# Fatal Case Study Analysis

Lindsay I. Griffin, III
Elizabeth Leggett
Catherine Mullen
Brian Powers

September 1975

University of North Carolina
Highway Safety Research Center

Chapel Hill, NC

UNC/HSRC-75/9/4

This study was financed by the North Carolina Governor's Highway Safety Program, Project # 310-75-002-001.

*ATTENTION*

*The enclosed report is a reprint of the original technical report which has recently gone out of print. Its content does not differ in any way from the original report. The format differs slightly due to time restrictions in the reprinting process.*

*We hope that this report will fulfill your interests. We appreciate your continued concern in highway safety.*

ACKNOWLEDGMENTS

We wish to express our appreciation to the North Carolina Highway Patrol for its cooperation in collecting the supplemental data required for this study, and to especially thank Captain Dan Emory and his office for distributing the forms, the district commanders for instructing the highway patrolmen in the forms' use, and the district secretaries for monitoring the reports.

Gratitude is extended to the State Chief Medical Examiner, Dr. Page Hudson, and his staff members, Doug Bradham and Penny Crutchfield, for their efforts in obtaining and forwarding the medical information on the fatal victims.

The Department of Motor Vehicles was invaluable in the handling of the various data collected in this study. Mr. Charles Hensley and Mrs. Rudine Scott assisted in the coordination of the supplemental data and standardized information. Mrs. Ruby Morris was responsible for the coding of information concerning the Fatal Analysis File.

Mr. Robert Schweitz at the National Highway Traffic Safety Administration was indispensable in the acquisition of the Fatal Analysis File and interpretation of data elements.

We would also like to thank the numerous people at HSRC who lent their skills and knowledge of programming, writing, editing, and engineering at appropriate times during the course of this project.

# INTRODUCTION

Since 1972, traffic deaths on North Carolina highways have been declining. The death toll decreased from 1,983 in 1972 to 1,580 in 1974. In spite of this downward trend, motor vehicle death rates (deaths per miles traveled, deaths per vehicle registration, and deaths per population) for this state are higher than those for the nation. This higher than average fatality rate, along with the absolute numbers of traffic deaths occurring each year throughout the state, indicates the need to further reduce fatal motor vehicle accidents in North Carolina. (See Table 1 and Figures 1, 2, and 3).

The purpose of this study is to examine fatal accidents to see how they differ from other accidents, and, on the basis of those differences, to recommend any appropriate countermeasures which could be implemented at a state level to reduce highway deaths in North Carolina.

In this study, five tasks were carried out. The results of these separate studies range from general descriptions (driver, environment, vehicle) to very specific details (driver precrash condition, roadway width, vehicle inspection data, etc.). The five separate studies are: (1) a subjective study of fatal vs. non-fatal accidents; (2) analysis of the 1973 North Carolina accident data tape; (3) analysis of the narrative descriptions from traffic accident reports; (4) examination of the Fatal Analysis File; and (5) supplemental data analysis.

The first study was in response to the question, "Is the fatal accident indeed different from the non-fatal accident with regard to its causal factors?" Photo copies of police accident reports were divided into two groups, fatal and non-fatal. Equal samples of each were selected at random and then intermingled in a random fashion. Fatality information itself was covered so that the readers would not know whether an accident was fatal or not. Each report was read by two independent judges and was subjectively evaluated as to the contribution of the driver, the vehicle, or the environment to the accident.

The second study was done to obtain a more refined comparison of fatal crashes vs. all others. A computer analysis was made of the 1973 North Carolina accident data tape. This tape contains digital information from the standard accident report pertaining to the accident environment, the vehicle, the driver, and the occupants involved in all traffic accidents during that year. Information for fatal accidents only was extracted and frequency distributions were compared with those for all accidents. A total of 105 variables were examined to single out factors associated with fatal accidents.

Further insight into the idiosyncrasies of fatal crashes was sought by reading the narrative accounts of fatal accidents (Study 3). The police-written narrative account of an accident gives a brief description of events leading to the accident and the events occurring during and after the onset of the accident. This open-ended response allows the investigator to report any unusual aspects of the accident which might not be provided for on other parts of the standard report form. Each accident account was read and categorized according to accident type.

The fourth study uses a more detailed computer file in North Carolina fatal accidents. This is the Fatal Analysis File, and was procured from the National Highway Traffic Safety Administration for analysis. The file contains detailed descriptive variables pertaining to the environment, the vehicle, the driver, and the occupants. Included are additional questions concerning driver training, driver history, vehicle history, roadway design, emergency and medical service, and information relating to cause and time of death which are not provided on the North Carolina standard report form. An analysis was made of this tape in three orientations--accident (83 variables), vehicle (102 variables), and person (76 variables). Unfortunately, comparable data on non-fatal accidents were unobtainable.

Analysis of the Fatal Analysis File indicated it was incomplete and thus necessitated acquisition of more detailed information from the investigating officer. Since the greater part of fatal accidents are investigated by the Highway Patrol, they were asked to fill out a supplemental form along with the standard form for all the fatal accidents they investigated during April, May and June 1975. This questionnaire requested needed information regarding the roadway, driver precrash, vehicle malfunction, the fatal victims (sources of injury, time of death), causal factors, along with medical and rescue information. In addition, the Office of the Chief Medical Examiner provided copies of the Medical Examiner's reports from which cause of death and alcohol concentrations were obtained. This information was

correlated with that from the standard report to provide as complete and detailed a computer file as possible. This Med Fatal File was put on a quick access computer file called RAPID.

Table 1. Total persons killed and injured.

| Year | All Accidents | Fatal Accidents | Injury Accidents | Fatal and Injury Accidents | Persons Killed | Persons Injured | Persons Killed and Injured |
|---|---|---|---|---|---|---|---|
| 1967 | 101,615 | 1,482 | 33,214 | 34,696 | 1,751 | 54,433 | 56,184 |
| 1968 | 109,383 | 1,583 | 33,578 | 35,161 | 1,869 | 55,133 | 57,002 |
| 1969 | 120,493 | 1,533 | 35,877 | 37,410 | 1,810 | 58,610 | 60,420 |
| 1970 | 124,784 | 1,520 | 36,268 | 37,788 | 1,772 | 58,622 | 63,216 |
| 1971 | 132,986 | 1,575 | 38,087 | 39,622 | 1,846 | 61,370 | 63,216 |
| 1972 | 127,870 | 1,721 | 40,753 | 42,474 | 1,983 | 65,421 | 67,404 |
| 1973 | 125,825 | 1,593 | 44,841 | 46,434 | 1,892 | 72,072 | 73,964 |
| 1974 est. | *117,196* | *1,365* | *42,174* | *43,595* | *1,599* | *66,451* | *68,050* |

Source: North Carolina Traffic Accident Summary, 1967-June 1974, Raleigh, N.C.: Department of Motor Vehicles, Research Triangle Institute.

FIGURE 1

# TRAFFIC DEATH RATES IN N.C. AND IN THE U.S. RELATED TO TRAVEL MILEAGE

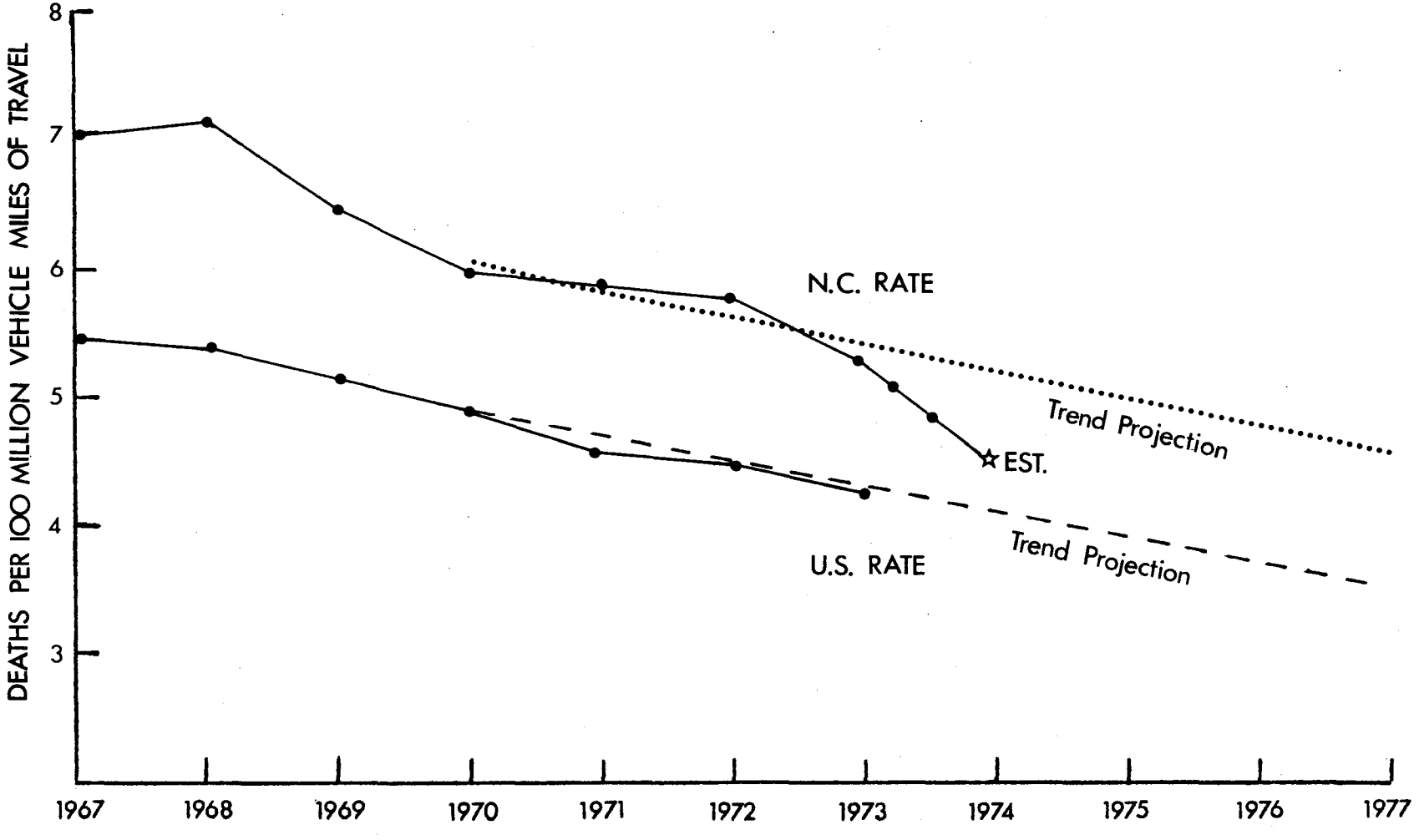


FIGURE 2

# TRAFFIC DEATH RATES IN N.C. AND IN THE U.S. RELATED TO POPULATION

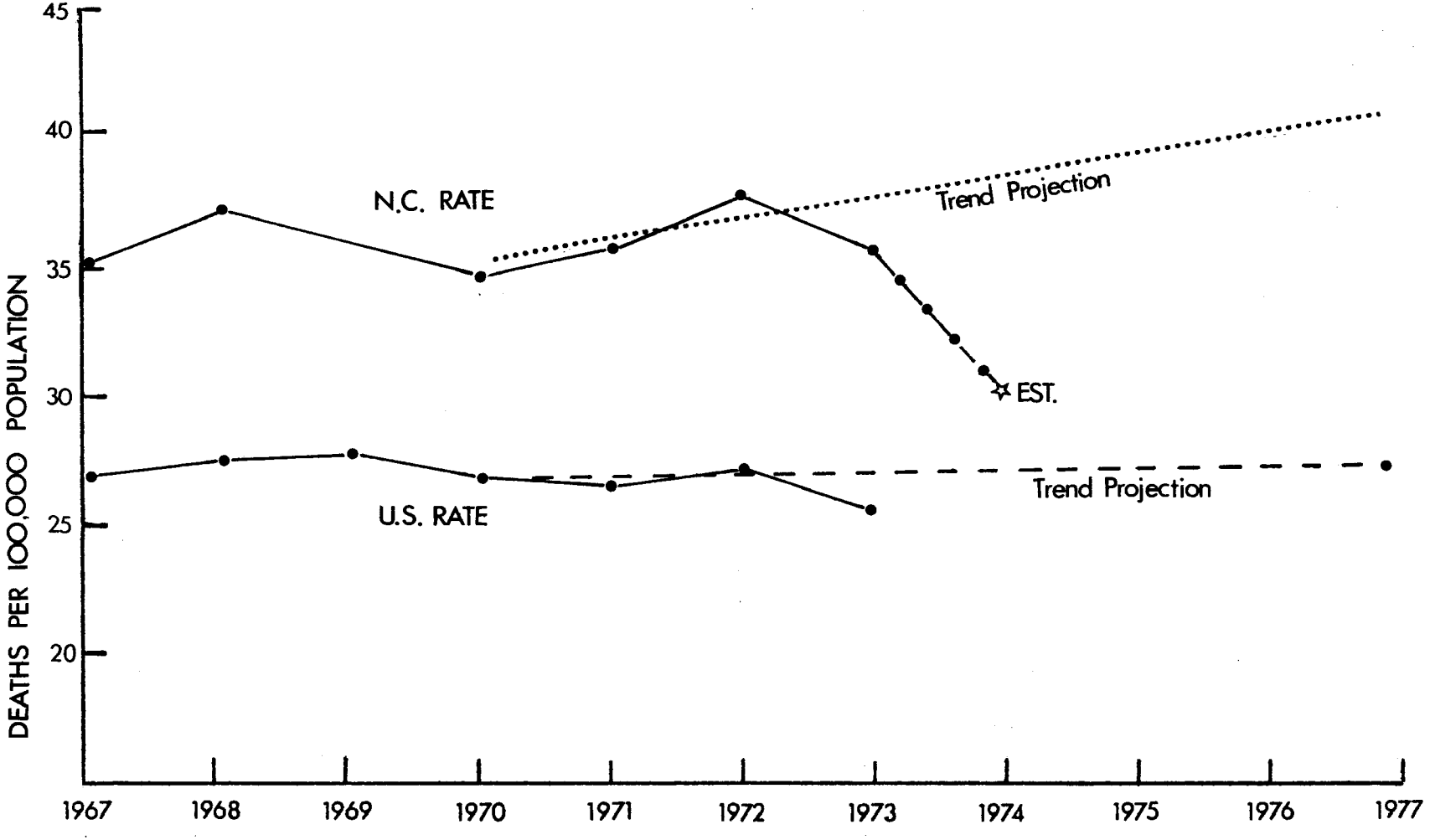
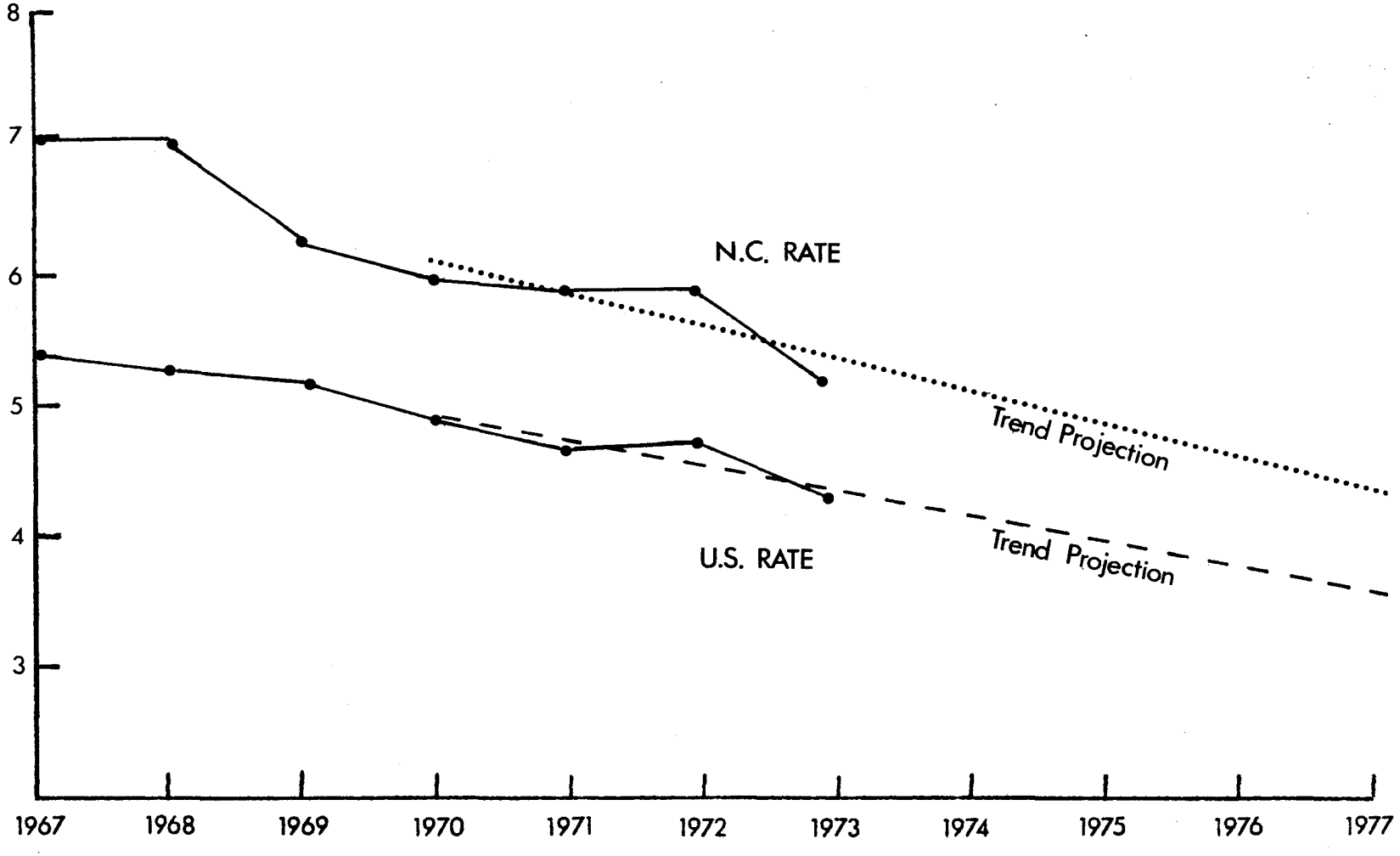


FIGURE 3

# TRAFFIC DEATH RATES IN N.C. AND IN THE U.S. RELATED TO VEHICLE REGISTRATION



## SUBJECTIVE STUDY

### Introduction

As one way of determining how fatal accidents differ from non-fatal accidents, a subjective evaluative study was conducted. Two independent raters made subjective judgments of differences between fatal and non-fatal accidents and then calibrated those differences across the three categories of potential deficiency or failure in the accident situation - driver, vehicle, and environment.

### Method

Two-hundred and fifty accident report forms of fatal accidents and 250 accident report forms of non-fatal accidents were randomly selected from photo copies of police reports for all accidents reported in North Carolina from July, 1972 through March, 1973. After the two samples were mixed together, the portion of each report form dealing with driver and/or occupant injury was covered over so that the judges did not know whether they were evaluating a fatal or a non-fatal accident. The judges could see the remaining information on the accident report, including the narrative and the collision diagram.

The 500 reports were presented to each of the two judges in the same random order and were rated according to "system" failure of the driver, vehicle, and environment. This was an attempt to rate (on a six-point scale, ranging from 0 to 5) the amount of breakdown on the part of each of the three system components and the contribution of each to the accident. Low numbers on the scale indicated little or no involvement in accident causation, while higher numbers indicated a greater degree of involvement. Therefore, each accident received a rating composed of three numbers, each component of the overall rating

# TRAFFIC ACCIDENT REPORT

N. C. Department of Motor Vehicles DMV-349 (Rev. 1-1-73)

*Do not write in this space*

*Patrol Area*

## LOCATION

Date of Accident 19 Day of Week Hour A.M. P.M.

