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16. Abstract The State Department of Highways and Public Transportation and the Texas Transportation Institute conducted a five-month study to determine the uses and analysis of traffic accident data. An additional objective was to evaluate the present accident data reporting system and to determine the capability of the current system and proposed systems to satisfy the accident data needs of the engineers in the Districts. This report presents the approach used in conducting the research, the findings of the study, and recommendations based on these findings.					
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THE USE AND ANALYSIS OF RECORDED
TRAFFIC ACCIDENT DATA

by

Anton Huber
Graeme D. Weaver
Frank Conklin
William R. Ratcliff

Research Report 238-1F

Research Study 2-18-78-238

Sponsored by the
State Department of Highways and Public Transportation
in cooperation with the
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Federal Highway Administration

August 1978

TEXAS TRANSPORTATION INSTITUTE
Texas A&M University
College Station, Texas 77843

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SUMMARY OF FINDINGS

The findings, based on replies to two questionnaires sent to all SDHPT Districts and personal visits to nine Districts and the Houston Urban Office, are summarized.

1. Recognizing the capabilities of the new system, those Districts visited indicated that they wished to receive or have available only the following tabulations:
 - (1) Master Accident Listing,
 - (2) Collision Diagram, Accident Detail Plotting Program,
 - (3) Current Year's Accident Data on RIS File, and
 - (4) Monthly Fatal Accident Listings.
2. Problems expressed are listed:
 - (1) Available accident data are several months in arrears, which inhibits immediate correction of problem areas.
 - (2) The exact cause of the accident is often difficult to determine from the reports which makes it difficult to identify possible solutions.
 - (3) Mile points of actual accident sites are often inaccurate which makes it difficult to locate the problem areas.
 - (4) Occasionally, several intersections within an urban area have the same milepoint.
 - (5) A large number of police reports of accidents occurring in urban areas are listed by street name and not by highway number: therefore, some accident data are either mis-coded or eliminated completely.
3. In addition to the correction of the problems mentioned above, the Districts expressed a desire for added capabilities. These suggested improvements are listed below:
 - (1) The capability of determining the cost justification of a safety improvement would be an improvement to the system.

- (2) Accident rates for typical situations are needed for a basis of comparison.
- (3) An evaluation technique to determine the damage to roadside obstacles such as signs, guardrails, etc., is needed.
- (4) A methodology for identifying the most hazardous locations within a District would aid in ranking safety projects in order of priority.

IMPLEMENTATION STATEMENT

The overall objective of this project was to identify those attributes of an accident data information system that would be responsive to the engineering needs in the Districts, and to document the needs for consideration by the SDHPT in developing a system to satisfy these needs.

Heretofore, approximately fourteen accident data tabulations were disseminated or made available to each District routinely. The newly implemented accident data information system allows tabulation from remote terminals in each District. It will permit generation of tabulations for special evaluations in addition to any accident tabulation previously distributed by File D-18SE. The findings of this needs study indicate that implementation of the new system is highly desirable. Also, the four accident data tabulations listed should be generated and/or made available annually to every District: (1) Master Accident Listing, (2) Collision Diagram, Accident Detail Plotting Program, (3) Current Year's Accident Data on RIS File, and (4) Monthly Fatal Accident History.

The study indicated a need for development of a document to provide techniques to evaluate safety needs and improvements using accident data. The document should include guidelines for selection of accident data to use in determining causal factors, data evaluation techniques, possible approaches for identifying and correcting safety-related problems and techniques to statistically evaluate the improvements selected. Preparation and dissemination of operating manuals and conduct of statewide training courses, if necessary, are recommended to assist in effective implementation of the new system.

DISCLAIMER

The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

ACKNOWLEDGMENTS

This report has been developed from the ideas and experiences expressed by many SDHPT District personnel. Their assistance in the conduct of this needs study is gratefully acknowledged.

Appreciation is expressed to all SDHPT Districts for their prompt response to a rather detailed questionnaire and to the nine Districts and the Houston Urban Office for meeting with the research staff to discuss their needs for an accident data information system. The information received from them was necessary to determine problems and identify the elements of an accident data system and implementation technique that would be responsive to their engineering needs.

This report has been prepared in cooperation with the U.S. Department of Transportation, Federal Highway Administration.

ABSTRACT

The State Department of Highways and Public Transportation and the Texas Transportation Institute conducted a five-month study to determine the uses and analysis of traffic accident data. An additional objective was to evaluate the present accident data reporting system and to determine the capability of the current system and proposed systems to satisfy the accident data needs of the engineers in the Districts.

This report presents the approach used in conducting the research, the findings of the study, and recommendations based on these findings.

Key Words: Traffic Accident Data, Reporting Systems, Analysis, Safety

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I. INTRODUCTION AND RESEARCH APPROACH

INTRODUCTION

Problem Statement

The use of accident data in analyzing safety improvement benefits, or for identification of hazardous roadside and roadway locations has long been a primary measure of effectiveness for the justification of expenditure of scarce funds for prioritizing safety projects. Although other measures can be used in many instances, the occurrence of accidents, particularly in high frequencies, generally is indicative of a problem area.

Considerable roadway and vehicle operational data are recorded on computer file from accident reports, and much is retrievable in various formats. Evidence indicates that the currently disseminated information may not satisfy engineering needs to facilitate analysis and evaluation of safety and operational improvements.

This study was directed towards identifying engineering needs, deficiencies in current data reporting procedures, and desired modifications by engineers responsible for usage of accident data so that potential changes may be developed.

Objectives

The objectives of this study were:

1. to determine deficiencies that currently exist in accident data supplied to the Districts;
2. to evaluate the present system used for disseminating the accident data to the Districts;
3. to determine what uses are made of the accident data by the Districts;
4. to determine what additional accident data are needed; and
5. to identify the needed improvements to the existing system of accident data reporting.

The research effort was specifically limited to determination of existing deficiencies in reporting procedures for accident data from the data available on traffic accident reports. No effort was directed toward modification of the accident forms currently used by the Texas Department of Public Safety (DPS) nor the data input on these forms. Instead, this study involved the evaluation of engineering needs that can be satisfied with the data available on the DPS accident forms using automated data retrieval systems.

RESEARCH APPROACH

The purpose of this project was to determine the present uses of accident data, to determine the deficiencies that currently exist in accident data supplied to the Districts, to determine what additional data are needed and to identify needed improvements to the accident data reporting system. It was believed that the most productive technique to obtain this information involved direct communication with the users of the data--the engineers in the Districts. Furthermore, since the current data system was established for statewide usage, it was considered desirable that input in the form of suggestions, constructive criticism, and recommendations be obtained from each District because the needs and uses of the data would vary among Districts. Included in this section is a description of the methods used to obtain statewide information.

Summarize Current Data Reporting Procedures

Considerable accident data are available and are transmitted to the Districts; however, discussion with operating engineers indicates that much of the information is not used to maximum efficiency because the data are not presented in a manner conducive to their needs, and that the magnitude of the data precludes ready understanding of what is actually available.

This task entailed summarizing and documenting precisely what data statistics are available in a format that operating engineers can readily understand what is available now. Chapter 2 documents the steps in producing the current reports that are distributed by File D-18SE.

Advise Districts of Request for Input

A letter was developed and transmitted to each District to inform SDHPT personnel of the accident data reporting system needs study. Each District was requested to identify personnel responsible for use of accident data and to include them in the determination of the engineering needs portion of the study. The overall usability of the research effort would depend highly on inclusion of District personnel in this initial phase. The letter transmitted is contained in Appendix B as per attachment to the questionnaire subsequently developed.

Develop Structured Interview Technique

To assure uniformity in identifying needs, a preliminary set of questions was developed to obtain answers from the Districts. It was anticipated that answers would be obtained through structured questionnaire administration and through follow-up personal interview with selected Districts. Rather than administer the preliminary questionnaire, followed by a second questionnaire after personal interview, the original letter transmitted to all Districts included the list of questions to which answers were desired. Then, personal interviews were conducted with ten Districts to determine additional questions that might be necessary to evaluate the current data needs and a structured questionnaire would then be developed for administration to all Districts.

Conduct Personal Interviews

Ten Districts were visited by members of the research staff to discuss the items identified in the initial letter and additional items identified by the participants. Personal interviews were considered necessary to clarify and amplify information requested by the letter. The results of these one-day personal discussions were expected to identify expressed specific advantages and disadvantages of the current data reporting systems and expressed needs of future systems. During these interviews, the District personnel discussed specific advantages and disadvantages of the current data reporting systems and expressed their needs and suggestions. In addition,

the new accident data information system was introduced and its merits and limitations were discussed. The interview team always included one member from File D-19 who was familiar with the current and proposed automated procedures and equipment potential, and at least one member who was knowledgeable in engineering analysis procedures for traffic operations.

Summarize Personal Interview Results

All interviews were tape recorded for future transcribing and detailed review. Comments, suggestions, and requests for particular data were summarized from which specific questions were developed for inclusion in the structured questionnaire that was subsequently transmitted to all Districts.

Administration of Structured Questionnaire

Based on the findings from the personal interviews with the ten Districts, a two-part questionnaire containing six questions regarding identification of specific uses of accident data, engineering analyses performed, measures of effectiveness used, deficiencies in current reporting system, and expressed need of development of additional analysis techniques for engineering evaluation of safety projects using current data. Each District was also asked to comment on the need for computerized data reporting techniques. Part 2 of the questionnaire requested that each District identify specifically those accident data reports traditionally distributed by File D-18SE that they still wished to receive after consideration of the new computerized data reporting system being implemented.

The responses to the questionnaire are presented in Appendix A; the questionnaire is presented in Appendix B.

Evaluation of Study Results

The tabulated results of the personnel interviews and the questionnaire were interpreted by the combined efforts of the total research staff including D-19, D-18SE, and TTI personnel. The evaluation of the findings is presented in Chapter 4; the recommendations for needed improvements are presented in Chapter 5.

II. OLD ACCIDENT DATA INFORMATION SYSTEM

This section summarizes the procedure by which accident data are entered into the file, merged with other information, and culminate in the generation of the accident tabulations that have been distributed by File D-18SE to the Districts for the past several years. The information is presented to provide a comparative base to which the modifications to the new accident data information system (ref. Chapter 3) may be referenced. Figure 1 illustrates schematically the process of accident data from preliminary encoding by the Department of Public Safety to the distribution of the accident data tabulations currently transmitted annually to each District by File D-18SE.

Accident Data Coding

Information from each traffic accident report received by the Department of Public Safety (DPS) is coded on the form, "Motor Vehicle Traffic Accident Code Sheet," illustrated in Figure 2 (Step B, Figure 1). At this time, control, section, and milepoint from the RI1 file are matched to the accident location stated on the report. These combined data constitute the basic accident description; the data are then punched to tape for processing through an edit check program.

Data Edit Check (Step D, Figure 1)

The coded accident data are processed through a comprehensive edit program to detect coding inconsistencies, omissions, etc. through comparison of sets of codes. For example, "light condition" codes are checked against "time of day," "wet pavement" codes against "weather" codes, etc. to ensure compatibility. Any coded accident report indicating incompatibility in the edit process is flagged, removed, and processed for correction. In certain cases, the investigating officer is contacted to clarify information if necessary. The edit program will identify a large proportion of coding inconsistencies or errors so that the final coded information can be considered to be practically error-free with respect to the information provided on the original accident report.

