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December 18, 1996

The Honorable Philip R. Recht
Deputy Administrator
NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION
400 Seventh Street, S.W., Room 5220
Washington, DC 20590

Dear Mr. Recht:

Re: **Settlement Agreement**
Final Report for Project B.1

Enclosed is the final report by Failure Analysis Associates, Inc., entitled "Comparative Analysis of Extant Databases Relevant to Motor Vehicle Collision and Noncollision Fire Causation." This Final Report relates to Task 1 of Project B.1 Analysis of Motor Vehicle Accident Data.

Sincerely,

James A. Durkin
Attorney

JAD:dld

Enclosure

Final Report:

Comparative Analysis of Extant Databases Relevant to Motor Vehicle Collision and Noncollision Fire Causation

Prepared for

General Motors
Detroit, Michigan

Prepared by

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Executive Summary

Data related to motor vehicle fire is collected by various federal agencies and state governments. Comprehensive evaluation and documentation of the strengths and weaknesses of this data is an essential step in developing a reliable statistical analysis relating to the causes of vehicle fire.

The study described in this report reviewed state and national traffic accident data, fire incident report data, and published data analyses from a multitude of sources in order to evaluate the completeness and quality of the statistical information they contained relating to collision and noncollision vehicle fires. This evaluation can be used in several ways:

- To develop methods for the statistical characterization of collision and noncollision fires in motor vehicles.
- To recommend revisions and enhancements to data collections that would improve the data's usefulness to researchers who study vehicle fires.
- To recommend avenues for statistical data analysis of the effectiveness of standards related to motor vehicle fire, such as FMVSS 301.

For this study, Failure Analysis Associates examined the Fatal Accident Reporting System (FARS) from NHTSA, the National Fire Incident Reporting System (NFIRS) from the Federal Emergency Management Administration, the National Accident Sampling System (NASS) from NHTSA, and 9 statewide motor vehicle accident databases, from Arkansas, Alabama, Florida, Maryland, Michigan, New York, North Carolina, Pennsylvania, and Texas. These state and national databases represent a wide spectrum of motor vehicle accident data. The results of this study will help safety researchers understand the accuracy, consistency, completeness, and limitations of the vehicle fire data these sources provide.

The principal findings of the research include these:

- State-level databases vary widely in the accuracy and completeness with which they capture information about fire accidents. Certain states may significantly misrepresent the frequency of fire incidents. The primary reasons for this are limitations in the design of police accident forms and the systems used to encode such information. The various limitations identified by this study provide guidance to researchers in avoiding or overcoming some of these limitations.

- All databases that were examined lack adequate coded information for the researcher to understand the cause of fire and to differentiate significant factors in a fire accident (e.g., engine fire versus fuel fire). Some databases provide an accounting of the frequency of vehicle fires, but much information relating to the cause of fire, fire origin, type of fire, and source of ignition can only be gleaned from a careful review of the original police accident reports. Such information is not captured by the coding systems in these databases.

- The strengths in the design of the Fatal Accident Reporting System (FARS) allow accurate identification of fatal motor vehicle accidents in which there is a collision fire. FARS contains information on many driver and environmental factors in traffic accidents. The usefulness of FARS is limited by the very restricted spectrum of accidents collected by this program, namely, only the most severe of all accidents—fatal accidents. As a result, almost no noncollision vehicle fires are captured in the FARS database. The nature of FARS makes it difficult to isolate the causes of vehicle fire and to identify the relative contribution of, on one hand, environmental and operator factors that result in severe crashes (e.g., adverse driving conditions, alcohol involvement, excessive speed), and, on the other hand, vehicle design differences that may contribute to the likelihood of fire.

- The Crashworthiness Data System (CDS) of the National Accident Sampling System (NASS) provides detailed information on traffic accidents in which fire occurred. These accidents are investigated by NHTSA analysts who interview witnesses and may investigate the accident scene in addition to their analysis of public records. The relatively small size of the database, coupled with the low rate of vehicle fire accidents, limits the usefulness of NASS data for the study of the causes of vehicle fire. The General Estimates System (GES) of NASS is a representative sample of all U.S. police-reported traffic accidents. It contains information gleaned from police reports. This database is useful for an overview of vehicle fires and as a check on the consistency of the state databases. Copies of original accident reports for records in the CDS and GES databases are not available publicly. No further evaluation of the quality of the NASS data was performed for this study.

- Despite the limitations in the various databases, the fuel system integrity of the vehicle population, which the FMVSS 301 addresses, can be evaluated by a detailed examination of some of these databases. Databases that provide adequate identification of vehicle type and model year and that have sufficient data to perform a historical trend analysis are well suited for such an evaluation.