Accident Occurred In ☐ In ☐ Near City or Town of ____ County

Outside City or Town ____ Miles ☐N ☐E ☐S ☐W of ☐ Limits ☐ Center

On ____ Hwy. No. (I., U.S., N.C., R.P., R.U.) If No., or within corporate limits, identify by name

☐ Miles ☐ Feet (0 Ft. if Intersec.) At or ☐N ☐E ☐S ☐W From ____ Hwy. No., or Adjacent County Line Toward ____ Hwy. No., City, or Adjacent County Line

## ACCIDENT TYPE

| Ran off Road | | | Non-Collision in Road | | Collision of Motor Vehicle in Road With: | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Right | 2. Left | 3. Straight Ahead | 4. Overturn | 5. Other in Road | 6. Pedestrian | 7. Parked Vehicle | 8. Train | 9. Bicycle | 10. Animal | 11. Fixed Obj. | 12. Other Obj. |

Collision of M.V. in Road With Another M. V.

| 13. Read End Slow or Stop | 14. Rear End Turn | 15. Left Turn Same Roadway | 16. Left Turn Cross Traffic | 17. Right Turn Same Roadway | 18. Right Turn Cross Traffic | 19. Head On | 20. Sideswipe | 21. Angle | 22. Backing |
|---|---|---|---|---|---|---|---|---|---|

## VEHICLE NO. 1

No. of Vehicles Involved ____

Driver: ____ First Middle Last Name

Address: ____

City: ____ State: ____

Is above address same as on Driver's License? Yes ☐ No ☐

Race/Sex: ____ Driver's Lic: ____ State: ____

Date of Birth: ____ Month Day Year Specify Restriction: ____

Member of Armed Forces Yes ☐ No ☐ Veh. Year: ____ Veh. Make: ____ Veh. Type: ____

Lic. Plate No. ____ State: ____ Year: ____

VIN ____ ODOM. ____ • ____

Owner: ____

Address: ____

City: ____ State: ____

Parts Damaged (TAD) ____ Amount of Damage $ ____

Drivable: Yes ☐ No ☐ Vehicle Removed to: ____

By: ____ Authority: ____

## VEHICLE NO. 2 or PEDESTRIAN

Driver: ____ First Middle Last Name

Address: ____

City: ____ State: ____

Is above address same as on Driver's License? Yes ☐ No ☐

Race/Sex: ____ Driver's Lic. ____ State: ____

Date of Birth: ____ Month Day Year Specify Restriction: ____

Member of Armed Forces Yes ☐ No ☐ Veh. Year: ____ Veh. Make: ____ Veh. Type: ____

Lic. Plate No. ____ State ____ Year: ____

VIN ____ ODOM. ____ • ____

Owner: ____

Address: ____

City: ____ State: ____

Parts Damaged (TAD) ____ Amount of Damage $ ____

Drivable: Yes ☐ No ☐ Vehicle Removed to: ____

By: ____ Authority: ____

Other Property Damaged ____ Amt. of Dam. $ ____

Owner and Address ____

## INJURY SECTION INSTRUCTIONS

Indicate which seats were occupied at the time of the collision, the degree of injury, the type of restraint used, the race, sex and age of the occupants. If occupant not injured, you do not need name and address. For type of Restraint (Res.) used: N=None, L=Lap Belt, LS=Lap & Shoulder, S=Shoulder Belt only.

K=Killed | A=Incapacitating | B=Nonincapacitating – Injury other than K or A evident at the scene | C=No visible sign of injury but complaint of pain, momentary unconsciousness | O=No injury

| SEAT | Inj cl | Res usd | Race, sex | Age | INJURED NAMES AND ADDRESSES First Name Last |
|---|---|---|---|---|---|
| Left Front | | | | | DRIVER 1 |
| Center Front | | | | | |
| Right Front | | | | | |
| Left Rear | | | | | |
| Center Rear | | | | | |
| Right Rear | | | | | |

Total No. Occupants ____ Total No. Inj. ____

| SEAT | Inj cl | Res usd | Race sex | Age | INJURED NAMES AND ADDRESSES First Name Last |
|---|---|---|---|---|---|
| Left Front | | | | | DRIVER 2 OR PEDESTRIAN |
| Center Front | | | | | |
| Right Front | | | | | |
| Left Rear | | | | | |
| Center Rear | | | | | |
| Right Rear | | | | | |

Total No. Occupants ____ Total No. Inj. ____

Injured taken to: ____

WITNESSES Name ____ Address ____ Phone No. ____

WITNESSES Name ____ Address ____ Phone No. ____

Arrests: Name ____ Charge(s) ____ (Cit. No.) ____

Name ____ Charge(s) ____ (Cit. No.) ____

Sign Here ____

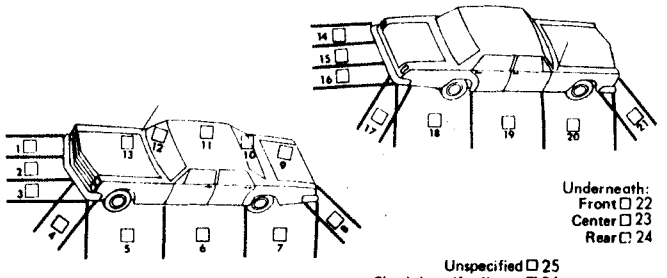
Officer's Rank and Name ____ Number ____ Department ____ Date of Report ____

ADDED BY ____ (Initial)

MARKS

10

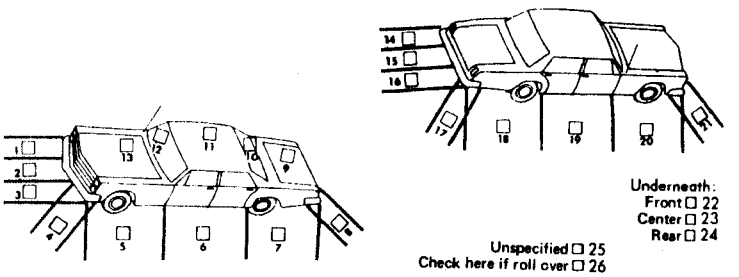
VEHICLE 1 POINT OF INITIAL CONTACT




Underneath:
Front ☐ 22
Center ☐ 23
Rear ☐ 24

Unspecified ☐ 25
Check here if roll over ☐ 26

VEHICLE 2 POINT OF INITIAL CONTACT




Underneath:
Front ☐ 22
Center ☐ 23
Rear ☐ 24

Unspecified ☐ 25
Check here if roll over ☐ 26

| | | | | | VEHICLE 1 | VEHICLE 2 |
|---|---|---|---|---|---|---|
| 1. Locality | 9. Traffic Control | Not Operating ☐ | Not Visible ☐ | | | |
| 2. Speed Limit | 10. Object Struck | | | 15. Veh. Maneuver | | |
| 3. Road Feature | | DRIVER 1 | DRIVER 2 or PED. | 16. Veh. Defects | | |
| 4. Road Surface | 11. Sobriety | | | 17. Estimated Speed | | |
| 5. Road Defects | 12. Physical Cond. | | | 18. Tire Impressions(ft) | | |
| 6. Road Condition | 13. Chem. Test | YES ☐ NO ☐ | YES ☐ NO ☐ | 19. Distance Traveled After Impact (ft.) | | |
| 7. Light Condition | | | | | | |
| 8. Weather | 14. Ped. Action | | | | | |

INDICATE NORTH

Vehicle 1 was Traveling ☐ N ☐ E ☐ S ☐ W on

Vehicle 2 was Traveling ☐ N ☐ E ☐ S ☐ W on

DESCRIBE WHAT HAPPENED:

Vehicle 1 2 VIOLATION INDICATED

- ☐ ☐ 1. No. Violation Indicated
- ☐ ☐ 2. Excessive Speed
- ☐ ☐ 3. Yield Violation
- ☐ ☐ 4. Left of Center
- ☐ ☐ 5. Passing Violation
- ☐ ☐ 6. Stop S. or Yield S. Vio.
- ☐ ☐ 7. Traffic Signal Vio.
- ☐ ☐ 8. Safe Movement Vio.
- ☐ ☐ 9. Too Close
- ☐ ☐ 10. Improper Turn
- ☐ ☐ 11. Improper or No Signal
- ☐ ☐ 12. Improper Parking Location
- ☐ ☐ 13. Other Improper Driving

(describe) _____

EMERGENCY ASSISTANCE INFORMATION

INVESTIGATOR NOTIFIED _____ ☐ a.m. ☐ p.m.

BY _____

INVESTIGATOR ARRIVED _____ ☐ a.m. ☐ p.m.

AMBULANCE ARRIVED _____ ☐ a.m. ☐ p.m.

OTHER COMMENTS: _____

RESERVED FOR STATE USE:

| | | | | |
|---|---|---|---|---|
| 20. | 21. | 22. | 23. | 24. |
| 25. | 26. | 27. | 28. | 29. |

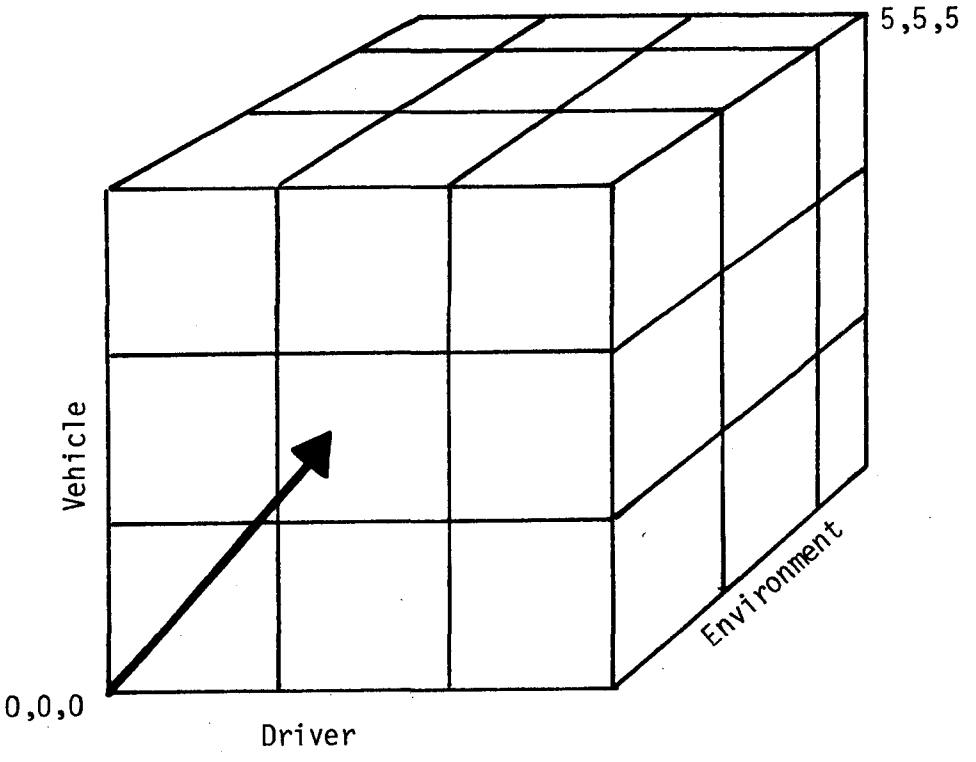
RESERVED FOR CITY OR OTHER USE:

having a potential range from 0 to 5. For example, an accident receiving a rating of 0,0,0 is one in which the driver, vehicle, and environment are all minimally involved in causing the accident, if they are involved at all. The driver could be physically healthy and alert and obeying traffic regulations; the vehicle could be in good repair; and environmental factors such as roadway, illumination, and weather conditions could all be favorable. However, an accident could occur if a pedestrian stepped into the path of the automobile. At the other extreme, an accident with a 5,5,5 rating is caused by total system failure. The driver, vehicle, and environment are all dysfunctional and are all contributory to the occurrence of the accident -- e.g., a driver is drinking and driving; the tires on his vehicle are slick; the accident occurs on a foggy, rainy night. All of this is, of course, based on the judgement of the rater after studying the case.

After receiving the same set of verbal instructions, the two judges evaluated the 500 accidents independently. The following specific points were emphasized: (1) in the case of multi-vehicular accidents, the judge was to determine which driver was responsible; (2) if a pedestrian was hit by an automobile, the driver was assumed to be responsible; (3) various driver, vehicle, and environment deficiencies are indicated on the accident report form. An accident-involved driver (a) could be speeding (as indicated under the category of "estimated speed" on the report form), (b) might be committing several other violations ("violations indicated"),(c) could have a physical impairment ("physical condition"), (d) could have consumed a considerable amount of alcohol ("sobriety"), (e) may have executed an improper driving maneuver ("vehicle maneuver"), and (f) might not

be wearing a seat belt and/or shoulder harness ("restraint used"). If present, vehicle defects would be enumerated on the report form -- brakes, headlights, tires, and steering mechanism are some of the vehicular components which might be defective. Environmental factors such as inclement weather ("weather"), the hours of dusk (" light condition"), icy roadways ("road condition"), soft shoulders ("road defects"), and fixed objects adjacent to the roadway ("object struck") could all contribute to an accident and are all indicated on the checklist portion of the report form.

After three-part ratings were assigned to each of the 250 fatal and 250 non-fatal accidents, each case was placed in one of 27 cells comprising a three-dimensional cube (see following).



Accidents receiving an 0,0,0 rating were, of course, the most benign accidents, while accidents considered to have a 5,5,5 rating would indicate total system failure. The vast majority of the cases fell somewhere in the interior of the three-dimensional cube. The distance of the ray measured from the 0,0,0 origin is defined as the amount of estimated system failure in each individual accident is calculated by the following formula:

$$D = \sqrt{Dr^2 + V^2 + E^2}$$

The mean estimated system failure for both fatals and non-fatals is calculated by summing all of the ray distances and dividing by the number of cases:

$$\frac{\Sigma\sqrt{Dr^2 + V^2 + E^2}}{250}$$

or

$$\frac{\Sigma D}{250}$$

This concept of categorization can be presented in two-dimensional fashion. Ratings of 0 and 1 indicate minimal involvement; scores of 2 and 3 suggest moderate involvement; factors receiving 4 or 5 points are maximally contributory. Using this scheme, 27 cells are generated, each containing a unique accident configuration (see following representation).

| Driver | Environment | Vehicle 0,1 min. | Vehicle 2,3 mod. | Vehicle 4,5 max. |
|---|---|---|---|---|
| 0 1 Minimal | 0 1 Minimal | 1 | 2 | 3 |
| | 2 3 Moderate | 4 | 5 | 6 |
| | 4 5 Maximal | 7 | 8 | 9 |
| 2 3 Moderate | 0 1 Minimal | 10 | 11 | 12 |
| | 2 3 Moderate | 13 | 14 | 15 |
| | 4 5 Maximal | 16 | 17 | 18 |
| 4 5 Maximal | 0 1 Minimal | 19 | 20 | 21 |
| | 2 3 Moderate | 22 | 23 | 24 |
| | 4 5 Maximal | 25 | 26 | 27 |

In an accident which was evaluated and assigned to cell 9, the driver would have been minimally involved, the environment maximally involved, and the vehicle maximally involved. An accident falling into cell 19 would have been caused by the driver with the vehicle and the environment being only minimally involved.

## Results

The mean ray distances representing estimated amount of system failure were calculated for fatal and non-fatal accidents. Using the formula

$$\frac{\Sigma\sqrt{Dr^2 + V^2 + E^2}}{250}$$

it was found that the mean distance calculated using the judgments concerning fatal accidents from Rater 1 was 2.9401 with a standard

deviation of 1.7502, while the mean distance and standard deviation for non-fatals were 2.8525 and 1.1308, respectively -- again, using data from Rater 1. Rater 2 yielded somewhat different judgments and, consequently, a different mean ray distance -- 3.4136 and 3.1844, respectively. It would be noted that, while the mean distances differ from one Rater to the other, both found a greater distance for fatals than for non-fatals -- indicating a greater amount of system failure (2.9401 for fatals compared to 2.8525 for non-fatals for Rater 1 and 3.4136 for fatals compared to 3.1844 for non-fatals for Rater 2).

Cases were evaluated and placed in one of 27 bins as described above. Fatal and non-fatal data were separated and are presented below. Each bin contains the percentage of accidents falling into each unique category.

FATAL

| Driver | Environment | Vehicle 0,1 min. | Vehicle 2,3 mod. | Vehicle 3,4 max. |
|---|---|---|---|---|
| 0,1 Minimal | 0,1 Minimal | 1 / 24. | 2 / .8 | 3 / .8 |
| | 2,3 Moderate | 4 / .8 | 5 / .4 | 6 / 0 |
| | 4,5 Maximal | 7 / 1.2 | 8 / .4 | 9 / 0 |
| 2,3 Moderate | 0,1 Minimal | 10 / 26.4 | 11 / 4 | 12 / .4 |
| | 2,3 Moderate | 13 / .8 | 14 / 0 | 15 / 0 |
| | 4,5 Maximal | 16 / .4 | 17 / 0 | 18 / 0 |
| 4,5 Maximal | 0,1 Minimal | 19 / 37.6 | 20 / 1.2 | 21 / 0 |
| | 2,3 Moderate | 22 / .4 | 23 / 0 | 24 / 0 |
| | 4,5 Maximal | 25 / .4 | 26 / 0 | 27 / 0 |

The three unique fatal accident situations occurring most frequently were those represented in cells 19, 10, and 1 -- minimal involvement of the environment and/or vehicle and varying degrees of involvement on the part of the driver. It should be noted that the greatest number of fatal accidents (37.6 percent) occurred when the driver was maximally involved in causing the accident while the environment and/or vehicle were minimally involved. In such cases, the drivers were rated as if they were the sole contributors to the accidents.

NON-FATAL

| Driver | Environment | Vehicle 0,1 min. | Vehicle 2,3 mod. | Vehicle 4,5 max. |
|---|---|---|---|---|
| 0,1 Minimal | 0,1 Minimal | 1 / 6.8 | 2 / 1.6 | 3 / .4 |
| | 2,3 Moderate | 4 / .4 | 5 / .4 | 6 / 0 |
| | 4,5 Maximal | 7 / 1.6 | 8 / .4 | 9 / 0 |
| 2,3 Moderate | 0,1 Minimal | 10 / 62.8 | 11 / 5.6 | 12 / .4 |
| | 2,3 Moderate | 13 / 1.6 | 14 / 0 | 15 / 0 |
| | 4,5 Maximal | 16 / .4 | 17 / 0 | 18 / 0 |
| 4,5 Maximal | 0,1 Minimal | 19 / 16.8 | 20 / 0 | 21 / 0 |
| | 2,3 Moderate | 22 / .4 | 23 / 0 | 24 / 0 |
| | 4,5 Maximal | 25 / .4 | 26 / 0 | 27 / 0 |

The clustering within each of the above three matrixes indicates that a majority of the non-fatal accidents occurred when the driver was moderately involved; the environment, minimally involved; and the vehicle, minimally involved (shown by 62.8 percent of the non-fatal

accidents in cell 10). The next two most frequently occurring non-fatal accident situations were determined to be 1) those in which the driver was maximally involved, the environment was minimally involved, and the vehicle was minimally involved (16.8 percent in cell 19) and 2) those in which the driver was minimally involved, the environment was minimally involved, and the vehicle was minimally involved (6.8 percent in cell 1).

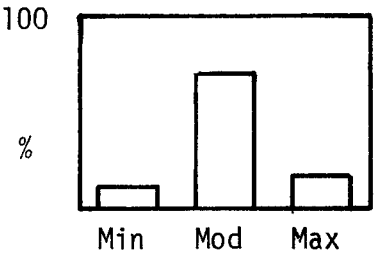
Segregated data were used to determine the degree of involvement of each of the three components of the accident situation -- driver, environment, and vehicle. The following two tables indicated this involvement.

NON-FATAL

Driver

| | | |
|---|---|---|
| min. | 0 1 | 11.6 |
| mod. | 2 3 | 69.8 |
| max. | 4 5 | 17.6 |

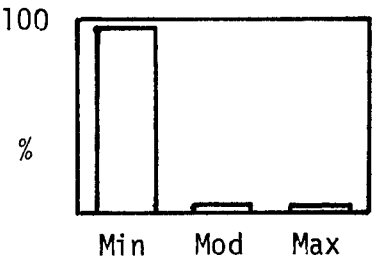
100.0% (N = 250)




Environment

| | | |
|---|---|---|
| min. | 0 1 | 94.4 |
| mod. | 2 3 | 2.8 |
| max. | 4 5 | 2.8 |

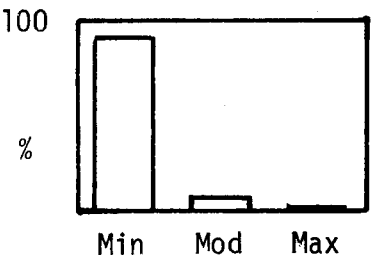
100.0% (N = 250)




Vehicle

| | | |
|---|---|---|
| min. | 0 1 | 91.2 |
| mod. | 2 3 | 8.0 |
| max. | 4 5 | .8 |

100.0% (N = 250)

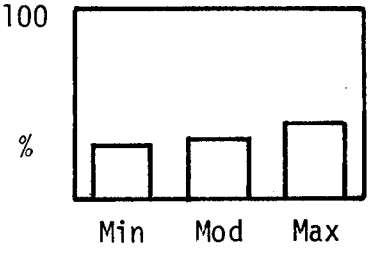


In looking at the distribution of non-fatal accidents, it can be seen that the majority (69.8 percent) of the 250 cases involved a driver that was "moderately" involved in causing the accident. It was determined that slightly over one-tenth (11.6 percent) of the non-fatal accidents occurred when the driver was only minimally involved. Maximal involvement by the driver occurred in 17.6 percent of the non-fatal accidents. Environmental and vehicle involvement were minimal. Of all 250 non-fatal accidents, the environment was minimally involved in causation in 94.4 percent of the cases, and the vehicle was minimally involved in 91.2 percent of the cases.