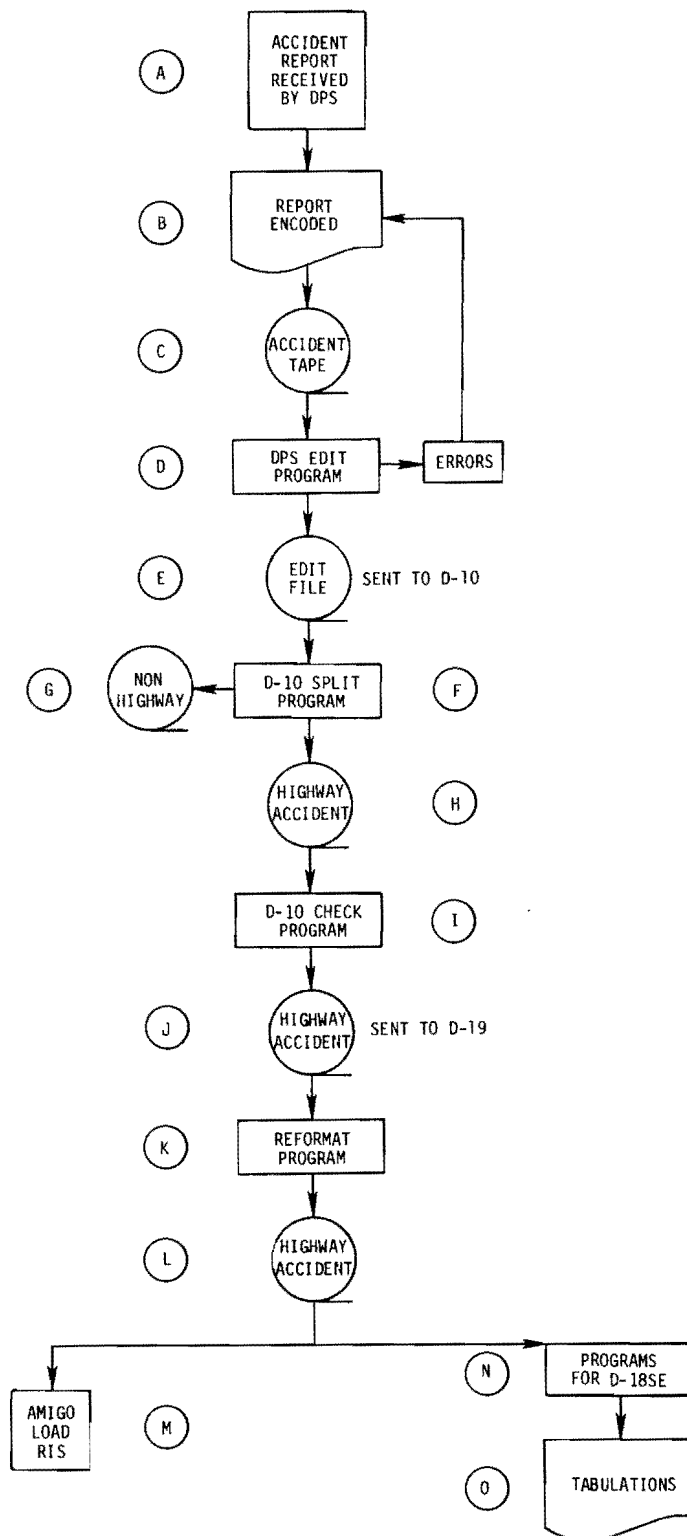


FIGURE 1 ACCIDENT DATA SYSTEM FROM DPS TO ACTUAL REPORTS

MOTOR VEHICLE TRAFFIC ACCIDENT CODE SHEET

DPS Accident No. (1-7)

57-70, Rev. 6-74

| | | | | | | | | | | | | | | | | | | | |
|-------------------|----|---------------|----|------------------|----|--------------------|----|-------------------|----|----------------|----|---------------|----|-----------|----|-----------------|----|-----------------|----|
| Record Control | | County | | City | | District | | Police or DP | | Road Class | | Month | | Date | | Day of Week | | Time of Day | |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| Light Condition | | Initial Event | | Severity | | Weather | | Surface Condition | | Road Condition | | Investigation | | Alignment | | Traffic Control | | Roadway Related | |
| 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| Intersection Type | | Entering Road | | Vehicle Movement | | Means of Collision | | Object Struck | | Other Factors | | | | | | | | | |
| 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 |

Highway _____ Severity _____

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|----|--------------|----|----------|----|---------------|----|---------------|----|------------------------------------|----|---------------|----|---------------------|----|---------------------|----|----------------------|----|--------------------------|----|---------|----|----------|----|------------|----|-----------------|----|----|----|----|----|----|----|----|----|----|
| Control | | Section | | Milepost | | Milepost Dir. | | Part Hwy Inv. | | Bridge Number or Physical Features | | Bridge Detail | | Direction of Travel | | From Veh. 1 | | From Veh. 2 | | Control | | Section | | Milepost | | County No. | | Total Veh. Inv. | | | | | | | | | | |
| Primary Street | | Block Number | | | | | | | | | | | | | | Intersecting Street | | City Accident Number | | Railroad Crossing Number | | | | | | | | | | | | | | | | | | |
| 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 |

Location _____

Code 1 _____ 2 _____ 3 _____

4 _____ 5 _____ 6 _____

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|---|------------|----|------------|----|------------|----|------|----|--------------|----|---------|----|---------------|----|------------|----|---------|----|----------|----|------------------|----|----------|----|----------------------|----|---------|----|----------|----|-------------|----|---------|----|------------------|----|-------|----|--------|----|-----------|----|------|----|-----------|----|-------------------|
| Record Control | | Vehicle | | | | | | | | | | Driver | | | | | | | | | | Total in Vehicle | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Year Model | | Make Model | | Body Style | | Type | | Damage Scale | | Defects | | Year of Birth | | Race & Sex | | License | | Military | | Reported | | Detected | | Contributing Factors | | Vehicle | | Severity | | Res. Device | | Ejected | | Part Veh. Injury | | Blind | | Helmet | | Eye Prot. | | Lens | | Equipment | | Color of Garments | |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|---|---------------------|----|-----|----|---------|----|-----------|----|----------|----|---------------------|----|---------|----|------------------|----|-------|----|-----|----|---------------------|----|---------|----|-----------|----|----------|----|-------------|----|-----------------------|----|------------------|----|-------|----|-----|----|-----|----|--------------------------|----|-----------|----|----------|----|-------------|----|---------|----|------------------|----|-------|----|---------|----|--------|----|-----------|----|------|----|-----------|----|-------------------|----|-------------|----|------------|----|-------------|----|----|----|----|----|----|
| Record Control | | Casualty/Occupant 1 | | | | | | | | | | Casualty/Occupant 2 | | | | | | | | | | Casualty/Occupant 3 | | | | | | | | | | Casualty/Occupant 4/5 | | | | | | | | | | Supplemental Information | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Age | | Sex | | Vehicle | | Seat Pos. | | Severity | | Res. Device | | Ejected | | Part Veh. Injury | | Blind | | Age | | Sex | | Vehicle | | Seat Pos. | | Severity | | Res. Device | | Ejected | | Part Veh. Injury | | Blind | | Age | | Sex | | Vehicle | | Seat Pos. | | Severity | | Res. Device | | Ejected | | Part Veh. Injury | | Blind | | P P P O | | Helmet | | Eye Prot. | | Lens | | Equipment | | Color of Garments | | Part Action | | Prod. Drum | | Prod. Viol. | | | | | | |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 |

FIGURE 2 MOTOR VEHICLE TRAFFIC ACCIDENT CODE SHEET

Disposition of DPS Accident Data Tape File

The edited tape is transmitted monthly to File D-10 where accident data are split into two files -- Highway System, and Non-Highway System -- accident files (Steps F, G, and H, Figure 1).

File D-10 Activities

The Highway System file is checked by File D-10 for correct control, section, and milepoint according to any update changes in these, and the SDHPT district and county number are added to the file. The Highway System accident tape file is transmitted to File D-19 to process the various monthly tabulations and the annual tabulations requested by File D-18SE.

Accident Reports Distributed by File D-18SE

The accident tabulations available to or distributed to each District by File D-18SE are listed below:

1. Master Accident Listing -- Rural & Urban
2. Wet Pavement Accidents
3. Bridge Accidents
4. Fixed Object, Run Off Road and Overturn Accidents
5. Railroad Grade Crossing Accidents
6. One-Tenth Mile Sections With Five or More Accidents
7. Urban/Rural Accident Rates by Control and Section
8. Highway System Accident Rates (included as a 1-page summary with No. 7 above)
9. Accident Spot Maps (Rural Only)
10. Collision Diagram, Accident Detail Plotting Program
11. Current Year's Accident Data on RIS File
12. Monthly Fatal Accident Listings

Also, the statewide summaries listed below are produced for use by the Austin, office:

1. Fixed-Object Accidents
2. Interstate Highway Accidents
3. Day/Night Accident Ratio

Tabulations other than those listed above have been available by special request to D-18SE. In addition, several Districts containing large metropolitan areas have obtained individual accident file tapes which they access by remote terminal to generate special tabulations for their use.

III. NEW ACCIDENT DATA INFORMATION SYSTEM

The accident information system that has been used for the past several years (Chapter 2) has been modified rather extensively to provide greatly increased flexibility. This section presents information regarding the capabilities and application of the new accident information system most of which will become operational in September, 1978.

Background and Status

Files D-10 and D-18SE have requested that the Districts be provided the capability to coordinate two files using MARK IV and the Remote Job Terminal. The programming required to accomplish this request has been completed and the necessary changes to the RIS and Remote Terminal Data Assembly and JCL manuals are being written at this time.

Application

Figure 3 depicts an example of the D.58 Accident File and the D.50 RI2TLOG. Using MARK IV (A, Figure 3) specify the selection criteria for the Start/End Search. Only those records meeting the selection criteria will pass to the MARK IV accident subfile (B, Figure 3). Use District, County, Control, Section, Milepoint of the accident record as selection criteria for the RI2TLOG record selection for the RI2TLOG subfile. The Couple Program (C, Figure 3) will now match each accident record to a RI2TLOG record and combine both into one record (D, Figure 3). Districts will now have available for any MARK IV report (E, Figure 3) the combined items of both files.

Table look-up capability for accident codes will be developed for use with the RIS accident file at a later date (anticipated December 1978). This will enable the user to receive a decoded tabulation (i.e., if object struck is desired, the tabulation would contain, "Vehicle hit culvert-headwall or marker post," rather than the code "22" as has been printed in the past). This modification is believed to greatly facilitate interpretation of the generated tabulation and is responsive to the expressed wishes of many Districts contacted.

