much does it currently cost the state to collect, process, store, and distribute traffic records data?

4. How much would it cost the state to collect, process, store, and distribute traffic records data if the system was consolidated in one central location?

5. What is the feasibility of carrying out such a consolidation scheme?

If this research could show that a reorganization of the state's traffic record-keeping activities would result in increased efficiencies over the current system at equal (or perhaps even less)

cost, then clearly a most convincing argument will have been made that traffic records deserves a closer look by top management. Such a study could be sufficient justification for reinitiating the traffic records project with the support of upper level management.

THE ARDI METHODOLOGY

Methodologically, the ARDI approach to systems development discussed here is very similar to that used in the TRIS project. This similarity should facilitate the integration of work previously completed into the new traffic records project. Further, the modular organizational and task structures of the ARDI approach make it easy to acquire consulting services wherever needed. So the ARDI approach embraces the best features of the two approaches discussed above.

It is important at this point not to get too involved in the details of the tasks to be completed in the course of a system development project. Methodologically, all approaches to developing an information system are basically the same at the task level. First, information is gathered on the existing system and is then analyzed and evaluated. Deficiencies are noted, objectives are generated which address these deficiencies, and alternative solutions are developed. One "best" alternative is chosen and implemented. The ARDI approach to systems development is presented in this report as an example of a rational, internally consistent, and detailed approach to developing a traffic records system in Virginia. It is not the only way be any means. It may be modified further or be discarded for another.

The organizational setup for the ARDI approach is very similar to that used for the original TRIS project. Initially it involves the formation of a Steering Committee of agency heads which answers to the governor. In a later phase the Steering Committee will set up a project team composed of top level data processing personnel and prospective system users. The committee may also organize ad hoc teams to look into specific issues, and the project team may do the same. This hierarchical organizational structure ensures that both technical and managerial issues are addressed systematically and simultaneously, and, further, that the project is seen in its perspective to competing statewide needs.

At the cabinet level the initial steps to be taken toward resurrecting the traffic records project might be, first, to advise all involved agency heads that a new look is going to be taken at the system and to solicit their comments; second, to identify the source and magnitude of potential economic and human resources; and third, to organize the Steering Committee composed of agency

heads such as the Commissioner of the Division of Motor Vehicles, Superintendent of the Department of State Police, Commissioner of the Department of Highways and Transportation, Director of the Virginia Department of Transportation Safety, and perhaps interested members of the State Transportation Safety Board. The Secretary of Transportation may chair the Committee (or cochair it with the Secretary of Public Safety). The Secretary of Transportation's MIS director may serve as the Committee's secretary and could act as principal liaison between the Steering Committee and each of the teams it may set up.

The Steering Committee should remain in existence throughout the life of the project. Its primary function will be to provide management control over the project. It will be responsible for installing project planning and control procedures, approving budgets, settling reporting lines among the various project teams, defining project priorities, and evaluating whether stated objectives are being fulfilled at the conclusion of each phase. Eventually it will be the responsibility of the Steering Committee to introduce and promote the use of the new system. The Committee should also conduct an evaluation once the system is installed.

Prior to initiating Phase I, the feasibility study phase of the ARDI approach, the Steering Committee must —

1. precisely define the problem to be solved;

2. define the scope of the project; and

3. determine the objectives of the project.

Once these items are agreed upon (and they are among the most important in the project) the Steering Committee would guide and participate in a feasibility study. (A subcommittee might be appointed for this task.) This might merely involve a review and update of the report of the Traffic Records Committee's Feasibility Study Team; however, it should be remembered that this report is now over 6 years old and may require considerable revision. The Steering Committee will have to decide if the Feasibility Study Team's report is adequate. (One topic that was not adequately covered in the earlier study was that dealing with the economics of developing and implementing a new traffic records system. It would seem prudent to be sure that this subject is given close attention this time around.) The feasibility study should provide adequate qualitative and quantitative information to permit a decision as to whether or not the project should be continued. It should also contain the objectives to be met by the new system,

the organizational constraints that are to be considered, and, perhaps, an indication of what computer hardware and software will be required. Once the feasibility study has been reviewed and accepted by the Steering Committee, a recommendation should be made to the Governor on the advisability of continuing the project. If the recommendation is positive and the Governor approves, then Phase II, the system analysis and design phase, should follow.

At this point the Project Team is organized by the Steering Committee. This team should be composed of technical experts such as data processing managers and systems analysts from the DMV, Department of State Police, Department of Management Analysis and Systems Development, and Department of Highways and Transportation, along with management representatives from prospective major system users such as the Department of Transportation Safety, Department of Health, Department of Education, DMV, Department of State Police, the Traffic and Safety Division of the Department of Highways and Transportation, and the localities. All of the individuals to be involved should be familiar with the line operations of their agencies (or division within their agency) so that system design alternatives can be considered within a realistic context. (See the project organizational chart in Figure 1.)

The system analysis and design will be a hybrid of the first two (requirements determination and system design) phases of the old TRIS project. Figure 2 summarizes the activities to be carried out during Phase II in flowchart form. The chart will be referred to by task number as the sequence of Phase II activities are described in the next few paragraphs.

Following formation of the Project Team (Step 1) the Steering Committee will be responsible for acquainting team members with the feasibility study (Step 2) and the project schedule (Step 3), and will introduce reporting and documentation guidelines for Phase II activities (Step 4).

The first task to be performed by the Project Team will be to analyze the existing traffic records system (Step 5). This will entail the accomplishment of two subtasks. The first will be to prepare an assessment of the environment in which the present system is operating. This would include an identification of federal requirements and programs which have an influence on the traffic records system in Virginia, a description of the organizational relationships existing among involved state transportation safety agencies with emphasis on their responsibilities related to accident data collection, processing, dissemination, and use, and a description of the organizational relationship between localities and state agencies. The second subtask will be to describe the present flow of traffic records information among state and local agencies.