FATAL

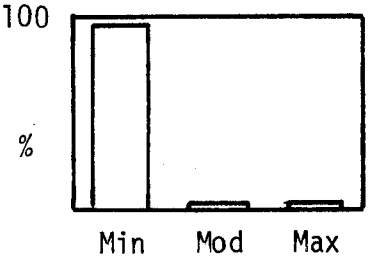
| | | | |
|---|---|---|---|
| Driver | min. | 0 1 | 28.4 |
| | mod. | 2 3 | 32.0 |
| | max. | 4 5 | 39.6 |

100.0% (N = 250)



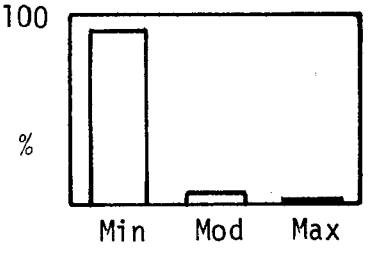

| | | | |
|---|---|---|---|
| Environment | min. | 0 1 | 95.2 |
| | mod. | 2 3 | 2.4 |
| | max. | 4 5 | 2.4 |

100.0% (N = 250)




| | | | |
|---|---|---|---|
| Vehicle | min. | 0 1 | 92.0 |
| | mod. | 2 3 | 6.8 |
| | max. | 4 5 | 1.2 |

100.0% (N = 250)



The fatal cases show a different, more even distribution for driver involvement. Fatal accidents in which drivers were only minimally involved account for 28.4 percent of the fatal accidents evaluated, moderate involvement of the driver occurred in 32.0 percent of the cases, and maximal involvement of the driver showed up in 39.6 percent of the accidents. As was true for non-fatal accidents, the environment and vehicle were minimally involved in fatal accidents -- 95.2 percent of the fatal cases showed minimal environment involvement, while 92.0 percent of these same accidents showed minimal vehicle involvement.

# ANALYSIS OF 1973 N.C. DATA TAPE

## Introduction

The purpose of this study was to illustrate how fatal accidents differ from all other accidents by comparing the frequency distributions from the standard accident report form for all accidents with those for all fatal accidents. Along with the standard information, HSRC was able to retrieve information about the vehicle that was not directly recorded on the accident report forms: (1) vehicle make, (2) vehicle model, (3) vehicle body style, (4) year of manufacture, (5) engine style, (6) driving wheels, (7) vehicle weight, (8) wheelbase, (9) vehicle type, and (10) vehicle size.

The information provided by investigating officers across the state (highway patrolmen, municipal police, sheriffs, etc.) was recorded in digital form on magnetic tape at the Department of Motor Vehicles in Raleigh in the format described in the Appendix. A tape with information on all accidents reported in North Carolina in 1973 made this analysis possible.

## Method

Single variable tabulations with percentages for all 1973 accidents (139,083 accidents and 242,883 vehicles) on the previously described data tape had been obtained by means of an SPSS (Statistical Package for the Social Sciences) computer program for 105 accident and/or vehicle variables.

In order to obtain the desired comparison, a second tape was created by pulling fatal cases out of the overall file and then comparing these fatal cases with those in the original file.

Printouts from these two programs were placed side by side, variable by variable, to note any differences.

From the original data tape, a file containing a five percent sample of all 1973 accidents which could be accessed by RAPID was created. The same was done for 1973 fatal accidents. These two files could then be used to obtain more detailed tables (cross-tabulations) comparing all accidents with fatal accidents. Because of the selection procedures on the SPSS runs and the definition of an accident in the RAPID files, discrepancies in sample size occurred.

## Results

When frequency distributions of all accidents were compared with those of all fatal accidents for the 105 accident variables, certain characteristics of fatal accidents were revealed.

Whereas all accidents were somewhat evenly distributed throughout the year, fatal accidents increased during the summer and fall months. A disproportionate number of all accidents take place during the weekend (48.8 percent), but this trend is even more marked for fatal accidents: Friday, Saturday, and Sunday accounted for 54 percent of all fatal collisions (see Tables A1 and A2, Appendix A).

Time of day data revealed that fatalities peaked at early evening hours of between 6:00 p.m. and 8:00 p.m. and remained high until 3:00 a.m. (see Table A3). Comparing all accidents with fatal accidents, we discovered that all accidents predominate during the working day 7 a.m. to 6 p.m. (62.2 percent), and that, after these hours, all accidents decrease to just 35.9 percent. Conversely fatal accidents occurred

just 43.7 percent during the working day, and jumped to 55.6 percent during the hours between 6 p.m. and 7 a.m. A graph of time of day versus day of week illustrates the peak times for fatal accidents as compared with a five percent sample of all accidents (see Figure A4).

With regard to environmental factors such as weather or road condition, it was indicated that adverse circumstances cannot be associated with fatal accidents. The typical fatality occurred in clear weather on dry paved roads (see Tables A4 and A5).

Although cloudy weather and rain were associated with fatalities (16.7 percent and 11.6 percent, respectively), this occurrence rate was not unlike that of all accidents (15.8 percent and 13.5 percent respectively). The only poor weather condition which appeared to correlate with fatals was fog (2.5 percent for fatals as compared with 1.3 percent for all accidents). The majority of fatal accidents (67.1 percent) occurred during clear weather. This was further confirmed by road condition: 80.5 percent of fatal accidents occurred on dry roads as compared to 73.0 percent for all accidents. Frequencies of wet, oily and muddy roads were about the same for all accidents (total = 18.7 percent), as opposed to fatals (total = 17.2 percent). But snowy and icy roads were significantly less related to fatal accidents (total = 1.8 percent) than to all accidents (total = 4.0 percent).

Time of day data would suggest that one variable strongly related to fatalities is nighttime. The light condition data as shown by Table A6 indicates that daylight hours were the setting for 65.1 percent of all accidents, while this was the case for only 49.0 percent of all fatal accidents. Nighttime hours were associated with 26.5

percent of all accidents as compared to 46.3 percent of all fatal accidents. When this data is further broken down it is discovered that the proportion of fatals on dark unlit roads were almost five times higher than the comparable proportion for roads having artificial lighting during night hours (8.1 percent to 38.2 percent). This can be compared with our data on all accidents, which reveal accident occurrence rates of 10.4 percent for lighted roadways and 16.1 percent for unlit roadways. This means that fatal accidents on unlit roads during nighttime occurred twice as often as expected when compared to all accidents 16.1 percent - 38.2 percent.

Road defects (see Table A7) were not a factor in 94 percent of fatal accidents just as they were rarely reported for all accidents. Nevertheless, low shoulders and soft shoulders were reported slightly more often in fatal accidents (2.4 percent) than in all accidents (1.6 percent), and loose material was a factor reported slightly more often for all accidents, than for all fatal accidents (1.8 percent compared to 1.1 percent).

The predominance of certain road surfaces can probably account for the fact that the overwhelming majority of both fatals and all accidents occurred on smooth or coarse asphalt (90.4 percent and 87 percent, respectively). Fatal accidents also occurred with some regularity on concrete surfaces (7.0 percent compared to 5.7 percent for all accidents). A slightly larger percentage of all accidents occurred on gravel, dirt, or sand when compared to fatals, but for both categories the numbers are small (2.7 percent for all accidents, 1.7 percent for all fatals - see Table A8).

Whereas the greatest percent of all accidents occurred on city streets (42.3 percent), fatal accidents were far more likely to occur on rural paved roads (31.3 percent - see Table A9). In the case of all accidents, more than twice as many occurred on city streets (42.3 percent) than on rural paved roads (20.1 percent). This trend was reversed for fatal accidents where the rate of occurrence on rural paved roads (31.3 percent) was more than double the frequency of such accidents on city streets (14.3 percent). One other interesting category is that, whereas 4.2 percent of all accidents occur on private property, fatal accidents rarely occur on such roadways (0.3 percent).

Locality data adds further evidence that, while the majority of all accidents occurred in business and residential neighborhoods (total 52.5 percent), the vast majority of fatal accidents occurred in open country (75.5 percent). This contrast is depicted in Table A10.

Urban and residential roadways make great use of traffic control devices to regulate traffic flow and, as a consequence, many of these were the site of accidents. Table A11 shows that, although 29.2 percent of all accidents were associated with these control devices, this was true for only 17.4 percent of all fatal accidents. Thus, while stop signs were present in 14.2 percent of all accidents, they were only mentioned in 10 percent of all fatals. Even more revealing is the data on stoplights which indicates that, while they were involved in 11.3 percent of all accidents, they were a factor in only 2.4 percent of all fatals.

Of the various road features associated with accidents, the intersection of two roads was the most common, being involved in 36.1 percent of all accidents and 20.4 percent of all fatal accidents. The next most

frequently mentioned road feature was driveways, which were a factor in almost 15 percent of all accidents and 11.2 percent of all fatal accidents. Bridge-underpasses, although only mentioned in 1.9 percent of all accidents, were involved in 4.5 percent of all fatals. Non-intersectional medians, on the other hand, while accounting for 2.5 percent of all accidents were only mentioned in 1.4 percent of fatal accidents (see Table A12).

Speed limits are often a function of road type and population density. Roadways with speed limits of 35 mph or below were the site of 43.4 percent of all accidents, but only 15.6 percent of all fatals. As could be expected, as speed limits rise, the ratio of fatals to all accidents increased dramatically. Thus, high speed roadways (55 mph - 70 mph) accounted for almost 70 percent of all fatal accidents, but only 36.2 percent of all accidents. Table A13 illustrates the differences in these distributions.

Just as data on where and when accidents occur is important, driver information reveals significant differences between all accidents compared to fatal accidents.

Driver exposure rates may partially account for the fact that, when an accident occurred, a male driver was much more likely to be involved. But, whereas 66 percent of the vehicles involved in accidents were driven by males, this figure was 80 percent in the case of vehicles involved in fatal accidents. The driver of a vehicle in which the fatality occurred was also a male in 80 percent of the cases (see Table A14).

Sobriety is another well known factor associated with fatal accidents. Table A15 indicates that, whereas 81.7 percent of the drivers involved in all accidents were listed as had not been drinking, this percentage slipped to only 53.9 percent for vehicles involved in fatal accidents. For vehicles in which the fatality occurred, only one-third of the drivers were reported not to have been drinking.

Although age distributions for drivers involved in fatals did not differ significantly from those in all accidents, the types of accidents which occurred did show significant variations when age data were analyzed (see Tables A16 and A17). Percentages indicate that run-off-the-road accidents, which comprised 23 percent of all accidents for 16-year-old drivers, accounted for almost half (48.7 percent) of the fatal accidents for this age group.

Vehicle maneuver data shown by Table A18 indicate that going straight, the maneuver typical of open roadway or highway driving, was more frequently associated with fatal accident involvement. Whereas 56.4 percent of all vehicles involved in accidents were engaged in such a maneuver, 85 percent of the vehicles involved in fatal accidents were going straight. Another maneuver associated with open road traveling, passing, accounted for 2.6 percent of all vehicles involved in accidents, 3.3 percent of vehicles involved in fatal accidents, and 3.9 percent of vehicles in which a fatality actually occurred. Many of the maneuvers typical of urban traffic showed a marked decrease in percentages of fatals as compared to all accidents. Thus, while 7.4 percent of all accidents involved a vehicle stopped in the road, this situation accounted for only 1.5 percent of the vehicles involved in fatal accidents, and only 0.4 percent of the vehicles in which a fatality

occurred. Left turns, which accounted for 9.9 percent of all accidents, dropped to just 4.1 percent for those vehicles involved in fatal accidents. Right turns, which resulted in 3.2 percent of all accidents, constituted only 0.5 percent of the vehilces involved in fatal accidents.

Analysis of the speed at which an accident occurred revealed not unexpectedly, that as speed increased fatal accidents were more likely to occur. Thus, the greatest percentage of all vehicles involved in accidents (42 percent) were not associated with a fatality because they were traveling at low speeds (0-29 mph). At higher speeds the opposing trend appeared, so that, although only 17.3 percent of all vehicles involved in accidents were traveling at a speed between 50-79 mph, this percentage rose to 48.3 percent for vehicles involved in fatal accidents and 52.9 percent for vehicles in which a fatality occurred.

Estimated speed prior to impact provided further evidence of the correlation between fatals and high speeds (see Table A20). Even at moderate speeds (36-50 mph), fatalities occurred twice as frequently as would be expected from the data on prior speeds of all vehicles involved in accidents (all accidents - 16 percent; vehicles involved in fatal accidents 0 31.2 percent). This ratio became even more lopsided as speed increased. For instance, only 7.7 percent of all accident-involved vehicles were involved in crashes between the speed of 51 mph and 65 mph, but 21.9 percent of all vehicles involved in fatal accidents were involved in crashes within this speed range. Similarly,

1.5 percent of all accident-involved vehicles were in crashes between the speeds of 66 mph and 80 mph, compared to 10.6 percent of all vehicles involved in fatal accidents. Although excessively high speeds prior to impact (80 mph and above) were rarely associated with total accidents (0.3 percent), they constituted a much higher percent of vehicles involved in fatal accidents (6.2 percent), and accounted for 10.5 percent of all vehicles in which a fatality occurs. Perhaps the most startling statistic is that . 0.8 percent of the vehicles in which a fatality occurs were estimated to be traveling in excess of 110 mph prior to impact.

Other traffic violations typical of all vehicles involved in crashes include didn't look (10.2 percent) and following too closely (3.5 percent - see Table A21). Violations of this type rarely occurred for vehicles involved in fatal accidents (2.2 percent and 0.7 percent, respectively). Traveling on the wrong side of the road was a violation which was often cited in the case of vehicles involved in fatal crashes (9.2 percent), but was cited for all vehicles involved in accidents only 3.6 percent of the time.

Severity of vehicle damage is related to injury. The vehicle damage scale often used by traffic accident investigators rates severity on a numbered scale from 1 (least severe) to 7 (most severe). Table A22 shows that, although the TAD scale was not reported for the majority of vehicles involved in accidents (58.6 percent), we did have this information for the majority of vehicles (60.5 percent) involved in fatal accidents. The TAD information available confirmed what would be naturally assumed, i.e., as the severity increased, the

likelihood of deadly crashes also increased (see Table A22). The two TAD numbers (6, 7) associated with near total damage to the vehicle, although they occurred in only 3.4 percent of all accidents, were listed for 31.8 percent of the vehicles involved in fatal accidents. This type of devastation was characteristic of 44.8 percent of the vehicles in which a fatality actually occurred.

Rollover accidents are also often indicators of severe accidents accompanied by high speeds. As seen by Table A24 it only occurred 1.9 percent of the time for all accident-involved vehicles as compared to 7 percent for all vehicles involved in fatal accidents and 12.4 percent for vehicles in which a fatality occurred.

Differences in fatal and all accidents can be seen by accident type, which may be characterized by vehicle maneuver or vehicle type. Table A25 shows that in all accidents, collisions while turning were the most prominent (20.2 percent), followed by rear-end collisions (slowing or turning--22.0 percent). Angle accidents accounted for 16.4 percent of all accidents while another 14.9 percent were ran-off-road. In contrast, fatal accidents were predominantly the ran-off-road type (31.1 percent). Head-on collisions occurred with a frequency of 16.6 percent as contrasted with 1.9 percent of all accidents. Pedestrian accidents would be expected to be fatal; they comprised 14.0 percent of fatal accidents as contrasted with 0.9 percent in all other crashes. Hit-at-angle occurred with much the same frequency in both fatal and all accidents (15.1 percent and 16.4 percent, respectively).

However, certain other types of accidents which did not constitute a large proportion in either all accidents or fatal accidents appear to

be severe. Train accidents occurred with greater frequency in fatal accidents as compared with all other (1.5 percent and 0.1 percent, respectively).

Differences were seen in regard to the amount of involvement of certain types of motor vehicles from all accidents to fatal accidents (see Table A26). Passenger cars (2-4 door sedans, 2-4 door sedans and trailer, passenger cars and trailers, station wagons, and taxi cabs) accounted for a total of 84.2 percent of all accidents, with trucks (2-axle and 3-axle) accounting for another 13.6 percent. When vehicles involved in fatal accidents were examined, the involvement for passenger cars went down to 75.2 percent and the involvement of trucks went up. The disproportionate number of trucks is mainly attributed to those with three axles, 0.5 percent of all vehicles.

The motorcyclist, because of his lack of protection, is highly susceptible to injury. Motorcyclists were found to be disproportionately involved in fatal crashes--3.8 percent as compared with 1.2 percent in all accidents--a threefold increase in involvement. When only vehicles which sustained a fatality were selected, this involvement increased to 6.4 percent.

Vehicle defects were involved to a slightly greater extent in fatal accidents than in all accidents, 6.3 percent and 4.1 percent, respectively (see Table A27). Defective tires (4.6 percent in fatal and 1.8 percent in all accidents) and steering mechanisms (0.3 percent in fatal, 0.2 percent in all accidents) appeared to be associated with fatal accidents, whereas problems with headlights (0.1 percent in all, 0.0 percent in

fatal) and rear lights (0.2 percent in all, 0.1 percent in fatal) were related to less severe accidents.

A cross-tabulation using passenger cars and trucks, of vehicle type by vehicle defects for all accidents and fatal accidents, showed that brake problems were associated with 3-axle trucks and tractor-trailer trucks involved in fatal accidents. Faulty steering was a problem in 2-axle trucks (0.4 percent in all accidents, 0.8 percent in fatal accidents), 3-axle trucks (0.0 percent in all accidents, 4.3 percent in fatal accidents), and tractor trailer trucks (0.0 percent in all accidents, 0.8 percent in fatal accidents). On the other hand, passenger cars involved in fatal accidents were found more likely to have had defective tires--5.8 percent compared with 2.1 percent of the vehicles in all accidents. Two-axle trucks also had slightly more defects in tires (1.6 percent as compared with 1.1 percent of all vehicles). It must be noted that this cross-tabulation for all accidents was made using a five percent sample of all accidents. This should explain differences in sample size and the zeros in this table (see Table A28).

An important factor related to accident severity is region of impact. Frontal collisions were the most frequent type, accounting for 47.5 percent of all accidents and 62.8 percent of all ~~total~~ fatal accidents. Rear-end collisions appeared less frequently in fatal accidents (3.6 percent) than in all accidents (17.2 percent). However, it appeared that, when a vehicle was struck in the right side or left side, the probability of a person being killed increased (27.2 percent of all accidents as compared to 33.0 percent of all fatal accidents).

Looking at initial point of contact, rear-end collisions were the least lethal along with those involving the front and right side quarters. Collisions with rear bumpers (sites 14, 15, 16) accounted for 7.9 percent of all accidents but only 1.5 percent of all fatal accidents. Impact into the trunk area appeared to be the same for all accidents and all fatal accidents. Impact sites 4, 8, 17 21, which are the front and rear quarters, tended to decrease in frequency from all to fatal vehicles. Rear end distributed impacts for all vehicles went from 4.6 percent to 0.9 percent to 0.5 percent as shown by Table A30.

The most penetrating impacts are those into the passenger compartments. Although angle accidents occurred with less relative frequency in fatal than in all accidents, if a vehicle was hit in the passenger area, an occupant was more likely to be killed. Notice the increases from 4.6 percent of all accident-involved vehicles to 5.6 percent of all fatal accidents to 7.5 percent of all vehicles involved in fatal accidents for the left side passenger area (6). For the right passenger area (19) this percentage went from 3.8 percent to 6.6 percent to 9.5 percent. Left side distributed also appeared to be somewhat more severe (1.7 percent to 1.7 percent to 2.3 percent - see Table A29).

As mentioned before, rollovers contribute to accident severity. A rollover only type of impact was found in only 0.7 percent of all accident-involved vehicles. By contrast, this frequency increased over 3 times to 2.5 percent for fatal vehicles. In vehicles involved in a fatal accident fatality this figure was 4.6 percent (see Table A30).

# ANALYSIS OF NARRATIVES

## Introduction

The purpose of this third study was to "use the officers' written narratives to diagnose" each accident type according to causal factors and to obtain any new information which had not been revealed in previous analyses.

The investigating officer is required to write a narrative description of the accident on the standard accident report form to supplement the objective information that can be recorded in digital form. The narrative should relate the sequence of events leading up to the accident, as well as those events occurring during and after the onset of the accident. In the narrative, the officer is supposed to indicate any factors which have contributed to the accident (i.e., condition of driver and/or pedestrian, maneuvers, violations, vehicle malfunctions, adverse roadway conditions and features, adverse weather conditions, etc.). Events occurring during the accident, such as objects hit, rollovers, skidding, ejections, explosions, fires, etc., should also be reported. The officer may add any information about the rescue operation, such as the period of entrapment. The open-ended nature of the narrative also allows the investigating officer to relate any unusual aspects of the accident which may or may not have been included as responses in the rest of the report. Because the narrative descriptions sometimes relate crucial details, they were read in order to expose factors that either were not or could not be expressed in the objective information section of the accident report form. Because of

the idiosyncrasies of narrative writing, a clinical approach was applied using categorization and frequency counts to obtain comparable and reportable results.

