DEVELOPMENT OF A MASTER FILE OF ESSENTIAL HIGHWAY SAFETY PLANNING AND EVALUATION DATA

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A Report Prepared by the Virginia Highway and Transportation Research Council Under the Sponsorship of the Department of Transportation Safety

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

Charlottesville, Virginia

July 1978
VHTRC 79-R1

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ABSTRACT

The National Highway Traffic Safety Administration requires each state to file an Annual Highway Safety Work Program as a prerequisite for obtaining federal §402 safety monies. However, the work program serves as more than a mechanism for obtaining funds; it induces planning, programming, and budgeting of highway safety projects. The Commonwealth of Virginia has endorsed the work program concept and is continually striving to improve its highway safety planning process.

The most recent improvement in Virginia's highway safety planning process was embodied in a report by Ferguson and Simpson that introduced the concept of "Problem Identification/Management by Objectives" to the state's work program. Local highway safety commissions and state traffic safety agencies were asked to complete their annual work program submissions using this concept, the intent being to enhance the quality of their planned highway safety activities.

This report attempts to further implement the concept by offering refinements to the Ferguson-Simpson approach. Under these refinements, the local commissions and state agencies are not asked to generate much of the problem identification data; the necessary information is provided them. These data should aid the local commissions and state agencies in identifying problem areas needing attention. This approach was well received when first used in preparing Virginia's FY '77 Annual Highway Safety Work Program. However, the methods of compiling and disseminating information proved quite laborious and time-consuming. Therefore, this report recommends further revisions be made to the process by automating various parts of the retrieval, assimilation, and dissemination stages.

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INTRODUCTION

With the advent of the Annual Highway Safety Work Program (AHSWP) in 1969, the National Highway Traffic Safety Administration (NHTSA) plotted a new course for the administration of the state highway safety program. Previous to that time, NHTSA, or its predecessor, the National Highway Safety Bureau, had required that its personnel review each highway safety project for which federal funds were requested. Afterwards, federal funding was integrated into state planning. That is, each state was required to develop a comprehensive plan for highway safety management, and in order to obtain federal funds, each was asked to document its safety program needs. This annual state submission became known as the Annual Highway Safety Work Program.

Generally, the new approach was aimed at the overall goal of identifying problem areas in the highway safety program structure. This approach also had several secondary goals. First, by introducing statewide planning the AHSWP attempted to produce a systematic, continuous review of safety programs. Secondly, by linking planning and budgeting, the AHSWP forced the states to review their current and future needs in order that federal funds be efficiently utilized. Finally, the AHSWP's emphasis on planning was designed to mesh with an evaluation process to ensure effective program implementation, review, and continuation.

Yet, from its incipience the AHSWP has created some problems. In Virginia, the program was initiated in precisely the manner described in the federal publication Highway Safety Program Manual (Volume 102). Each state traffic safety agency and local highway safety commission was asked to complete a "sub-element plan." This plan requested each organizational unit concerned to list safety programs it wished to implement and the costs associated with these programs. No emphasis was placed on problem identification. Consequently, the programs listed under the sub-element plan were sometimes quite arbitrarily chosen.

In 1976, Ferguson and Simpson proposed revisions to the AHSWP in Virginia.* They critically reviewed the existing system for completing the AHSWP, concluded that the system was inadequate, and called for a resurrection of the goals outlined by NHTSA when the AHSWP was created. Specifically, they outlined an AHSWP which emphasized the identification of highway safety problem areas.

With the adoption of the Ferguson-Simpson proposal, state agencies and local commissions were furnished "problem identificatio statements" for each program area that would aid in focusing attention on problem areas. The agencies and commissions were asked to utilize these problem identification statements in completing their sub-element plans. However, in the initial year of implementing the revised plan, a number of commissions and agencies failed to complete the work program in the prescribed format. As a result, some sub-element plans were again prepared in a less than creditable manner.

The Ferguson-Simpson report pointed out that in order for the AHSWP to work, the bodies formulating the tangible safety programs (i.e., the local commissions and state traffic safety agencies) must be provided the data necessary for identifying problem areas. And that once these problem areas were identified, the agency or commission could create a plan to give them the needed attention and request funds on a priority basis. These requests could then be compiled in the state's AHSWP and submitted to the appropriate federal agencies. Thus, the AHSWP would accurately represent Virginia's funding and programming needs. Furthermore, when the bloc grant was received, the submissions from the commissions and agencies could be used as a basis for systematically and fairly distributing the funds.

Focusing upon the need for problem identification and informed decision making, the FY 77 AHSWP attempted to advance the ideas developed in the Ferguson-Simpson report. Rather than using a work program approach, staff members of the Virginia Highway and Transportation Research Council gathered planning and programming information, and then provided each local commission and state agency a completed "problem identification statement" for each standard area for use in developing program needs and requests for funds.

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*"Suggested Revisions to the Annual Highway Safety Work Program in Virginia," Virginia Highway and Transportation Research Council, January 1976.

Although the effect of this approach upon the quality of the funding requests has yet to be thoroughly evaluated, it is felt that it will enhance the AHSWP. Therefore, this study is premised upon the assumption that providing local highway safety commissions and state traffic safety agencies with relevant program data is a basic component of a viable highway safety program.