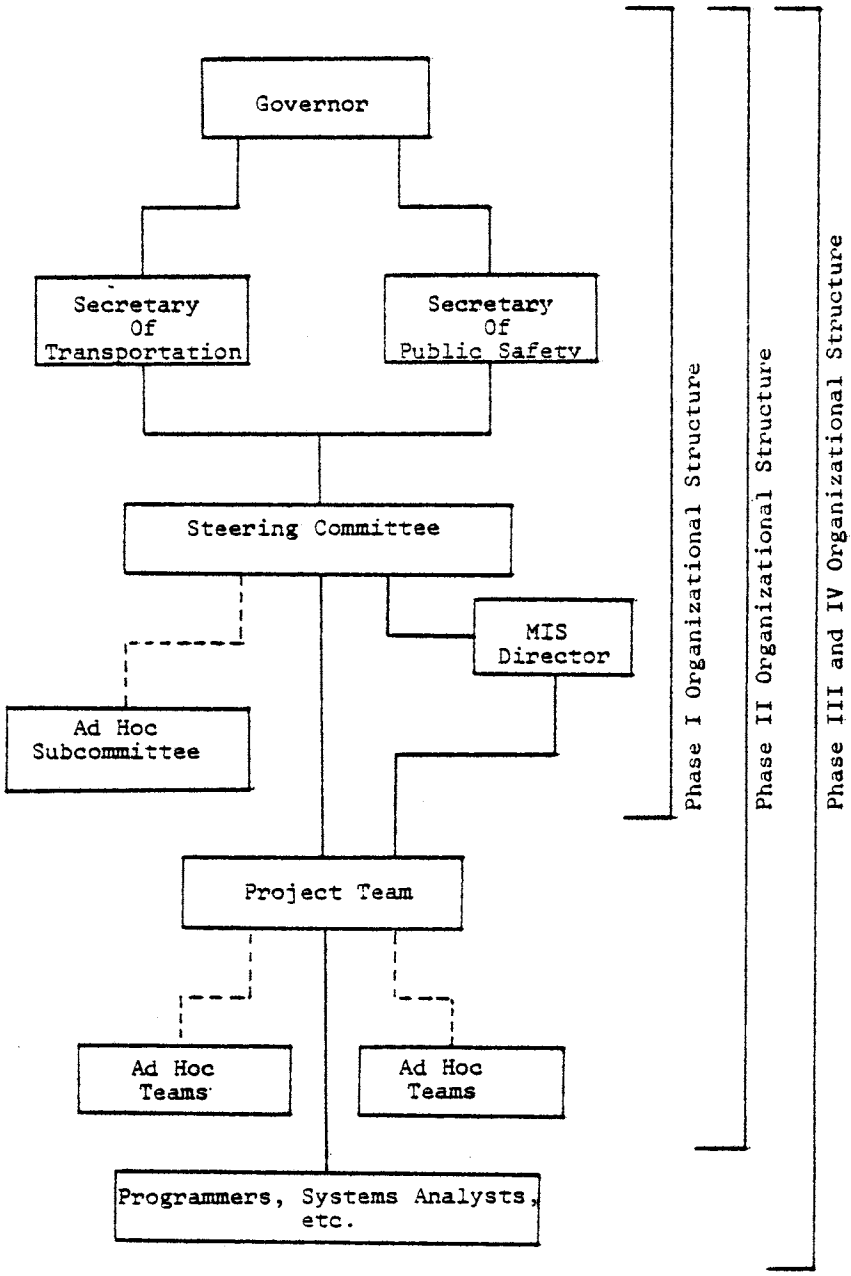


Figure 1. Organizational structure for ARDI approach to systems design and development.

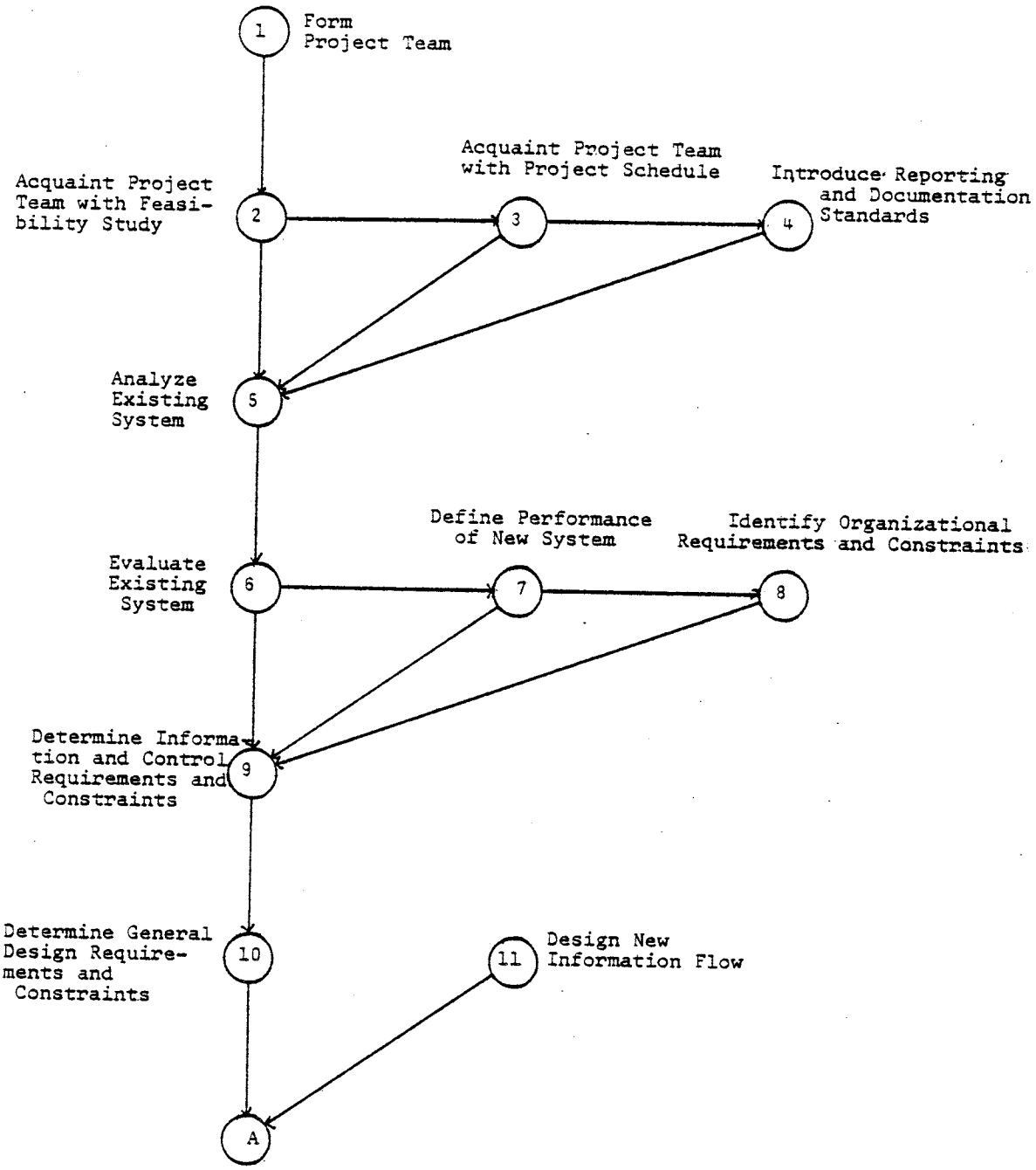


Figure 2. Flowchart of ARDI system analysis and design (Phase II) activities.