Method

Because the narrative descriptions of all 1973 accidents had been recorded on magnetic tape, a computer program was used to retrieve the narratives. Also obtained were the corresponding report numbers for all of that year's fatal accidents. After reading the printout of all the narratives, classification was attempted for those types of accidents which seemed to recur. The individual accounts were read a second time and each was placed into one of the following categories: (1) ran-off-road (if this was the first event mentioned in the sequence of events, exclusive of accidents in which a pedestrian was involved); (2) intersectional (if some type of intersection (i.e., driveway, T-intersection, X-intersection, stop sign, or traffic signal, etc.) was involved); (3) head-on collisions (if the accident occurred as a result of the vehicle being driven in the wrong lane); (4) pedestrian (if a pedestrian was involved); and (5) other types (if the accident did not fit into one of the preceding categories (i.e., train accidents, bicycle accidents, rear-end collisions, etc.)).

The ran-off-road accidents were further typed according to the following sequences of events: (1) ran-off-road, hit fixed object; (2) ran-off-road, hit another motor vehilce; (3) ran-off-road, overturned; (4) ran-off-road, hit fixed object, overturned; (5) ran-off-road, hit fixed object, hit vehicle; (6) ran-off-road, overturned, hit vehicle; (7) ran-off-road, overturned, hit vehicle, hit fixed object; and

were further divided into either (1) single-vehicle or (2) multi-vehicle accidents. Pedestrian accidents were further divided according to the reported pre-crash actions of the pedestrian: (1) running, (2) walking, (3) lying, (4) falling, (5) getting into or out of a vehicle, and (6) not clear.

The causes of the accidents were considered to be any violation (i.e., speeding, racing, failure to obey signal, etc.), maneuver (i.e., avoiding an animal, or vehicle, passing, being pursued, entering roadway), driver condition (i.e., falling asleep, DUI, seizure), roadway feature (i.e., curves, hill, visual problems), and vehicle malfunctions that were reported to have been factors in the accident. Post-crash occurrences that were examined were ejection, occupant pinned in vehicle, fire, and vehicle overturned.

It should be noted that, although some accident investigators provided extensive narratives that were elaborately descriptive, others provided so few details about the accident that little information could be derived from their narratives. Categorization from these latter reports was sometimes difficult. The differences in the amount of detail can be seen in the following three examples.

> Vehicle 1 was traveling north on RP1138 and was attempting to make left hand curve. After turning the curve the steering mechanism went out of Vehicle 1 causing the vehicle to veer left of the center line and go over a 50 ft. embankment turning over into a river throwing both occupants free of the vehicle. This officer checked the steering on the vehicle after the accident and found that it would not work correctly and found that there was no damage done to the steering in the accident.

> Vehicle 1 traveled to left side of road striking a trailer which was parked on left shoulder.

> Vehicle 2 hit vehicle 1 head on.

## Results

### Ran-off-road.

Ran-off-road accidents appear to be both the most predominant and the most violent type of fatal accident. They are generally precipitated by loss of control of the vehicle during high-speed driving situations. Ran-off-road accidents comprise more than one-third of the accidents studied (35.7 percent--see Table B1).

Speed was a factor in one-third of all fatal ran-off-road accidents; racing and being pursued were factors in relatively few cases (0.2 percent and 0.4 percent, respectively). A small number of fatal ran-off-road accidents occurred while the driver was either in the process of passing (4.2 percent) or engaged in some avoidance maneuver (2.6 percent). The driver falling asleep was a reported factor in a very small proportion of fatal ran-off-road accidents (0.4 percent).

The presence of curves was the second most frequently reported factor that contributed to fatal ran-off-road accidents. Adverse weather conditions and vehicle malfunctions were reported as factors in a small proportion of fatal ran-off-road accidents (3.6 percent and 2.8 percent, respectively).

When vehicles leave the roadway, they may, while out of control either collide with a number of different objects or overturn. Most fatal ran-off-road accidents involved only a single vehicle. In 45.6 percent of the fatal ran-off-road accidents, the vehicle struck only a fixed object, in 24.8 percent of the cases it both struck a fixed object and overturned, and in 16.6 percent of the

cases, it only overturned. In fatal ran-off-road accidents, the vehicle leaving the roadway struck another vehicle in 7.4 percent of the cases, struck a fixed object and then another motor vehicle in 7.4 percent of the cases, struck a fixed object and then another motor vehicle in 1.6 percent of the cases, struck another motor vehicle and then overturned in 0.8 percent of the cases, and struck another motor vehicle and fixed object and then overturned in 0.4 percent of the cases.

Occupant ejection occurred more frequently in ran-off-road accidents than in any other single category of accident. At least one occupant was reported to have been ejected in 20.6 percent of these accidents. In 3.4 percent of ran-off road accidents, an occupant was pinned in the vehicle, and in 2.8 percent a fire occurred.

Pedestrian accidents.

After ran-off-road accidents, pedestrian accidents were the second largest category of fatal accidents (19.9 percent--see Table B1). In 40.9 percent of these accidents, the pedestrian was walking either in the road or off the road. Other types of pedestrian behavior at the time of the accident were running in the roadway (27.2 percent), standing in the roadway (7.8 percent) and lying in the roadway (5.4 percent). Our study revealed one instance in which the pedestrian had a seizure immediately prior to the accident. Very few of these accidents involved blind pedestrian (0.8 percent).

There were instances in which the driver of the vehicle was definitely at fault; the driver was speeding or ran off the road in

1.4 percent and 0.4 percent of all fatal pedestrian accidents, respectively. Hit-and-run drivers were reported to be involved in 3 percent of all pedestrian accidents. Problems of vision or perception were reported as a factor more commonly in pedestrian accidents than in any other accident category; in 9.7 percent of these accidents, either the driver or the pedestrian was reported not to have been aware of the other's presence until it was too late. Curves were reported as a factor in 2.5 percent of all pedestrian accidents. In some of the pedestrian accidents, the pedestrian had been an occupant of a vehicle that had been involved in another accident.

Intersection accidents.

Accidents at intersections accounted for 17.4 percent of all fatal accidents (see Table B1). For the purpose of this study, intersections were defined as anywhere that some stopping, slowing, or turning maneuver was required or was taking place (i.e., driveways, T-intersections, X-intersections, median crossovers, etc.). Most fatal intersection accidents were multi-vehicle accidents (89.3 percent--see Table B3). In 35.8 percent of all fatal intersection accidents, a driver was reported to have failed to obey a stop sign or signal. Another common situation for fatal intersection accidents involved a driver making a turn and being struck by another vehicle (29.0 percent). In 6.6 percent of all fatal intersection accidents, a vehicle that was either stopping or slowing down was struck in the rear. In fatal single-vehicle intersection accidents, the vehicle frequently struck some fixed object.

The cause of 8.6 percent of all fatal intersection accidents was attributed to visual or perceptual problems. Speeding was reported to be a factor in 7.0 percent of the cases. Our study revealed only one instance in which icy pavement was reported to be a factor.

Head-on collisions.

Previous analyses have indicated that 16 percent of all fatal accidents involve head-on collisions. Our analysis of the narrative descriptions from the accident report forms indicates that 16.3 percent of all fatal accidents were head-on collisions caused by a vehicle being driven in the wrong lane (see Table B1). Over one-third (36.8 percent) of the drivers involved in fatal head-on collisions were in the left lane of traffic because they had lost control of their vehicles. In 11.4 percent of the fatal head-on collisions studied, the driver whose vehicle was in the left-hand lane was cited for speeding. The driver was in the wrong lane because he was passing or engaged in some avoidance maneuver in 14.5 percent and 5.7 percent of all fatal head-on collisions, respectively. In a small number of instances the reason for the vehicle being on the wrong side of the road was that the driver had either fallen asleep (1.3 percent) or was under the influence of alcohol (.9 percent).

Visual obstructions and the improper negotiation of curves were reported to be the cause for vehicles being in the wrong lane in 12.3 percent and 3.5 percent of these accidents, respectively. Other visual and perceptual problems were reported to be a factor in an additional 2.2 percent of fatal head-on collisions. More frequently

than in any other type of accident, wet or icy roads were reported to be a factor in fatal head-on collisions (10.1 percent). Vehicle malfunction was reported to be the cause for a vehicle being in the wrong lane in 5.3 percent of these accidents.

Head-on collisions are one of the most violent types of accidents. In fatal head-on collisions, at least one occupant was ejected in 1.8 percent of the accidents, an occupant was pinned inside the vehicle in 3.5 percent of the cases, and fire occurred in 2.2 percent of the cases. A vehicle overturned after the collision 4.4 percent of the time.

Other fatal collisions.

The remainder of fatal accidents that were studied were grouped into this category. It includes the types of accidents which occurred relatively infrequently, but which were often severe. The largest groups in this accident category are train accidents (17.4 percent) and bicycle accidents (14.1 percent). Rear-end accidents and those that could not be grouped into any of the other accident categories were also placed in this category.

Speeding and avoidance maneuvers were a factor in accidents within this category in a very small proportion of the cases (4.0 percent and 0.7 percent, respectively). Visual or perceptual problems were reported to be a factor less frequently than they were for intersection or pedestrian accidents, and about as frequently as they were for head-on collisions. Vehicle malfunctions were reported in 4.7 percent of this category of accidents, less frequently than in head-on collisions, but more frequently than in

ran-off-road and intersection accidents. Ejection, occupant pinned in the vehicle, fire, and overturning were reported in 1.8 percent, 3.5 percent, 2.2 percent, and 4.4 percent of this category of crashes, respectively.

# ANALYSIS OF FATAL ANALYSIS FILE

## Introduction

Since the beginning of 1972, a computer file containing detailed information on most U.S. fatal motor vehicle accidents has been maintained by the National Highway Safety Administration of the Department of Transportation through contracts with the individual states. Since March of that year, North Carolina has been providing the required information. A special coding form is regularly filled out by the Division of Motor Vehicles in Raleigh. In order to answer the detailed questions on this form, information on the standard accident report is correlated with information from the driver license file and vehicle registration file. In some cases, information from death certificates is used. This information is processed at NHTSA and recorded for use on magnetic tape. It is called the Fatal Analysis File (FAF). HSRC acquired a tape containing North Carolina's fatal accident data for July through December of 1973 and January through June of 1974 for the purposes of this study.

## Method

HSRC was actually provided three subfiles, an Accident file, a Vehicle file, and a Person file. The separate files were then analyzed by means of a SPSS computer program (Statistical Package for the Social Sciences).

The SPSS codebook procedure was used to obtain frequency distributions for 83 data elements in the Accident file, 102 data elements in the Vehicle file, and 76 data elements in the Person file for those

fatal accidents during the first six months of 1974. A list of these data elements is found in the Appendix. It should be noted that some of the same data elements are contained in all files, thus providing three different orientations for these data elements.

To check for reliability, an in-house tape containing the digital information from the standard report for North Carolina's accidents during the same time period was secured. Frequency distributions were obtained for accident-related variables in an accident orientation and vehicle-related variables in a vehicle orientation. Comparisons of these two tapes were made in regard to the number of accidents and number of vehicles involved along with frequency distributions for those data elements which were alike in orientation, content, and level.

Variables comparable in content level and orientation were examined for any differences in sample size and frequency distributions. Accident-oriented variables or data elements which are exact or similar include year, month, day of month, time, day of week, county, light conditions, weather conditions, land use, traffic controls, surface condition, roadway defects, and posted speed. Those vehicle variables which could be compared were vehicle maneuver, speed before impact, vehicle defects, condition of driver, driver impairment (restrictions), and vehicle make, model, and year. Assured of the reliability of the FAF data, other elements were examined to obtain a more detailed description of those items contained on our data tape along with new information not routinely provided. Of special interest

were those data elements which convey information either not requested on the standard accident report form or are not entered on the data tape. These data elements include Emergency Medical Service requested, delay in notification to EMS, EMS response time, fire involved, number of lanes, class of trafficway, divided, alignment and grade, precrash actions, driver training, previous convictions, previous accidents, number of years driving, ejection, Blood Alcohol Content (BAC) type, BAC result, BAC elapsed time, extrication, and police response time.

Results

From the North Carolina data tape, there were 524 recorded accidents involving 747 vehicles, excluding those which did not have supplemental information (pedestrians, bicycles, farm equipment, and some passenger cars and trucks). From the three files of the FAF, there were recorded 582 accidents involving 818 vehicles, and 1629 persons.

Variables which were comparable in orientation, content, and level were examined -- more specifically, accident information in the accident mode and vehicle information in the vehicle mode. Accident variables from the accident file which had similar distributions were month, day of month, day of week, light conditions, weather conditions, land use, posted speed limit, class of trafficway, and road surfaces. There were some discrepancies in traffic controls, surface conditions, and

road defects. Actually, less detailed information was given about these variables on the FAF than on our data file since fewer levels were printed out. Vehicle variables which were comparable and which had similar frequency distribution included vehicle position number, model year, vehicle maneuver, driver condition, use of alcohol, and driver sex.

On the basis of these comparisons, the data on the FAF were considered to be reliable. Frequency distributions for these data elements were also consistent with the results from previous analyses regarding the accident environment, vehicles, and drivers, and thus provided no new insights regarding fatal crashes.

All other data elements were studied in each of the three orientations for additional information, i.e., more specific information or new information which would be useful.

Some data elements which were similar in content but which differed in level (i.e., impact points, damage areas, extent of deformation, dollar damage, violations charged, mileage, speed of vehicle, and class of trafficway) confirmed previous results.

Other data elements such as skidmarks before and after impact, state of registration, state of licensure, number of axles--truck and trailer either offered no useful information or confirmed previous results.

There were other new data elements for which the vehicle file indicated the information had simply been "unknown." These included

road alignment and grade, years driving, drug use, occupation, marital status, and driver training. Also "unknown" were trapped time, blood alcohol levels, BAC time lapsed, emergency service response time, delay in notification to emergency service, emergency services and place of death. In almost all cases at least 99 percent of this information was unknown (see Table C1).

Some information pertaining to driver history, such as number of previous accidents, number of license withdrawals, previous convictions, previous speeding and driving under the influence convictions, revocations, and previous convictions of the same offense, had been recorded from the driver record. This information was not meaningful without a comparable data base.

There were some data elements which give a few new details on the driver, and rescue and medical aid. Fatal crashes appear to occur most often on two-lane roads (92.6 percent), with some on four lanes involved (5.0 percent). Accidents occurring at intersections accounted for 10.3 percent of these accidents, entrances to roadway (2.1 percent), and driveways (5.8 percent). The remainder occurred at nonjunctions either on the roadway (40.0 percent), shoulders (8.4 percent), roadside (27.1 percent), or out of roadway (1.9 percent). In 90.2 percent of these accidents, there were no physical divisions.

Class of trafficway showed that fatals were occurring primarily on county roads (39.3 percent), then on U.S. routes (22.2 percent), then on local streets (13.7 percent), and least frequently on Interstates (5.7 percent). This is consistent with that information from previous analyses which showed that fatals were occurring on rural paved, and

U.S. highways, with Interstates involved to some degree: 40.5 percent of these accidents were on federally aided roads, with another 39.2 percent on other state roads. Interstates were involved in 5.7 percent and local streets 14.1 percent of these accidents.

In only one case was there a vision obstruction reported (0.2 percent) out of these fatal accidents.

Precrash actions of those drivers involved in fatal crashes showed that, while the majority were normal (81.8 percent), a number were attempting to regain control of their vehicle (12.3 percent). A small proportion (1.8 percent) were avoiding some other vehicle. Pursuing and fleeing from pursuit were reported in 0.1 percent and 0.5 percent of the cases respectively (see Table C2).

Information on emergency medical service indicated that in the 86.3 percent of these accidents an ambulance was requested, in 0.2 percent a rescue squad was requested, in 0.2 percent both an ambulance and a rescue squad were requested and in 1.5 percent some other emergency medical was asked for. In 11.7 percent of the cases, the type of medical service requested was unknown (see Table C3).

Extrication was accomplished by the emergency medical service for 86.1 percent of vehicles involved. For 12.1 percent of the vehicles, it was unknown and for 0.2 percent there was not required (see Table C4).

Emergency medical service was provided by the ambulance attendant for 68.3 percent of the 1629 persons involved in fatal accidents, 20.1 percent received no medical attention, and for 10.9 percent, the type of medical attention was listed as unknown. Doctors and citizens each provided aid for 0.1 percent of the victims (see Table C5).

## SUPPLEMENTAL DATA ANALYSIS

### Introduction

For this final sub-study, the North Carolina Highway Patrol provided specific information regarding the roadway, driver and pedestrian, vehicle, emergency service, sources of injury, and place of death for persons killed in the fatal accidents they investigated during April, May, and June, 1975.

The Blood Alcohol Level (BAL) and injury information for each fatality were taken from copies of the Medical Examiners reports provided by the Office of the Chief Medical Examiner.

This information was correlated with the information from the standard report to produce a highly detailed file on fatal accidents.

### Method

A supplemental form was designed which included additional data not present on the standard report form. It was designed to be easily filled out by the investigating officer at the scene of the accident. To meet these specifications, the questions were put in the format of a check-list (see Appendix D).

Since the North Carolina Highway Patrol investigates more than 80 percent of fatal accidents, they were asked to provide the needed information. Through each Patrol District, each officer was given copies of the supplemental form and a set of written instructions. The supplemental form was to be filled out for every fatal accident which occurred during April, May, and June, 1975, and was to be turned in with the corresponding standard report.

These completed supplemental forms were collected periodically from the Department of Motor Vehicles with copies of the corresponding standard reports.

The usual information on the standard report was recorded excluding some information on those occupants who survived. Some additional information recorded included the distance the collision occurred from the City limits or center, the type of intersection (T-intersection, X-intersection, 4-way, driveway, etc.) and the number of lanes as depicted in the accident diagram.

The Officer of the Chief Medical Examiner furnished us with copies of their reports for the victims involved in this sample to be correlated with the standard report and supplement. These reports related the cause of death, fatal and non-fatal wounds, and in some cases, blood alcohol levels.

Information from all three sources was coded and keypunched at HSRC. The format in the Appendix describes the organization of this data.

Compilation of this data was accomplished by RAPID, a quick access computer program. This program was used to obtain frequency counts for all accident variables, vehicle variables, and fatal victim variables in the appropriate orientation. Also some selections and cross-tabulations were made.

At the time of the analysis, 183 cases had been placed on file. However, 15 of these lacked medical information.

## Results

### Primary causes and errors.

Almost all the accidents were attributable to some driver or pedestrian error; few vehicular or road problems were primary factors. The errors most frequently committed were traffic violations or pedestrian actions: these accounted for 36 percent of all accidents. Drinking-involved accidents were the second-most cited errors: the investi-

gators reported alcohol involvement for 22.4 percent of the cases in this study (see Table D1). As we will see later on, actual blood levels show this figure to be higher.

Alcohol concentrations.

Investigators reported that 40 percent of the pedestrians involved had been drinking or were intoxicated. When the actual blood alcohol levels of those pedestrians 16 years or older were examined, it was discovered that 14 out of the 15 who were tested post-mortum had positive test results. Looking at the deceased drivers who were 16 years or older, almost half (49 percent) of those tested had some level of alcohol present. Table D2 shows the distribution of these levels for all victims, drivers (16 or older) who were killed, and deceased pedestrians (16 years or older). Note that for all the victims tested post-mortum, almost half had some level of alcohol present in the blood, with these levels ranging from .04 to as high as .42. Twenty-eight percent showed concentrations of .20 or above, suggestive of alcoholism according to NHTSA.

Causes of injury.

As expected, the pedestrian, motorcyclists, and bicyclists killed were injured due to bodily contact with the vehicle (65.85 percent); 36.59 percent were run over by the vehicle. Some 9.76 percent were injured by falling off their vehicles after the collision (see Table D3).

For those victims who were occupants of motor vehicles it is shown in Table D3 that the instrument panel was the most frequently mentioned interior source of injury (37 percent) followed by the steering assembly (35.44 percent), windshield (22.15 percent) and door structures (13.92 percent); 29.75 percent of these victims were ejected.

Note that while fires were reported for 12 of the vehicles in which a person was killed, only four victims were trapped in the burning vehicle and for none (see Table D5) was fire the cause of death.

Place of death and fatal wounds.

Over the half the victims (57.8 percent), died while still at the scene of the accident, either before the emergency equipment had arrived or while it was on the scene. Another 10 percent expired enroute to the hospital and 27 percent after their arrival at the hospital.

It is interesting to note that in this sample, rescue squads were at the scene of approximately two-thirds of the accidents extricating the victims and providing medical aid.