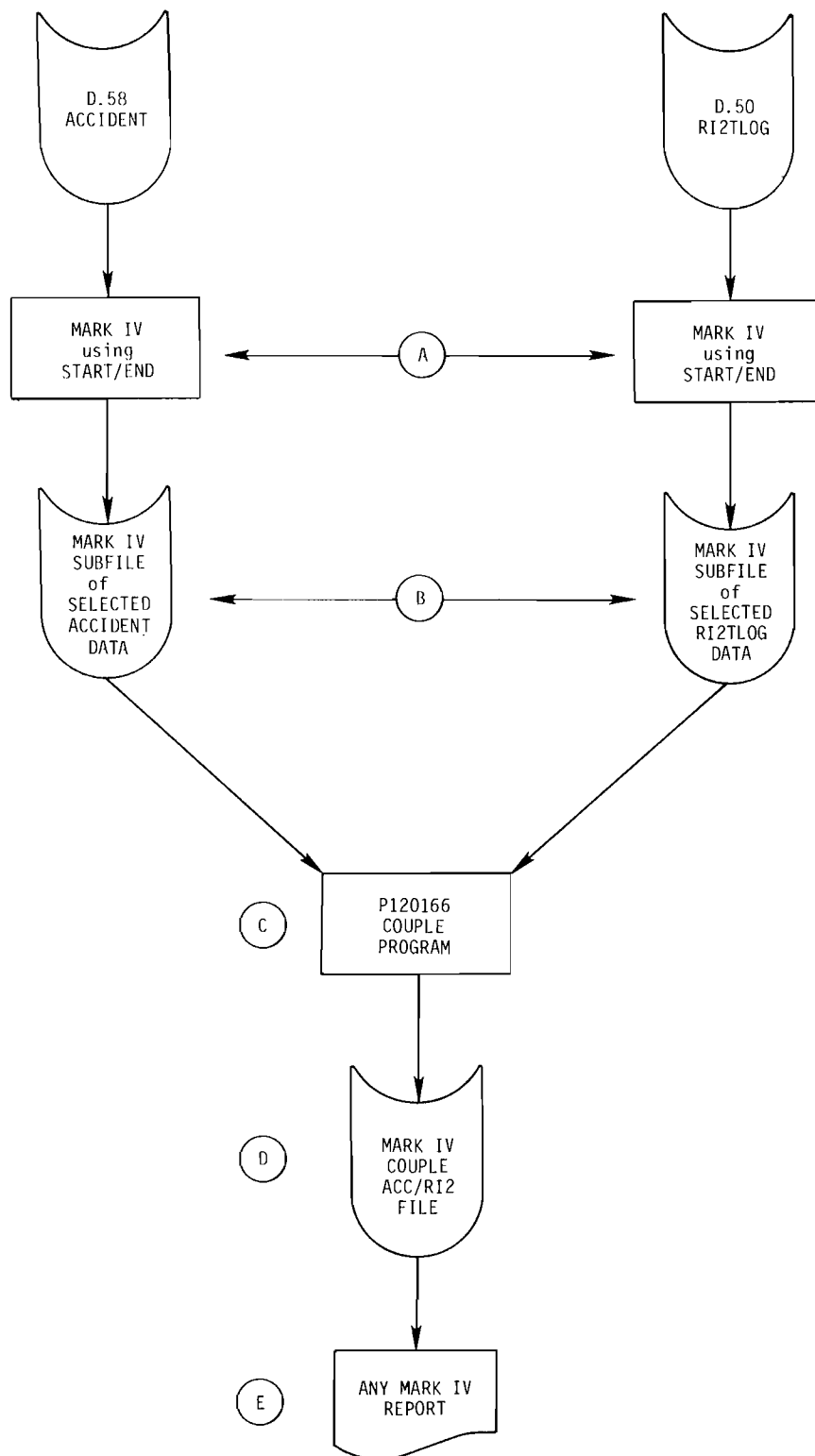


FIGURE 3 EXAMPLE OF MERGING THE D.58 ACCIDENT FILE AND THE D.50 RI2TLOG

New Accident Data Coding and Format

The coding system used in the old accident data file differs from the DPS coding system by which the traffic accident tabulations originally were encoded. Also, during the re-coding transformation and reformatting, certain accident data encoded on the DPS file were omitted from the SDHPT data file. To more fully describe the total accident scenario and to achieve uniformity in coding, File D-18SE has requested that all accident files use Department of Public Safety coding and that all files (RIS and Master Accident) be in the same format. Programming necessary to accomplish this request is nearing completion and changes to the RIS manual to reflect this modification will be published at that time.

The accident data codes are published in the Department of Public Safety Motor Vehicle Traffic Accident Coding Instructions. The new accident record format is illustrated in Figure 4 (Form 10.395).

New Format For Prior Year's Accident Data

File D-18SE has requested that, after completion of the above request, new accident files for years 1974 through 1977 be generated in the new coded format and that these accident data be made available to the Districts. This will enable a District to access prior year's accident data using MARK IV to generate any special report desired (wet pavement, bridge, night/day, or any other type selection).

Retrieval of Reformatted Prior Years Accident Data

Figure 5 illustrates the steps in the process to retrieve accident data from tape files for all years prior to the current year (current years data are on the RIS disk file). The desired year accident file will be input to the Record Picker Program (A, Figure 5). Selection criteria will be input by the Selection Card (Key). This could be the wet pavement, bridge, railroad, county, control or any other selection code desired. Only those records meeting the selection criteria will be passed to the Temporary Disk File (B, Figure 5). An Amigoload (C, Figure 5) will pass the selected records to the MARK IV subfile (D, Figure 3) which is now available to the District for any MARK IV report (E, Figure 5). Note that the MARK IV subfile (D, Figure 5)

| JOB NUMBER
TRA - 005 | | FILE NAME
ACCIDENT (D18-SE) | | | STORAGE MEDIUM
TAPE | |
|--|---------|--------------------------------|-------------------|-------------|-----------------------------|---------------------------------------|
| AVERAGE NO. RECORDS
225,000 | | FIELDS
64 | CHARACTERS
130 | HOW CURRENT | DATE PREPARED
July, 1978 | |
| FILE SEQUENCE 1. DISTRICT, 2. COUNTY, 3. CONTROL (HWY #1),
4. SECTION (HWY #1), 5. MILEPOINT (HWY #1) | | | | | DATE PREPARED | REVIEWED BY
Alan Jarl |
| LABELS (FB,130 X 5200) | | | | | RECORD SOURCE | |
| RETENTION CHARACTERISTICS | | | | | | |
| REMARKS | | | | | | |
| PAGE 1 OF 4 | | | | | | |
| ITEM NO. | FROM TO | SIZE | NO. OF DEC.POS. | FIELD CHAR. | LABEL | ITEM NAME |
| 1 | 1-2 | 2 | | A | | DISTRICT |
| 2 | 3-5 | 3 | | A | | COUNTY |
| 3 | 6-9 | 4 | | A | | CONTROL (HWY #1) |
| 4 | 10-11 | 2 | | A | | SECTION (HWY #1) |
| 5 | 12-14 | 3 | 1 | A | | MILEPOINT (HWY #1) |
| 6 | 15-21 | 7 | | A | | REPORT NUMBER |
| 7 | 22-25 | 4 | | A | | CONTROL (HWY #2) |
| 8 | 26-27 | 2 | | A | | SECTION (HWY #2) |
| 9 | 28-30 | 3 | 1 | A | | MILEPOINT (HWY #2) |
| IF RRR-ING ACCIDENT, X-ING # IN COLS. 24-30 | | | | | | |
| 10 | 31 | 1 | | A | | SURFACE CONDITION |
| 11 | 32 | 1 | | A | | ROAD CONDITION |
| 12 | 33 | 1 | | A | | INVESTIGATION BY |
| 13 | 34 | 1 | | A | | ALIGNMENT |
| 14 | 35 | 1 | | A | | TRAFFIC CONTROL |
| 15 | 36 | 1 | | A | | ROADWAY RELATED |
| 16 | 37 | 1 | | A | | INTERSECTION RELATED |
| 17 | 38 | 1 | | A | | INTERSECTING ROAD TYPE |
| 18 | 39 | 1 | | A | | INTERSECTION TYPE/ENTERING ROADS |
| 19 | 40-41 | 2 | | A | | VEHICLE MOVEMENTS/MANNER OF COLLISION |

File 10.395

FIGURE 4 NEW ACCIDENT RECORD FORMAT

| | | | | | | | |
|---------------------------|---------|-----------|-----------------|-------------|---------------|--|--|
| JOB NUMBER | | FILE NAME | | | | STORAGE MEDIUM | |
| AVERAGE NO. RECORDS | | FIELDS | CHARACTERS | | HOW CURRENT | DATE PREPARED | |
| FILE SEQUENCE | | | | | DATE PREPARED | REVIEWED BY | |
| LABELS | | | | | | RECORD SOURCE | |
| RETENTION CHARACTERISTICS | | | | | | | |
| REMARKS | | | | | | PAGE 2 OF 4 | |
| ITEM NO. | FROM TO | SIZE | NO. OF DEC.POS. | FIELD CHAR. | LABEL | ITEM NAME | |
| 20 | 42-43 | 2 | | A | | OBJECT STRUCK | |
| 21 | 44-45 | 2 | | A | | OTHER FACTORS | |
| 22 | 46 | 1 | | A | | POPULATION GROUP | |
| 23 | 47 | 1 | | A | | ROAD CLASS | |
| 24 | 48-49 | 2 | | A | | MONTH | |
| 25 | 50-51 | 2 | | A | | DATE | |
| 26 | 52-53 | 2 | | A | | TIME | |
| 27 | 54 | 1 | | A | | LIGHT CONDITION | |
| 28 | 55 | 1 | | A | | FIRST HARMFUL EVENT | |
| 29 | 56 | 1 | | A | | MILEPOINT DIRECTION | |
| 30 | 57 | 1 | | A | | PART OF ROADWAY #1 INVOLVED | |
| 31 | 58 | 1 | | A | | WEATHER | |
| 32 | 59 | 1 | | A | | BRIDGE NUMBER (1) | |
| 33 | 60 | 1 | | A | | BRIDGE NUMBER(2)/PHYSICAL FEATURES (1) | |
| 34 | 61 | 1 | | A | | BRIDGE NUMBER(3)/PHYSICAL FEATURES (2) | |
| 35 | 62 | 1 | | A | | BRIDGE DETAIL | |
| 36 | 63-64 | 2 | | A | | DIRECTION OF TRAVEL | |
| 37 | 65-67 | 3 | | A | | VEHICLE #1 FROM | |
| 38 | 68-70 | 3 | | A | | POINT OF IMPACT | |
| 39 | 71-73 | 3 | | A | | VEHICLE #2 FROM | |

File 10.395

FIGURE 4 NEW ACCIDENT RECORD FORMAT (Continued)

| | | | | | | | |
|---------------------------|---------|------|-----------------|-------------|---------------|------------------------------------|--|
| JOB NUMBER | | | FILE NAME | | | STORAGE MEDIUM | |
| AVERAGE NO. RECORDS | | | FIELDS | CHARACTERS | HOW CURRENT | DATE PREPARED | |
| FILE SEQUENCE | | | | | DATE PREPARED | REVIEWED BY | |
| LABELS | | | | | | RECORD SOURCE | |
| RETENTION CHARACTERISTICS | | | | | | | |
| REMARKS | | | | | | PAGE 3 OF 4 | |
| ITEM NO. | FROM TO | SIZE | NO. OF DEC.POS. | FIELD CHAR. | LABEL | ITEM NAME | |
| 40 | 74-75 | 2 | | A | | TOTAL VEHICLES INVOLVED | |
| 41 | 76 | 1 | | A | | PEDESTRIAN ACCIDENT | |
| 42 | 77-78 | 2 | | A | | NUMBER OF PEDESTRIANS KILLED | |
| 43 | 79-80 | 2 | | A | | NUMBER OF PEDESTRIANS INJURED | |
| 44 | 81-83 | 3 | | A | | TOTAL NUMBER OF PEOPLE KILLED | |
| 45 | 84-86 | 3 | | A | | TOTAL NUMBER OF PEOPLE INJURED | |
| 46 | 87-88 | 2 | | A | | VEHICLE #1 TYPE | |
| 47 | 89-90 | 2 | | A | | VEHICLE #2 TYPE | |
| 48 | 91-92 | 2 | | A | | DRIVER #1 CONTRIBUTING FACTORS | |
| 49 | 93-94 | 2 | | A | | DRIVER #2 CONTRIBUTING FACTORS | |
| 50 | 95-96 | 2 | | A | | HIGHWAY SYSTEM (Hwy #1) | |
| 51 | 97-100 | 4 | | A | | HIGHWAY NUMBER (Hwy #1) | |
| 52 | 101-102 | 2 | | A | | HIGHWAY SYSTEM (Hwy #2) | |
| 53 | 103-106 | 4 | | A | | HIGHWAY NUMBER (Hwy #2) | |
| 54 | 107-108 | 2 | | A | | FEDERAL AID DESIGNATED (Hwy #1) | |
| 55 | 109-110 | 2 | | A | | FEDERAL AID DESIGNATED (Hwy #2) | |
| 56 | 111 | 1 | | A | | HIGHWAY STATUS (Hwy #1) | |
| 57 | 112 | 1 | | A | | HIGHWAY STATUS (Hwy #2) | |
| 58 | 113-115 | 3 | | A | | FUNCTIONAL CLASSIFICATION (Hwy #1) | |
| 59 | 116-118 | 3 | | A | | FUNCTIONAL CLASSIFICATION (Hwy #2) | |

File 10.395

FIGURE 4 NEW ACCIDENT RECORD FORMAT (Continued)