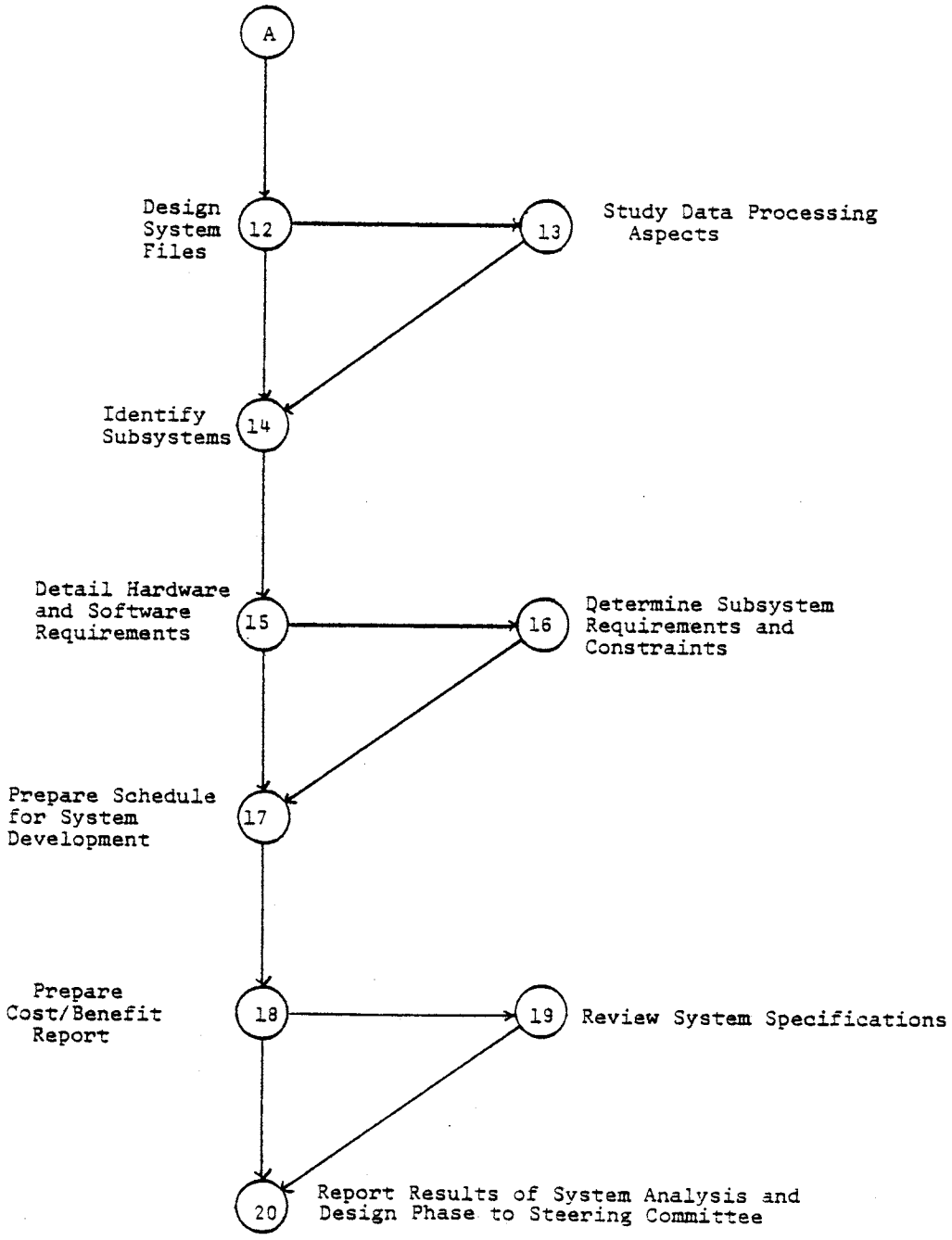


Figure 2. continued

This should include a description of inputs into the system, a tracing of their flow among agencies, a description of the files and format in which traffic records information is stored, and an identification of the outputs and capabilities of the current system. With some updating, part of the work done during the requirements analysis phase of the TRIS project may be of considerable value here.

The Project Team will then prepare an evaluation of the existing system (Step 6). This evaluation should be a qualitative and quantitative assessment of the performance of the system with particular attention being paid to its operating costs.

At this point the Steering Committee, with the assistance of the Project Team, will define the performance of the new system (Step 7). Basically this will involve the preparation of a set of objectives to be met by the new system along with an assessment of the likelihood of achieving them. If the objectives are stated in general terms (i.e., Objective: to decrease the time lag in the flow of accident data among state agencies), then they should be broken down into detailed sub-objectives capable of being quantified (i.e. Sub-objective: all accident reports received at the DMV should be forwarded to the Department of State Police within 48 hours). It will be necessary to predict the performance of the new system in this manner for three reasons:

1. To facilitate comparisons of the cost and benefits of the old and new systems;

2. to determine if the new system, once implemented, is satisfactorily achieving its objectives; and

3. to enable the establishment of priorities for the objectives so that alternative system designs can be developed which address the most important system performance criteria.

Concurrent with the development of these system performance objectives, the Project Team will identify the organizational requirements and constraints which will be expected to exist when their system is implemented (Step 8). Since it is conceivable that alternative system designs may call for changes in the organizational relationships among state and local agencies, it is important to note in the early going where changes can and cannot take place so that only realistic alternatives will be considered by the Project Team.

The next task to be addressed by the Project Team will be the determination of the new system's information and control requirements and constraints (Step 9). This will involve the identification

of the accident data needs of each agency (as performed in Phase I of the TRIS project). The needs may be expressed in terms of inputs (i.e., data element needs), outputs (statistical reports, data summaries), or both. It will be vitally important for the Project Team to distinguish between an agency's needs and wishes for particular information items. The Project Team must also articulate what restrictions will be placed on the use and dissemination of traffic records data (i.e., right to privacy considerations).

The Project Team will develop the general design requirements and constraints for the new system (Step 10). The characteristics of the anticipated system should be described with respect to the parameters of maintainability, flexibility, expandability, and compatibility with peripheral systems. Budgetary constraints on data processing should be articulated at this point. Additionally, it should be determined if any restrictions (contractual, financial, etc.) exist which will constrain the state from purchasing additional computer hardware.