When fatal wounds (body region and type) were considered, "survivability" seemed questionable. The degree of injury to the victim in this sample was severe or multiple in most cases. There were instances of complete decapitation of some occupants and mutilations of pedestrians who were run over by more than one vehicle. Table D5 shows the foremost lethal injury (body region by type of injury). General or multiple injuries to the head accounted for about 47 percent of the deaths followed by general or multiple injuries to the thorax. Fractures of the head region (6.9 percent) and neck (6.9 percent) were the predominant fatal wounds for some victims.

Table A1.

| Month | All Accidents | Fatal Accidents |
|---|---|---|
| January | 8.3 | 7.0 |
| February | 7.2 | 6.3 |
| March | 8.8 | 9.0 |
| April | 8.0 | 8.1 |
| May | 8.5 | 8.2 |
| June | 8.2 | 8.7 |
| July | 8.2 | 9.0 |
| August | 8.8 | 9.4 |
| September | 8.3 | 9.0 |
| October | 8.9 | 10.6 |
| November | 8.4 | 7.2 |
| December | 8.4 | 7.5 |
| N | 139083 | 1452 |

Table A2.

| Day of Week | All Accidents | Fatal Accidents |
|---|---|---|
| Monday | 13.5 | 12.5 |
| Tuesday | 12.0 | 11.0 |
| Wednesday | 12.6 | 10.0 |
| Thursday | 13.1 | 12.6 |
| Friday | 18.4 | 17.4 |
| Saturday | 17.3 | 19.8 |
| Sunday | 13.1 | 16.8 |
| N | 139083 | 1452 |

Table A3.

| Hour of Day | All Accidents | Fatal Accidents |
|---|---|---|
| 12:00 - 12:59 am | 2.4 | 4.1 |
| 1:00 - 1:59 am | 2.1 | 4.8 |
| 2:00 - 2:59 am | 1.3 | 2.4 |
| 3:00 - 3:59 am | 0.9 | 1.9 |
| 4:00 - 4:59 am | 0.7 | 1.1 |
| 5:00 - 5:59 am | 0.7 | 1.2 |
| 6:00 - 6:59 am | 2.0 | 2.5 |
| 7:00 - 7:59 am | 4.3 | 3.4 |
| 8:00 - 8:59 am | 4.6 | 2.5 |
| 9:00 - 9:59 am | 3.2 | 2.4 |
| 10:00 - 10:59 am | 3.6 | 3.1 |
| 11:00 - 11:59 am | 4.4 | 3.4 |
| 12:00 - 12:59 pm | 5.4 | 3.0 |
| 1:00 - 1:59 pm | 5.3 | 3.6 |
| 2:00 - 2:59 pm | 5.9 | 4.8 |
| 3:00 - 3:59 pm | 8.2 | 5.9 |
| 4:00 - 4:59 pm | 8.9 | 6.2 |
| 5:00 - 5:59 pm | 8.4 | 5.4 |
| 6:00 - 6:59 pm | 5.8 | 7.9 |
| 7:00 - 7:59 pm | 5.1 | 6.8 |
| 8:00 - 8:59 pm | 4.1 | 5.2 |
| 9:00 - 9:59 pm | 3.8 | 5.9 |
| 10:00 - 10:59 pm | 3.4 | 5.5 |
| 11:00 - 11:59 pm | 3.6 | 6.3 |
| Not Stated | 2.0 | 0.8 |
| N | 139083 | 1452 |

Figure A4.

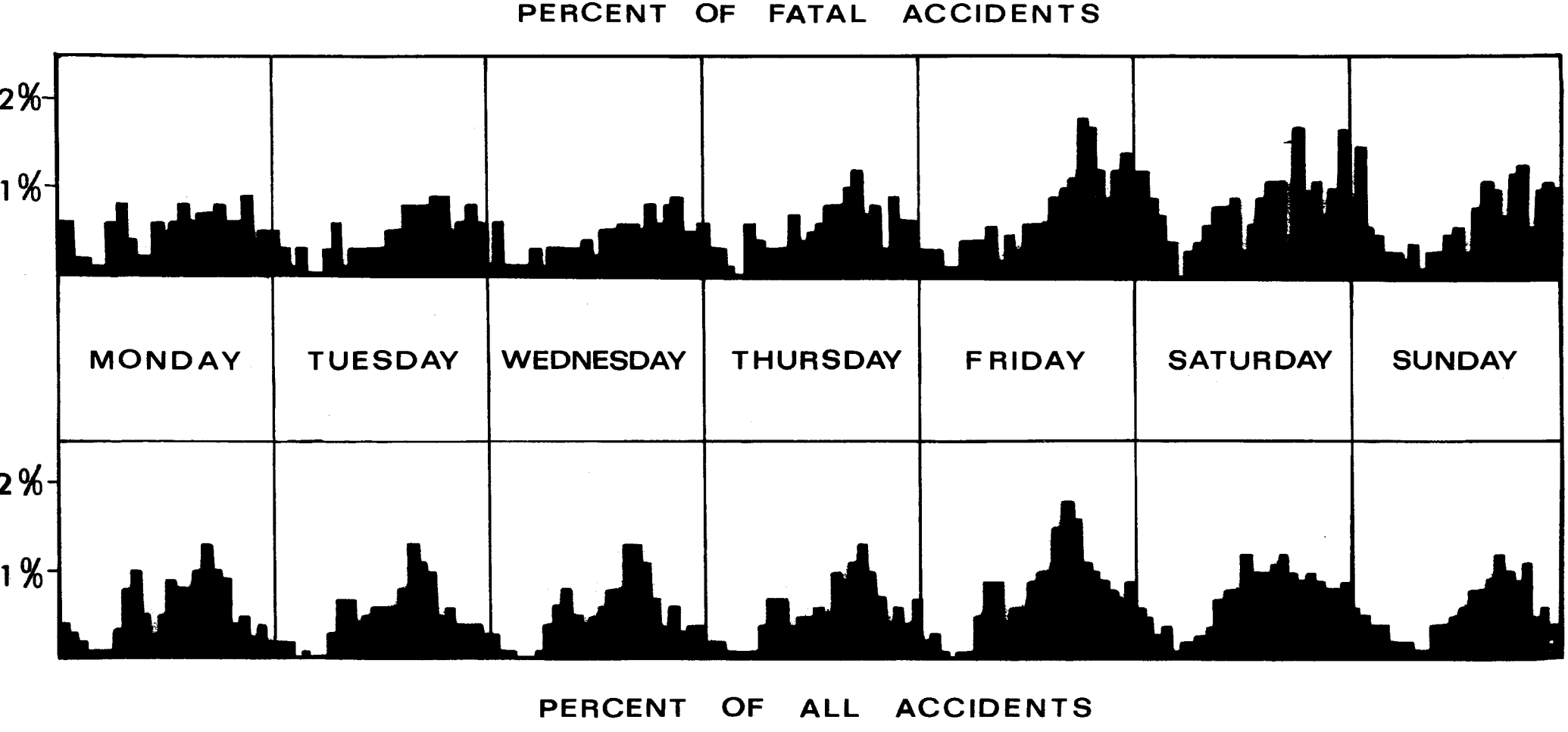

PERCENT OF FATAL ACCIDENTS
2%
1%
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
2%
1%
PERCENT OF ALL ACCIDENTS

Table A4.

| Weather | All Accidents | Fatal Accidents |
|---|---|---|
| Clear | 63.0 | 67.1 |
| Cloudy | 15.8 | 16.7 |
| Rain | 13.5 | 11.6 |
| Snowing | 1.5 | 0.6 |
| Fog | 1.3 | 2.5 |
| Sleet or Hail | 0.2 | 0.1 |
| Not Stated | 4.7 | 1.4 |
| N | 139083 | 1452 |

Table A5.

| Road Condition | All Accidents | Fatal Accidents |
|---|---|---|
| Dry | 73.0 | 80.5 |
| Wet | 18.4 | 17.0 |
| Oily | 0.1 | 0.1 |
| Muddy | 0.2 | 0.1 |
| Snowy | 1.6 | 0.6 |
| Icy | 2.4 | 1.2 |
| Not Stated | 4.4 | 0.4 |
| N | 139083 | 1452 |

Table A6.

| Light Condition | All Accidents | Fatal Accidents |
|---|---|---|
| Daylight | 65.1 | 49.0 |
| Dusk | 2.8 | 2.7 |
| Dawn | 1.1 | 1.7 |
| Dark--Road Lit | 10.4 | 8.1 |
| Dark--Road Unlit | 16.1 | 38.2 |
| Not Stated | 4.4 | 0.4 |
| N | 139083 | 1452 |

Table A7.

| Road Defect | All Accidents | Fatal Accidents |
|---|---|---|
| Loose Material | 1.8 | 1.1 |
| Holes, Deep Ruts | 0.5 | 0.3 |
| Low Shoulders | 0.8 | 1.2 |
| Soft Shoulders | 0.8 | 1.2 |
| Other Defects | 0.6 | 0.6 |
| In Construction | 1.0 | 1.0 |
| No Defects | 90.1 | 94.2 |
| Not Stated | 4.4 | 0.4 |
| N | 139083 | 1452 |

Table A8.

| Road Surface | All Accidents | Fatal Accidents |
|---|---|---|
| Concrete | 5.7 | 7.0 |
| Smooth Asphalt | 60.0 | 61.5 |
| Course Asphalt | 27.0 | 28.9 |
| Gravel | 1.2 | 0.7 |
| Dirt or Sand | 1.5 | 1.0 |
| Other | 0.3 | 0.3 |
| Not Stated | 4.4 | 0.5 |
| N | 139083 | 1452 |

Table A9.

| Highway Class | All Accidents | Fatal Accidents |
|---|---|---|
| Interstate | 2.7 | 5.1 |
| U.S. | 17.1 | 26.3 |
| N.C. | 11.4 | 20.9 |
| Rural Paved Road | 20.1 | 31.3 |
| Rural Unpaved Road | 1.9 | 1.3 |
| City Street | 42.3 | 14.3 |
| Private Property | 4.2 | 0.3 |
| Not Stated | 0.4 | 0.4 |
| N | 139083 | 1452 |

Table A10.

| Locality | All Accidents | Fatal Accidents |
|---|---|---|
| Business | 26.3 | 7.7 |
| Residential | 26.2 | 16.1 |
| School or Playground | 1.0 | 0.5 |
| Open Country | 42.3 | 75.5 |
| Not Stated | 4.2 | 0.2 |
| N | 139083 | 1452 |

Table A11.

| Traffic Control | All Accidents | Fatal Accidents |
|---|---|---|
| Stop Sign | 14.2 | 10.0 |
| Yield Sign | 1.1 | 0.3 |
| Stop and Go Signal | 11.3 | 2.4 |
| Flashing Signal with Stop Sign | 0.4 | 0.3 |
| Flashing Signal | 0.3 | 0.3 |
| R.R. Gate and Flasher | 0.0 | 0.1 |
| R.R. Flasher | 0.1 | 0.3 |
| Officer | 0.1 | 0.2 |
| Other Device | 1.6 | 3.4 |
| No Control | 65.1 | 81.5 |
| Not Stated | 5.7 | 1.1 |
| N | 139083 | 1452 |

Table A12.

| Road Feature | All Accidents | Fatal Accidents |
|---|---|---|
| Bridge-Underpass | 1.9 | 4.5 |
| Driveway | 14.8 | 11.2 |
| Alley Intersection | 0.4 | 0.1 |
| Intersection 2 Roads | 36.1 | 20.4 |
| Non-Intersection Median Crossover | 2.5 | 1.4 |
| Change to Divided Highway | 0.4 | 0.7 |
| Other | 37.5 | 57.6 |
| Not Stated | 6.4 | 4.1 |
| N | 139083 | 1452 |

Table A13.

| Speed Limit | All Accidents | Fatal Accidents |
|---|---|---|
| Not Stated | 5.1 | 0.0 |
| 05 mph | 0.1 | 0.0 |
| 10 mph | 0.0 | 0.0 |
| 15 mph | 0.1 | 0.1 |
| 20 mph | 4.2 | 0.8 |
| 25 mph | 4.0 | 0.6 |
| 30 mph | 0.5 | 0.1 |
| 35 mph | 34.5 | 14.0 |
| 40 mph | 0.5 | 0.1 |
| 45 mph | 13.9 | 12.0 |
| 50 mph | 0.9 | 1.2 |
| 55 mph | 27.6 | 50.1 |
| 60 mph | 6.7 | 14.7 |
| 65 mph | 1.3 | 3.0 |
| 70 mph | 0.6 | 2.1 |
| 75 mph | 0.0 | 0.0 |
| N | 139083 | 1452 |

Table A14.

| Sex - Driver | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| Male | 65.9 | 80.2 | 80.7 |
| Female | 29.0 | 18.0 | 18.7 |
| Not Stated | 5.1 | 1.9 | 0.7 |
| N | 242883 | 2121 | 1163 |

Table A15.

| Sobriety | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| Not Drinking | 81.7 | 53.9 | 31.5 |
| Drinking--Impaired | 3.1 | 5.7 | 6.6 |
| Drinking--Impairment Unknown | 3.8 | 9.3 | 12.9 |
| Not Stated | 11.4 | 31.0 | 49.0 |
| N | 242883 | 2121 | 1163 |

Table A16.

| Age - Driver | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| 1 - 5 Years | 0.0 | 0.0 | 0.0 |
| 6 - 10 Years | 0.0 | 0.1 | 0.3 |
| 11 - 14 Years | 0.1 | 0.4 | 0.7 |
| 15 Years | 0.2 | 0.2 | 0.3 |
| 16 Years | 4.4 | 3.5 | 4.5 |
| 17 Years | 4.7 | 4.2 | 4.4 |
| 18 Years | 5.0 | 5.0 | 4.7 |
| 19 Years | 4.7 | 5.4 | 6.0 |
| 20 Years | 4.3 | 4.5 | 5.2 |
| 21 - 25 Years | 17.5 | 18.0 | 19.6 |
| 26 - 30 Years | 11.8 | 11.4 | 9.2 |
| 31 - 35 Years | 8.0 | 9.2 | 7.6 |
| 36 - 40 Years | 6.6 | 7.0 | 6.5 |
| 41 - 45 Years | 5.9 | 5.0 | 3.6 |
| 46 - 50 Years | 5.6 | 5.6 | 5.3 |
| 51 - 55 Years | 4.8 | 5.0 | 4.7 |
| 56 - 60 Years | 3.8 | 4.3 | 5.2 |
| 61 - 65 Years | 3.0 | 3.5 | 3.9 |
| 66 - 70 Years | 2.0 | 2.5 | 3.4 |
| 71 - 75 Years | 1.1 | 1.0 | 1.6 |
| 76 - 80 Years | 0.6 | 1.0 | 1.4 |
| 81 - 85 Years | 0.2 | 0.4 | 0.5 |
| 86 - 90 Years | 0.0 | 0.0 | 0.0 |
| 91 + Years | 0.1 | 0.0 | 0.0 |
| Not Stated | 5.7 | 2.7 | 1.3 |
| N | 242883 | 2121 | 1163 |

Table A17.

| Accident Type | All Accidents | | Fatal Accidents | |
|---|---|---|---|---|
| | Driver 16 yrs | Driver 26+ yrs | Driver 16 yrs | Driver 26+ yrs |
| Ran Off Road-Right | 14.7 | 7.0 | 25.7 | 16.1 |
| Ran Off Road-Left | 7.8 | 3.6 | 23.0 | 9.3 |
| Ran Off Road-Straight Ahead | 0.5 | 0.4 | 0.0 | 0.9 |
| Overturn | 0.4 | 0.1 | 2.7 | 0.2 |
| Other in Road | 0.0 | 0.2 | 2.7 | 0.5 |
| Hit Pedestrian | 0.6 | 1.1 | 12.2 | 14.1 |
| Hit Parked Vehicle | 4.4 | 4.3 | 0.0 | 0.7 |
| Hit Train | 0.1 | 0.2 | 0.0 | 1.5 |
| Hit Bicycle | 0.4 | 0.5 | 0.0 | 1.0 |
| Hit Animal | 0.3 | 0.7 | 0.0 | 0.3 |
| Hit Fixed Object | 0.4 | 0.4 | 0.0 | 0.3 |
| Hit Other Object | 0.1 | 0.2 | 0.0 | 0.2 |
| Rear End, Slowing | 19.4 | 21.2 | 2.7 | 6.0 |
| Rear End, Turning | 3.1 | 3.4 | 0.0 | 0.3 |
| Left Turn | 8.8 | 10.1 | 4.1 | 5.9 |
| Left Turn Across Traffic | 7.6 | 8.3 | 2.7 | 2.9 |
| Right Turn | 2.0 | 2.3 | 0.0 | 0.0 |
| Right Turn Across Traffic | 2.0 | 2.2 | 0.0 | 0.4 |
| Head On | 1.9 | 1.8 | 14.9 | 17.4 |
| Sideswipe | 6.2 | 8.4 | 1.4 | 4.2 |
| Angle | 15.9 | 19.9 | 8.1 | 16.8 |
| Backing | 3.2 | 3.8 | 0.0 | 0.9 |
| Not Stated | 0.2 | 0.0 | 0.0 | 0.1 |
| N | 4895 | 70521 | 74 | 1187 |

Table A18.

| Vehicle Maneuver | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| Stopped in Road | 7.4 | 1.5 | 0.4 |
| Parked out of Road | 3.0 | 1.1 | 0.2 |
| Parked in Road | 0.7 | 0.6 | 0.3 |
| Going Straight | 56.4 | 84.3 | 85.3 |
| Changing Lanes | 1.9 | 0.6 | 0.4 |
| Passing | 2.6 | 3.3 | 3.9 |
| Right Turn | 3.2 | 0.5 | 0.8 |
| Left Turn | 9.9 | 4.1 | 4.2 |
| U Turn | 0.2 | 0.1 | 0.2 |
| Backing | 2.2 | 0.5 | 0.2 |
| Slowing-Stopping | 5.5 | 1.0 | 0.9 |
| Starting in Road | 1.8 | 0.8 | 1.0 |
| Parking | 0.1 | 0.0 | 0.0 |
| Leaving Parked Position | 0.5 | 0.0 | 0.1 |
| Other | 0.3 | 0.8 | 0.9 |
| Not Stated | 4.3 | 0.9 | 1.2 |
| N | 242883 | 2121 | 1163 |

Table A19.

| S -- Speed Of Accident | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| 0 - 29 mph | 42.0 | 9.5 | 7.0 |
| 30 - 49 mph | 32.9 | 25.2 | 17.5 |
| 50 - 79 mph | 17.3 | 48.3 | 52.9 |
| Not Stated | 7.7 | 17.0 | 22.6 |
| N | 242883 | 2121 | 1163 |

Table A 20.

| Estimated Speed Prior to Impact | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| 00 mph | 15.1 | 4.0 | 2.9 |
| 01 - 05 mph | 10.4 | 2.5 | 1.7 |
| 06 - 10 mph | 8.8 | 2.9 | 3.2 |
| 11 - 15 mph | 6.0 | 2.4 | 2.7 |
| 16 - 20 mph | 7.2 | 1.7 | 1.3 |
| 21 - 25 mph | 5.9 | 1.8 | 1.2 |
| 26 - 30 mph | 6.8 | 3.4 | 1.2 |
| 31 - 35 mph | 8.1 | 6.4 | 4.1 |
| 36 - 40 mph | 5.1 | 7.3 | 4.9 |
| 41 - 45 mph | 5.7 | 9.8 | 7.4 |
| 46 - 50 mph | 5.2 | 14.1 | 11.1 |
| 51 - 55 mph | 3.9 | 10.3 | 10.5 |
| 56 - 60 mph | 2.7 | 8.1 | 9.8 |
| 61 - 65 mph | 1.1 | 3.5 | 4.5 |
| 66 - 70 mph | 0.8 | 4.3 | 6.6 |
| 71 - 75 mph | 0.4 | 2.9 | 5.1 |
| 76 - 80 mph | 0.3 | 3.4 | 5.7 |
| 81 - 85 mph | 0.1 | 1.1 | 1.6 |
| 86 - 90 mph | 0.1 | 2.3 | 3.7 |
| 91 - 95 mph | 0.0 | 0.2 | 0.3 |
| 96 - 100 mph | 0.1 | 2.1 | 3.8 |
| 101 - 105 mph | 0.0 | 0.0 | 0.0 |
| 106 - 110 mph | 0.0 | 0.1 | 0.3 |
| over 110 mph | 0.0 | 0.4 | 0.8 |
| not stated | 6.4 | 5.0 | 5.7 |
| N | 242883 | 2121 | 1163 |

Table A 21.