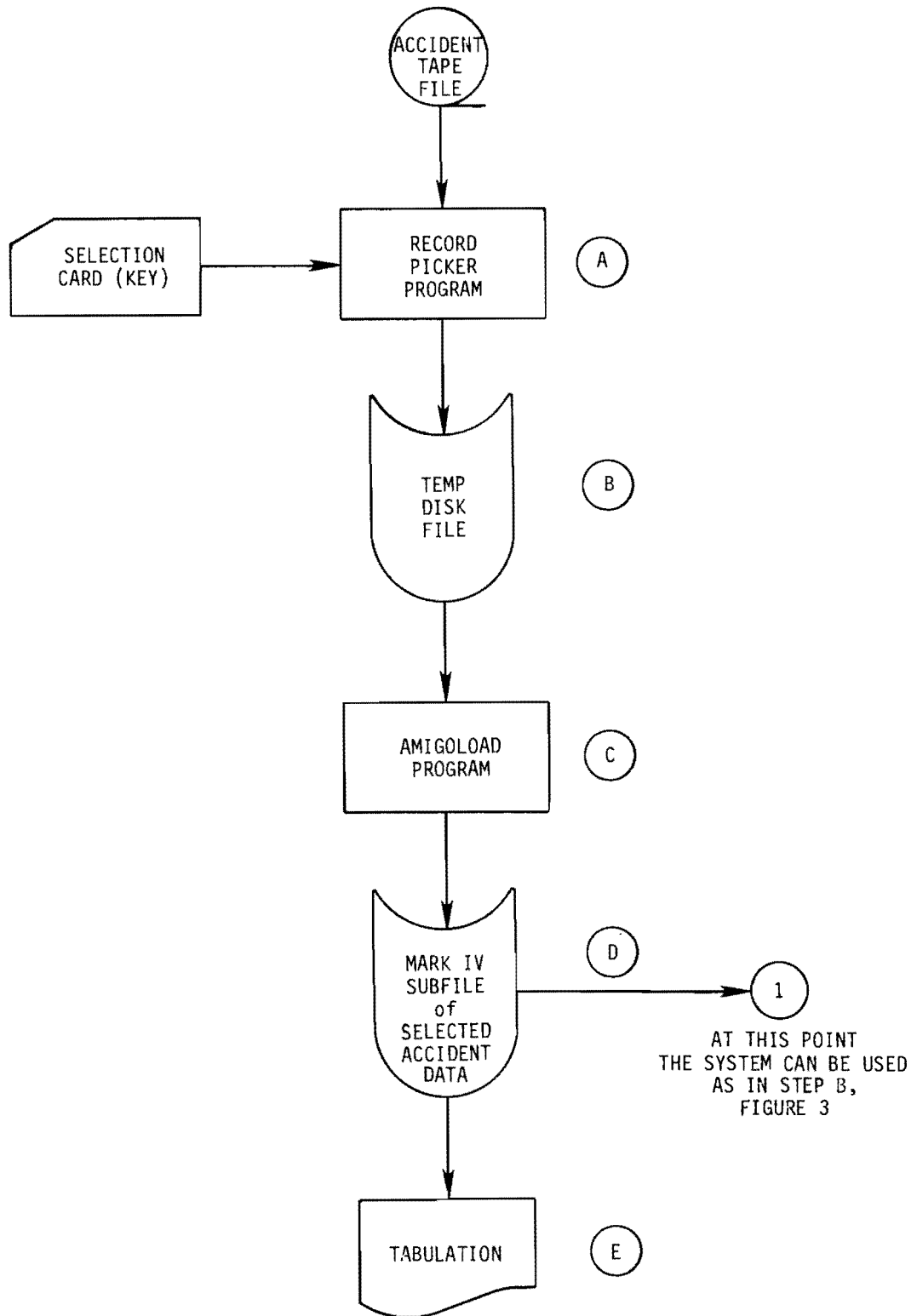


FIGURE 5 STEPS INVOLVED IN RETRIEVING ACCIDENT DATA FROM TAPE FILES FOR YEARS PRIOR TO CURRENT YEAR

can be input into the job stream depicted in step B, Figure 3 (Chapter 3) in order to combine the accident file and RI2TLOG (since prior years's ADT is available on the RI2TLOG, accident rates may be generated).

A manual and an addition to the Remote Terminal Data Assembly and JCL manual will explain the procedures to generate various accident reports.

Modification of the Master Accident Listing has been completed. The 1978 accident listing will contain column headings (as illustrated in Figure 6), eliminating the use of the present template.

Advantages of New Accident Data Information System

With the changes to the data information system described above, a District will be provided the capability to generate any accident report now being received plus the flexibility to generate various special reports to accommodate their particular engineering need.

1978 MASTER ACCIDENT LISTING

PAGE 15

CONTROL - SECTION 521 - 5

DISTRICT 15 COUNTY 15 BEXAR

| INTER | | HIGHWAY 2 | | BRIDGE | | VEHCL CNTRB | | | | | | | | | | | | | | | | TOTAL | | P HIGHWAY | | HIGHWAY | | | | | | | | | | | | |
|---|----|-----------|----|--------|---|-------------|----|----|---|----|----|----|----|----|----|----|----|---|----|----|----|-------|-------|-----------|---|---------|---|---|---|-------|-------|--------|--------|---|---|--------|--------|-----|
| M | P | R | A | C | R | R | E | C | S | M | D | H | M | O | P | D | V | P | V | O | T | L | W | S | R | M | D | D | T | VEHCL | CNTRB | N | I | K | P | NUMBER | NUMBER | |
| IP | PR | DL | UE | DN | N | E | IP | IT | A | OC | BS | HF | E | EF | TF | RI | ER | D | O | AA | AI | TYPE | FACTR | O | N | I | O | V | J | L | P | NUMBER | NUMBER | | | | | |
| LN | D | T | R | IR | L | T | T | T | C | LN | RR | R | VO | UT | YE | T | HR | I | HR | HC | FG | AF | N | T | Y | M | E | E | 1 | 2 | 1 | 2 | H | D | D | R | ONE | TWO |
| ET | R | IE | G | V | T | Y | R | L | T | ET | TV | M | EL | TR | SA | L | O | O | ET | C | H | T | C | C | T | E | E | E | E | E | E | E | E | E | E | E | E | E |
| T | N | L | N | E | D | P | D | 12 | L | K | T | 1M | 2M | RR | T | T | R | N | N | H | | | | | | | | | | | | | | | | | | |
| CONTROL - SECTION 521 - 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 175 E 2 1 1 0 1 5 4 71 2 10 00 616 126 126 00 9 3 1 1 0 01 01 1 00 01 01 00 00 02 002 000 0 08 0410 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTALS - FATALITIES 0 FATAL ACC 0 INJURED 2 INJURY ACC 1 PDO ACC 0 TOTAL ACC 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONTROL - SECTION 2104 - 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 061 E 1 2 1 0 2 1 4 2452 01 189 30 7 01 20 212 106 42 4 1 2 2 0 01 01 1 17 01 20 01 000 000 0 05 1957 03 1604 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTALS - FATALITIES 0 FATAL ACC 0 INJURED 0 INJURY ACC 0 PDO ACC 1 TOTAL ACC 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONTROL - SECTION 2255 - 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 019 E 1 3 1 0 4 0 0 50 0 01 33 112 162 00 9 3 1 1 0 01 01 1 00 04 00 01 000 001 0 03 1604 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTALS - FATALITIES 1 FATAL ACC 1 INJURED 0 INJURY ACC 0 PDO ACC 0 TOTAL ACC 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONTROL - SECTION 2440 - 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 005 N 1 3 4 3 4 0 0 50 7 01 36 112 162 00 9 3 2 2 0 01 01 1 19 04 20 01 003 000 0 05 2536 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTALS - FATALITIES 0 FATAL ACC 0 INJURED 3 INJURY ACC 1 PDO ACC 0 TOTAL ACC 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONTROL - SECTION 2452 - 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 399 S 1 3 1 0 4 0 0 10 0 01 00 116 164 00 9 1 1 1 0 01 01 1 12 01 20 01 001 000 5 03 1604 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTALS - FATALITIES 0 FATAL ACC 0 INJURED 1 INJURY ACC 1 PDO ACC 0 TOTAL ACC 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| COUNTY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTALS - FATALITIES 1 FATAL ACC 1 INJURED 6 INJURY ACC 3 PDO ACC 1 TOTAL ACC 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

FIGURE 6 EXAMPLE OF NEW MASTER ACCIDENT LISTING

IV. STUDY FINDINGS

The personal interviews and the questionnaires were developed to address specific questions concerning the accident data system in Texas. The questions and a complete list of the responses to each are included in Appendix A (Table A-1). The complete questionnaire is presented in Appendix B. A summary of the pertinent findings from the interview and the questionnaire administration is presented herein.

Acceptance of Planned Changes

During each of the personal interviews with the ten Districts and in Attachment 1 of the questionnaire, a thorough discussion of the planned changes to the accident data system was presented. The personal interview format included first the discussion of the new system followed by a question and answer session. The questionnaire contained a written description of the changes followed by questions to identify needs, problems, deficiencies, and suggestions for improvements.

The interviews provided an opportunity to introduce the new accident data system to the Districts. After realizing the capabilities of the new system, those Districts visited indicated that they wished to receive or have available only the following tabulations:

- (1) Master Accident Listing
- (2) Collision Diagram, Accident Detail Plotting Program
- (3) Current Year's Accident Data on RIS File
- (4) Monthly Fatal Accident Listings

The District interviews were successful and resulted in some very positive expressions of acceptance to the new system; however, the questionnaire results indicate that some Districts, including many of those visited, stated that they wished to continue to receive, in addition to the four tabulations mentioned above, several other reports (Appendix A, Table A-2). Possible reasons for this discrepancy are discussed later in this chapter.

Problems Expressed by Districts

Included in the questionnaire were questions designed to identify problems encountered by the Districts with the present accident data reporting system. From the responses to these questions and from opinions expressed during the District interviews, certain problems were identified. The following is a list of the most prevalent answers including a brief explanation of each problem.

- (1) *Available accident data are several months in arrears, which inhibits immediate correction of problem areas.* With the new modification to the system, engineers may access the current year's data directly which should ameliorate the delay problem; however, the data can be input to this file only as quickly as received from the Department of Public Safety.
- (2) *The exact cause of the accident is often difficult to determine from the reports which makes it difficult to identify possible solutions.* Engineering analysis of accident data to determine causal factors has always been a difficult task because certain operational, geometric and environmental factors cannot be coded in sufficient detail to permit precise definition of the influence exerted on the accident. Also, accident reports describe the events at the point of impact whereas causal factors may be several hundred feet upstream from the point of collision. The new data search and reporting system will, however, permit more microscopic inspection of the accident site and traffic and environmental factors through selection of specific variables coded in the file.
- (3) *Mile points of actual accident sites are often inaccurate which makes it difficult to locate the problem areas.*
- (4) *Occasionally, several intersections within an urban area have the same milepoint. This problem makes individual intersection studies difficult.*
- (5) *A large number of police reports of accidents occurring in urban areas are listed by street name and not by highway number;*

therefore, some accident data are either mis-coded or eliminated completely.

The above three problems pertain to coding problems regarding accident location. Practically all Districts visited expressed similar problems with precise accident location, particularly in urban areas where many accidents occur within closely spaced distances. Although not solvable in this study, the universal expression of this factor indicates that there exists a need to develop a more precise accident location referencing system.

Improvements and Additional Needs Expressed by Districts

In addition to the correction of the problems mentioned in the above section and in the Appendix, the Districts expressed a desire for added capabilities. These suggested improvements are listed below:

- (1) The capability of determining the cost justification of a safety improvement would be an improvement to the system.
- (2) Accident rates for typical situations are needed for a basis of comparison.
- (3) An evaluation technique to determine the damage to roadside obstacles such as signs, guardrails, etc., is needed.
- (4) A methodology for identifying the most hazardous locations within a District would aid in ranking safety projects in order of priority.

Question 6 of the questionnaire requested information regarding the usefulness of a document containing engineering techniques to assist in identifying and analyzing safety improvements. Preparation of such a document has been considered; however its expected use and desired contents must be determined before the decision can be made to pursue this development. Each District was requested to determine if a document of this type would be beneficial and to list typical applications. Of the 24 Districts that responded, 21 indicated that a manual of this type was needed. Typical applications for the manual from each District are presented in Appendix A.

Summarized responses are listed below:

- (1) A document on improvements relating to different types of accidents would aid in identifying possible solutions.
- (2) An aid in projecting and anticipating problem areas would be helpful.
- (3) Information on the amount of data required for statistical analysis or alternative types of analyses if sufficient data are not available is needed to aid in accident evaluations.
- (4) The manual should include economic analysis techniques for analyzing proposed improvements.
- (5) Analysis techniques are needed to determine the effects of roadway factors such as lane width, side clearance, level of service, etc.

Distribution of Accident Reports by File D-18SE

The new accident reporting system will provide the capability to generate accident reports on an "as needed" basis and to include only as much data as specifically requested. The capabilities of the new system were explained in detail at all personal interviews and a written explanation was included with the questionnaire. In an attempt to identify the use rate of the currently distributed reports and to identify those reports that each District would still desire (taking into consideration the new system capabilities and the fact that almost any current tabulation can be generated by remote terminal), each District was asked to complete Part 2 of the questionnaire to provide this information. It was assumed that there would be a direct correlation between ranked preference and usage.