Given all the requirements and constraints, the Project Team will design a new information flow (Step 11). This will be a description of how traffic records data will pass among the various users of the new information system. Following this, the Project Team will design the system files (files which will be used by more than one agency) for the new information system (Step 12). Simultaneously, a study of the data processing aspects of the new information flow will be undertaken (Step 13). The result should be a description of the major software systems that will be needed along with an outline for the new data processing flow.

The Project Team may divide the system into subsystems at this point (Step 14). The Team will select one or two subsystem configurations from among the many possible alternatives, detailing the hardware and software requirements (Step 15) and the general subsystem requirements and constraints (Step 16) for each. Since it will most likely be impractical to develop all subsystems simultaneously, the Project Team will prepare a preliminary schedule for system development (Step 17) granting priority to certain subsystems consistent with overall system objectives. The Project Team will prepare a cost/benefit report (Step 18), review their system specifications (Step 19), and report their findings for Phase II to the Steering Committee (Step 20).

The Steering Committee will review and approve the findings of the Project Team. It will then decide if the state has the necessary expertise to develop, implement, and test the software systems specified in the design phase or whether a software and systems development consultant should be called in to complete the project. The Steering Committee should submit its recommendations and comments to the Governor for his review and approval. At this

point, the state should have a blueprint for the development of a traffic records system which meets as many user needs as possible within a set of clearly defined economic, technological, and operational constraints. This will complete Phase II of the project.

The procedures to be followed for Phases III and IV will be contingent upon the Steering Committee's evaluation of the state's ability to develop the prescribed system. Phase III activities will be basically the same as those in Phase II, the distinction being that they will be performed in greater detail by lower level personnel. It is at this level that the actual software systems will be coded and tested for each subsystem, the details for information flow procedures and system file design will be worked out, and final decisions on the make and type of hardware to be employed will be made. Once these items have been worked out Phase IV, the final system implementation and evaluation phase, will follow. The activities for this phase will include the training of system users, installation of hardware and peripheral equipment, implementation of the software systems on the hardware, and the conversion of existing programs and files to ensure compatibility with the new system. After the system has been in use for some time, an evaluation of its performance relative to the original objectives of the project will be carried out by the Steering Committee. Adjustments, if necessary, will be made to the system and the evaluation process will be repeated.

RECOMMENDATIONS

At present the state has no active traffic records project nor any strategy to address its traffic records deficiencies in any comprehensive, coordinated manner. As documented in earlier traffic records studies, the information needs of many of Virginia's traffic safety agencies and localities are not being served by the existing traffic records system. If Virginia's traffic safety agencies and localities are to effectively analyze highway safety data, identify problems, and plan and evaluate countermeasures, then accurate and timely accident data must be provided to them. While the information needs of many agencies and localities are an important concern, the state cannot blindly undertake a large-scale traffic records project without sufficient economic justification. It is a recommendation of this report that a detailed cost study be made of the current traffic records system to examine the feasibility of consolidating the state's accident record-keeping activities in a central location. If the results of this study demonstrate that efficiencies and cost savings can be realized by this consolidation, then it is recommended that the state reinitiate its traffic records project in an attempt to study and improve the

existing accident data information system. Particular attention should be paid to improving the accuracy of the data contained in state files, developing the means to correlate the information contained in the state's driver, vehicle, accident, and roadway files, and improving the accident data distribution systems so that all agencies receive the information they need in a timely manner.

The state has been aware of its traffic records deficiencies for almost a decade yet, despite pressure exerted both from within and outside of the Commonwealth to improve the system, it remains essentially unchanged. The responsibility for the perpetuation of this situation lies not with any single agency but rather with the existing system as a whole. In order to overcome this problem of organizational inertia, it is imperative that the motivation to improve the Commonwealth's traffic records system should come from the top levels of state government. Thus, it is a recommendation of this report that the Governor should be involved throughout the life of any new traffic records project. Final decisions must be made at the executive level. Without the support of the Governor's office any new attempt to improve the traffic records system will surely be unsuccessful.

The state must choose from three basic approaches to solving its traffic records problems. The first is to reinitiate the TRIS Project, which has been dormant for almost four years; the second is to call in a consultant to design and develop a system for the state; and the third is to start the project over again, salvaging the best of the work already completed and discarding the rest. The ARDI approach to system development was presented in this report as an example of a scheme which will allow for the use of previously completed work and will accommodate the use of consulting services, if needed. Additionally, the suggested organizational structure of the ARDI approach calls for the involvement of managerial personnel from the top levels of state government as well as high level technical experts. This structure ensures that management and technical issues will be considered systematically and simultaneously in the design of a new traffic records system. It is a recommendation of this report that the state adopt, at least in concept, the ARDI approach to systems development in the design and development of a new traffic records system for Virginia.

ACKNOWLEDGEMENTS

The author thanks Richard Edwards of the DMV, Jack Williams of the Department of State Police, C. P. Heitzler of the Department of Management Analysis and Systems Development, Charles D. Hall of the Virginia Department of Highways and Transportation, and Hiram Johnson of the Office of the Secretary of Transportation for freely offering their time and valuable perspectives on Virginia's traffic records situation.

Also, the author thanks the following staff members of the Virginia Highway and Transportation Research Council for their advice and editorial assistance: Frank Lisle, Wayne Ferguson, Cheryl Lynn, Clint Simpson, Martin Parker, and Philip Harris.

Finally, special thanks go to Harry Craft for his professional editorial assistance and to Toni Thompson and Jean Vanderberry for typing the draft and final manuscripts.

REFERENCES

1. Doom, I. F., Ferguson, W. S., Walton, L. E., Meachum, C., and Greenberg, D., Base Year Highway Safety Expenditures and Cost Estimates for Implementing the Highway Safety Act of 1966 in Virginia. Virginia Highway and Transportation Research Council, November 1967.

2. Governor's Management Study, Inc., Governor Management Study, Richmond, Virginia, November 1970.

3. Hartman, W., Mathes, H., and Proene, A., Management Information Systems Handbook, McGraw-Hill, 1968.

4. Taylor, Hunter F., Report of the Virginia Traffic Records Feasibility Study Team to the State Traffic Records Committee, Virginia Highway Research Council, January 1973.

5. Heitzler, C. P., and Lisle, F. N., Executive Summary, Virginia Traffic Records Information System Project, Description of Current System and Documentation of Needs, Unpublished, May 1975.

6. Lisle, F. N., Traffic Records Needs of Local Governments in Virginia, Virginia Highway and Transportation Research Council, May 1975.

7. _____, Traffic Records Needs of the Highway Safety Division of Virginia, Virginia Highway and Transportation Research Council, January 1976.

8. Simpson, C. H., and Haggerty, M. P., Development of a Master File of Essential Highway Safety Planning and Evaluation Data, Virginia Highway and Transportation Research Council, July 1978.