| Violation #1 | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| Speeding < 65 | 9.0 | 7.9 | 10.9 |
| Speeding 65-75 | 1.2 | 6.0 | 9.6 |
| Speeding > 75 | 0.6 | 9.5 | 16.3 |
| Failed to Yield | 5.5 | 4.7 | 6.0 |
| Wrong Side Road | 3.6 | 9.2 | 11.6 |
| Improper Passing | 1.2 | 0.7 | 0.7 |
| Ran Stop Sign | 1.7 | 2.5 | 3.6 |
| Ran Traffic Signal | 1.4 | 0.7 | 0.9 |
| Followed Too Close | 3.5 | 0.3 | 0.3 |
| Improper Turn | 1.4 | 0.8 | 1.0 |
| Improper or No Signal | 0.4 | 0.0 | |
| Improper Parking | 0.3 | 0.1 | |
| Drinking | 1.4 | 2.0 | 2.0 |
| Reckless Driving | 0.6 | 1.0 | 1.3 |
| Racing | 0.0 | 0.0 | |
| Didn't Look | 10.2 | 2.2 | 2.1 |
| Passed on Hill | 0.0 | 0.0 | |
| Passed Stopped School Bus | 0.0 | 0.0 | |
| Improper Lights | 0.0 | 0.0 | 0.2 |
| Improper Brakes | 0.4 | 0.1 | 0.9 |
| Other Improper Driving | 1.4 | 1.2 | |
| Not Stated | 56.1 | 51.0 | 32.5 |
| N | 242883 | 2121 | 1163 |

Table A 22.

| Number of Tads For Vehicle | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| 0 | 58.6 | 39.5 | 38.1 |
| 1 | 39.5 | 55.8 | 55.6 |
| 2 | 1.8 | 4.2 | 5.5 |
| 3 | 0.1 | 0.5 | 0.7 |
| 4 | 0.0 | 0.0 | 0.1 |
| 5 | 0.0 | 0.0 | 0.0 |
| N | 242883 | 2121 | 1163 |

Table A23.

| Tad #1 Severity | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| 0 | 58.6 | 39.5 | 38.1 |
| 1 | 11.5 | 7.4 | 1.5 |
| 2 | 10.1 | 4.9 | 1.4 |
| 3 | 7.6 | 3.9 | 2.8 |
| 4 | 5.8 | 5.2 | 4.5 |
| 5 | 2.9 | 7.2 | 7.7 |
| 6 | 2.1 | 12.1 | 14.8 |
| 7 | 1.3 | 19.7 | 29.0 |
| 8 | 0.2 | 0.3 | 0.2 |
| (Not applicable) | | | |
| N | 242883 | 2121 | 1163 |

Table $A_{24}$.

| Roll-Over | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| Yes | 1.9 | 7.0 | 12.4 |
| No | 98.1 | 93.0 | 87.6 |
| N | 242883 | 2121 | 1163 |

Table A25.

| Accident Type | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| Ran Off Road-Right | 9.2 | 19.2 | 30.4 |
| Ran Off Road-Left | 5.2 | 11.1 | 17.0 |
| Ran Off Road-Straight Ahead | 0.5 | 0.8 | 1.5 |
| Overturn | 0.4 | 0.3 | 0.5 |
| Other in Road | 0.3 | 0.7 | 0.9 |
| Hit Pedestrian | 0.9 | 14.0 | 0.7 |
| Hit Parked Vehicle | 5.7 | 0.9 | 0.7 |
| Hit Train | 0.1 | 1.5 | 2.7 |
| Hit Bicycle | 0.4 | 0.9 | 0.2 |
| Hit Animal | 0.7 | 0.2 | 0.3 |
| Hit Fixed Object | 0.5 | 0.4 | 0.6 |
| Hit Other Object | 0.3 | 0.1 | 0.1 |
| Rear End,Slowing | 18.9 | 5.1 | 3.4 |
| Rear End, Turning | 3.1 | 0.3 | 0.3 |
| Left Turn | 9.4 | 5.0 | 4.4 |
| Left Turn Across Traffic | 6.9 | 2.7 | 2.2 |
| Right Turn | 2.1 | 0.1 | 0.1 |
| Right Turn Across Traffic | 1.8 | 0.4 | 0.4 |
| Head On | 1.9 | 16.6 | 16.0 |
| Sideswipe | 8.1 | 3.7 | 3.3 |
| Angle | 16.4 | 15.1 | 13.8 |
| Backing | 3.2 | 0.7 | 0.5 |
| Not Stated | 3.9 | 0.1 | 0.1 |
| N | 242883 | 2121 | 1163 |

Table A26.

| Vehicle Type | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| 2-4 Door Sedan | 78.8 | 71.5 | 77.2 |
| 2-4 Door Sedan and Trailer | 0.0 | 0.0 | 0.0 |
| Passenger Car and Trailer | 0.1 | 0.1 | 0.1 |
| Station Wagon (Passenger Car) | 5.0 | 3.5 | 3.6 |
| Station Wagon (Truck) | 0.1 | 0.1 | 0.2 |
| Commercial Bus | 0.1 | 0.3 | 0.2 |
| School Bus | 0.5 | 0.4 | 0.1 |
| Activity Bus | 0.0 | 0.0 | 0.0 |
| Truck 2-Axles | 11.3 | 11.9 | 8.9 |
| Truck 2-Axles and Trailer | 0.1 | 0.0 | 0.0 |
| Truck 3-Axles | 0.5 | 1.1 | 0.4 |
| Truck 3-Axles and Trailer | 0.0 | 0.1 | 0.2 |
| Truck-Tractor and Semi-Trailer | 1.7 | 5.8 | 1.4 |
| Taxicab | 0.3 | 0.1 | |
| Farm Equipment | 0.0 | 0.0 | |
| Farm Tractor | 0.1 | 0.1 | 0.2 |
| Motorcycle | 1.2 | 3.8 | 6.4 |
| Motor Scooter | 0.0 | 0.0 | 0.1 |
| Ambulance | 0.0 | 0.1 | 0.2 |
| Bicyclist | 0.0 | 0.0 | 0.1 |
| Recreational Vehicle | 0.0 | 0.1 | |
| Camper, 2-Axle Truck | 0.0 | 0.0 | 0.1 |
| Camper, 2-Axle Truck-Trailer | 0.0 | 0.0 | |
| Other Vehicle | 0.0 | 0.0 | |
| Pedestrian | 0.0 | 0.4 | 0.8 |
| Not Stated | 0.1 | 0.1 | 0.1 |
| N | 242883 | 2121 | 1163 |

Table A27.

| Vehicle Defect | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| Brakes | 1.3 | 1.0 | 0.9 |
| Headlights | 0.1 | 0.0 | |
| Rear Lights | 0.2 | 0.1 | 0.1 |
| Steering | 0.2 | 0.3 | 0.2 |
| Tires | 1.8 | 4.6 | 7.5 |
| Other | 0.5 | 0.2 | 0.1 |
| No Defects | 76.6 | 25.7 | 32.8 |
| Not Stated | 19.3 | 68.0 | 58.5 |
| N | 242883 | 2074 | 1134 |

Table A 28

| Vehicle Defect | All Accidents | | | | Fatal Accidents | | | |
|---|---|---|---|---|---|---|---|---|
| | Passenger Cars | 2-Axle Trucks | 3-Axle Trucks | Tractor Trailer Trucks | Passenger Cars | 2-Axle Trucks | 3-Axle Trucks | Tractor Trailer Trucks |
| Brakes | 1.1 | 2.3 | 2.1 | 4.1 | 0.6 | 0.8 | 8.7 | 5.0 |
| Headlights | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rear Lights | 0.2 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Steering | 0.2 | 0.4 | 0.0 | 0.0 | 0.1 | 0.8 | 4.3 | 0.8 |
| Tires | 2.1 | 1.1 | 0.0 | 1.6 | 5.8 | 1.6 | 0.0 | 0.0 |
| Other | 0.5 | 0.9 | 0.0 | 2.6 | 0.2 | 0.4 | 0.0 | 0.8 |
| None | 76.6 | 76.2 | 79.2 | 77.3 | 27.6 | 18.9 | 8.7 | 16.8 |
| Not Stated | 19.2 | 18.2 | 18.8 | 13.9 | 65.7 | 77.5 | 78.3 | 76.5 |
| N | 9294 | 1377 | 48 | 194 | 1575 | 244 | 23 | 119 |

Table A 29.

| R -- Region of Impact | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| Frontal Collision | 47.5 | 62.8 | 54.9 |
| Right Side Collision | 12.0 | 12.3 | 16.8 |
| Left Side Collision | 15.2 | 13.1 | 16.2 |
| Rear End Collision | 17.2 | 3.6 | 2.0 |
| Unspecified | 8.2 | 8.2 | 10.1 |
| N | 242883 | 2121 | 1163 |

Table A 30.

| Initial Point Of Contact | All Vehicles | Vehicles Involved in Fatal Accidents | Vehicles in Which Fatality Occurred |
|---|---|---|---|
| 1 | 6.5 | 11.6 | 7.9 |
| 2 | 10.2 | 16.9 | 15.6 |
| 3 | 4.0 | 8.5 | 6.2 |
| 4 | 10.3 | 8.0 | 7.5 |
| 5 | 5.0 | 3.7 | 4.6 |
| 6 | 4.6 | 5.6 | 7.5 |
| 7 | 3.9 | 2.0 | 1.8 |
| 8 | 2.4 | 0.7 | 0.4 |
| 9 | 0.1 | 0.1 | 0.1 |
| 10 | 0.0 | 0.0 | 0.1 |
| 11 | 0.4 | 1.1 | 1.6 |
| 12 | 0.2 | 0.6 | 0.7 |
| 13 | 0.1 | 0.3 | 0.3 |
| 14 | 1.5 | 0.2 | 0.1 |
| 15 | 5.1 | 0.9 | 0.5 |
| 16 | 1.3 | 0.4 | 0.3 |
| 17 | 2.2 | 0.5 | 0.2 |
| 18 | 2.9 | 1.0 | 1.0 |
| 19 | 3.8 | 6.6 | 9.5 |
| 20 | 3.8 | 3.2 | 3.8 |
| 21 | 7.8 | 4.8 | 4.2 |
| 22 | 0.2 | 0.5 | 0.4 |
| 23 | 0.0 | 0.0 | 0.0 |
| 24 | 0.0 | 0.0 | 0.0 |
| Frnt End-Dstrbtd | 8.6 | 0.0 | 0.0 |
| Lft Side-Dstrbtd | 1.7 | 1.7 | 2.3 |
| Rear End-Dstrbtd | 4.6 | 0.9 | 0.5 |
| Rt Side-Dstrbtd | 1.6 | 1.6 | 2.4 |
| Roll-Over Only | 0.7 | 2.5 | 4.6 |
| No Contact | 0.0 | 0.0 | 0.0 |
| Not Stated | 6.4 | 16.1 | 15.9 |
| N | 242883 | 2121 | 1163 |

Table B1.

| Accident Classification | Frequency | Percent |
|---|---|---|
| Ran off road | 500 | 35.7 |
| Pedestrian | 279 | 19.9 |
| Intersection | 243 | 17.4 |
| Wrong lane | 228 | 16.3 |
| Other or Unknown | 149 | 10.7 |
| | 1399 | 100.0 |

Table B2.

RAN OFF ROAD (N = 500)

| Consequences | Frequency | Percent |
|---|---|---|
| Hit fixed object | 228 | 45.6 |
| Hit vehicle | 37 | 7.4 |
| Overturned | 83 | 16.6 |
| Hit fixed object and overturned | 124 | 24.8 |
| Hit fixed object and another motor vehicle | 8 | 1.6 |
| Hit another motor vehicle and overturned | 4 | 0.8 |
| Hit another motor vehicle and fixed object and overturned | 2 | 0.4 |
| Not clear | 14 | 2.8 |
| | 500 | 100.0 |
| **Precursors** | | |
| Speed | 169 | 33.8 |
| Passing | 21 | 4.2 |
| Curve | 116 | 23.2 |
| Wet, icy | 18 | 3.6 |
| Driver fell asleep | 2 | 0.4 |
| Avoiding animal, vehicle, etc. | 13 | 2.6 |
| Vehicle malfunction | 14 | 2.8 |
| Racing | 1 | 0.2 |
| Pursued | 2 | 0.4 |
| **Miscellaneous** | | |
| Ejection | 103 | 20.6 |
| Pinned in vehicle | 17 | 3.4 |
| Fire | 14 | 2.8 |

Table B5.

PEDESTRIAN (N = 279)

| Pedestrian Actions -- Precrash | Frequency | Percent |
|---|---|---|
| Running | 76 | 27.2 |
| Walking | 114 | 40.9 |
| Standing | 22 | 7.8 |
| Lying | 15 | 5.4 |
| Falling | 9 | 3.2 |
| Getting on or off vehicle | 11 | 4.0 |
| Other or not clear | 32 | 11.6 |
| | 279 | 100.0 |
| **Precursors** | | |
| Visual | 27 | 9.7 |
| Previous accident | 5 | 1.8 |
| Vehicle malfunction | 3 | 1.1 |
| Speed | 4 | 1.4 |
| Vehicle ran off road | 4 | 1.4 |
| Seizure | 1 | 0.4 |
| Curve | 7 | 2.5 |
| **Miscellaneous** | | |
| Hit and run | 9 | 3.2 |
| Blind pedestrian | 2 | 0.8 |

Table B3.

INTERSECTION (N = 243)

| Precursors | Frequency | Percent |
|---|---|---|
| Failed to obey sign or signal | 87 | 35.8 |
| Rear end accident | 16 | 6.6 |
| Turning | 70 | 29.0 |
| Visual, perceptual | 20 | 8.6 |
| Speed | 17 | 7.0 |
| Icy | 1 | 0.4 |
| Vehicle malfunction | 4 | 1.6 |
| Vehicle entering roadway | 44 | 18.1 |
| Pursued | 2 | 0.8 |
| **Miscellaneous** | | |
| Ejection | 8 | 3.3 |
| Pinned in vehicle | 8 | 3.3 |
| Fire | 5 | 2.1 |
| Overturn | 23 | 9.5 |
| **Number of Vehicles Involved** | | |
| Single vehicle accident | 24 | 9.9 |
| Multivehicle accident | 217 | 89.3 |
| Not clear | 2 | 0.8 |
| | 243 | 100.0 |

Table B4.

WRONG LANE (N = 228)

| Precursors | Frequency | Percent |
|---|---|---|
| Rounding curve | 28 | 12.3 |
| Lost control | 84 | 36.8 |
| Avoiding, animal, vehicle, etc. | 13 | 5.7 |
| Visual, perceptual | 5 | 2.2 |
| Vehicle malfunction | 17 | 5.3 |
| Passing | 33 | 14.5 |
| Hill | 8 | 3.5 |
| Wet, icy | 23 | 10.1 |
| Speed | 26 | 11.4 |
| Driver fell asleep | 3 | 1.3 |
| Racing | 2 | 0.9 |
| Pursued | 2 | 0.9 |
| Driving under the influence | 2 | 0.9 |
| **Miscellaneous Occurrences** | | |
| Ejection | 4 | 1.8 |
| Pinned in vehicle | 8 | 3.5 |
| Fire | 5 | 2.2 |
| Overturn | 10 | 4.4 |

Table B6.

OTHER OR UNKNOWN (N = 149)

| Accident Types | Frequency | Percent |
|---|---|---|
| Train | 26 | 17.4 |
| Bicycle | 21 | 14.1 |
| Rear end collision | 36 | 24.2 |
| Other | 30 | 20.1 |
| Unknown | 36 | 24.2 |
| | 149 | 100.0 |
| **Precursors** | | |
| Visual, perceptual | 4 | 2.7 |
| Vehicle malfunction | 7 | 4.7 |
| Hit animal | 2 | 1.3 |
| Avoiding animal | 1 | 0.7 |
| Speed | 6 | 4.0 |
| **Miscellaneous** | | |
| Ejection | 4 | 2.7 |
| Pinned in vehicle | 2 | 1.3 |
| Fire | 1 | 0.7 |
| Overturn | 11 | 7.4 |

# 2. FILES DESCRIPTION

## A. ACCIDENT FILE

| DATA ELEMENT | DATA NAME | LENGTH | FORMAT | POSITION |
|---|---|---|---|---|
| 1. State (Reporting) | ASTATE | 2 | N | 01 |
| 2. Sequential Number | ASEQNO | 4 | A | 03 |
| 3. First Harmful Event | AHARM | 2 | N | 07 |
| 4. Location First Harmful Event | ALOCH | 2 | N | 09 |
| 5. Light | ALGHT | 1 | N | 11 |
| 6. Weather | AWTHR | 2 | N | 12 |
| 7. Land Use | APOPL | 1 | N | 14 |
| 8. County Code | ACNTY | 3 | N | 15 |
| 9. Year of Accident | AYEAR | 1 | N | 18 |
| 10. Month of Accident | AMNTH | 2 | N | 19 |
| 11. Day of Accident | ADATE | 2 | N | 21 |
| 12. Time of Accident | ATIME | 4 | N | 23 |
| 13. Day of Week | ADAWK | 1 | N | 27 |
| 14. EMS Requested | AEMSR | 1 | N | 28 |
| 15. Delay in Notification to EMS | AEMS1 | 3 | N | 29 |
| 16. EMS Response Time | AEMS2 | 3 | N | 32 |
| 17. Fire Involved in Accident | AFIRE | 1 | N | 35 |
| 18. No. of Vehicles | ANOMV | 1 | N | 36 |
| 19. No. Occupants Killed | AOKIL | 2 | N | 37 |
| 20. No. Non-Occupants Killed | ANKIL | 1 | N | 39 |
| 21. No. Occupants Injured | AOINJ | 2 | N | 40 |
| 22. No. Non-Occupants Injured | ANINJ | 1 | N | 42 |
| 23. No. of Occupants | ANOCC | 2 | N | 43 |
| 24. No. of Non-Occupants | ANNOC | 1 | N | 45 |
| 25. Number of Lanes | ALANE | 1 | N | 46 |
| 26. Divided | ADIVD | 1 | N | 47 |
| 27. Class of Trafficway | ACLAS | 1 | N | 48 |
| 28. TA-1 Class | ATA1 | 1 | N | 49 |
| 29. Alignment | AALGN | 1 | N | 50 |
| 30. Grade | AGRAD | 1 | N | 51 |
| 31. Traffic Controls | ATRAF | 2 | N | 52 |
| 32. Surface Condition | ASCND | 1 | N | 54 |
| 33. Roadway Defective | ARDFC | 1 | N | 55 |
| 34. Make | AMAKE1 | 4 | A | 56 |
| 35. Model | AMODEL1 | 3 | A | 60 |
| 36. Body Type | ABODY1 | 2 | N | 63 |
| 37. Model Year | AVEHYR1 | 2 | N | 65 |
| 38. Speed Before Impact | AISPD1 | 2 | N | 67 |
| 39. Posted Speed | APSPD1 | 2 | N | 69 |
| 40. Vehicle Maneuver | AMANVR1 | 2 | N | 71 |

ACCIDENT FILE (cont'd)

| DATA ELEMENT | DATA NAME | LENGTH | FORMAT | POSITION |
|---|---|---|---|---|
| 41. Impact Point | AIMPPT1 | 2 | A | 73 |
| 42. Vehicle Defective | AVDFC1 | 2 | N | 75 |
| 43. Extent of Deformation | ADFRM1 | 1 | N | 77 |
| 44. Age | AAGE1 | 2 | N | 78 |
| 45. Sex | ASEX1 | 1 | N | 80 |
| 46. Injury Severity | AINJR1 | 1 | N | 81 |
| 47. Alcohol | AALCHL1 | 1 | N | 82 |
| 48. Drugs | ADRUGS1 | 1 | N | 83 |
| 49. Vision Obstruction | AVISN1 | 2 | N | 84 |
| 50. Pre-Crash Action | AACTN1 | 2 | N | 86 |
| 51. Violation Charged | AVIOL11 | 3 | N | 88 |
| 52. Driver Speeding | ADVSP1 | 1 | N | 91 |
| 53. Occupants Restraint Use | AVEQP1 | 1 | N | 92 |
| 54. Occupants Ejected | AVEJC1 | 1 | N | 93 |
| 55. No. of Killed Occupants (Veh.) | AVNOCK1 | 1 | N | 94 |
| 56. No. of Injured Occupants (Veh.) | AVNOCI1 | 1 | N | 95 |
| 57. Traffic Unit Identification | ATUID | 1 | N | 96 |
| 58. Make | AMAKE2 | 4 | A | 97 |
| 59. Model | AMODEL2 | 3 | A | 101 |
| 60. Body Type | ABODY2 | 2 | N | 104 |
| 61. Model Year | AVEHYR2 | 2 | N | 106 |
| 62. Speed Before Impact | AISPD2 | 2 | N | 108 |
| 63. Posted Speed | APSPD2 | 2 | N | 110 |
| 64. Vehicle Maneuver | AMANVR2 | 2 | N | 112 |
| 65. Impact Point | AIMPPT2 | 2 | A | 114 |
| 66. Vehicle Defective | AVDFC2 | 2 | N | 116 |
| 67. Extent of Deformation | ADFRM2 | 1 | N | 118 |
| 68. Age | AAGE2 | 2 | N | 119 |
| 69. Sex | ASEX2 | 1 | N | 121 |
| 70. Injury Severity | AINJR2 | 1 | N | 122 |
| 71. Alcohol | AALCHL2 | 1 | N | 123 |
| 72. Drugs | ADRUGS2 | 1 | N | 124 |
| 73. Vision Obstruction | AVISN2 | 2 | N | 125 |
| 74. Pre-Crash Action | AACTN2 | 2 | N | 127 |
| 75. Violation Charged | AVIOL12 | 3 | N | 129 |
| 76. Driver Speeding | ADVSP2 | 1 | N | 132 |
| 77. Occupants Restraint Use | AVEQP2 | 1 | N | 133 |
| 78. Occupants Ejected | AVEJC2 | 1 | N | 134 |
| 79. No. of Killed Occupants (Veh.) | AVNOCK2* | 1 | N | 135 |
| 80. No. of Injured Occupants (Veh.) | AVNOCI2* | 1 | N | 136 |

ACCIDENT FILE (cont'd)

| DATA ELEMENT | DATA NAME | LENGTH | FORMAT | POSITION |
|---|---|---|---|---|
| 81. Type of Non-Occupant | ATYPN | 1 | N | 137 |
| 82. Action of Non-Occupant | AACTNN | 2 | N | 138 |
| 83. Accident Predisposition Factors | AFACT | 2 | N | 140 |

*If the second involvement is a pedestrian, this will reflect his injury status also.