  Analyses of the following types are envisioned. Comparison of the rates of post collision and non collision fire for vehicles prior to the change in FMVSS 301 standards with model years after the change in standards. Matched pair analyses, in which the vehicles models are essentially the same, except for a change to the fuel system design to meet the revised FMVSS are the most powerful. The pairs must, of course, span the period over which the fuel system design change is made, not simply before and after the effective date of the standard. If possible a set of control pairs, for which the revised FMVSS301 did not require a fuel system design change can be used to estimate changes in motor vehicle fire rates which are correlated with the passage of time but unrelated to changes in fuel system design. Data analyses should be performed using FARS and several of the states: Michigan, Pennsylvania, Florida, Alabama and Maryland. The Michigan data cannot be used for vehicle specific comparisons after 1991 as vehicle identification information is no longer recorded in the computerized data after December 31, 1991. As there are shortcomings associated

with each of the databases, it is recommended that separate analyses be performed for each database and the information be combined via statistical meta-analysis techniques. A consistent pattern of results across several analyses and databases is a more powerful demonstration of the effect (or lack thereof) of FMVSS 301 than a single statistically significant result.

1. Introduction

There are two primary sources of data on vehicle fires in the United States: data originating in traffic accident reports and data originating in fire department reports. Traffic accident data is available in National Highway Traffic Safety Administration (NHTSA) databases such as the Fatal Accident Reporting System (FARS) and the National Accident Sampling System (NASS), and in some traffic accident databases maintained by individual states. Information from fire department reports is available from the National Fire Protection Association (NFPA) and the National Fire Incident Reporting System (NFIRS) of the Federal Emergency Management Agency (FEMA).

The product of the research reported here is twofold. First is identification of publicly available databases that contain information pertinent to the study of the causes of vehicle fire and to the evaluation of the effectiveness of Federal Motor Vehicle Safety Standard number 301 (FMVSS 301). Second is evaluation of the accuracy, consistency, and limitations of these data sources. The results of this evaluation will be used as a guide for the statistical characterization of vehicle fires that will be performed in follow-on research.

A brief description of each database follows.

Fatal Accident Reporting System (FARS)

NHTSA's Fatal Accident Reporting System began collecting data in 1975. FARS contains uniformly coded records of all traffic accidents on public roadways in the U.S. in which a fatality that is attributable to the traffic accident occurs within 30 days. Data is collected by trained analysts and reported to NHTSA. The FARS analysts rely on state police traffic accident reports, death certificates, and coroners' reports. While the data coding is uniform within each year, the system has been modified and updated several times since 1975.

FARS data indicates that 54,514 motor vehicles were involved in fatal accidents in 1994. Fire was recorded for 1,517 or 2.8% of these vehicles; the fire was recorded as the most harmful event in 382 or 0.7% of the cases. There were 30,621 vehicles with 1 or more fatalities in the vehicle. Fire was noted in 1,236 or 4% of these cases, accounting for 1,542 fatalities; most harmful event fire was noted in 341 or 1.1% of the vehicles, accounting for 429 fatalities.

National Fire Protection Association Survey Data

Each year the NFPA surveys a random sample of U.S. fire departments to make national projections of fire occurrence. The NFPA survey does not capture any detailed information about the fire incidents. The following is the latest published data estimated for highway vehicles[1] during 1994.

Fires in highway vehicles	402,000
Civilian deaths in highway fire vehicles	555
Percent of deaths in highway fire vehicles	0.1%
Civilian injuries in highway fire vehicles	2,325
Percent injured in highway fire vehicles	0.6%

NFPA estimates of vehicle fire and of fatalities in vehicle fires are based on a sample survey of fire departments and are subject to sampling error of about 10%. The differences between the NFPA estimates and the FARS counts cannot, therefore, be attributed solely to sampling variation.

National Fire Incident Reporting System (NFIRS)

FEMA's U.S. Fire Administration has established NFIRS for the collection of fire incident and fire casualty data in the U.S. NFIRS was designed as a tool for fire departments to report and maintain computerized records of fires in a uniform manner. This system provides data that allows analysts to detect local, state, and national trends. The system is voluntary; not every fire department in the U.S. contributes to the system. Thus, the data from NFIRS must be combined with other information such as the NFPA sample survey to produce national estimates.

Fires in highway vehicles are distinguished from fires in other vehicles. NFIRS offers codes for injuries and fatalities in noncollision motor vehicle fires by vehicle make and model (although some make and model information is blank). In addition, the amount of direct property damage is estimated. Fire incidents can be detailed by area of fire origin, type of material first ignited, and form of heat of ignition.