9. Federal Highway Administration, Virginia's Accident Data Collection Analysis and Applications Systems, FHWA, 1976.

10. Simpson, C. H., and Robins, R., Commonwealth of Virginia, Department of Transportation Safety, Highway Safety Plan, Virginia Highway and Transportation Research Council, September 1978.

11. Simpson, C. H., Commonwealth of Virginia, Highway Safety Division, Seventh Annual Highway Safety Work Program, Virginia Highway and Transportation Research Council, August 1977.

12. _____, Commonwealth of Virginia, Highway Safety Division, Sixth Annual Highway Safety Work Program, Virginia Highway and Transportation Research Council, August 1976.

APPENDIX A

DATA ELEMENT NEEDS OF VIRGINIA'S TRANSPORTATION SAFETY AGENCIES BY FUNCTIONAL AREA

TABLE A-1

TRAFFIC RECORDS REQUIREMENTS BY FUNCTIONAL AREA

Functional Area	Original Listing	Elements Added	Elements Deleted	Elements Required	Elements[a] Unmet	Elements[a] Unmet Time[b]	Elements[a] Unmet Unavailable[c]
Driver	93	34	11	116	19 (16%)	5 (4%)	14 (12%)
Vehicle	93	1	8	86	30 (35%)	17 (20%)	13 (15%)
Roadway	169	11	12	167	131 (78%)	82 (49%)	49 (29%)
Accident	164	19	7	176	162 (92%)	108 (61%)	54 (31%)
Emergency Medical Services	46	0	0	46	19 (41%)	2 (4%)	17 (37%)
Pupil Transportation	0	202	0	202	197 (98%)	104 (52%)	93 (46%)
Miscellaneous	38	0	10	28	14 (50%)	0 (0%)	14 (50%)
Management Summary	160	171	3	328	265 (81%)	185 (56%)	80 (25%)
TOTAL	762	438	51	1149	837 (73%)	503 (44%)	334 (29%)

[a] ( ) = Percent of required

[b] Time indicates elements collected and stored but not available in time required.

[c] Unavailable indicates elements not collected or stored in existing system.

Source: Executive Summary, Virginia TRIS Project, Description of Current System and Documentation of Needs, May 1975.

APPENDIX A continued

TABLE A-2

UNMET TRAFFIC RECORDS REQUIREMENTS BY AGENCY

Functional Area	DMV		Highway Dept.		State Police		Highway Safety Division		Localities		Emergency Medical Services		Driver Ed. Ser.		Pupil Trans. Ser.	
	T	U	T	U	T	U	T	U	T	U	T	U	T	U	T	U
Driver		1					2	13			3	1			1	
Vehicle					1	1	5	9	1	5	3				10	2
Roadway			74	30			22	28	21	24						2
Accident			57	2	1	3	44	49	84	15	50	18	1		71	12
Emergency Medical Services							2	15				16				
Pupil Transportation															104	93
Miscellaneous						2		12		2						
Management Summary			4	1			87	69	132	23	23	9	13	4	1	3
TOTAL	0	1	135	33	2	6	162	195	238	69	79	44	14	4	190	112

T = Unmet elements which are collected and stored but not available in time required.

U = Unmet elements which are not collected or stored in existing system.

Unmet Pupil Transportation Services (PTS) requirements based on Federal Highway Safety Standard 17 which includes both public and private pupil transportation.

Source: Executive Summary, Virginia TRIS Project, Description of Current System and Documentation of Needs, May 1975.

APPENDIX B

STATE ACCIDENT REPORTING SYSTEM
DUPLICATE ACCIDENT PROCESSES — ANNUAL COSTS

Step	Div. Motor Vehicles		Dept. State Police		Va. Dept. Highways		Total	
	Personnel	Computer	Personnel	Computer	Personnel	Computer	Personnel	Computer
Receipt and matching of accident reports	$121,900	$3,060	$48,700	N/A	N/A	N/A	$170,600	$3,060
Coding and editing of accident data	65,100	N/A	74,600	N/A	85,500	N/A	225,200	N/A
Data entry, key-punch, scanning and update files (automated)	44,940	45,000	34,100	13,800	900	1,840	79,940	60,640
Filing of accident report	5,000	N/A	(a)	N/A	11,460	N/A	15,460	N/A
Generation of statistical information	(b)	(b)	400	1,500	38,600	15,100	39,000	16,600
TOTAL	$235,940	$48,060	$157,700	$15,300	$136,460	$16,940	$530,200	$80,300

(a) Accident reports filed by Highway Department personnel at State Police Headquarters.
(b) Costs not documented in agency survey.

Source: Executive Summary, Virginia TRIS Project, Description of Current System and Documentation of Needs, May 1975.

APPENDIX C

SUMMARY OF FINDINGS AND RECOMMENDATIONS FROM TRAFFIC RECORDS NEEDS OF LOCAL GOVERNMENTS IN VIRGINIA AND TRAFFIC RECORDS NEEDS OF THE HIGHWAY SAFETY DIVISION OF VIRGINIA

Traffic Records Needs of Local Governments in Virginia was published by the Virginia Highway and Transportation Research Council in May 1975. The study was conducted in conjunction with the Virginia Traffic Records Information System Project initiated in August 1974. Following are the summary of findings and recommendations contained in that report.

SUMMARY OF FINDINGS

The state of Virginia has a unilateral traffic records system whereby localities are compelled by law to provide law enforcement information to the state without any assurance that usable information will be returned to the localities. This situation has forced localities to develop and maintain their own traffic records systems to satisfy state reporting requirements and meet the localities' operation, evaluation and planning needs.

While the localities' roadway systems account for only 17% of the total state mileage, they also account for 35% of the travel, 52% of the reported accidents, 23% of the persons killed, 44% of the persons injured, 54% of the property damage accidents, and 27% of the economic loss due to traffic accidents.

The typical traffic records system employed by Virginia localities is similar to the "Standard City Traffic Accident Reporting System" actively promoted for many years by the National Safety Council with modifications to satisfy the particular characteristics of the individual locality. The small communities make use of the standard system with certain tasks deleted because of the lack of demand. In the medium size communities, the standard system incorporates minor modifications to accommodate the specific characteristics of the community. The large communities exhibit the standard system as the basic structure, or skeleton, for their computer automated tasks. Thus, the primary elements of the standard system are evident in the small local traffic records systems as well as in the large, complex local systems.