The results are tabulated in Table A-2, Appendix A, to present a ranking of preference for continued distribution of the fourteen tabulations now available, and the priority ranking of usage of each. The results are summarized in Table 1.

TABLE 1
SUMMARY OF ACCIDENT TABULATION USAGE AND DISTRIBUTION

| Accident Report | Stated Preference
Ranking for
Distribution of
Accident Tabulation | Priority Ranking
of Accident
Tabulation by
Stated Usage |
|--|--|--|
| Master Accident Listing | 1st | 1st |
| Wet Pavement Accidents | 5th | 5th |
| Bridge Accidents | 10th | 7th |
| Fixed Object, Run off Road
& Overturned Accidents | 9th | 8th |
| Railroad Grade Crossing
Accidents | 6th | 6th |
| One-Tenth Mile Sections with
Accidents | 3rd | 2nd |
| Urban/Rural Accidents Rates
by Control and Section | 12th | 9th |
| Statewide Highway System
Accident Rates | 8th | 12th |
| Accident Spot Maps
(Rural Only) | 4th | 11th |
| Collision Diagram, Accident
Detail Plotting Program | 11th | 10th |
| Current Year's Accident
Data on RIS File | 7th | 3rd |
| Monthly Fatal Accident
Listings | 2nd | 4th |
| Interstate Highway
Accidents | 13th | 13th |
| Day/Night Accident Ratio | 14th | 14th |

The data reveal no correlation between stated usage and desire for continued distribution, which may indicate that most Districts wish to have ready access to these data no matter how few times the data are used annually so that they can respond immediately to the situation for which the data are used.

V. RECOMMENDATIONS

The primary purpose for conducting this study was to identify those attributes of an accident data information system that would be responsive to the engineering needs in the Districts, and to document the needs for consideration by the SDHPT in developing a system to satisfy these needs.

Evaluation of the study findings by the research staff including personnel from File D-18SE, File D-19, and TTI predicates the following recommendations:

- (1) The new accident information system allowing computerized tabulation from remote terminals in each District appears to supply a large portion of the data retrieval needs in the Districts. It will permit generation of tabulations for special evaluations in addition to any accident tabulation now distributed by File D-18SE. Implementation of the system is recommended.
- (2) Preparation and dissemination of operating manuals and conduct of statewide training courses, if necessary, are recommended to assist in effective implementation of the new system.
- (3) The four accident data tabulations listed below should be generated and/or made available annually to every District:
 - (1) Master Accident Listing
 - (2) Collision Diagram, Accident Detail Plotting Program
 - (3) Current Year's Accident Data on RIS File
 - (4) Monthly Fatal Accident History

The annual distribution of the remaining nine tabulations does not appear to be warranted from a usage standpoint since most can be generated remotely if needed; however, the decision to continue distribution may be warranted from a public relations standpoint since many Districts stated that they wished to receive a large proportion of them.

- (4) It is recommended that consideration be given to the development

of a document to provide techniques to evaluate safety needs and improvements using accident data. The document should include guidelines for selection of accident data to use in determining causal factors, data evaluation techniques, possible approaches for identifying and correcting safety-related problems and techniques to statistically evaluate the improvements selected.

APPENDIX A

This appendix contain questions and responses from the Statewide questionnaire.

TABLE A-1
RESPONSES TO STATEWIDE QUESTIONNAIRES

Question 1

What uses are made, in your District, of the accident data currently transmitted? Please be specific regarding the engineering application of the accident data or other reasons for which accident data are used (ex. legal purposes, obtaining safety funds, evaluation of safety improvements, etc.)

Responses

1. Evaluation for safety improvement projects, traffic signal surveys, speed zone strip maps, traffic complaint investigations, intersection improvement studies, and interstate needs estimate.
2. Accidents are used in evaluating problem areas. Different types of accidents require different solutions (example: right angle collisions - possibly signalize intersection). The accidents are also used to obtain safety funds for improvements. A large percentage of nighttime accidents might reflect the need for roadway illumination. Accident data are also used to make studies after improvements have been made to see what effect they have had.
3. The Master Accident Listing is used:
 - (a) to detect problem areas and to identify the nature of the deficiency,
 - (b) to justify requests for improvements in channelization, signalization, signing, etc. through rehabilitation projects and safety programs,
 - (c) to verify traffic complaints of specific problems,
 - (d) to assist in the analysis of specific locations.
4. The Master Accident Listing is used:
 - (a) to research background for legal purposes,
 - (b) as part of traffic engineering study to determine need for signals,
 - (c) to provide quick reference when citizens complain of accident problems,

TABLE A-1
RESPONSES TO STATEWIDE QUESTIONNAIRES

Question 1

What uses are made, in your District, of the accident data currently transmitted? Please be specific regarding the engineering application of the accident data or other reasons for which accident data are used (ex. legal purposes, obtaining safety funds, evaluation of safety improvements, etc.)

Responses (Continued)

- (d) to evaluate needs of safety improvements.
5. Wet Pavement, Bridge, RR Crossing, and Tenth-Mile Sections are used to help determine needs for seal coats or safety improvements. System Accident Rates are used in project environmental reports.
 6. Accident Spot Maps are used to supply Resident Engineers and Maintenance Supervisors a quick view of their area trouble spots that may need attention.
 7. Collision Diagrams are used when the manner of collision cannot be determined by codes.
 8. Monthly Fatal Accident Listing is used each month to determine any potential problem area.
 9. The accident data are used to verify information received from various municipalities for traffic signal recommendations.
 10. The accident data are used for speed zone accident information and evaluation of safety improvements.
 11. Each report received is systematically searched for evidence of trouble spots.
 12. Reports are used to calculate S.I.I. for the purpose of obtaining safety funds.
 13. Completed safety projects are evaluated with the use of reports.
 14. The Master Listing and items 7, 8, and 12 are the most used options.

TABLE A-1
RESPONSES TO STATEWIDE QUESTIONNAIRES

Question 1

What uses are made, in your District, of the accident data currently transmitted? Please be specific regarding the engineering application of the accident data or other reasons for which accident data are used (ex. legal purposes, obtaining safety funds, evaluation of safety improvements, etc.)

Responses (Continued)

These uses include investigations of complaints, designing traffic control devices, obtaining safety funds, and evaluation of improvements. If there are legal questions the actual officer's report is used.

15. Data are used to determine locations needing improvements, to determine what type improvements are needed, and to obtain safety funds.
16. The accident data are used to construct accident condition diagrams for traffic operation study and project documentation.
17. The data are used for speed zone, traffic, and engineering investigations.
18. Accident data sheets for projects are submitted in response to Statewide Safety Program requests.
19. The data are used to evaluate system operations.
20. The Master Accident Listing is used for obtaining safety funds, evaluation of safety improvements, and determining specifics about apparent hazardous locations.
21. Accident data are used primarily for the following: signal warrant studies, safety improvement studies, and research of reported "Hot spots."
22. Primarily used to evaluate citizen complaints to determine if further investigation is needed
23. Occasionally used to evaluate effectiveness of traffic control changes
24. The Master Accident Listing provides all the data needed to do the accident investigation studies and for back up material in financing projects.

TABLE A-1
RESPONSES TO STATEWIDE QUESTIONNAIRES

Question 1

What uses are made, in your District, of the accident data currently transmitted? Please be specific regarding the engineering application of the accident data or other reasons for which accident data are used (ex. legal purposes, obtaining safety funds, evaluation of safety improvements, etc.)

Responses (Continued)

25. Accident data are used for traffic signal and channelization studies, in formulation of safety improvement programs, and for legal purposes.
26. Accident data are used in setting up Safety Program, support data for installation of traffic signals, court cases, before and after studies, for ramp control, railroad grade crossing programs (on and off system), government transportation agencies, and public official requests.
27. Signal studies (accident warrant)
28. Railroad protection device studies
29. Obtaining safety funds
30. Evaluation of safety improvements
31. Speed zoning
32. Legal purposes (data for torts claims suits)
33. The current accident data are being used for evaluating speed zones, basis for safety improvement, developing safety project, and obtaining State and Federal Funds, reference for routine replies to complaints and inquiries, and as a reference in legal actions against the Department.
34. High accident locations: determine cause by noting similarities (e.g. day-night, wet-dry, turns, front-rear at intersection, etc.)
Legal purposes: driver error (speed, drunk, etc.) highway error (curves, slick, etc., similarity of accidents off road, lost control, FYROW at intersection, etc.)

TABLE A-1
RESPONSES TO STATEWIDE QUESTIONNAIRES

Question 1

What uses are made, in your District, of the accident data currently transmitted? Please be specific regarding the engineering application of the accident data or other reasons for which accident data are used (ex. legal purposes, obtaining safety funds, evaluation of safety improvements, etc.)

Responses (Continued)

Evaluate safety improvements: Need for traffic control devices, turning lanes, lighting, resurfacing roadway, straightening or banking curves, additional signing, etc.

Speed zones and signal requests: Accident information plotted or diagrammed.

Pin map: Fatal accidents depicted by map pins, different color for each year, with special markings for pedestrian accidents, mounted on wall, 5 years per map.

35. Obtaining safety funds, seal coats, extending structures, removing fixed objects, traffic signals, intersection geometrics and speed zoning
36. Traffic signal studies
37. Safety lighting studies
38. Highway improvements justification
39. Evaluation of improvements
40. Locate problem areas
41. Accident data are used primarily to respond to the Austin office request for program information and development.
42. Monthly listing of fatal accidents used to check if roadway conditions were involved
43. Accident data are analyzed to:
(a) document need for proposed safety projects or other improvements,

TABLE A-1
RESPONSES TO STATEWIDE QUESTIONNAIRES

Question 1

What uses are made, in your District, of the accident data currently transmitted? Please be specific regarding the engineering application of the accident data or other reasons for which accident data are used (ex. legal purposes, obtaining safety funds, evaluation of safety improvements, etc.)

Responses (Continued)

- (b) evaluate safety improvements,
- (c) monitor polish of aggregates and relation to wet weather accidents.
- 44. To study accident prone areas
- 45. To substantiate funding for safety projects
- 46. Identification of hazardous locations and establishment of safety improvement project priorities
- 47. Legal purposes (tort claims actions)
- 48. Evaluating changes in geometrics and striping-delineation
- 49. Transportation system planning and monitoring of system performance (Accidents and accident rates by inventory sections)

TABLE A-1, (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 2

What additional engineering analyses would be desirable that currently are not being made using accident data? (or cannot be made)

Responses

1. A system is needed to determine the worst accident locations within the district. Some rural intersections with four or five accidents could be worse than urban intersections with twenty accidents. Many factors would have to be considered - volume of traffic, severity of accidents, number of accidents, type of accidents (head-ons are normally more severe than rear-ends) etc. A printout of the twenty worst intersections in the District with the above mentioned factors considered would be useful.
2. Information regarding physiological factors which could influence drivers involved in accidents, i.e. intoxication, drug influence, evidence of fatigue, mental incapacitation, etc.
3. Citations issued by investigating officers to drivers involved
4. A candid estimate of the cause of the accident by the investigating officer
5. None
6. Analysis of "run-off road and overturn" type accidents occurring near horizontal curves and on straight roadways
7. Analysis of "wet pavement" type accidents with particular reference to hydroplaning
8. None, other than efforts to decrease lapse time from incident to programming
9. Accident data on city streets by street name and not by mile marker are needed. Generally, city streets are too close together to determine specific intersections using mile marker indicators.