The definition of vehicle fire fatalities in FARS is not the same as the NFPA and NFIRS definitions. The FARS definition includes some cases that are excluded by NFPA/NFIRS. FARS vehicle fire deaths include all deaths (1) that occur in traffic accidents on public roadways and (2) in which death occurs within 30 days of the accident, while NFPA/NFIRS motor vehicle fire fatalities include only fatal accidents at which (1) there was a fire department in attendance and (2) the death was the result of the fire. However, the NFPA/NFIRS definition also includes some cases that are excluded FARS; for

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[1] Automobiles, motorcycles, buses, trucks, or trailers.

example, NFPA/NFIRS definitions include fire-related deaths for which the fire did not occur on a public roadway, and these are excluded from FARS.

State Databases of Police-Reported Motor Vehicle Accidents

Computerized databases of police-reported traffic accidents from the following states were selected for detailed evaluation of the quality of their vehicle fire information: Arkansas, Alabama, Florida, Maryland, Michigan, New York, North Carolina, Pennsylvania, and Texas. All of these states identify vehicles according to VIN (manufacturer's vehicle identification number) except for Texas, which has make/model codes to identify vehicles. All 9 databases contain data fields that provide some description of the accident circumstances, and all 9 states will usually provide copies of original accident reports upon request.

Additional Data Sources

The scientific literature was searched for recent research concerning the causes and frequency of vehicle fires and for references to databases that may contain additional useful information.

2. Methodology

2.1 Literature Review

The purpose of the literature review was to identify sources of statistical data that may be useful in the study of causes of vehicle fire. Specifically, this study looked for previous statistical studies of vehicle fire and for articles that contained evaluation of these data sources.

The literature review performed here does not constitute a comprehensive survey of the literature on vehicle fire nor an evaluation of the quality or usefulness of the research papers reviewed. The focus of the literature review was to determine which statistical data sources were used in past research on vehicle fire and to determine whether the quality of these data sources could be ascertained from the research reports.

The primary search was conducted through Transportation Research Information Services (TRIS), an online computer database produced by the Transportation Research Board. TRIS contains reference materials on air, highway, rail, maritime, and waterborne transport, and on mass transit and other transportation modes. The TRIS database accesses the Highway Research Information Service, International Road Research Documentation, the Transportation Library of Northwestern University, the Institute of Transportation Studies Library of the University of California, and the Highway Safety Literature database, among others. The TRIS database contains citations of approximately 400,000 reference works. All references to either *car* or *automobile* or *passenger vehicle* and also to *fire* or *fires* and to *statistic*, *incidence*, or *occurrence* were retrieved from the TRIS database.

In addition, the National Center for Statistics and Analysis and the technical library at the National Highway Traffic Safety Administration were contacted. Searches were also performed using Internet web searchers. Finally, the collection of passenger vehicle safety literature at Failure Analysis Associates was reviewed.

More than 50 articles were identified in this broad selection process. Of these, nearly half were eliminated as being clearly unrelated to the subject of this study. A total of 27 articles received close scrutiny. These articles were reviewed according to the following issues:

- Whether they contained references to statistical sources of data on vehicle fires
- Whether or not the validity of these sources was evaluated by the authors
- Whether the data was available as public administrative records or was based on the results of special studies or investigations

As a last step, the authors' conclusions regarding vehicle fire were summarized.

2.2 Database Evaluation

Random samples of 30 accidents recorded as involving fire were selected from each of 9 state motor vehicle accident databases: Alabama, Arkansas, Florida, Maryland, Michigan, New York, North Carolina, Pennsylvania, and Texas. The police reports for these accidents were obtained from the states. In addition, 79 fire accidents that occurred in the 9 states were randomly selected from FARS.

The sample size of 30 reports from each state was chosen to provide a 95% chance of finding at least one erroneous report if the actual error rate was 15% or higher. In addition, this sample size will provide a standard error of the estimated error rate of approximately .10. A larger sample size was chosen for the FARS comparisons in order to allow for comparisons of differences between the nine states in the study.

The suitability of each candidate database was evaluated in terms of its accuracy, consistency, and completeness in coding vehicle fire. This was accomplished by comparing the state database information to the original police report and by comparing the fire cases identified in FARS to the information recorded in the state database.

The following questions were applied to each database.

How *accurately* is fire information captured?

- What fields contain fire information?
- Are these fields independent of other codes?
- Are they specific to individual vehicles?
- Of the random sample of fire accidents (according to their coding), how many and what percentage of the accidents are really fires?
- Of the sample of fatal fire accidents from FARS in this state, how many and what percentage of the accidents are also coded as fire in the state database?
- Does the coded information in the database distinguish between postcollision fire and noncollision or precollision fire?

How *consistent* is the coded fire information?

- What are the annual number and percentage of fire accidents?
- Is the data consistent across time? What trends, if any, appear?
- Are the codes for "first harmful event" and "most harmful event" consistent with the fire codes?
- Does the data raise any other consistency questions?