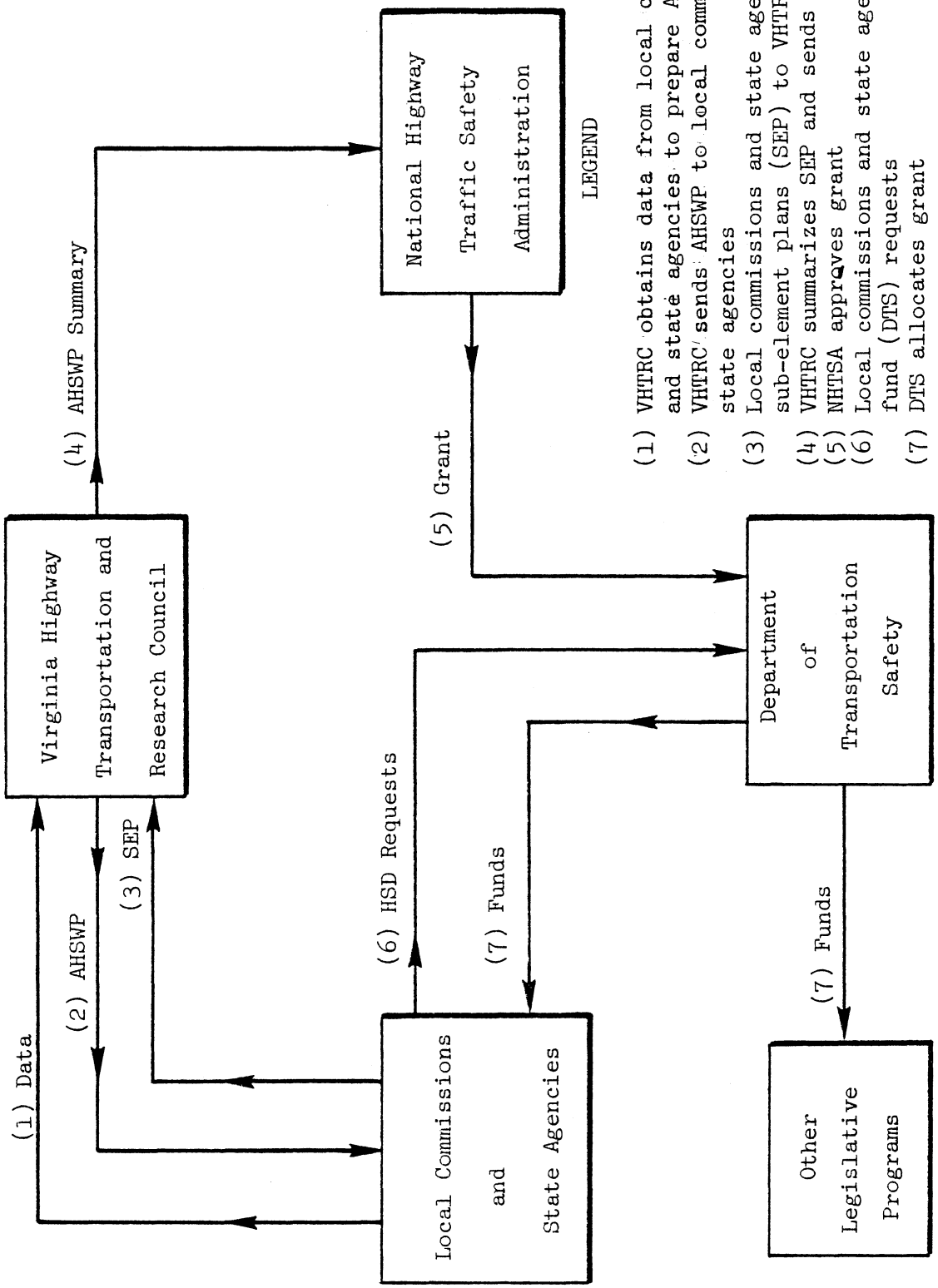
STATEMENT OF THE PROBLEM

Conceptually, Virginia's work program achieves the results prescribed by the federal reporting criteria. Each local commission and state agency files a sub-element plan which justifies needed safety programs and gives projected costs for them. These submissions are compiled and forwarded to the NHTSA and FHWA with a request for a bloc grant of funds. In order to obtain funds from this bloc grant to the state, each commission and agency completes and submits to the Department of Transportation Safety an HSD-1 project fund request form. Like the sub-element plans, the HSD-1 form lists and justifies the highway safety program needs. The federal monies are distributed on the basis of the work program and HSD-1 submissions.

The approach introduced by Ferguson and Simpson in 1976 focuses on the commissions' and agencies' sub-element plan submission. However, as the organizational analysis implies (see Figure 1), the new approach should improve the quality of the sub-element plan and HSD-1 submissions. Conceptually, the HSD-1 represents a subset of the sub-element plan which itself is a product of the more comprehensive highway safety program. The significance of tying the sub-element plan to the HSD-1 is that the commissions and agencies have a clear incentive to file a completely substantiated HSD-1 in order to obtain their share of the federal grant. That the sub-element plan and HSD-1 have equal weight is a basic assumption underlying the research reported here.

Mechanically, the information on a particular program area to be presented to the commissions and agencies must be gathered from the various state agencies directly involved. For instance, the information presented to the local commissions concerning the driver education programs in their localities is obtained from the Driver Education Services of the State Department of Education. Because the majority of the needed data are not computerized, the information must be obtained manually. As one can imagine, this task is formidable. The data must be manually gathered from each state agency in whatever format they are available, be rearranged in the format required for the "problem identification statement", and compiled in informational packets to be sent to each commission and state agency.

Figure 1. Procedure for obtaining federal monies.



PURPOSE

This study was conducted to investigate the feasibility of automating the compilation and dissemination stages for the problem identification data needed in the Commonwealth's AHSWP and, if deemed appropriate, to prescribe a viable method for accomplishing such automation.

OVERVIEW

In looking at the processes used in collecting the information needed in the problem identification statements and supplying it to the local commissions, it was noted that different costs, efforts, and skills were associated with the different standard areas in the AHSWP. The processes are discussed under the following subheads.

Retrieval of Information

Depending on what standard area and what state agency or agencies were involved, the process of retrieving information varied. Three general methods were used. One of these was used to gather the information processed by computer and available on either computer printouts or computer tapes. The Division of Motor Vehicles and the State Police were the only two agencies that supplied data in this form, which is here referred to as "computerized information."

A second method of retrieval involved traveling to those state agencies that had information relating to their particular highway safety program areas stored in the files. The standard areas involved were Driver Education and Emergency Medical Services. The information to be retrieved was determined by pre-screening the data bank before two or three people visited an agency to extract the raw data from the files and record them on prepared forms. This task took several days. The data are not computerized and are manually updated and filed on a periodic basis. These data are referred to here as "filed information."