The basic information needs of local agencies from a traffic records system are similar to those of their counterparts on the state level. The needs of local police departments are analogous to those of the Department of State Police and the needs of local engineering departments are analogous to those of the Department of Highways and Transportation. The validity of these informational needs has been expressed by localities for many years through the establishment and maintenance of local traffic records systems. However, the performance of these local systems is limited to the percentage of traffic accidents occurring in the community which are reported by the local police department and to the manpower resources available within the localities. In 1973 local police departments reported only 76% of the accidents reported to the state for cities and 68% of the accidents reported to the state for counties with a population of 50,000 or greater. Hence, it appears that local authorities are not aware of 24% of the reported accidents in cities and of 32% of the reported accidents in counties with a population of 50,000 or greater.

RECOMMENDATIONS

In the course of the local traffic records survey, a number of traffic records activities were identified as unnecessarily time-consuming for localities. The following are recommendations which can alleviate some of the problems which were found to exist.

1. The state should return to localities general traffic accident and summons summary information on a monthly basis and more comprehensive summary information on an annual basis. To be of most benefit to the localities, the information should be returned to localities within 30 days of the close of each reporting period. In addition, the information should be returned to the localities in a format which can be used without additional manpower consumption.

2. The state should develop a crash investigation course for local police. This course would be modeled after similar courses conducted by The Traffic Institute, Northwestern University. It would provide every police officer with the most efficient and effective crash investigative techniques and would provide uniformity in crash investigation practices.

3. The state should develop an accident report manual. This manual would provide a definition of terms and outline a step-by-step procedure for completion of the accident report. It would provide uniformity in accident reporting.

4. The State Accident Report (FR-300) should be redesigned to accomplish the following:

   (a) Reduce or eliminate typing.

   (b) Utilize standard typewriter line spacing if typing is required.

   (c) Utilize standard typewriter tabs if typing is required.

   (d) Provide more space for driver's address.

   (e) Utilize the standard TAD personal injury and vehicle damage scales.

5. The state should develop, through a pilot project, a standardized, multilevel locator system. This standardized, locator system would allow each locality to select the level of traffic safety analysis desired. Each locality would develop and maintain its locator system within the guidelines and specifications of the standardized locator system. The standardized locator system concept provides each locality with the automated capabilities of the state traffic records analysis programs commensurate with the selected level of the standardized locator system.

6. The state should develop a form to be completed and exchanged by the drivers at the scene of an accident. The form would contain information necessary for the completion of the state accident report and insurance information such as company name and policy number. This form would reduce the police clerical time required following an accident by providing the drivers with the necessary information for completion of the accident report and would allow the driver to perform a beneficial task while the officer performs his duties.

Traffic Records Needs of the Highway Safety Division of Virginia was published by the Virginia Highway and Transportation Research Council in January 1976. The study was conducted in conjunction with the Virginia Traffic Records Information System Project initiated in August 1974. Following are the summary of findings and recommendations contained in that report.

SUMMARY OF FINDINGS

(1) Currently, the Commonwealth of Virginia cannot meet all of the traffic records requirements stipulated in Highway Safety Program Standard 4.4.10 Traffic Records.

(2) Failure of the Commonwealth to implement a complete and comprehensive traffic records system as described in Highway Safety Standard 4.4.10 Traffic Records could result in an annual loss to Virginia of approximately $18 million in federal funds.

(3) Individual record information is required by the Highway Safety Division for use in special studies to identify and evaluate the interaction of driver, vehicle, accident, and roadway information.

(4) Summaries and tabulations of fundamental characteristics within the traffic safety environment are required by the Highway Safety Division. These fundamental characteristics are sought for the driver, vehicle, roadway, accident, emergency medical services, traffic law enforcement and adjudication, and driver education functional areas.

RECOMMENDATIONS

(1) The Highway Safety Division should more fully utilize the traffic records information currently retained in the state system as an interim substitute for an integrated traffic records system.

(2) The Highway Safety Division should initiate a program to inform the suppliers of requested data of the benefits achieved through the use of the requested data.

(3) The Highway Safety Division should initiate a study of the economic feasibility of implementing the integrated traffic records system proposed by the Traffic Records Feasibility Study Team.

(4) Contingent upon the results of recommendation (3), the Highway Safety Division should recommend to the Management Review Committee the design and implementation of an integrated traffic records system as identified by the Traffic Records Feasibility Study Team.

APPENDIX D

STATE ACCIDENT REPORT FORMS

Following are copies of Virginia's accident report forms. The first (FR-300P) is the police accident report form, which consists of a single page of written and graphic information (page D-3) pertaining to an accident surrounded by 37 boxes in which numerical codes are entered by the investigating officer according to an overlain key (shown in place on page D-4). Pages D-5 and D-6 are the front and reverse sides, respectively, of the citizen accident report form (FR-300C).

APPENDIX D continued.

DMV COPY

PAGE ____ OF ____ PAGES

POLICE ACCIDENT REPORT

FR 300P 1/78

ACCIDENT DATE Month Day Year | DAY OF WEEK | TIME AM PM | COUNTY OF ACCIDENT | MILE POST NUMBER | RAILROAD CROSSING ID. NO. IF WITHIN 150 FEET

1 CITY OR TOWN ☐ ☐ OF | LANDMARKS AT SCENE | NUMBER OF VEHICLES | OFFICIAL USE ONLY | 17

ROUTE NO. OR STREET NAME AT SCENE | 18

ROUTE NUMBER OR STREET NAME

☐ AT INTERSECTION WITH OR ____ ☐ MILES ☐ FEET ☐ N ☐ S ☐ E ☐ W OF

2 VEHICLE NO. 1 | VEHICLE NO. 2 (OR PEDESTRIAN)

DRIVER'S NAME (LAST, FIRST, MIDDLE) | OCCUPATION | DRIVER'S NAME (LAST, FIRST, MIDDLE) | OCCUPATION

3 ADDRESS (STREET & NO.) | YEARS OF DRIVING EXPERIENCE | ADDRESS (STREET & NO.) | YEARS OF DRIVING EXPERIENCE | 19

CITY | STATE | ZIP CODE | CITY | STATE | ZIP CODE | 20

4 DATE OF BIRTH Month Day Year | SEX | DRIVER'S LICENSE NUMBER | STATE | DATE OF BIRTH Month Day Year | SEX | DRIVER'S LICENSE NUMBER | STATE | 21

VEHICLE OWNER'S NAME (LAST, FIRST, MIDDLE) | VEHICLE OWNER'S NAME (LAST, FIRST, MIDDLE) | 22

5 ADDRESS (STREET & NO.) | ADDRESS (STREET & NO.) | 23

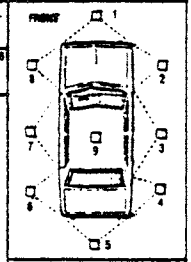
CITY | STATE | ZIP CODE | CITY | STATE | ZIP CODE