RECORD SIZE- 141 CHARACTERS

NO. OF ELEMENTS - 83

## B. VEHICLE ACCIDENT FILE

| DATA ELEMENT | DATA NAME | LENGTH | FORMAT | POSITION |
|---|---|---|---|---|
| 1. State (Reporting) | VSTATE | 2 | N | 001 |
| 2. Sequential Number | VSEQNO | 4 | A | 003 |
| 3. Vehicle Number | VVEHNO | 1 | N | 007 |
| 4. Make | VMAKE | 4 | A | 008 |
| 5. Model | VMODEL | 3 | A | 012 |
| 6. Body Type | VBODY | 2 | N | 015 |
| 7. Model Year | VVEHYR | 2 | N | 017 |
| 8. Mileage | VMILES | 2 | N | 019 |
| 9. State of Registration | VSTATR | 2 | N | 021 |
| 10. Special Use | VSPECL | 2 | N | 023 |
| 11. Combined Weight | VVEHWT | 3 | N | 025 |
| 12. Laden Code | VLCODE | 1 | N | 028 |
| 13. No. of Axles Vehicle | VVAXLE | 1 | N | 029 |
| 14. No. of Axles Trailer | VTAXLE | 1 | N | 030 |
| 15. Posted Speed Limit | VPSPD | 2 | N | 031 |
| 16. Speed Before Impact | VISPD | 2 | N | 033 |
| 17. Vehicle Maneuver | VMANVR | 2 | N | 035 |
| 18. Impact Type | VIMPTP | 2 | N | 037 |
| 19. Impact Point | VIMPPT | 2 | A | 039 |
| 20. Vehicle Defect | VVDFC | 2 | N | 041 |
| 21. Area Damaged (1) | VDAMG1 | 2 | N | 043 |
| 22. Area Damaged (2) | VDAMG2 | 2 | N | 045 |
| 23. Area Damaged (3) | VDAMG3 | 2 | N | 047 |
| 24. Extent of Deformation | VDFRM | 1 | N | 049 |
| 25. Towed Away | VTOWD | 1 | N | 050 |
| 26. 1st Subsequent Event | VEVNT1 | 2 | N | 051 |
| 27. 2nd Subsequent Event | VEVNT2 | 2 | N | 053 |
| 28. 3rd Subsequent Event | VEVNT3 | 2 | N | 055 |
| 29. Skid Marks Before Crash | VSKID1 | 2 | N | 057 |
| 30. Skid Marks After Crash | VSKID2 | 2 | N | 059 |
| 31. Dollar Damage Code | VDOLLR | 2 | N | 061 |
| 32. Fire in Vehicle | VVFIRE | 1 | N | 063 |
| 33. Age | VAGE | 2 | N | 064 |
| 34. Occupation | VOCCUP | 2 | N | 066 |
| 35. Licensing State | VSTATL | 2 | N | 068 |
| 36. Minority Identification | VRACE | 1 | N | 070 |
| 37. Marital State | VMARRY | 1 | N | 071 |
| 38. Licensed for Vehicle Driven | VLICNS | 1 | N | 072 |
| 39. Complied with Restrictions | VCOMPL | 1 | N | 073 |

VEHICLE ACCIDENT FILE (cont'd)

| DATA ELEMENT | DATA NAME | LENGTH | FORMAT | POSITION |
|---|---|---|---|---|
| 40. Condition of Driver | VCONDN | 1 | N | 074 |
| 41. Vision Obstruction | VVISN | 2 | N | 075 |
| 42. Pre-Crash Action | VACTN | 2 | N | 077 |
| 43. Alcohol | VALCHL | 1 | N | 079 |
| 44. Drugs | VDRUGS | 1 | N | 080 |
| 45. Driver Training | VTRANG | 1 | N | 081 |
| 46. Impairments | VIMPR | 2 | N | 082 |
| 47. Violation Charged | VVIOL1 | 3 | A | 084 |
| 48. Other Violation | VVIOL2 | 3 | A | 087 |
| 49. No. of Convictions Same Offense | VSAME | 1 | N | 090 |
| 50. No. of Convictions DI | VCONDI | 1 | N | 091 |
| 51. No. of Convictions RK | VCONRK | 1 | N | 092 |
| 52. No. of Convictions SP | VCONSP | 1 | N | 093 |
| 53. No. of Convictions | VCNTOT | 1 | N | 094 |
| 54. No. of Withdrawals | VWITH | 1 | N | 095 |
| 55. No. of Accidents | VACCID | 1 | N | 096 |
| 56. No. of Years Driving | VYEARS | 2 | N | 097 |
| 57. Sex | VSEX | 1 | N | 099 |
| 58. Injury Severity | VINJR | 1 | N | 100 |
| 59. Restraints | VSFEQ | 2 | N | 101 |
| 60. Ejection | VEJCT | 1 | N | 103 |
| 61. BAC Type | VBACT | 1 | N | 104 |
| 62. BAC Result | VBACR | 2 | N | 105 |
| 63. BAC Elapsed Time | VBACE | 3 | N | 107 |
| 64. No. of Occupants(Veh.) | VVNOC | 1 | N | 110 |
| 65. No. of Injured Occ. (Veh.) | VVNOCI | 1 | N | 111 |
| 66. No. of Killed Occ. (Veh.) | VVNOCK | 1 | N | 112 |
| 67. Occupants Restrain Use | VVEQP | 1 | N | 113 |
| 68. Occupants Ejected | VVEJC | 1 | N | 114 |
| 69. Number of Lanes | VLANE | 1 | N | 115 |
| 70. Divided | VDIVD | 1 | N | 116 |
| 71. One Way | V1WAY | 1 | N | 117 |
| 72. Class of Trafficway | VCLAS | 1 | N | 118 |
| 73. Limited Access Location | VLIMT | 1 | N | 119 |
| 74. TA-1 | VTA1 | 1 | N | 120 |
| 75. Pavement Surface Type | VSURF | 1 | N | 121 |
| 76. Alignment | VALGN | 1 | N | 122 |
| 77. Grade | VGRAD | 1 | N | 123 |
| 78. Traffic Controls | VTRAF | 2 | N | 124 |
| 79. Surface Condition | VSCND | 1 | N | 126 |
| 80. Roadway Defect | VRDFC | 1 | N | 127 |
| 81. First Harmful Event | VHARM | 2 | N | 128 |
| 82. Location First Harmful Event | VLOCH | 2 | N | 130 |

VEHICLE ACCIDENT FILE (cont'd)

| DATA ELEMENT | DATA NAME | LENGTH | FORMAT | POSITION |
|---|---|---|---|---|
| 83. Light | VLGHT | 1 | N | 132 |
| 84. Weather | VWTHR | 2 | N | 133 |
| 85. Land Use | VPOPL | 1 | N | 135 |
| 86. County Code | VCNTY | 3 | N | 136 |
| 87. City Code | VCITY | 4 | N | 139 |
| 88. Time of Accident | VTIME | 4 | N | 143 |
| 89. Day of Week | VDAWK | 1 | N | 147 |
| 90. Police Response Time | VPRSP | 3 | N | 148 |
| 91. Delay in Notification EMS | VEMS1 | 3 | N | 151 |
| 92. EMS Response Time | VEMS2 | 3 | N | 154 |
| 93. Extrication | VEXTR | 1 | N | 157 |
| 94. Type EMS Requested | VEMSR | 1 | N | 158 |
| 95. Year of Accident | VYEAR | 1 | N | 159 |
| 96. Month of Accident | VMNTH | 2 | N | 160 |
| 97. Day of Accident | VDATE | 2 | N | 162 |
| 98. No. of Vehicles | VNOMV | 1 | N | 164 |
| 99. No. of Persons Killed | VPKIL | 2 | N | 165 |
| 100. No. of Persons Injured | VPINJ | 2 | N | 167 |
| 101. No. of Non-Occupants | VNNOC | 1 | N | 169 |
| 102. Accident Predisposition Factors | VFACT | 2 | N | 170 |

RECORD SIZE - 171 CHARACTERS

NO. OF ELEMENTS - 102

## C. PERSON FILE

| DATA ELEMENT | DATA NAME | LENGTH | FORMAT | POSITION |
|---|---|---|---|---|
| 1. State (Reporting) | PSTATE | 2 | N | 1 |
| 2. Sequential Number | PSEQNO | 4 | A | 3 |
| 3. Person Identification | PIDNO | 1 | N | 7 |
| 4. Seating Position | PSEAT | 2 | N | 8 |
| 5. Age | PAGE | 2 | N | 10 |
| 6. Sex | PSEX | 1 | N | 12 |
| 7. Minority Identification | PRACE | 1 | N | 13 |
| 8. Injury Severity | PINJR | 1 | N | 14 |
| 9. Restraint | PSFEQ | 2 | N | 15 |
| 10. Ejection | PEJCT | 1 | N | 17 |
| 11. Time to Extricate | PTEXTR | 2 | N | 18 |
| 12. EMS | PEMS | 1 | N | 20 |
| 13. BAC Type | PBACT | 1 | N | 21 |
| 14. BAC Result | PBACR | 2 | N | 22 |
| 15. BAC Elapsed Time | PBACE | 3 | N | 24 |
| 16. Place of Death | PDETHP | 1 | N | 27 |
| 17. Elapsed Days Till Death | PDETHD | 3 | N | 28 |
| 18. Elapsed Hours Till Death | PDETHH | 2 | N | 31 |
| 19. Non-Occupant Number | PNOCNO | 1 | N | 33 |
| 20. Type of Non-Occupant | PTYPN | 1 | N | 34 |
| 21. Location of Non-Occ. | PLOCN1 | 1 | N | 35 |
| 22. Loc. of Non-Occ. (Detail) | PLOCN2 | 1 | N | 36 |
| 23. Violation Charge (Non Occupant) | PVIOLN | 2 | N | 37 |
| 24. Action of Non-Occupant | PACTNN | 2 | N | 39 |
| 25. Clothing Shade | PCLOTH | 1 | N | 41 |
| 26. Reflective Quality (Of Clothing) | PRFLEC | 1 | N | 42 |
| 27. Alcohol | PALCHL | 1 | N | 43 |
| 28. Drugs | PDRUGS | 1 | N | 44 |
| 29. Vehicle Number | PVEHNO | 1 | N | 45 |
| 30. Make | PMAKE | 4 | A | 46 |
| 31. Model | PMODEL | 3 | A | 50 |
| 32. Body Type | PBODY | 2 | N | 53 |
| 33. Model Year | PVEHYR | 2 | N | 55 |
| 34. Special Use | PSPECL | 2 | N | 57 |
| 35. Posted Speed Limit | PPSPD | 2 | N | 59 |
| 36. Speed Before Impact | PISPD | 2 | N | 61 |
| 37. Vehicle Maneuver | PMANVR | 2 | N | 63 |
| 38. Impact Type | PIMPTP | 2 | N | 65 |
| 39. Impact Point | PIMPPT | 2 | A | 67 |
| 40. Vehicle Defect | PVDFC | 2 | N | 69 |
| 41. Areas Damaged (1) | PDAMG1 | 2 | N | 71 |

PERSON FILE (cont'd)

| DATA ELEMENT | DATA NAME | LENGTH | FORMAT | POSITION |
|---|---|---|---|---|
| 42. Areas Damaged (2) | PDAMG2 | 2 | N | 73 |
| 43. Areas Damaged (3) | PDAMG3 | 2 | N | 75 |
| 44. Extent of Deformation | PDFRM | 1 | N | 77 |
| 45. 1st Subsequent Event | PEVNT1 | 2 | N | 78 |
| 46. 2nd Subsequent Event | PEVNT2 | 2 | N | 80 |
| 47. 3rd Subsequent Event | PEVNT3 | 2 | N | 82 |
| 48. Skid Marks Before Crash | PSKID1 | 2 | N | 84 |
| 49. Skid Marks After Crash | PSKID2 | 2 | N | 86 |
| 50. Vehicle Dollar Damage | PDOLLR | 2 | N | 88 |
| 51. Number of Lanes | PLANE | 1 | N | 90 |
| 52. Divided | PDIVD | 1 | N | 91 |
| 53. One-Way | P1WAY | 1 | N | 92 |
| 54. Class of Trafficway | PCLAS | 1 | N | 93 |
| 55. Limited Access Location | PLIMT | 1 | N | 94 |
| 56. TA-1 Class | PTA1 | 1 | N | 95 |
| 57. Traffic Controls | PTRAF | 2 | N | 96 |
| 58. Surface Condition | PSCND | 1 | N | 98 |
| 59. Roadway Defect | PRDFC | 1 | N | 99 |
| 60. First Harmful Event | PHARM | 2 | N | 100 |
| 61. Location of Harmful Event | PLOCH | 2 | N | 102 |
| 62. Light | PLGHT | 1 | N | 104 |
| 63. Weather | PWTHR | 2 | N | 105 |
| 64. Land Use | PPOPL | 1 | N | 107 |
| 65. Year of Accident | PYEAR | 1 | N | 108 |
| 66. Month of Accident | PMNTH | 2 | N | 109 |
| 67. Day of Accident | PDATE | 2 | N | 111 |
| 68. Time of Accident | PTIME | 4 | N | 113 |
| 69. Day of Week | PDAWK | 1 | N | 117 |
| 70. Delay in Notification to EMS | PEMS1 | 3 | N | 118 |
| 71. EMS Response Time | PEMS2 | 3 | N | 121 |
| 72. No. Of Vehicles | PNOMV | 1 | N | 124 |
| 73. No. of Persons Killed | PPKIL | 2 | N | 125 |
| 74. No. of Persons Injured | PPINJ | 2 | N | 127 |
| 75. No. of Non-Occupants | PNNOC | 1 | N | 129 |
| 76. Accident Predisposition Factors | PFACT | 2 | N | 130 |

RECORD SIZE - 131 CHARACTERS

NO. OF ELEMENTS - 76

Table C1.

| BAC Level | Frequency | Percent |
|---|---|---|
| Unknown | 813 | 99.4 |
| .10% | 1 | 0.1 |
| .15% | 1 | 0.1 |
| Error | 3 | 0.4 |
| | 818 | 100.0 |

Table C2.

| Precrash Actions of Driver | Frequency | Percent |
|---|---|---|
| Unknown | 13 | 1.6 |
| Normal | 669 | 81.8 |
| Pursuing | 1 | 0.1 |
| Fleeing | 4 | 0.5 |
| Avoiding vehicle | 15 | 1.8 |
| Drinking | 1 | 0.1 |
| Other inattention | 1 | 0.1 |
| Tired | 1 | 0.1 |
| Attempt to Regain Control | 101 | 12.3 |
| Error | 12 | 1.5 |
| | 818 | 100.0 |

Table C3.

| Type Emergency Medical Service Requested | Frequency | Percent |
|---|---|---|
| Unknown | 68 | 11.7 |
| Ambulance | 502 | 86.3 |
| Rescue Squad | 1 | 0.2 |
| Other | 9 | 1.5 |
| Ambulance & Rescue Squad | 1 | 0.2 |
| Error | 1 | 0.2 |
| | 582 | 100.0 |

Table C4.

| Extrication By Whom | Frequency | Percent |
|---|---|---|
| Unknown | 99 | 12.1 |
| Emergency Med.Service | 705 | 86.2 |
| Other | 10 | 1.2 |
| Not Required | 2 | 0.2 |
| Error | 2 | 0.2 |
| | 818 | 100.0 |

Table C5.

| Emergency Medical Service | Frequency | Percent |
|---|---|---|
| Unknown | 177 | 10.9 |
| None | 327 | 20.1 |
| Ambulance Attendant | 1113 | 68.3 |
| Doctor | 2 | 0.1 |
| Citizen | 2 | 0.1 |
| Error | 8 | 0.5 |
| | 1629 | 100.0 |

# INSTRUCTIONS FOR FATAL ACCIDENT SUPPLEMENT

## Highway Safety Research Center

This supplement is to be filled out for any accident which results in a fatality during the time period April 1, 1975 through June 30, 1975.

The form should be filled out on the scene along with the usual accident report form and turned in with the standard report or its supplement when a fatality results.

The intent of this supplement is to obtain additional information on fatal accidents. It is still important to fill out the standard report form accurately and completely.

## I. EMERGENCY AND MEDICAL

These questions apply to rescuing of fatal victims.

(1) Equipment required. Indicate all the necessary emergency equipment which was called to the scene of the accident. If other than ambulance and rescue squad were called, describe those. Check as many as apply.

(2) Medical aid. Indicate all persons who gave medical attention to fatal victims at the scene of the accident. If there were others than those listed, describe them. Check as many as apply.

(3) Time to extricate. Tell how long in minutes it took to remove fatal victims from entanglement (trapped in vehicle, under vehicle, etc.)

(4) Extrication by whom. Indicate all those persons who were involved in the extrication process. Check as many as apply.

(5) Time ambulance called.
Time ambulance arrived.
Time ambulance left scene.
Time ambulance arrived at hospital.

Record this time sequence giving hour and minute, a.m. or p.m.

(6) Mode of transportation to hospital. Indicate means by which fatal victims were transported to hospital. Check as many as apply.

(7) Distance of hospital from scene of accident. Record to the nearest mile the distance of the hospital from the location of accident if those involved were carried to hospital.

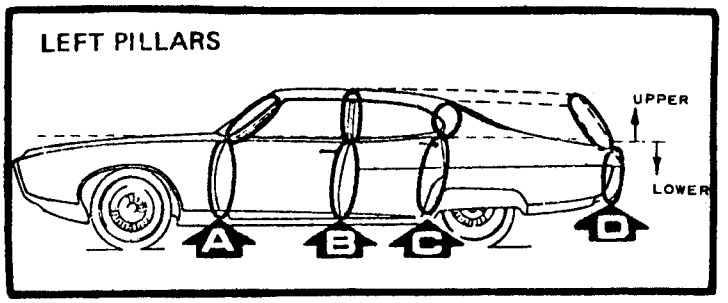
## II. FATAL VICTIM (up to three victims)

Fill out for each person who died in the accident up to three victims.

(8) Name. As indicated on the standard accident report.

(9) Place of death. At which point in the rescue sequence did the victims die?

(10) Causes of injury. Indicate all causes of injury to the deceased (Check as many as apply). If fatal victim was ejected out of vehicle use "ejection" as source of injury.




III. DRIVER AND PEDESTRIAN

(11) Precrash actions and condition of driver (not pedestrian). Check any actions or conditions of driver which existed prior to the accident. If driver did anything unusual prior to the crash or some condition may have been present, check other and specify, as many as apply.

(12) Pedestrian pre-crash actions. Check any actions which the pedestrian was engaged in prior to the accident, as many as apply.

IV. VEHICLE (up to three vehicles)

These questions apply only to motor vehicles. Vehicle numbers should correspond to those on the standard report.

(13) Objects contacted during collision. Check all objects with which vehicle had contact with during the course of the accident.

(14) Fire or explosion. If there was a fire or explosion, indicate the cause.

(15) Avoidance maneuver. As can be ascertained from skid marks and statements, indicate avoidance maneuvers which drivers were applying before the accident.

(16) Vehicle defects. This question should be answered in the same manner as on the standard report form. The type of vehicle defect should be more specific. Indicate any condition or occurrence with the vehicle which may have precipitated or contributed to the accident. If there was some other malfunction, specify and check other. If you are reasonably sure there was no defect which may have caused the accident,

check "none". If it is too difficult to determine whether there were defects, check "unable to determine".

(17) Inspection certificate. Check to see whether vehicle has valid inspection certificate.

(18) Inspection date. Record the date of last inspection if any.

V. ROADWAY

(19) Alignment and grade. If accident occurred in or at curve, indicate so, otherwise check straight. Choose the term which best describes the vertical alignment.