The last method employed various activities fashioned to fit the situation. Some information, such as that for Pupil Transportation, is available upon request to the agencies involved. Other information, such as that for Debris, Hazard Control, and Cleanup, is not under the auspices of any particular agency and, therefore, is difficult to obtain. This last genre of information is referred to as "manual information."

Assimilation of Information

Once the information has been retrieved, it is compiled, processed, and recorded in rough draft form. This process is the most time-consuming activity in the entire system. It involves not only the processing of raw data into the format desired, but also other tasks such as the insertion of county data on a problem identification statement where a town or city might not have any other relevant information available, with this fact being appropriately noted.

Two general methods of assimilating information were used. One is used for that information available in the form of printouts or computer tapes. The data on printouts must be manually processed; however, for the data on computer tapes, a computer program can be written for automatic processing into the format desired. During the past year, a program was written that automatically processed about 90% of the accident data received from State Police. The information from the Division of Motor Vehicles was processed manually from computer printouts.

The second method of assimilating information is the manual processing of data available from agencies or bureaus who do not store or process the information on computers. The data are available in a wide array of written formats ranging from an agency's complete annual report to sheets of raw data. This information is manually translated into the desired format.

Dissemination of Information

The final process in supplying information to the local highway safety commissions is the printing or typing of the information into the final form and reproducing it. If this process is done manually, the information is typed in final form for reproduction on a copying machine. If the process is automated, the information can be typed manually into a data file and then automatically typed in the final format in as many copies as required.

AUTOMATED APPROACH TO PREPARING ANNUAL HIGHWAY SAFETY WORK PROGRAM

In the previous section, the AHSWP was divided into three fundamental areas: retrieval, assimilation, and dissemination. The complete automation of the work program implies automation of each of these areas, which is not now possible because "computerized information" is not available for all standard areas.

Although complete automation of the work program is not possible at this time, the initial stages of automation should be developed. Even in the absence of computerized information, a format program seemingly could be developed to type out a data page of the information packet. The data can be retrieved as usual, but keypunched into the format program. Thus, a completed work program information package can be obtained while bypassing the cumbersome dissemination stage.

The authors strongly recommend the present development of a format program. This step would (1) allow data to be keypunched and stored in the computer as they are retrieved throughout the year, and thereby avoid the bottleneck that develops during the final stages in preparing the program; and (2) permit information to be stored by year and thereby create a useful data base and enable a comparison of the work programs for successive years.

Although, as has been noted, a completely automated AHSWP is presently impossible, completely automated standard areas are quite possible where computerized information is available. These areas will be noted in the ensuing discussion.

General Information Appendix A, page A-1

The first data sheet in the work program's information package contains general data ranging from population figures to crash statistics. The diverse sources of data for this page make it useful in illustrating the gamut of processes which can be performed in advance of complete automation.

A. Noncomputerized Information

1. Population — These data come from a brochure prepared by the University of Virginia's Tayloe Murphy Institute. The data change annually and therefore would require annual keypunch additions to the format program. It is unlikely that computerized information for this cell will become available in the near future.

2. Number of Licensed Drivers and Registered Vehicles — The DMV provides computer printouts containing this information. At present, this information would have to be keypunched annually; however, it has been recommended that the source tapes be furnished the Research Council. Once this computerized information is received by the Council, these two lines can be completely automated. Progress can be made in this area in the near future.

3. Road Miles — This information is gathered from Mileage Tables, a publication of the Virginia Department of Highways and Transportation. The road mileage for some localities could change annually and therefore require additional key-punching by the Council. In other instances the data will be unchanged and the previous year's data can be recalled and used for current needs so as to make further keypunching unnecessary.

B. Computerized Information

1. Crash Data — These data are illustrative of an area in which complete automation is possible. At present, the Research Council receives crash data in computerized form. A program has been written to pull off the data required for the work program. In the absence of complete automation, this printout will be the source for key-punching changes to the format program. Pervasive changes will be required annually. However, complete automation can be achieved if a program is written to interface the present program for pulling the data off the tape and the format program. This complete automation should be accomplished in the near future by the Research Council.

Motorcycle Safety Appendix A, page A-2

A. Non-Computerized Information

1. Training Data — These data have been difficult to obtain because of the absence of a state agency focusing directly upon motorcycle education programs. The data that are made available, however, come from Driver Education files, which makes complete automation in the future extremely improbable. However, as will be seen in various other standard areas, this information changes only slightly, thus making format programming quite significant. If no new information is obtained, the previous year's information, which has been stored in the computer's memory, can be recalled and printed on the appropriate line for current needs. No manual process will be involved.

Assuming no changes in the Training Data section and the complete automation of the Crash Data section, this page can be completed without manual effort.

B. Computerized Information

1. Crash Data — This section parallels the Crash Data section on the general information page. At present, the computerized information is converted into a printout from which the appropriate data are collected. These data can be keypunched into the format program. However, this section should be completely automated in the near future.

Driver Education Appendix A, page A-3

The data source for this standard area must be drastically changed before complete automation can occur. The data are from filed information obtained from Driver Education Services, which manually compiles it into the AHSWP format. The information thus gathered would have to be keypunched into format program. Extensive keypunching would be required annually.

Codes and Laws Appendix A, page A-4

This locally gathered information, although not computerized, will rarely change. Once keypunched into the program, the data will rarely change from year to year. Since computer recall will suffice, manual labor will be eliminated.

Traffic Courts Appendix A, page A-5

These data are presently received from the DMV in computer printout form. The printout lists convictions by court jurisdiction by violation number. The various violation numbers corresponding to the general violation types listed on page A-5 must be compiled and added on work sheets. The data must then be transferred from the work sheets to pages reflecting the work program format. In essence, this page is deficient in each of the general stages: retrieval, assimilation, and dissemination. Systematic improvement in each stage can be readily achieved, however.

First, by using the format program, the data can be keypunched directly from the work sheets into the program and thereby significantly improve the dissemination stage.