TABLE A-1, (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 2

What additional engineering analyses would be desirable that currently are not being made using accident data? (or cannot be made)

Responses (Continued)

10. None
11. In urban areas (or small towns) give name of intersecting street on detail accident listings.
12. The capability to generate reports and analysis will give the Districts the most benefit.
13. More current data would allow quicker evaluation of control changes.
14. Statistical analysis of changes in number of accidents per section and rate per section would be helpful in pinpointing hot spots.
15. Current data are sufficient.
16. The capability to combine wet weather accidents with ADT and skid factors to formulate a safety program for lowering wet weather accidents is desired. It is understood that this capability is being added to the system.
17. Railroad off system accidents should be made available to the Districts to help evaluate grade crossings.
18. (a) Damage to signs, crash barrels, guard rails, fences, etc. which do not disable vehicle but if happening with some frequency could indicate some problems, also would give information as to their safety value.
(b) Accidents that are classified as "Incidents" such as jack-knife, loss of control etc. and do not involve another vehicle, disabling damage to vehicle, or injury. On low volume roads these could be happening with frequency that indicates surface problems, they are reported but not written up as accidents, therefore not recorded.
(c) The report "INTERSECTIONS WITH 3 OR MORE ACCIDENTS" appears to have

TABLE A-1, (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 2

What additional engineering analyses would be desirable that currently are not being made using accident data? (or cannot be made)

Responses (Continued)

been discontinued this year.

19. Generate safety evaluation report including cost data of various types of accidents (i.e. PDO, injury, fatality)
20. None
21. Loss costs to determine economic justification
22. Accident rates; accident costs; establishment of control sections for accident comparisons; statistical tests to establish confidence limits in statistical analysis; information as to percent of unreported accidents; accident rates and severities on different systems of roads such as: collectors, arterials, rural, controlled access, etc.
 - (a) Summary of accidents and accident rates by sections smaller than control sections and longer than 1/10 mile
 - (b) Separation of accidents on controlled access facilities between main lanes, ramps and frontage road

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRES

Question 3

What deficiencies exist in the current reporting system that inhibit or prohibit desired analyses?

Responses

1. The Master Accident Listing would be of much greater value if it could be received earlier in the year, which would make the accident studies more up to date. It is difficult to plot collision diagrams of some accidents due to contradictions between the Master Accident Listing and the local DPS and Police records.
2. The input into the computer is accurate as far as it goes. Within this District areas have been found where, apparently, the cities have failed to turn the accidents in to Austin. This makes it difficult to use the listing to evaluate problems at an intersection. One intersection in particular had about ten accidents one year, eleven the next and none the next, with no improvements, according to the listing. Checking the actual accident reports from the City for the intersection, it was found that there were several more accidents than the listing reflected. There is no way to determine what improvements to make, or if the improvements have done any good if the listings are not complete.
3. Lack of information regarding the cause of the accident, which could mitigate certain associated criteria.
4. Changes in R.I. Sheets, subsequent to the accident report, render it most difficult to establish the exact location of an accident on the new R.I. Sheets.
5. Physical features surrounding an accident location, i.e. sight distance, pavement surface, competition for driver attention (highly visible commercial signs or screen of drive-in movie, etc.)
6. An immediate mailing of reports of major accidents to the District Headquarters by the local D.P.S. office which conducts the accident

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRES

Question 3

What deficiencies exist in the current reporting system that inhibit or prohibit desired analyses?

Responses (Continued)

investigation.

7. Sometimes it is hard to determine just what happened in the accident from the codes used. When a change is made to the DPS coding manual, this problem should be eliminated.
8. Locations along a stretch of roadway are not tied close enough to give accurate locations for plotting of individual accidents.
9. Inaccurate accident information and coding
10. Mile markers used in Master Listing do not correspond with mile markers in the RI log. The maneuver columns on the master listing are not accurate, making it difficult to get a complete "picture" of the accident.
11. None
12. Leaving out the names of intersecting streets prohibits the use of accident listings at intersections in cities.
13. The use of codes in the reports causes a great amount of frustration and delay for those who compile the data. Also, the urban report seems to have many errors in it, especially in the location of the accidents.
14. Time lag in compilation is the main deficiency.
15. Not enough information on the manner of collision. Could expand on contributing factor column for more information.
16. Most of the problems encountered are due to incomplete accident reports. Another problem arises when two or more cross streets intersect the highway at the same milepoint. The present system does not allow the determination of which street the accident occurred.
17. Accidents in a major interchange are very difficult to pin-point, especially on a connector or cloverleaf.

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRES

Question 3

What deficiencies exist in the current reporting system that inhibit or prohibit desired analyses?

Responses (Continued)

18. The accidents at all railroad crossings would be very helpful.
19. When access to present year accident data is made, it would be helpful if the date to which the material is current were known.
20. The accident plotting program idea is good, but quite often the plots do not contain all the accidents shown in the master listing. There is a problem of changing control and section numbers on a roadway.
21. As new streets are developed in urban areas, they are not logged for some time period and the locations have to be estimated by persons not familiar with the area involved.
22. Since the majority of police accident reports indicate the street names, it is recommended that in conjunction with the present milepoints that the street names also be printed.
23. The present accident listing being used lists both highway numbers when an accident occurs at the intersection of two State routes. Why not show the street name (may be abbreviated) as highway No. 2 when the road No. 2 is a city street. Coordination of the accident data to a more local level is desirable in urban areas.
24. (a) Number of highway lanes, divided highway or not,
(b) Clarification of vehicle position or accident location by additional code where there are feeder roads (C&D), ramps and frontage roads all at the same M.P.
(c) The same code should be used throughout for direction (not compass direction for some and Mile Point direction for others).
(d) "TO," "FROM," and "POINT OF IMPACT" columns should be used for all accidents.

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRES

Question 3

What deficiencies exist in the current reporting system that inhibit or prohibit desired analyses?

Responses (Continued)

- (e) Need Diagram and clear explanation in DECODING MANUAL for lane numbering of secondary roads, (second highway or city/county road).
- (f) More use of "OTHER FACTOR" column to explain accident. Need code for fire, illness, asleep, etc.
- (g) Need separate designation for "ANIMAL" - large or small, domestic or wild, (even birds - through windshield)
- (h) The RI-1 Sheets are up-graded or completely changed throughout the year, often these changes involve the milepoint or the bridge number.

It would be helpful and time saving for the decoder to know the date on the RI-1 sheet used. Not knowing which sheets were used or just when they were changed makes it very difficult to confirm accident location.

- (i) Computer should be programmed (if possible) to "kick out" conflicting information.
- (j) Computer should be programmed (if possible) to compensate for M.P. changes.
- (k) In column now reserved for Control-Section-MP of secondary Highway, it would be helpful if the name or number of street or road could be printed. Often one MP covers 2 or 3 intersections.
- (l) When does the "coder" start using the new Mile Points?
- (m) When does the computer start using the new Mile Points?
- (n) Information should be available so that for each accident, the coder, the computer, and the decoder are using the same source of information.

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRES

Question 3

What deficiencies exist in the current reporting system that inhibit or prohibit desired analyses?

Responses (Continued)

25. A legend is needed on collision diagrams.
26. The required use of the template and code to determine causative factors
27. The Road Inventory Logs are necessary to locate the accidents. A problem occurs when mile points are reversed which makes past years accident search more difficult.
28. Current information is satisfactory.
29. Coding is cumbersome, the Mark IV Manual is hard to understand. Lack of traffic volumes to calculate accident rates. Local, area, and Statewide accident rates related to typical design features such as; on or off ramps, curvature, traffic volumes, with or without emergency parking shoulders, median width, vertical and horizontal sight distance, grade, etc.

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 4

What criteria (measures of effectiveness, statistical analyses, etc.) are used to evaluate the benefits derived from safety improvement projects?

Responses

1. The Master Accident Listing is consulted to determine if highway improvements have reduced the accident rate.
2. Studies are made after the improvements have been made to determine whether the number of accidents, severity, and type of accident related to the improvement, have decreased.
3. (a) Analysis of accident history before the improvement compared to that after the improvement
(b) An engineering evaluation of the effectiveness of the improvement
4. There have not been enough safety projects completed to look back on and evaluate benefits.
5. Accident rates before and after improvement
6. Comparison of before and after accident rates and benefit cost ratios are criteria used.
7. Overall change in quantity of accidents
8. Simply check number and type of accidents before and after improvement.
9. A simple before and after review of the number and type of accidents is all there is time for.
10. Reduction in number of accidents
11. A Chi Square test could be used to check significance.
12. Reduction in number of accidents (before and after studies.)
13. Change in traffic patterns
14. Presently, evaluating the effects of safety improvements is not being done, due to a lack of manpower.
15. A dollar value is assigned to a fatality, injury and property damage

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 4

What criteria (measures of effectiveness, statistical analyses, etc.) are used to evaluate the benefits derived from safety improvement projects?

Responses (Continued)

which is then applied to the cost of improvements to obtain a cost-benefit ratio. Only accidents that pertain to a given improvements are used.

16. Before and after accident studies
17. Usually observation of improvements and comparison of accident reduction
18. Before & After Studies at:
 - (a) Stop and Go Signals
 - (b) Stop Signs
 - (c) Curves smoothed out
 - (d) Re-surfacing roadway
 - (e) Dividing road
 - (f) Installing turn lanes
 - (g) Grooving pavement
 - (h) Glare Screens
19. Safety improvement index, accident cost, (fatal, injury, & PDO), and reduction factor
20. Accident rate, severity
21. None
22. Before and after accident data are examined to see if accidents are reduced, and if so, if the reduction is statistically significant. Accident data are checked for change in type of accident occurring after an improvement.
23. Before and after comparisons to determine effectiveness of redesign

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 4

What criteria (measures of effectiveness, statistical analyses, etc.) are used to evaluate the benefits derived from safety improvement projects?

Responses (Continued)

and reconstruction

24. (a) Accident rates
(b) Accident severity
(c) Time of accidents
(d) Relationship between accidents and volumes
(e) Absolute number of accidents
(f) Type of accidents

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 5

Would the computerized techniques for data search and reporting be beneficial to your needs?

Responses

| Response | Totals |
|-------------|--------|
| Yes | 23 |
| No | 1 |
| No Response | 2 |

Explanations for "Yes" Response

1. It will help to have the accident data available on an "as needed" basis and to not have files jammed with a lot of information that is not needed. The availability of access to previous years records will be very useful and the collision diagram plot system will save many man-hours of time.
2. Computerized techniques for data search and reporting would be very useful to this District. Accidents could be pulled and comparisons made where needed.
3. A great deal more information would be available for detailed investigation of specific areas. Several specific categories of information can be easily retrieved which could greatly enhance the investigation of an area or incident.
4. The new techniques will be useful in researching same-type accident data for traffic and safety studies in analyzing particular problems.
5. It will make available the ability to pick and choose information relative only to a specific type problem.
6. It would be convenient during design and analysis briefings to have

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 5

Would the computerized techniques for data search and reporting be beneficial to your needs?

Responses

decoded listings for those not familiar with the codes.

7. These techniques allow individuals not familiar with the coding system to more easily interpret the accident data, allows districts to save valuable time researching and translating specific accident types and locations and is definitely a more efficient and desirable program.
8. Listing the accidents by type and weather from one given milepost to another given milepost to the nearest 0.1 mile, total miles, may be helpful in preparing project submissions for safety funds.
9. This capability will enable the design of individual reporting systems.
10. There has been a frequent need to determine specific accident data for proposed improvement projects. This technique would apparently save time in obtaining this information.
11. The techniques would be extremely beneficial as they would allow the comparison of roadway sections quickly and easily to formulate safety programs.
12. This data would be used for various traffic operations.
13. Use of the techniques would save time.
14. Accidents tabulated in this manner would be useful in discussing accidents with lay people such as city elected officials.
15. Easy access to latest available data resulting in prompt action to inquiries or complaints. Also, data can be obtained when needed.
16. Current information, (especially in the latter part of the year): might give clue to the development of a trouble area before it is brought into focus by a tragedy. Would confirm trouble locations reported by concerned citizens, or give the necessary information to quell

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 5

Would the computerized techniques for data search and reporting be beneficial to your needs?

Responses (Continued)

the sometimes angry demands of persons who feel their cause has highest priority.

17. Reduction of time and effort now spent in manual search and hand calculations
18. Would reduce the number of reports received
19. A Mark IV Program to bring out a word description of accidents at an intersection or roadway section would be helpful.
20. Specific information is needed most of the time whereas Districtwide or Statewide information is bulky and mostly not pertinent or particular area of study.
21. The new arrangement of Accident Data Files into identical formats lessens the changes for encoding errors. There will still be a need for a working knowledge of Mark IV. The proposed revised Mark IV Manual should contain specific examples of search and analysis problems in order for terminal operators to understand how to retrieve data. Comparison of accident rates is required.