(20) Width of lane. Measure from the center line to edge of lane to determine its width to the nearest foot. If accident occurred at parking lot or on private property, check not applicable.

(21) Shoulders. If there are no shoulders, check "none". If there are paved shoulders, check "paved". Otherwise indicate the composition of the shoulder "sod", "gravel", or "other". If shoulders are soft or low be sure that this is indicated on the standard report form.

(22) Width of shoulder. If the shoulder is paved, measure its width. If shoulder is not paved, measure from edge of pavement until the shape changes appreciably. If no shoulder exists or it is difficult to define, check "not applicable".

(23) Dropoff. Measure from the top of pavement to the normal ground or shoulder adjacent to the pavement edge.

(24) Visability of obstructions. Check out any objects which were reported to have obscured or partially obscured the view of the driver or pedestrian. If there is evidence of an obstruction, indicate it. If there is any dropoff or dip in the road which contributed to the accident check "hillcrest". If there are others not mentioned, please check "other" and specify. If none are reported and none observed check "none".

(25) Visability limitations. Indicate any condition which may have limited the vision of the driver or pedestrian. If headlight glare or sunlight glare is reported by witness to have been a factor indicate so. Windshield condition may be one that is dirty or icy.

VI. CAUSAL FACTORS

In this part the investigator must decide on the prime cause of the accident. Prime cause is to be defined as the factor which the investigator is certain was necessary or sufficient for the occurrence of the accident. Had the factor not been present in the accident sequence, the accident would not have occurred.

(26) First most responsible vehicle. Decide which vehicle was most responsible for the accident. If some unknown vehicle was most responsible and left the scene, indicate so. Vehicle numbers correspond to those on standard report.

(27) Second most responsible vehicle. Decide which vehicle was the second most responsible. If there was only one vehicle involved, check none. Vehicle numbers correspond to those on standard report.

(28) Primary factor responsible for accident. Indicate the primary cause of the accident.
"Driver or pedestrian error" -- any mistake which the driver or pedestrian made which caused the accident.
"Vehicle defect" -- any defect or condition of vehicle which if they had not been present, the accident would not have occurred.
"Road construction or condition" -- Consider here road alignment and grade, width or any manner of construction which caused the accident. Road conditions to be considered are roads in poor repair, under construction, roads with loose material on the surface or any material which would make the road slippery. Do not include weather conditions which would make road slippery.
"Trafficing defect" -- Include any defects in signs or signals, pavement markings, etc. in traffic controls which were the cause of the accident.
"Weather conditions" -- Designate weather conditions (rain, ice, snow, fog) as the prime cause only if the accident would not have occurred under different conditions.
"Unknown" -- check here if cause cannot be determined.

(29) Primary error of most responsible vehicle (driver or pedestrian). If the primary factor was driver or pedestrian error select one as the primary error, otherwise check unknown.
"None" -- This should be checked if the primary factor was other than driver or pedestrian error.
"Underestimation" -- If driver or pedestrian obeys all traffic laws (looks for cars, yields, etc) but underestimates speed or distance of another vehicle, check underestimation.
"Falling asleep, blackout, or death-at-wheel" -- If any of these are reported as happening prior to the accident, check as primary error regardless of violation.
"Diverted attention" -- If driver or pedestrian reports to have been diverted from his driving or was crossing and was not paying attention, check here.
"Inexperienced driving" -- Check this if the driver error was attributed to a lack of skill and/or knowledge in the driving task.
"Violation which is indicated on report form" -- If there appears to be no other cause other than a violation, check this as the primary driver error.
"Avoidance maneuver" -- If driver/or pedestrian was not violating any traffic laws but was forced to avoid some object, pedestrian, or motor vehicle and in doing so suffered an accident, then this would be the primary error.
"Unknown" -- Check unknown if unable to determine primary driving error.

(30) Comments. Use this space to report any additional information, unusual circumstances, or problems in filling out the form.

## MOTOR VEHICLE

13 All Objects Contacted During Collision

| Vehicle #1 | Vehicle #2 | Vehicle #3 | |
|---|---|---|---|
| ☐ | ☐ | ☐ | None |
| ☐ | ☐ | ☐ | Tree |
| ☐ | ☐ | ☐ | Utility pole |
| ☐ | ☐ | ☐ | Guardrail, guard-post on median |
| ☐ | ☐ | ☐ | Guardrail, guard-post on shoulder |
| ☐ | ☐ | ☐ | Bridge |
| ☐ | ☐ | ☐ | Sign |
| ☐ | ☐ | ☐ | Ditch |
| ☐ | ☐ | ☐ | Embankment |
| ☐ | ☐ | ☐ | Culvert |
| ☐ | ☐ | ☐ | Building |
| ☐ | ☐ | ☐ | Hydrant |
| ☐ | ☐ | ☐ | Mailbox |
| ☐ | ☐ | ☐ | Guywire |
| ☐ | ☐ | ☐ | Pedestrian |
| ☐ | ☐ | ☐ | Animal |
| ☐ | ☐ | ☐ | Bicycle |
| ☐ | ☐ | ☐ | Another motor vehicle |
| ☐ | ☐ | ☐ | Object disengaged from other vehicle |
| ☐ | ☐ | ☐ | Other object |

_____

14 Fire or Explosion

| | | | |
|---|---|---|---|
| ☐ | ☐ | ☐ | None |
| ☐ | ☐ | ☐ | Ruptured fuel tank |
| ☐ | ☐ | ☐ | Broken filler neck |
| ☐ | ☐ | ☐ | Unable to determine |

15 Avoidance Maneuvers

| | | | |
|---|---|---|---|
| ☐ | ☐ | ☐ | None |
| ☐ | ☐ | ☐ | Braking |
| ☐ | ☐ | ☐ | Steering |
| ☐ | ☐ | ☐ | Braking and steering |
| ☐ | ☐ | ☐ | Acceleration |
| ☐ | ☐ | ☐ | Acceleration and steering |
| ☐ | ☐ | ☐ | Brake release |
| ☐ | ☐ | ☐ | Mistakenly hit accelerator rather than brake |
| ☐ | ☐ | ☐ | Unknown |

16 Vehicle Defects

| | | | |
|---|---|---|---|
| ☐ | ☐ | ☐ | None |
| ☐ | ☐ | ☐ | Brakes locked |
| ☐ | ☐ | ☐ | Brakes failed |
| ☐ | ☐ | ☐ | Tires slick |
| ☐ | ☐ | ☐ | Tires - blowout |
| ☐ | ☐ | ☐ | Tires came off |
| ☐ | ☐ | ☐ | Tires different size or type |
| ☐ | ☐ | ☐ | Headlights not working |
| ☐ | ☐ | ☐ | Headlights not turned on |
| ☐ | ☐ | ☐ | Rear lights not working |
| ☐ | ☐ | ☐ | Defective steering |
| ☐ | ☐ | ☐ | Unable to determine |
| ☐ | ☐ | ☐ | Other _____ |

17 Inspection Certificate

| | | | |
|---|---|---|---|
| ☐ | ☐ | ☐ | Current N.C. |
| ☐ | ☐ | ☐ | Expired N.C. |
| ☐ | ☐ | ☐ | Other |
| ☐ | ☐ | ☐ | None |

18 Last Inspected

_____ _____ _____

## ROADWAY

19 Alignment and Grade

| Horizontal | Vertical |
|---|---|
| ☐ Straight | ☐ Level |
| ☐ Curve | ☐ Crest of hill |
| | ☐ Slope |
| | ☐ Bottom of hill |

20 Width of Lane _____ ft.
☐ Not applicable

21 Shoulders
☐ None
☐ Paved
☐ Sand
☐ Gravel
☐ Other

22 Width of Shoulder _____ ft.
☐ Not applicable

23 Drop-off _____ in.
☐ Not applicable

24 Visibility Obstructions
☐ None
☐ Curve
☐ Hillcrest/dip
☐ Trees, crops, or shrubbery
☐ Parked vehicle
☐ Building
☐ Signs or billboards
☐ Moving vehicle
☐ Other _____

25 Visibility limitations
☐ None
☐ Cloudy
☐ Fog
☐ Dark
☐ Windshield condition
☐ Headlight glare/high beams
☐ Sunlight glare
☐ Reflection of sun off object
☐ Rain
☐ Snow

## CAUSAL FACTORS

26 First Most Responsible Vehicle
☐ Vehicle 1
☐ Vehicle 2
☐ Vehicle 3
☐ Unknown vehicle
☐ Unable to determine

27 Second Most Responsible Vehicle
☐ None
☐ Vehicle 1
☐ Vehicle 2
☐ Vehicle 3
☐ Unknown vehicle
☐ Unable to determine

28 Primary Factor Responsible for Accident
☐ Driver or pedestrian error
☐ Vehicle defect
☐ Road construction or condition
☐ Trafficing defect (signs, signals, etc.)
☐ Weather conditions
☐ Unknown

29 Primary Error of Most Responsible Vehicle
☐ No error
☐ Underestimation
☐ Falling asleep, blackout or death at wheel
☐ Diverted attention
☐ Inexperienced driving
☐ Drunken driving, drinking involved, medication
☐ Violation which is indicated on standard report
☐ Avoidance maneuver
☐ Unknown

# FATAL ACCIDENT SUPPLEMENT

## EMERGENCY AND MEDICAL

1 Equipment Required (any which apply)
- ☐ Ambulance (funeral home)
- ☐ Ambulance (hospital)
- ☐ Rescue squad
- ☐ Other _____

2 Medical Aid (any which apply)
- ☐ None
- ☐ Police
- ☐ Ambulance attendant
- ☐ Doctor
- ☐ Registered nurse
- ☐ Citizen
- ☐ Rescue squad
- ☐ Other _____

3 Time to Extricate _____ min.
- ☐ Not required

4 Extrication by (any which apply)
- ☐ None required
- ☐ Ambulance attendant
- ☐ Police
- ☐ Passer-by
- ☐ Rescue squad
- ☐ Other _____

5 Ambulance Service
- ☐ Not applicable

Time ambulance called _____
Time ambulance arrived _____
Time ambulance left scene _____
Time ambulance arrived at hospital _____

6 Mode of Transportation to Hospital (any which apply)
- ☐ Not applicable
- ☐ Ambulance
- ☐ Police car
- ☐ Private car
- ☐ Other _____

7 Distance To Hospital _____ miles

## FATAL VICTIMS

8 Victim #1 Name _____

Victim #2 Name _____

Victim #3 Name _____

9 Place of Death

| Victim #1 | Victim #2 | Victim #3 | |
|---|---|---|---|
| ☐ | ☐ | ☐ | At accident scene |
| ☐ | ☐ | ☐ | Enroute to hospital |
| ☐ | ☐ | ☐ | At hospital |
| ☐ | ☐ | ☐ | Unknown |

10 Causes of Injury (as many as apply)

| | | | |
|---|---|---|---|
| ☐ | ☐ | ☐ | Impact with exterior of vehicle |
| ☐ | ☐ | ☐ | Fell off vehicle |
| ☐ | ☐ | ☐ | Run over by vehicle |
| ☐ | ☐ | ☐ | Ejection |
| ☐ | ☐ | ☐ | Trapped in burning vehicle |
| ☐ | ☐ | ☐ | Trapped in submerged vehicle |
| ☐ | ☐ | ☐ | Trapped in vehicle (no fire, no water) |
| | | | Impact with interior of vehicle |
| ☐ | ☐ | ☐ | Instrument panel |
| ☐ | ☐ | ☐ | Steering assembly |
| ☐ | ☐ | ☐ | Windshield |
| ☐ | ☐ | ☐ | Door structures |
| ☐ | ☐ | ☐ | A pillar |
| ☐ | ☐ | ☐ | B pillar |
| ☐ | ☐ | ☐ | C pillar |
| ☐ | ☐ | ☐ | D pillar |
| ☐ | ☐ | ☐ | Backrest of front seat (top) |
| ☐ | ☐ | ☐ | Backrest of front seat (lower) |
| ☐ | ☐ | ☐ | Rear view mirror |
| ☐ | ☐ | ☐ | Other |
| ☐ | ☐ | ☐ | Other |

## DRIVERS AND/OR PEDESTRIAN

11 Precrash Actions of Driver (check any which apply)

| Driver #1 | Driver #2 | Driver #3 | |
|---|---|---|---|
| ☐ | ☐ | ☐ | Unknown |
| ☐ | ☐ | ☐ | Proceeding as intended |
| ☐ | ☐ | ☐ | Fleeing from pursuit |
| ☐ | ☐ | ☐ | Racing |
| ☐ | ☐ | ☐ | Avoiding another M.V. |
| ☐ | ☐ | ☐ | Avoiding an animal |
| ☐ | ☐ | ☐ | Avoiding pedestrian |
| ☐ | ☐ | ☐ | Avoiding other object in road |
| ☐ | ☐ | ☐ | Inattention of some form |
| | | | Physically ill |
| ☐ | ☐ | ☐ | Seizure |
| ☐ | ☐ | ☐ | Fainting - blackout |
| ☐ | ☐ | ☐ | Heart attack |
| ☐ | ☐ | ☐ | Other _____ |
| ☐ | ☐ | ☐ | Sitting in stopped vehicle |
| | | | Attempting to regain control after |
| ☐ | ☐ | ☐ | Blowout |
| ☐ | ☐ | ☐ | Running off road |
| ☐ | ☐ | ☐ | Striking debris or fallen object |
| ☐ | ☐ | ☐ | Other; specify _____ |

12 Pedestrian Precrash Actions (check any which apply)
- ☐ No pedestrian involved
- ☐ Fell in road
- ☐ Ran into road
- ☐ Fell out of vehicle
- ☐ Fell off vehicle
- ☐ Failed to look for cars
- ☐ Going to or from motor vehicle
- ☐ Crossing between stopped cars
- ☐ Assisting another person
- ☐ Soliciting a ride
- ☐ Lying beside road
- ☐ Drunk or suspected of drinking
- ☐ Other _____

Comments:

Table D1.

| Primary Factor | Frequency | Percent |
|---|---|---|
| Driver or pedestrian error | 160 | 87.91 |
| Vehicle defect | 1 | 0.55 |
| Road construction or condition | 2 | 1.10 |
| Trafficing defect | 1 | 0.55 |
| Weather condition | 3 | 1.65 |
| Unknown | 12 | 6.59 |
| Not stated | 4 | 2.19 |
| | 183 | 100.00 |

| Primary Error | | |
|---|---|---|
| No error | 9 | 4.92 |
| Underestimation | 12 | 6.56 |
| Falling asleep, blackout, death at wheel | 11 | 6.01 |
| Diverted attention | 10 | 5.46 |
| Inexperienced driving | 8 | 4.37 |
| Drunken driving, drinking involved medication | 41 | 22.40 |
| Traffic violation or pedestrian action | 66 | 36.06 |
| Avoidance maneuver | 3 | 1.64 |
| Unknown | 20 | 10.93 |
| Not stated | 3 | 1.64 |
| | 183 | 100.00 |

Table D2. Blood Alcohol Levels for those tested.

| Level | All Victims | | Deceased Drivers 16 or Older | | Deceased Pedestrians 16 or Older | |
|---|---|---|---|---|---|---|
| .04 | 2 | 1.85 | 1 | 1.43 | 0 | 0.00 |
| .05 | 1 | 0.92 | 1 | 1.43 | 0 | 0.00 |
| .06 | 2 | 1.85 | 1 | 1.43 | 1 | 6.67 |
| .07 | 2 | 1.85 | 1 | 1.43 | 0 | 0.00 |
| .08 | 1 | 0.92 | 1 | 1.43 | 0 | 0.00 |
| .09 | 1 | 0.92 | 1 | 1.43 | 0 | 0.00 |
| .10 | 2 | 1.85 | 1 | 1.43 | 0 | 0.00 |
| .11 | 2 | 1.85 | 0 | 0.00 | 0 | 0.00 |
| .13 | 1 | 0.92 | 1 | 1.43 | 0 | 0.00 |
| .14 | 1 | 0.92 | 1 | 1.43 | 0 | 0.00 |
| .15 | 3 | 2.78 | 3 | 4.28 | 0 | 0.00 |
| .16 | 2 | 1.85 | 2 | 2.86 | 0 | 0.00 |
| .17 | 4 | 3.70 | 1 | 1.43 | 2 | 13.33 |
| .18 | 2 | 1.85 | 1 | 1.43 | 1 | 6.67 |
| .19 | 2 | 1.85 | 0 | 0.00 | 0 | 0.00 |
| .20 | 1 | 0.92 | 1 | 1.43 | 0 | 0.00 |
| .21 | 2 | 1.85 | 2 | 2.86 | 0 | 0.00 |
| .22 | 6 | 5.55 | 4 | 5.71 | 1 | 6.67 |
| .23 | 5 | 4.63 | 3 | 4.28 | 2 | 13.33 |
| .24 | 3 | 2.78 | 3 | 4.28 | 0 | 0.00 |
| .25 | 4 | 3.70 | 2 | 2.86 | 1 | 6.67 |
| .26 | 1 | 0.92 | 1 | 1.43 | 0 | 0.00 |
| .27 | 1 | 0.92 | 0 | 0.00 | 1 | 6.67 |
| .29 | 1 | 0.92 | 1 | 1.43 | 0 | 0.00 |
| .30 | 1 | 0.92 | 0 | 0.00 | 1 | 6.67 |
| .32 | 1 | 0.92 | 0 | 0.00 | 1 | 6.67 |
| .33 | 1 | 0.92 | 1 | 1.43 | 0 | 0.00 |
| .35 | 1 | 0.92 | 0 | 0.00 | 1 | 6.67 |
| .42 | 2 | 1.85 | 0 | 0.00 | 2 | 13.33 |
| Negative Results | 50 | 46.30 | 36 | 51.43 | 1 | 6.67 |
| N = | 108 | 100.00 | 70 | 100.00 | 15 | 100.00 |

Legally intoxicated

Table D3.

| | *Pedestrians, bicyclists and Motorcyclists | | *Occupants of Other Vehicles | |
|---|---|---|---|---|
| | f | % | f | % |
| Exterior sources | | | | |
| Hit by vehicle | 27 | 65.85 | 8 | 5.06 |
| Fell off vehicle | 4 | 9.76 | 2 | 1.27 |
| Run over by vehicle | 15 | 36.59 | 6 | 3.80 |
| Ejection | | | 47 | 29.75 |
| Trapped | | | | |
| In burning vehicle | | | 4 | 2.53 |
| In submerged vehicle | | | 1 | 0.63 |
| No fire, no water | | | 27 | 17.09 |
| Interior sources | | | | |
| Instrument panel | | | 59 | 37.34 |
| Steering assembly | | | 56 | 35.44 |
| Windshield | | | 35 | 22.15 |
| Door structures | | | 22 | 13.92 |
| A pillar | | | 10 | 6.33 |
| B pillar | | | 6 | 3.80 |
| C pillar | | | 1 | 0.63 |
| Backrest of front seat (top) | | | 2 | 1.27 |
| Backrest of back seat (lower) | | | 2 | 1.27 |
| Other interior source | | | 1 | 0.63 |
| Other source | 1 | 2.44 | 10 | 6.33 |
| Not stated | | | | |
| | N = 41 | | N = 158 | |

*Percentages do not total 100%

Table D4.

| Place of Death | Frequency | Percent |
|---|---|---|
| At accident scene | 115 | 57.79 |
| Enroute to hospital | 20 | 10.05 |
| At hospital | 54 | 27.13 |
| Unknown | 8 | 4.02 |
| Not Stated | 2 | 1.00 |
| | 199 | 100.00 |

Table D5. First most fatal injury.

| | Head | Neck and Cervical Spine | Thorax | Abdomen | Legs | Drowning | No Medical Report |
|---|---|---|---|---|---|---|---|
| General or multiple | 94 (46.54) | 4 (1.98) | 34 (16.83) | 6 (2.97) | 1 (0.50) | 0 (0.00) | 0 (0.00) |
| Fracture | 14 ( 6.93) | 14 (6.93) | 2 ( 0.99) | 2 (0.99) | 1 (0.50) | 0 (0.00) | 0 (0.00) |
| Laceration | 1 ( 0.50) | 1 (0.50) | 0 ( 0.00) | 0 (0.00) | 1 (0.50) | 0 (0.00) | 0 (0.00) |
| Concussion | 0 ( 0.00) | 0 (0.00) | 0 ( 0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) |
| Burn | 0 ( 0.00) | 0 (0.00) | 0 ( 0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) |
| Hemorrhage | 0 ( 0.00) | 0 (0.00) | 1 ( 0.50) | 2 (0.99) | 0 (0.00) | 0 (0.00) | 0 (0.00) |
| Other | 0 ( 0.00) | 2 (0.99) | 1 ( 0.50) | 1 (0.50) | 1 (0.50) | 1 (0.50) | 0 (0.00) |
| No medical report | 0 ( 0.00) | 0 (0.00) | 0 ( 0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 15 (7.43) |

N = 202