Second, if the Research Council could obtain the source tapes rather than computer printouts, the standard area could be completely automated. This automation would be a two-step process. A program would have to be written to pull off the data required for the work

program. Note that this would require a subprogram to compile and add those violation numbers corresponding to the violation types appearing on page A-5. Once this program has been written, it can be interfaced with the format program. In summary, the computer could pull off the appropriate data from the source tape, assimilate the data to correspond to the prescribed violation types, and print out a completed page. Thus, complete automation for the standard area would be achieved.

Alcohol in Relation to Highway Safety Appendix A, page A-6

A. Noncomputerized Information

1. Breath Test Data — This section will remain a burdensome process. The data are presently sent to the Council by the Consolidated Laboratories in brochure form and will not be computerized in the near future. Thus, the data will have to be keypunched into the format program at the Council. Annual changes will be extensive.

B. Computerized Information

1. Crash Data — The data for this section differ from those for the crash data sections heretofore described. The data are presented as percentages, not straight figures. This difference will require a program to be written to perform the mathematical computations once the information is pulled from the crash tapes but before it is fed into the format program.

   If this stage cannot be computerized, the process will be considerably lengthened. Unlike the crash data discussed on page 8, those for this standard area are derived from a separate printout prepared for the Virginia Alcohol Safety Action Program (VASAP). Presumably this printout will be generated even though the AHSWP crash data printout might be discontinued if complete automation of crash data is achieved. If this is so, the manual computations would not be more expensive or burdensome than under the present system. If, however, the VASAP printout is discontinued, the absence of a program for performing mathematical computations would require a separate printout of these data so that the computations can be manually performed. This extra step would be an unnecessary waste of time. In summary, the authors suggest that a program be written, by the Council, to pull the appropriate data from the source tape; that a program be

written to perform the necessary calculations; and that this program be interfaced with the format program.

Note that line B.5 on page A-6 will require the addition of two bits of data, i.e., a computerization of the assimilation stage for this line.

Identification and Surveillance of Accident Locations Appendix A, page A-7

Highway Design, Construction and Maintenance Appendix A, pages A-10 and A-11

Traffic Engineering Services Appendix A, pages A-12 and A-13

The data for these three standard areas follow the same pattern. For all counties except Henrico and Arlington, the data are the same, since this subject matter is under the control of the Virginia Department of Highways & Transportation. Moreover, the data rarely change. For all cities, plus the counties of Henrico and Arlington, the data are unique to each location; but here again the data rarely change. The changes that do appear are made by each local commission. The likely continuity in these areas would cause these standard areas to be particularly benefitted by the format program.

Traffic Records Appendix A, page A-8

Debris, Hazard Control and Cleanup Appendix A, page A-16

Like that for the previous three standard areas, the information for these two pages rarely changes, thus making them particularly amenable to format programming. However, these standard areas do not fall under the control of any single state agency. Thus, any changes which are made could come from a number of state agencies as well as from various county and city commissions. The likelihood of complete automation of these standard areas is highly improbable.

Emergency Medical Services Appendix A, page A-9

This standard area does not lend itself to extensive automation. The data source is filed information. The data change extensively each year, and the source data will not be computerized in the near future. The changes will require keypunching annually.

Pedestrian Safety Appendix A, page A-14

As was the case for the other areas using crash data this standard area will immediately benefit by increased automation. The data source is computerized information, and no calculations will be necessary. Thus, complete automation for this standard area can be achieved by interfacing a retrieval program with a format program.

Police Traffic Services Appendix A, page A-15

A. Noncomputerized Information

1. Program Data and System Operation — This information cannot be gathered from a single state agency; instead, it must be updated by the local commissions. This fact creates the unlikelihood that computerized information will be forthcoming. This standard area is benefitted by the format program, however, because annual changes will be minimal.

2. Traffic Summons Data — At present, these data are not computerized information. The data, received in computer printout form, will have to be keypunched annually. If, however, the source tapes for the data can be obtained from the DMV, complete automation of this standard area can be achieved.

Pupil Transportation Safety Appendix A, page A-17

A. Noncomputerized Information

1. School Bus Operations — These data are received in brochure form from Pupil Transportation Services. The extensive changes in these noncomputerized data will have to be keypunched annually. Complete automation of this area in the near future is doubtful.

B. Computerized Information

1. Crash Data — As with other crash data, this computerized information lends itself to complete automation.

Accident Investigation and Reporting Appendix A, page A-18

Data for this standard area undergo extensive annual changes. For this reason, complete automation should be attempted. At present, the data come in the form of computer printouts. If, however, the source tapes can be obtained, complete automation will be possible in the near future.

SUMMARY

The prior discussion revealed that the information for various standard areas or portions thereof can be presently benefitted by automation. The areas are as follows:

I. AREAS WHERE COMPUTERIZED INFORMATION IS PRESENTLY AVAILABLE. THESE AREAS SHOULD BE COMPLETELY AUTOMATED IN THE NEAR FUTURE.

1. General Information — Crash Data
2. Motorcycle Safety — Crash Data
3. Alcohol in Relation to Highway Safety — Crash Data (Assimilation stage will require computerization)
4. Pedestrian Safety
5. Pupil Transportation Safety — Crash Data

II. AREAS WHERE COMPUTERIZED INFORMATION IS NOT PRESENTLY AVAILABLE

A. Areas where complete automation might be attained in the near future.

1. General Information — Licensed Drivers and Registered Vehicles
2. Traffic Courts
3. Police Traffic Services — Traffic Summons Data

B. Areas which are substantially the same each year and thus would be particularly benefitted by partial automation.

1. Motorcycle Safety — Training Data
2. Codes and Laws

3. Identification and Surveillance of Accident Locations
4. Highway Design, Construction and Maintenance
5. Traffic Engineering Services
6. Traffic Records
7. Debris, Hazard Control and Cleanup
8. Police Traffic Services — Program Data and System Operation

C. Problem Areas — Those areas which will not be completely automated in the near future and which would require extensive annual changes.