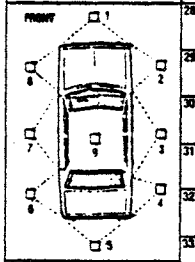
MAKE & TYPE OF VEHICLE (SHOW MOPED, MOTORCYCLE, AMBULANCE, ETC.) | YEAR | REPAIR COST | MAKE & TYPE OF VEHICLE (SHOW MOPED, MOTORCYCLE, AMBULANCE, ETC.) | YEAR | REPAIR COST | 24

6 LICENSE PLATE NUMBER | STATE | NAME OF INSURANCE CO. (NOT AGENT) | LICENSE PLATE NUMBER | STATE | NAME OF INSURANCE CO. (NOT AGENT) | 25

DAMAGE TO PROPERTY OTHER THAN VEHICLES | OBJECT STRUCK (TREE, FENCE, ETC.) | OWNER'S NAME (LAST, FIRST, MIDDLE) | ADDRESS | REPAIR COST | 26

7 VEHICLE NO. 1 DAMAGE CHECK POINTS OF IMPACT | ACCIDENT DIAGRAM | VEHICLE NO. 2 DAMAGE CHECK POINTS OF IMPACT | 27





28 29 30 31 32 33

SPEED: BEFORE ACCIDENT | LIMIT | MAXIMUM SAFE

INDICATE NORTH BY ARROW

SPEED: BEFORE ACCIDENT | LIMIT | MAXIMUM SAFE

VEHICLE NO. 1 DAMAGED: ☐ UNKNOWN ☐ NO DAMAGE ☐ OVERTURNED ☐ MOTOR ☐ UNDERCARRIAGE ☐ TOTALED ☐ BY FIRE ☐ OTHER

VEHICLE NO. 2 DAMAGED: ☐ UNKNOWN ☐ NO DAMAGE ☐ OVERTURNED ☐ MOTOR ☐ UNDERCARRIAGE ☐ TOTALED ☐ BY FIRE ☐ OTHER | 34

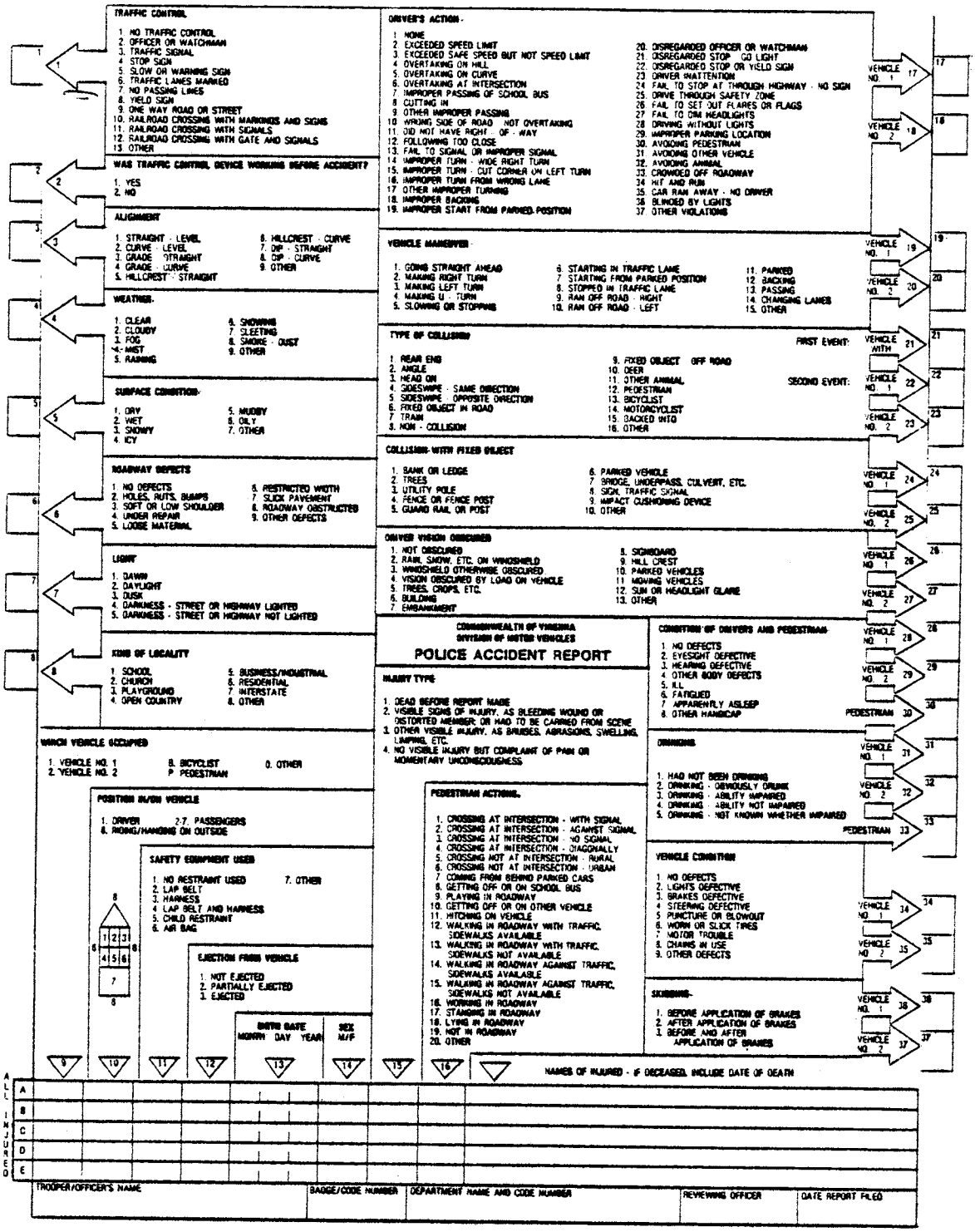
ACCIDENT DESCRIPTION: | 35 36 37

OFFENSES CHARGED DRIVER

	9	10	11	12	13	14	15	16	NAMES OF INJURED - IF DECEASED, INCLUDE DATE OF DEATH
ALL INJURED A									
B									
C									
O									
E									

TROOPER/OFFICER'S NAME | BADGE/CODE NUMBER | DEPARTMENT NAME AND CODE NUMBER | REVIEWING OFFICER | DATE REPORT FILED

APPENDIX D continued.



APPENDIX D continued.