Explanation for "No" Response

1. No reason given

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 6

Consideration is being given to the development of a document containing engineering techniques to assist in identification and analysis of safety improvements using accident data as criteria. It is envisioned that a document of this type will include checklists depicting specific accident data that might be retrieved to analyze particular problems, suggested potential improvement for specific accident problems, and techniques to evaluate improvements made.

Would a document of this type be beneficial to your engineering staff?

Responses

| Response | Totals |
|-------------|--------|
| Yes | 21 |
| No | 3 |
| No Response | 2 |

Typical Applications "Yes" Response

1. A document on improvements relating to different types of accidents would be useful. It would be useful if the document related specifically to accidents at intersections and suggested improvements.
2. A document of this type, widely accepted in the profession, could provide a sound technical and legal foundation upon which decisions could be based for possible improvements or for the justification to "leave it as it is."
3. This document, well done, could standardize analysis techniques to assist in the training of traffic personnel and the implementation of investigations.

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 6

Consideration is being given to the development of a document containing engineering techniques to assist in identification and analysis of safety improvements using accident data as criteria. It is envisioned that a document of this type will include checklists depicting specific accident data that might be retrieved to analyze particular problems, suggested potential improvement for specific accident problems, and techniques to evaluate improvements made.

Would a document of this type be beneficial to your engineering staff?

Responses (Continued)

4. Typical applications might include:
 - (a) The significance of certain types of accidents at a given type location.
 - (b) Recommended remedial measures for the prevention of certain types of accidents.
 - (c) Statistical accident analysis of two-way frontage streets vs. one-way frontage streets with similar traffic volumes.
5. Slick pavement studies
6. Roadside obstacle studies
7. Safety lighting improvements
8. Narrow bridge widening projects
9. Culvert headwall modifications
10. Pavement marking improvements and modifications
11. The observed problems could be associated with types of system deficiencies and would require analysis of specific accident data.
12. Analysis of intersection accidents
13. Any help we could have would be appreciated.
14. Supplementary data for our accident studies of high frequency accident locations. Aid in studying signalized locations to determine if timing

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 6

Consideration is being given to the development of a document containing engineering techniques to assist in identification and analysis of safety improvements using accident data as criteria. It is envisioned that a document of this type will include checklists depicting specific accident data that might be retrieved to analyze particular problems, suggested potential improvement for specific accident problems, and techniques to evaluate improvements made.

Would a document of this type be beneficial to your engineering staff?

Responses (Continued)

and phasing changes are necessary.

15. (a) Low skid value pavement - wet weather accidents and skid values
(b) Roadside obstacle accidents
(c) Narrow bridge accidents
(d) Sharp curve accidents
16. Each accident study is unique to the location and conditions, thus the studies, cannot be listed as typical. The document would be used as a guide for all studies in general.
17. (a) Slick pavement
(b) Left turn
18. Information now available appears to give us enough to study and analyze problem areas; however, if this document could project and anticipate problem areas, due to population growth and traffic volume increase, it would be helpful in planning improvements (building and widening highways, turning lanes signals, etc.) before they become a necessity, thus saving time and maybe lives.
19. On ramp/off ramp at discontinuous frontage roads, interchanges (weaving accidents)
20. Roadway conditions, weather conditions, DPS evaluation of contributing

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 6

Consideration is being given to the development of a document containing engineering techniques to assist in identification and analysis of safety improvements using accident data as criteria. It is envisioned that a document of this type will include checklists depicting specific accident data that might be retrieved to analyze particular problems, suggested potential improvement for specific accident problems, and techniques to evaluate improvements made.

Would a document of this type be beneficial to your engineering staff?

Responses (Continued)

factors.

21. Where are the problems, what are the cures, what is the cost, and did it work.

22. Capabilities which would furnish information comparative to a "sufficiency index" or "cost effective ratio."

23. Safety improvements for short sections. Information on how much data are required for reliable statistical analysis or alternative type of analysis when sufficient data are not available. Economic analysis of proposed improvements. Analysis of the effect of: lane width, side clearance, ramp metering, queueing, level of service. Examples of analysis should be presented in full for users to follow.

Explanation for "No" Responses

1. No reason given

2. No reason given

3. No two conditions or circumstances are alike, nor do any call for the same physical solutions. Traffic Engineers should be trained and capable of dealing with the majority of situations which may arise. If a manual is developed and adopted by the Department, which has several

TABLE A-1 (Continued)
RESPONSES TO STATEWIDE QUESTIONNAIRE

Question 6

Consideration is being given to the development of a document containing engineering techniques to assist in identification and analysis of safety improvements using accident data as criteria. It is envisioned that a document of this type will include checklists depicting specific accident data that might be retrieved to analyze particular problems, suggested potential improvement for specific accident problems, and techniques to evaluate improvements made.

Would a document of this type be beneficial to your engineering staff?

Responses (Continued)

hypothetical solutions to a general accident condition, then it becomes a tool to be used against the Department in legal actions just as the various present highway manuals are being used against the Department. If a non-departmental manual is developed and made available for use, if desired, no objections would be offered.

TABLE A-2 SUMMARY OF RESPONSES TO ATTACHMENT 2
OF DISTRICT QUESTIONNAIRE

| (Column 1) | (Columns 2 through 5) | | | | (Column 6) | (Column 7 and 8) | | (Column 9) | (Column 10) |
|--|---|---------|----------|--------------------|---|---|----|---|---|
| Accident Report | Usage of Accident Reports
by Districts | | | | Weighted Ranking
Index of Accident
Report Usage
(Note 1) | Number of Districts
Stating Desire for
Distribution of
Accident Report | | Stated Preference
Ranking for
Distribution of
Accident Reports | Priority Ranking
of Accident
Reports by
Stated Usage |
| | Not Used | 1/10/Yr | 11-20/Yr | More Than
20/Yr | | Yes | No | | |
| Master Accident Listing | 1 | 3 | 4 | 16 | 460 | 22 | 2 | 1st | 1st |
| Wet Pavement Accidents | 0 | 20 | 1 | 2 | 165 | 14 | 10 | 5th | 5th |
| Bridge Accidents | 3 | 18 | 1 | 1 | 130 | 10 | 14 | 10th | 7th |
| Fixed Object, Run off Road
& Overturned Accidents | 6 | 15 | 3 | 0 | 120 | 10 | 13 | 9th | 8th |
| Railroad Grade Crossing
Accidents | 1 | 20 | 1 | 2 | 165 | 13 | 11 | 6th | 6th |
| One-Tenth Mile Sections with
Accidents | 1 | 14 | 6 | 2 | 210 | 20 | 4 | 3rd | 2nd |
| Urban/Rural Accidents Rates
by Control and Section | 8 | 13 | 2 | 1 | 120 | 8 | 15 | 12th | 9th |
| Statewide Highway System
Accident Rates | 10 | 12 | 0 | 0 | 60 | 10 | 13 | 8th | 12th |
| Accident Spot Maps
(Rural Only) | 6 | 15 | 2 | 0 | 105 | 15 | 9 | 4th | 11th |
| Collision Diagram, Accident
Detail Plotting Program | 9 | 11 | 2 | 1 | 110 | 8 | 10 | 11th | 10th |
| Current Year's Accident
Data on RIS File | 3 | 13 | 3 | 4 | 210 | 10 | 11 | 7th | 3rd |
| Monthly Fatal Accident
Listings | 3 | 11 | 9 | 0 | 190 | 20 | 3 | 2nd | 4th |
| Interstate Highway
Accidents | 18 | 3 | 0 | 0 | 15 | 6 | 16 | 13th | 13th |
| Day/Night Accident Ratio | 19 | 3 | 0 | 0 | 15 | 6 | 17 | 14th | 14th |

Note 1: Weighted Ranking Index = Summation of product of frequency and mid value of usage range

$$I = [(0)(\text{Freq. Col 2}) + (5)(\text{Freq. Col 3}) + (15)(\text{Freq. Col 4}) + (25)(\text{Freq. Col 5})]$$

APPENDIX B

This appendix contains:

- (1) the letter that was transmitted to each District with the questionnaire;
- (2) a brief explanation of the "new" accident data system (transmitted to the District);
- (3) the questionnaire that was sent to each District;
- (4) the letter sent to the Districts introducing the study.



COMMISSION
REAGAN HOUSTON CHAIRMAN
DEWITT C. GREER
CHARLES F. SIMONS

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78701

ENGINEER DIRECTOR
B. L. DEBERRY

IN REPLY REFER TO
FILE NO

To: All District Engineers and Engineer-Manager

Gentlemen:

The Department, in cooperation with the Texas Transportation Institute, is conducting a study entitled, "The Use and Analysis of Recorded Traffic Accident Data." The current accident data recording and reporting system is being critically evaluated with respect to satisfying the needs of the engineers in the Districts. The objectives of the five month study are to identify the needs and deficiencies in the current system and solicit suggested recommendations for improvement so that desired capabilities may be integrated into the system to make it responsive to the needs of the users. A letter, dated May 19, 1978 (copy enclosed, Attachment No. 4), sent to all District Engineers and Engineer-Manager outlined the general study approach and action desired from the Districts.

Study personnel from D-18SE, D-19, and TTI have visited nine Districts to discuss:

- (1) System modifications currently proposed
- (2) Accident data needs
- (3) Engineering analysis needs

To be responsive to the expressed input from all Districts, since all cannot be visited personally before August, answers to specific questions are solicited herein so that the needs study can consider the entire State. Attachment No. 1 documents the system modifications that will be implemented by mid July.

Since the procedure outlined in Attachment No. 1 will enable the Districts to generate many of the accident reports currently distributed annually, each District is requested in Attachment No. 2 to specify only those hard-copy reports that will still be desired from D-18SE annually. Attachment No. 3 requests answers to specific questions regarding the needs of an accident data system and the use of accident data for engineering purposes.

All District Engineers
and Engineer-Manager

Action Requested

Each District is requested to:

- (1) Thoroughly review Attachment No. 1 to understand the capabilities and flexibility offered by the proposed accident data system
- (2) Complete Attachment No. 2
- (3) Complete Attachment No. 3
- (4) Return completed Attachment No. 2 and 3 to the address below by July 19, 1978

Texas Transportation Institute
Texas A&M University
College Station, Texas 77843
Attn: Graeme D. Weaver

Your usual excellent cooperation will be appreciated. We look forward to working with the Districts in this effort.

Sincerely yours,

B. L. DeBerry
Engineer-Director

ATTACHMENT NO. 1

D-10 and D-18 have requested that the Districts be provided the capability to coordinate two files using Mark IV and the Remote Job Terminal. The programming necessary to accomplish this task will be completed in mid July.

Also, D-18 has requested that a District be able to access prior year's accident tapes using the above procedure. D-18 and D-19 will develop a manual to be used as a guide in obtaining information from the accident files.

This procedure will allow a District flexibility to access accident files from 1974 forward, on any type breakdown that may be selected (i.e., by control, section, milepoint; by wet weather; by night or day; by time; or any other item that is in the accident file.) As depicted in Figure 1 (flow chart), the accident file would be input to the "Record Picker" program. The selection card would have the key to the data desired, i.e.; control, section, milepoint; wet weather, etc. Only that data meeting the selection card criteria will pass to the temporary disk file. The data in the temporary disk file can then be accessed by Mark IV to be used in any way (i.e.; tally number of accidents at the control, section, milepoint selected; tally wet weather accidents; sort in descending order, etc.).

The accident data on the temporary disk file may also be coordinated with another file on the RIS file, such as the RI2TLOG. This will enable a District to obtain ADT for a particular length of roadway and compute accident rate.

The new procedure, allowing access to prior year's accident data, will enable a District to generate any report now received by the District (list of current reports in Attachment 2), plus the flexibility to generate any other type report desired. However, in order that a District have a complete copy of their accidents, the master accident listing and state-wide accident rates will be produced in Austin and sent to each District. Spot maps, collision diagrams and the monthly fatal accident listing will be processed in Austin. Other changes to the accident files that are in progress, and will be available later in the year, are:

1. Print the master accident listing on pre-printed sheets and eliminate the use of the template. Reduce the size to 8½ by 11 inches and use plastic ring binders.