1. General Information — Population and Road Miles
2. Driver Education
3. Alcohol in Relation to Highway Safety — Breath Test Data
4. Emergency Medical Services
5. Pupil Transportation Safety — School Bus Operations

CONCLUSIONS

The time and manpower needed for handling the problem identification data in the compilation and dissemination stages of the work program information packet are immense. Therefore, it is essential that an ongoing program be initiated to achieve complete automation of these stages and, if possible, the remaining planning components of the highway safety plan. This program will ensure that the optimal utilization of personnel is achieved in preparing the work program and will foster the level of validity and reliability of and accessibility to data which are necessary for sound program management.

RECOMMENDATIONS

Based on the results of the information presented in this report, the following recommendations are advanced.

1. Pursuit of an ongoing program for complete automation of the work program should continue.

2. Implementation of the format program, as discussed in this report, should be achieved as soon as possible in order to facilitate the dissemination function of the current work program and to ensure advancement toward total automation.

3. The crash data computer program currently used in producing the work program should be interfaced with the proposed format program. This act will completely automate five components of the AHSWP information package.

4. Action should be taken to procure computerized driver licensing and conviction data. When such data are available, a computer program should be developed by the Research Council to retrieve the information needed for the work program. This new program should then be interfaced with the format program. Three additional sections of the program data packet will be completely automated if these tasks are accomplished.

5. Efforts should be initiated by the Department of Transportation Safety to encourage those traffic safety agencies (state and local) which presently maintain a manual records system to give strong consideration to automating their respective program information files to increase the overall efficiency and effectiveness of their program operations.

6. The previous recommendations include many intangible benefits produced by automation of the work program. Costs cannot be assigned to these intangibles. In Appendix B, however, the authors have presented a cost-benefit analysis using tangible factors. The authors must note, however, that these costs are estimates. Appendix B, Part A indicates that, if the format program were implemented, a loss of $111 would occur in the initial year, but this loss would be offset by a $789 savings in the following years. Appendix B, Part B illustrates a typical cost-benefit analysis with respect to further automation of any part of the AHSWP. Specifically, Part B shows the cost savings which would be produced by automating conviction data. The appendix shows a gain in the initial year of $60, and a savings in the following years of $410. The authors feel that the cost-benefit analysis presented in Appendix B supports automation, where possible, of the AHSWP.

APPENDIX A

PROBLEM IDENTIFICATION STATEMENTS CONTAINED IN THE WORK PROGRAM INFORMATION PACKAGES

GENERAL INFORMATION

COMMISSION DATA

		1975	1976
A.	Population	_____	_____
B.	No. Licensed Drivers	_____	_____
C.	No. Registered Vehicles	_____	_____
D.	No. Road Miles - State System	_____	_____
E.	No. Road Miles - Non-State System	_____	_____

CRASH DATA

		1975	1976
A.	Fatal Crashes	_____	_____
B.	Persons Killed	_____	_____
C.	Personal Injury Crashes	_____	_____
D.	Persons Injured	_____	_____
E.	Property Damage Crashes	_____	_____
F.	Total No. Crashes	_____	_____

MOTORCYCLE SAFETY

CRASH DATA	1976
A. Fatal Motorcycle Crashes	_____
B. Persons Killed — Motorcyclists	_____
C. Motorcycle Injury Crashes	_____
D. Persons Injured — Motorcyclists	_____
E. Motorcycle Property Damage Crashes	_____

TRAINING DATA

	School Year 1976-77	
	Public	Nonpublic
A. Number of schools conducting a State-approved Motorcycle Education program as a part of the driver education program	_____	_____
B. Number of schools conducting a State-approved Motorcycle Education program as a special course of instruction	_____	_____

PROGRAM DATA

SY 76-77

ype of chool	No. Of Secondary Schools *	No. Schools Teaching Driver Ed. To:			No. Driver Ed. Teachers	No. Of Schools Utilizing Each Driver Ed. Program:								
		Youth In School	Youth Out Of School	Adults		Class. Only	Class. & On-Street	Class. & Range	Class. & Simulator	Class., On-Street Simulator	Class., Range, Simulator	Class., On-Street Range	Class., Simulator, On-Street, Range	On-Street Only
ublic														
on-Public														

ype Of tudent	Tenth Grade Enrollment (Eligible For Driver Ed.)	No. Completing A Driver Ed. Course (All Grades)	Of Those Completing A Driver Ed. Course, The No. Instructed In:			Of Those Enrolled In A Driver Ed. Course, The No. Instructed On:	
			Class. & In-Car	Class. Only	In-Car Only	Simulators	Ranges
Public							
on-Public							

ype of river Ed. tudent	No. Completing Driver Ed. From A Public School	No. Completing Course From A Non-Public School	No. To Be Instructed By A State-Approved Commercial School During CY 1976 In:	
			Classroom	In-Car
6-18 Yr. Old Student				
outh Out Of School			N/A	N/A
dult			N/A	N/A

COMMERCIAL SCHOOLS

No. of State-Approved (Licensed to Teach 16-18 Yr. Olds) Commercial Schools. _____

a. No. of State-Approved Teachers in These Schools. _____

Total No. of Commercial Schools in Your Commission. _____

Figures include any other schools offering Driver Education.

CODES & LAWS

A. Has your locality adopted Model Traffic Ordinances which are compatible with the Code of Virginia? Yes ___X___ No _____

TRAFFIC COURTS

TRAFFIC SUMMONS DATA-1976

Violation Type	No. Convicted By Court Jurisdiction
A. Driver Violations	
1. Speed Over Posted Limit	
2. Speed Too Fast For Conditions	
3. Disregarded Stop Sign	
4. Disregarded Yield Sign	
5. Disregarded Traffic Signal	
6. Drove on Wrong Side of Road	
7. Followed Too Closely	
8. Made Improper Turn	
9. Failed to Yield Right of Way	
10. Improper Passing, Overtaking	
11. D.W.I.	
12. Reckless Driving	
13. Hit & Run	
14. Driving W/O License or Under Suspension or Revocation	
15. Refused Blood/Breath Test	
16. Other	
17. Total	
B. Equipment Violations	