FR 300 C (3/78)

COMMONWEALTH OF VIRGINIA
DIVISION OF MOTOR VEHICLES
CITIZEN ACCIDENT REPORT

DMV COPY

(SEE INSTRUCTIONS ON REVERSE SIDE)

ACCIDENT INFORMATION

ACCIDENT DATE MONTH DAY YEAR	DAY OF WEEK	TIME AM PM	INVESTIGATED AT SCENE BY POLICE?	NUMBER OF VEHICLES	WAS THERE AN INJURY?	WAS THERE A DEATH?	CITY OR COUNTY OF ACCIDENT

ROUTE NO. OR STREET NAME AT SCENE | ☐ AT INTERSECTION WITH | OR ——→ MILES FEET N E S W OF | ROUTE NO. OR STREET NAME

VEHICLE INFORMATION

YOUR VEHICLE	OTHER VEHICLE OR PEDESTRIAN INVOLVED
DRIVER'S NAME (LAST, FIRST, MIDDLE)	DRIVER'S NAME (LAST, FIRST, MIDDLE)
ADDRESS (NO. & STREET)	ADDRESS (NO. & STREET)
CITY / STATE / ZIP CODE	CITY / STATE / ZIP CODE
DATE OF BIRTH MONTH DAY YEAR / SEX / DRIVER'S LICENSE NUMBER / STATE	DATE OF BIRTH MONTH DAY YEAR / SEX / DRIVER'S LICENSE NUMBER / STATE
VEHICLE OWNER'S NAME (LAST, FIRST, MIDDLE)	VEHICLE OWNER'S NAME (LAST, FIRST, MIDDLE)
ADDRESS (NO. & STREET)	ADDRESS (NO. & STREET)
CITY / STATE / ZIP CODE	CITY / STATE / ZIP CODE
DATE OF BIRTH MONTH DAY YEAR / SEX / OWNER'S DRIVER LICENSE NUMBER / STATE	DATE OF BIRTH MONTH DAY YEAR / SEX / OWNER'S DRIVER LICENSE NUMBER / STATE
MAKE & TYPE OF VEHICLE / YEAR / VEHICLE PARKED?	MAKE & TYPE OF VEHICLE / YEAR / VEHICLE PARKED?
LICENSE PLATE NUMBER / STATE / COST TO REPAIR $	LICENSE PLATE NUMBER / STATE / COST TO REPAIR $

DAMAGE TO PROPERTY OTHER THAN VEHICLES — EST. AMOUNT OF DAMAGES $

WAS VEHICLE INSURED?	NAME OF YOUR LIABILITY INSURANCE COMPANY (NOT AGENT)	POLICY NUMBER

INSURED'S NAME (LAST, FIRST, MIDDLE) — POLICY PERIOD MONTH DAY YEAR TO MONTH DAY YEAR

SIGNATURE OF DRIVER	DATE FILED	IF SIGNED BY PERSON OTHER THAN DRIVER, GIVE REASON

APPENDIX D continued.

CITIZEN ACCIDENT REPORT INSTRUCTIONS

THE DRIVER OF ANY VEHICLE INVOLVED IN AN ACCIDENT THAT RESULTS IN ANY PERSONAL INJURY OR IN $250 OR MORE TOTAL DAMAGES TO ALL VEHICLES AND OTHER PROPERTY MUST FILE AN ACCIDENT REPORT WITH DMV WITHIN FIVE DAYS.

THE ONLY EXCEPTIONS TO THIS ARE THAT IF YOUR VEHICLE WAS LEGALLY PARKED OR THE ACCIDENT OCCURRED ON PRIVATE PROPERTY NO REPORT IS REQUIRED. IF THE DRIVER IS PHYSICALLY INCAPABLE OF FILING A REPORT, AN OCCUPANT ABLE TO MAKE A REPORT MUST DO SO.

WHEN FILLING OUT THIS REPORT PLEASE:

1. USE A TYPEWRITER OR PRINT PLAINLY IN INK.
2. FILL IN ALL INFORMATION TO THE BEST OF YOUR KNOWLEDGE. IF INFORMATION IS UNKNOWN, WRITE "UNKNOWN".
3. PLACE A CIRCLE AROUND THE PROPER ANSWERS IN THE ACCIDENT INFORMATION AREA.
4. WHEN COMPLETING INFORMATION CONCERNING YOU AS THE DRIVER, USE SECTION MARKED "YOUR VEHICLE".
5. USE INFORMATION EXACTLY AS IT APPEARS ON YOUR DRIVER'S LICENSE, REGISTRATION CARD, AND INSURANCE POLICY.
6. FOR "TYPE OF VEHICLE" WRITE THE EXACT TYPE OF VEHICLE SUCH AS: SEDAN, STATION WAGON, TRUCK, MOTORCYCLE, MOTOR HOME, CAR AND TRAVEL TRAILER, MINI BIKE, BICYCLE, ETC.
7. USE A SECOND REPORT FORM OR A PLAIN SHEET OF PAPER TO REPORT ADDITIONAL VEHICLES.
8. PLEASE SIGN AND DATE THE REPORT AND MAIL THE FIRST AND SECOND COPIES TO: FINANCIAL RESPONSIBILITY DEPARTMENT, DIVISION OF MOTOR VEHICLES, P.O. BOX 27412, RICHMOND, VIRGINIA 23269.

YOU MAY KEEP THE LAST COPY OF THE REPORT FOR YOUR RECORDS.

THE PERSONAL INFORMATION REQUIRED ON THIS REPORT IS USED TO IDENTIFY PERSONS AND VEHICLES INVOLVED IN ACCIDENTS. ALL INSURANCE INFORMATION WILL BE VERIFIED WITH YOUR INSURANCE COMPANY. THIS INFORMATION IS REQUIRED BY VIRGINIA LAW AND FAILURE TO FURNISH IT MAY RESULT IN THE SUSPENSION OF THE VEHICLE OWNER'S DRIVER'S LICENSE AND LICENSE PLATES.

TO BE COMPLETED BY INSURANCE COMPANY WHEN COVERAGE IS DENIED.

TO: DIVISION OF MOTOR VEHICLES
FINANCIAL RESPONSIBILITY DEPARTMENT
P. O. BOX 27412
RICHMOND, VIRGINIA 23269

THE RECORDS OF THE UNDERSIGNED COMPANY SHOW THERE WAS NO AUTOMOBILE LIABILITY INSURANCE POLICY IN FORCE PROVIDING VIRGINIA MINIMUM LIMITS OF LIABILITY REQUIRED UNDER SECTION 46.1-504 CODE OF VIRGINIA FOR THE VEHICLE INVOLVED IN THE ACCIDENT SHOWN ON THE REVERSE SIDE OF THIS FORM.

NAME OF INSURANCE COMPANY	SIGNATURE OF AUTHORIZED REPRESENTATIVE	DATE