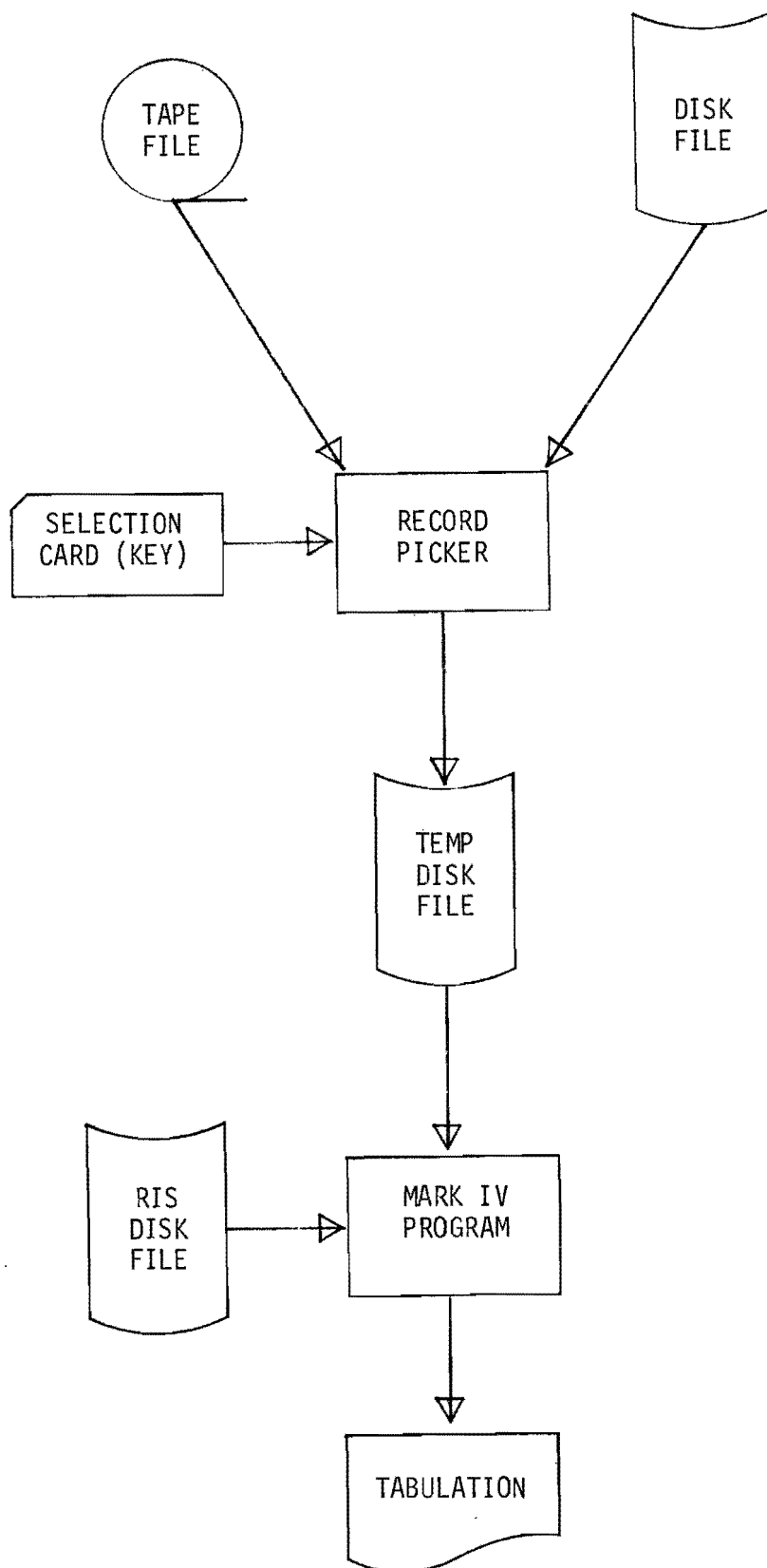


FIGURE 1 Flow Chart of New Retrieval System Requested by D-10 and D-18.

ATTACHMENT NO. 1 (Cont'd)

2. To more accurately describe the true picture of the accident, DPS coding will be used (the same manual to decode the master accident listing as was used to encode the file).
3. The RIS accident file and prior year's accident files will be made available in the same format to avoid confusion when using the new procedure to access accident data (old files will be rerun).
4. Build look-up tables for the new Mark IV procedure to enable the user to receive a decoded report (i.e.; if object struck is desired it would print-out, "Vehicle hit culvert-headwall or marker post," rather than the code "22" as is currently printed).

ATTACHMENT NO. 2

The accident reports produced by D-18S and distributed currently to each District on a yearly basis are listed below. Please indicate, by checking the appropriate boxes, the hard-copy reports that you wish to continue to receive.

In making your Selection, please review the modification to the accident data retrieval system outlined in Attachment No. 1. With the new system, each District will be provided the capability to produce any of the listed reports (except Item 10, collision diagrams) using the remote terminal in the District.

In general, each District will be able to access the re-formatted accident data from 1974 through the most recent data on file (usually a minimum of 45 days in arrears for current year's data). Also, the accident files may be coordinated with any other RIS file. In addition, the following factors should be considered in completing the questions below.

- (a) The master accident listing (Item 1) will be furnished annually in the new format.
- (b) Urban and rural accidents, currently separated into two documents, will be printed in a single document with no separation.
- (c) Items 8, 9, and 12 below will be furnished to each District unless specifically not requested.
- (d) Item 12, Monthly Fatal Accident Listing, will provide cumulative monthly data rather than merely the most recent month's data.
- (e) In general, each District will have the capability to generate and sort all reports listed below (except Items 8 and 9) on an "as-needed" basis for any roadway or portion thereof within the District.

ATTACHMENT NO. 2 (Cont'd)

Please complete the questions adjacent to each item below:

Report Currently Transmitted or Made Available
Annually to DistrictsApproximate Number
of Times Used Each YearDo You Still Wish To
Receive this Report Annually

| | Not Used | 1-10 | 11-20 | More Than
20 | Yes | No | Remarks |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| 1. Master Accident Listing | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 2. Wet Pavement Accidents | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 3. Bridge Accidents | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 4. Fixed Object, Run off Road & Overturned
Accidents | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 5. Railroad Grade Crossing Accidents | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 6. One-Tenth Mile Sections with Five or More
Accidents | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 7. Urban/Rural Accident Rates by Control
and Section | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 8. Statewide Highway System Accident Rates | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 9. Accident Spot Maps (Rural only) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 10. Collision Diagram, Accident Detail Plotting
Program | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 11. Current Year's Accident Data on RIS File | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 12. Monthly Fatal Accident Listings | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 13. Interstate Highway Accidents | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |
| 14. Day/Night Accident Ratio | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | _____ |

ATTACHMENT NO. 3

District No: _____

Date: _____

Please answer the listed questions as fully as possible (your answers will be held in confidence and will form the basis of recommendations for modifications to the data system and engineering analysis needs).

1. What uses are made, in your District, of the accident data currently transmitted? (See Attachment No. 2 for list of reports) Please be specific regarding the engineering application of the accident data or other reasons for which accident data are used (ex. legal purposes, obtaining safety funds, evaluation of safety improvements, etc.)

(Use separate sheet if necessary.)

2. What additional engineering analyses would be desirable that currently are not being made using accident data? (or cannot be made)

(Use separate sheet if necessary.)

3. What deficiencies exist in the current reporting system that inhibit or prohibit desired analyses?

(Use separate sheet if necessary)

4. What criteria (measures of effectiveness, statistical analyses, etc.) are used to evaluate the benefits derived from safety improvement projects?

(Use separate sheet if necessary)

5. Would the computerized techniques for data search and reporting (outlined in Attachment No. 1) be beneficial to your needs?

☐ Yes

☐ No

Explain: _____

(Use separate sheet if necessary)

ATTACHMENT NO. 3 (Cont'd)

6. Consideration is being given to the development of a document containing engineering techniques to assist in identification and analysis of safety improvements using accident data as criteria. It is envisioned that a document of this type will include checklists depicting specific accident data that might be retrieved to analyze particular problems, suggested potential improvements for specific accident problems, and techniques to evaluate improvements made.

Would a document of this type be beneficial to your engineering staff?

☐

Yes

☐

No

List typical applications that you might desire or problems that you would like to be addressed in such a document.

(Use separate sheet if necessary)



COMMISSION

HEALAN HOUSTON, CHAIRMAN
DEWITT C. GREER
CHARLES E. SIMONS

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

AUSTIN, TEXAS 78701

ENGINEER-DIRECTOR
B. L. DEBERRY

May 19, 1978

ATTACHMENT NO. 4

IN REPLY REFER TO
FILE NO

TO: All District Engineers and Engineer-Manager

Gentlemen:

The Department, in cooperation with Texas Transportation Institute, has initiated a study entitled, "The Use and Analysis of Recorded Traffic Accident Data". The current accident data recording and reporting system is being critically evaluated with respect to satisfying the needs of the engineers in the Districts.

Prior to making rather extensive modifications to the existing system, it is considered essential that the desired capabilities be identified by the practicing engineers who use the accident data. Therefore, a 5-month Type B cooperative study has been initiated to identify the needs, the deficiencies in the current system, and suggested recommendations for improvement so that desired capabilities can be integrated into the system that will make it responsive to the needs of the users.

Study personnel from D-18SE, D-19 and TTI plan to visit the Districts during May and June to discuss:

- (1) What uses are made of accident data currently transmitted to each District? (See Attachment No. 1 for list of reports)
- (2) What engineering analyses are currently performed or would be desirable using accident data?
- (3) What deficiencies exist in the current reporting system that inhibit or prohibit desired analyses? (data output, type, format, necessary transformations, etc.)
- (4) Would computerized techniques for data search and reporting be desirable?
- (5) Suggested improvements in reporting procedure.

All District Engineers
and Engineer-Manager

May 19, 1978

In preparation for the visits, it is requested that the following action be initiated:

- (1) Appropriate District personnel (Traffic Engineer, Safety Engineer, etc.) selected to attend and participate in the 1-day visits be identified and the TTI project staff be notified by May 23, 1978 (Phone: (713)845-1727, TexAN - 857-1727).
- (2) Attendees be prepared to discuss the above questions and offer specific recommendations for system capabilities.
- (3) Tentative dates be selected for this visit.

The general approach in conducting the needs study is summarized below:

- (1) Summarize current data reporting system.
- (2) Advise Districts of request for input.
- (3) Develop structured interview techniques.
- (4) Conduct personal interviews.
- (5) Summarize results of interviews.
- (6) Transmit summary of results of interviews to Districts and receive final comments.
- (7) Document results.

The above seven tasks are to be completed by September 1, 1978, therefore, it is requested that those Districts desiring to provide specific input into the development of an accident reporting system that will be the most beneficial to their engineering needs express this desire by contacting Dr. G. D. Weaver as soon as possible.

The staff working on this project are:

Mr. W. R. Ratcliff (File D-18SE, SDHPT)
Mr. F. Conklin (File D-19, SDHPT)
Dr. Graeme D. Weaver (TTI, Study Supervisor)
Mr. Anton Huber (TTI, Co-Study Supervisor)
Mr. W. R. Stockton (TTI)

Your usual excellent cooperation will be appreciated. We look forward to working with the Districts in this effort.

Sincerely yours,

B. L. DeBerry
B. L. DeBerry
Engineer-Director
mg

ATTACHMENT NO. 4 (Cont'd)

ATTACHMENT NO. 1

Summary of Accident Reports

The accident reports available to or distributed to each district are listed as follows:

1. Master Accident Listing - Rural & Urban
2. Wet Pavement Accidents
3. Bridge Accidents
4. Fixed Object, Run Off Road and Overturn Accidents
5. Railroad Grade Crossing Accidents
6. One-Tenth Mile Sections With Five or More Accidents
7. Urban/Rural Accident Rates by Control and Section
8. Highway System Accident Rates (included as a 1-page summary with No. 7 above)
9. Accident Spot Maps (Rural Only)
10. Collision Diagram, Accident Detail Plotting Program
11. Current Year's Accident Data on RIS File
12. Monthly Fatal Accident Listings

Also, the statewide summaries listed below are produced for use by the Austin office:

1. Fixed-Object Accidents
2. Interstate Highway Accidents
3. Day/Night Accident Ratio