0436

ALCOHOL IN RELATION TO HIGHWAY SAFETY (CY 1976)

A. Breath Test Data

1. No. Tests Administered:

   a. Dept. of State Police (throughout Virginia) _____
   b. Local Agencies (in your commission) _____

2. No. Licensed Operators:

   a. Dept. of State Police _____
   b. Local Agencies (in your commission) _____

3. No. Instruments In Use:

   a. Dept. of State Police _____
   b. Local Agencies: State-owned instruments _____
   c. Local Agencies: Locally-owned instruments _____

B. Crash Data

1. Percent of Accidents Which are Alcohol-Related:

   a. Total Accidents _____%
   b. Fatal Accidents _____%
   c. Injury Accidents _____%

2. Percent of Deaths and Injuries Which are Alcohol-Related:

   a. Deaths _____%
   b. Injuries _____%

3. Percent of Vehicle-Pedestrian Accidents Involving Pedestrians Who Were Drinking _____%

4. Percent of Vehicle-Pedestrian Accidents Involving Drivers Who Were Drinking _____%

5. No. Accidents Involving Drinking Drivers or Pedestrians _____

IDENTIFICATION & SURVEILLANCE OF ACCIDENT LOCATIONS

PROGRAM DATA

A. Number of Locations on the Following Roadway Systems Selected for:	Review	In-Depth Study	Recommended For Approval
1. Interstate	_____	_____	_____
2. Arterial & Primary	_____	_____	_____
3. Secondary	_____	_____	_____
4. Urban (Over 3,500 Pop.)	_____	_____	_____
Total	_____	_____	_____

Comments:

B. Indicate if the High Accident Locations are Identified by:	Spot Locations		Roadway Sections	
	Yes	No	Yes	No
1. Interstate	_____	_____	_____	_____
2. Arterial & Primary	_____	_____	_____	_____
3. Secondary	_____	_____	_____	_____
4. Urban (Over 3,500 Pop.)	_____	_____	_____	_____

Comments:

C. Indicate if the High Accident Locations are Identified by an Accident Severity:	Spot Locations		Roadway Sections	
	Yes	No	Yes	No
1. Interstate	_____	_____	_____	_____
2. Arterial & Primary	_____	_____	_____	_____
3. Secondary	_____	_____	_____	_____
4. Urban (Over 3,500 Pop.)	_____	_____	_____	_____

Comments:

TRAFFIC RECORDS

LOCAL TRAFFIC RECORDS SYSTEM

Category and Component	Status: Included		Status: Automated	
	Yes	No	Yes	No
A. Driver Subsystem				
1. Violation Convictions	____	____	____	____
2. Suspensions/Revocations	____	____	____	____
3. Alcohol Related Convictions	____	____	____	____
4. Accident Involvements	____	____	____	____
B. Vehicle Subsystem				
1. Stolen	____	____	____	____
2. Abandonment	____	____	____	____
C. Highway Subsystem				
1. Physical Features Inventory	____	____	____	____
2. Accident Location History	____	____	____	____
3. Traffic Characteristics	____	____	____	____
4. Maintenance	____	____	____	____
D. Accident Subsystem				
1. Investigation Reports	____	____	____	____
E. Emergency Services Subsystem				
1. Emergency Medical Services Inventory Summary	____	____	____	____
F. Traffic Law Enforcement and Adjudication				
1. Convictions Data Summary	____	____	____	____
2. Non-Convictions Data Summary	____	____	____	____
3. Enforcement Index	____	____	____	____
G. Safety Program Management Subsystem				
1. National Safety Council Reports	____	____	____	____
2. Traffic Law Enforcement Summary	____	____	____	____
3. Accident Factors Summary	____	____	____	____

EMERGENCY MEDICAL SERVICES

PROGRAM DATA

A. No. of Rescue Squad Units By:

	1975	1976
1. Volunteer		
2. Private		
3. Police/Fire/Municipal		

PERSONNEL AND TRAINING

B. No. of EMS Ambulance Personnel with Training in the Following:

	Volunteer		Private		P/F/M	
	1975	1976	1975	1976	1975	1976
1. Less than Advanced First Aid						
2. Red Cross Advanced First Aid						
3. DOT 81 Hour Course (Certified EMT's)						
4. Total No. EMS Ambulance Personnel						

5. Certified EMT Lay Instructors in Commission in 1976 _____
6. Certified Cardiac EMT's in Commission in 1976 _____

C. No. of Community Colleges that have Educational Aids to Support Basic-EMT and DOT Crash Injury Courses _____

EQUIPMENT

D. No. of Licensed Ambulances

	Meet State Standards		Meet Fed. Standards*	
	1975	1976	1975	1976
1. Volunteer				
2. Private				
3. Police/Fire/Municipal				

*DOT Specs. KKK-A-1822

COMMUNICATIONS

E. No. of Licensed Ambulances With Two-Way Radio Communications (CY 76)

	Volunteer	Private	P/F/M
1. To Hospital			
2. To Dispatcher			
3. Both			
4. Total With Two-Way Radios			

HIGHWAY DESIGN, CONSTRUCTION & MAINTENANCE

PROGRAM DATA

Please Note If The Following Exist:	Yes	No
A. Design standards relating to safety features such as sight distance, horizontal and vertical curvature, spacing of decision points, width of lanes, etc., for all new construction or reconstruction, at least on expressways, major streets and highways, and through streets and highways.	____	____
B. Street systems designed to provide a safe traffic environment for pedestrians and motorists when subdivisions and residential areas are developed or redeveloped.	____	____
C. Roadway lighting is provided or upgraded on a priority basis at the following locations:		
1. Expressways and other major arteries in urbanized areas.	____	____
2. Junctions of major highways in rural areas.	____	____
3. Locations or sections of streets and highways having high ratios of night-to-day motor vehicle and/or pedestrian accidents.	____	____
4. Tunnels and long underpasses.	____	____
D. Standards for pavement design and construction with specific provisions for high skid resistance qualities.	____	____
E. A program for resurfacing or other surface treatment with emphasis on correction of locations or sections of streets and highways with low skid resistance and high or potentially high accident rates susceptible to reduction by providing improved surfaces.	____	____
F. A system of guidance, warning and regulation of traffic approaching and traveling over construction or repair sites and detours.	____	____
G. A systematic identification and tabulation of all railway grade crossings and a program for the elimination of hazards and dangerous crossings.	____	____
H. A program to insure that roadways and roadsides are maintained consistent with the design standards which are followed in construction to provide safe and efficient movement of traffic.	____	____

	Yes	No
I. A program which identifies and corrects hazards within the highway right-of-way.	____	____
J. There are highway design and construction features wherever possible for accident prevention and survivability including at least the following:		
1. Roadsides clear of obstacles, with clear distance being determined on the basis of traffic volumes, prevailing speeds, and the nature of development along the street or highway.	____	____
2. Support for traffic signs and lighting that are designed to yield or break away under impact wherever appropriate.	____	____
3. Protective devices that afford maximum protection to the occupants of vehicles wherever fixed objects cannot reasonably be removed or designed to yield.	____	____
4. Bridge railings and parapets which are designed to minimize severity of impact, to retain the vehicle, to redirect the vehicle so that it will move parallel to the roadway, and to minimize danger to traffic below.	____	____
5. Guardrails, and other design features which protect people from out-of-control vehicles at locations of special hazard such as playgrounds, schoolyards, and commercial areas.	____	____
K. A post-crash program which includes at least the following:		
1. Signs at freeway interchanges directing motorists to hospitals having emergency care capabilities.	____	____
2. Maintenance personnel trained in procedures for summoning aid, protecting others from hazards at accident sites, and removing debris.	____	____
3. Provisions for access and egress for emergency vehicles to freeway sections where this would significantly reduce travel time without reducing the safety benefits of access control.	____	____

TRAFFIC ENGINEERING SERVICES

PROGRAM DATA

Please Note If The Following Exist:	Yes	No
A. A comprehensive manpower development plan to provide the necessary traffic engineering capability, including:		
1. Provisions for supplying traffic engineering assistance to those jurisdictions unable to justify a full-time engineering staff.	_____	_____
2. Provisions for upgrading the skills of practicing traffic engineers, and providing basic instruction in traffic engineering techniques to subprofessionals and technicians.	_____	_____
B. Utilization of traffic engineering principles and expertise in the planning, design, construction, and maintenance of the public roadways, and in the application of traffic control devices.	_____	_____
C. A traffic control devices plan including:		
1. An inventory of all traffic control devices.	_____	_____
2. Periodic review of existing traffic control devices, including a systematic upgrading of substandard devices to conform with standards issued or endorsed by the Federal Highway Administrator.	_____	_____
3. A maintenance schedule adequate to insure proper operation and timely repair of control devices, including daytime and nighttime inspections.	_____	_____
4. Where appropriate, the application and evaluation of new ideas and concepts in applying control devices and in modifying existing devices to improve their effectiveness through controlled experimentation.	_____	_____
D. An implementation schedule to utilize traffic engineering manpower to:		
1. Review road projects during the planning, design, and construction stages to detect and correct features that may lead to operational safety difficulties.	_____	_____

		Yes	No
2.	Install safety-related improvements as a part of routine maintenance and/or repair activities.	_____	_____
3.	Correct conditions noted during routine operational surveillance of the roadway system to rapidly adjust for the changes in traffic and road characteristics as a means of reducing accident frequency or severity.	_____	_____
4.	Conduct traffic engineering analyses of all high accident locations and develop corrective measures.	_____	_____
5.	Analyze potentially hazardous locations, such as sharp curves, steep grades, and railroad grade crossings and develop appropriate countermeasures.	_____	_____
6.	Identify traffic control needs and determine short and long range requirements.	_____	_____
7.	Evaluate the effectiveness of specific traffic control measures in reducing the frequency and severity of traffic accidents.	_____	_____
8.	Conduct traffic engineering studies to establish traffic regulations such as fixed or variable speed limits.	_____	_____

PEDESTRIAN SAFETY

EDUCATION

The Code of Virginia, Title 22-235, states that in "one or more of the elementary grades or in one or more of the high school grades of every public school there shall be provided a course of study including elementary training in accident prevention, and in proper conduct on streets and highways . . . . Such course shall be required of every pupil. . . ." Therefore, all students attending public schools have received or will receive instruction in Pedestrian Safety.

CRASH DATA	CY 76
A. No. Accidents Involving Pedestrians	_____
B. No. Pedestrians Injured	_____
C. No. Pedestrian Fatalities	_____
D. No. Bicyclists Injured	_____
E. No. Bicyclists Fatalities	_____
F. No. Nighttime Pedestrian Deaths	_____
G. No. Daytime Pedestrian Deaths	_____
H. No. Nighttime Pedestrian Injuries	_____
I. No. Daytime Pedestrian Injuries	_____
J. No. Unknown Time Pedestrian Injuries	_____

POLICE TRAFFIC SERVICES

PROGRAM DATA - 1976

	Local
No. Police Officers Assigned to Traffic Full-Time	_____
No. Police Officers Assigned to Traffic Part-Time	_____
Avg. Man Days Devoted Monthly to Traffic Services	_____
No. of Accidents Resulting in Arrest or Citation of One of More Persons	_____
No. of Persons Prosecuted in Accident Cases	_____
No. of Prosecutions That Result in Conviction	_____

SYSTEM OPERATION - 1976

	Local
Approximate Mileage Covered Per Police Officer	_____
Approximate No. of Accidents Investigated/Per Officer/Per Month	_____
Approximate No. of D.W.I. Arrests/Per Officer/Per Month	_____

TRAFFIC SUMMONS DATA

Violation Type	Local CY 76 No. Convictions By Residence Jurisdiction
A. Driver Violations	
1. Speed Over Posted Limit	_____
2. Speed Too Fast For Conditions	_____
3. Disregarded Stop Sign	_____
4. Disregarded Yield Sign	_____
5. Disregarded Traffic Signal	_____
6. Drove on Wrong Side of Road	_____
7. Followed Too Closely	_____
8. Made Improper Turn	_____
9. Failed to Yield Right of Way	_____
10. Improper Passing, Overtaking	_____
11. D.W.I.	_____
12. Reckless Driving	_____
13. Hit & Run	_____
14. Driving W/O License or Under Suspension or Revocation	_____
15. Refused Blood/Breath Test	_____
16. Other	_____
17. Total	_____
B. Equipment Violations	_____

DEBRIS, HAZARD CONTROL & CLEANUP PROGRAM DATA

Roadway Operations	Urban	Rural
A. Number of accidents for which rescue and/or salvage equipment personnel were dispatched	_____	_____
B. Number of incidents involving debris or hazard for which rescue and/or salvage equipment personnel were dispatched	_____	_____
C. Number of operational units available for rescue and/or salvage operations on a 24-hour basis	_____	_____
D. Number of secondary motor vehicle accidents resulting in part from inadequacies in debris removal	_____	_____
E. Average elapsed time between accident occurrence and notification of rescue and/or salvage equipment personnel	_____	_____
F. Average response time from notification for rescue and/or salvage equipment personnel to reach scene of accident	_____	_____
G. Average time from accident occurrence to restore facility to normal use	_____	_____
H. Number of incidents resulting from spillage of hazardous materials	_____	_____
I. Number of accidents involving:		
1. Radioactive material	_____	_____
2. Flammable material	_____	_____
3. Poisonous material	_____	_____
4. Explosive material	_____	_____
5. Otherwise hazardous material	_____	_____

PUPIL TRANSPORTATION SAFETY

SCHOOL BUS OPERATIONS (PUBLIC SCHOOLS ONLY)

		SY 75-76
A.	Total Number of School Bus Drivers:	
	1. Adult	
	2. Student	
B.	Total Number of School Buses in Operation	
	1. Public-owned	
	2. Contract carrier	
C.	Total Number of Miles Being Run by all School Buses in Commission	
D.	Average Daily Attendance of "Transported Pupils"	
E.	Public School Enrollment	
F.	Average Number of Pupils/Bus	
G.	Average Number of Miles/Bus/Day	
H.	Number of Pupil Standees:	
	1. In the A.M.	
	2. In the P.M.	

CRASH DATA *

		CY 76
A.	No. School Buses Involved in:	
	1. Fatal Crashes	
	2. Personal Injury Crashes	
	3. Property Damage Crashes	
B.	No. of Persons Killed in School Bus Crashes:	
	1. Pupils	
	2. Bus Drivers	
	3. Others	
C.	No. of Persons Injured in School Bus Crashes:	
	1. Pupils	
	2. Bus Drivers	
	3. Others	

* Source: State Police.

0440

ACCIDENT INVESTIGATION AND REPORTING

ACCIDENT/VIOLATION DATA

Accidents Caused By:	CY 1976 No. Citations Issued By: State Police	Local
A. Driver Violations		
1. Speed Over Posted Limit	_____	_____
2. Speed Too Fast For Conditions	_____	_____
3. Disregarded Stop Sign	_____	_____
4. Disregarded Traffic Signal	_____	_____
5. Drove on Wrong Side of Road	_____	_____
6. Followed Too Closely	_____	_____
7. Made Improper Turn	_____	_____
8. Failed to Yield Right of Way	_____	_____
9. Improper Passing Or Overtaking	_____	_____
10. Hit and Run	_____	_____
11. Other	_____	_____
12. Total	_____	_____
B. Equipment Violations	_____	_____
C. Pedestrian Violations		
1. Drunk	_____	_____
2. Other	_____	_____
3. Total	_____	_____

APPENDIX B

COST-BENEFIT ANALYSIS

A. FORMAT PROGRAM

1. Cost Using Present Manual Approach

	Initial Year	Ongoing
Typing Expense[(a)]	388	$ 388
Research Assistants[(b)]	50	50
Reproduction Exp.[(c)]	731	731
Total	$1,169	$1,169

2. Costs If Automated:

Programming Costs[(d)]	1,000	
Cost of Computer Runs[(e)]	280	280
Annual Program Maintenance Costs[(f)]	—	100
Total	$1,280	$ 380
Savings by Automating (2-1)	$ 111	$ 789

(a) Typing Exp: Salary: $4.41/hr; est. time — 2 min./page; No. Pages — 2,660
Formula: $4.41 (2 min./p. x 2,660 pp. ÷ 60 min.) = $388.

(b) Research Assts. — Aid in reproduction process: Salary — $5.00/hr.(Avg.); time — 10 hr.
Formula: $5/hr. x 10 hr. = $50.

(c) Reproduction Exp: No. of pages — 2,660; no. of copies — 5; Cost/page — 5.55¢ (paper plus overhead)
Formula: 2,660 x 5 x 5.55¢ = $731.

(d) Programming Cost — Estimate supplied by Jerry Korf of Research Council.

(e) Cost of Computer Runs — Computer time plus paper. Estimate supplied by Jerry Korf.
Formula: $2.00/booklet x 140 commissions = $280.

(f) Annual Program Maintenance Costs — Add new commissions into program, change printout format, etc. Estimate supplied by Jerry Korf.

B. COST OF AUTOMATING CONVICTION DATA

1. Costs Using Manual Approach:

	Initial Year	Ongoing
Research Analysts[(a)]	$ 560	$ 560
2. Costs of Automating:		
Programming[(b)]	200	
Computer Runs[(c)]	150	150
Assist in Programming[(d)]	150	—
Total	$ 500	$ 150
Savings by Automating	$ 60	$ 410

(a) Research Analysts — Estimates based on experience in FY 77.
Formula: (2 research assistants x 7 days x 8 hrs. day) $5/hr. = $560.

(b) Programming — Estimate furnished by Jerry Korf.

(c) Computer Runs — Estimate furnished by Jerry Korf.
Formula: $1/1,000 convictions = $150.

(d) Research Assistants (Estimate)
Formula: $5/hour x 30 hours = $150.