How *complete* is the database in helping us understand fire?

- How complete is information on vehicle identity? Does the database include a code for VIN? If so, for what percentage of vehicles is the VIN present? What percentage

of VINs can be decoded at least enough to determine vehicle series? If the database includes VIN, is there independent coding for make, model, and model year? If the database does not include VIN, what vehicle information is available?

- Does the database include codes for additional information on accidents and vehicles, specifically crash severity, accident type, vehicle role, travel speed, location of fire, and contributing factors such as environment and temperature? For each of these factors, if a code is available, in what percentage of accidents is the code missing or unknown?
- Does essential information on the handwritten report not get coded into the database, either due to competition for limited space in the data codes or due to an absence of codes for the information?

Information on vehicle identity is most complete in states where the manufacturer's vehicle identification number (VIN) is reliably coded into the accident database. In those states in which VIN was available, evaluation of the database included application of the VINA computer program from R.L Polk & Co. VINA decodes VINs into make, model or "series," subseries, and model year. The benchmark for the dependability of VINs coded in the state databases was whether VINA could identify vehicles at least down to the level of vehicle series. (The Ford Escort, for example, is a vehicle series; Ford Escort LX is a subseries.)

States often identify crash severity according to the most severe injury sustained by any occupant of any vehicle in the accident. This is commonly coded according to the "KABC0 scale," in which *K* designates a fatality, *A* is major or incapacitating injury, *B* is minor or nonincapacitating injury, *C* is possible injury, and *0* is no injury.

Typically, information in a database is organized into "accident level," "vehicle level," and "occupant level" variables. Accident level is the highest level of organization, describing the accident as a whole. Vehicle-level data is given for each vehicle in the accident. Occupants (the superset of driver and passengers) are particular to a vehicle.

State databases vary widely in the detail they offer. The detail is a result of the number and exactness of the variables and, in turn, the exactness of the codes for those variables. For example, does the database include a variable for "vehicle type"? If it does, are the codes for vehicle type as precise as *2-door sedan* or as general as *passenger car*? If there is a variable for "object hit" by a vehicle, are the available codes as precise as *tree* or *lamppost* or as general as *fixed object* or *motor vehicle in transport*?

Codes for vehicle damage are subject to the same variation. Some states (such as Florida) characterize accident severity merely by coding the accident vehicle as either functional or disabled and recording whether or not the vehicle was towed away. At the other end of the spectrum is the 8-point TAD (traffic accident damage) scale, developed by the National Safety Council. TAD is coded in data from a few states, including Michigan, North Carolina, and Texas. The investigating police officer evaluates accident damage by

comparing the accident vehicle to a set of exemplar photographs showing typical damage at each level of severity.

The point at which a vehicle was struck or damaged is commonly coded as "point of impact." Many states use a coding scheme based on points of the clock, in which *12* represents front and center and *1* is just to the passenger side of front center. Some states also include codes for *top* and *undercarriage*. These can prove important in investigation of vehicle fires, since override and underride can provide valuable insight into possible fuel-tank damage. Some databases, however, also include *rollover* as a code for "point of impact" rather than as an independent variable. If, as is often the case, only 1 value can be coded for "point of impact," this means that rollover may obscure an actual impact, or vice-versa. In databases like FARS that include codes for "initial impact point" and "principal impact point," this is less of a problem.

Events in the accident are coded in many states. In some cases the events are recorded as first event, second event, and so on. An event can be recorded at the accident level or separately for each vehicle. A common coding scheme used in FARS and in several of the states is "first harmful event" (FHE), usually recorded for the accident as a whole, and "most harmful event" (MHE), usually recorded for each vehicle in the accident. The level of detail in event coding varies from database to database. It can be as general as *collision with motor vehicle in transport* or *hit fixed object*, or as precise as *collision with tree less than 4 inches in diameter*. A code for *fire* or *fire/explosion* is usually included in the harmful event codes. Databases that have codes for fire that are separate from the first and most harmful event codes are more useful for the study of vehicle fire than those that identify vehicle fires only through the first and most harmful event codes. In states such as New York, in which the only identification of fire vehicles is through the harmful event codes, vehicle fires are sometimes not identifiable in the computerized database.

Almost every police accident report contains an accident diagram and a narrative description of the accident. Accident diagrams provide insight into the accident scenario, but narratives in particular often elucidate the circumstances and causation of vehicle fire.

3. Results

3.1 Literature Review

In the United States, data from several sources has been used in the study of collision and noncollision fires in passenger vehicles. These include the Fatal Accident Reporting System (FARS), the National Accident Reporting System (NASS), the National Crashworthiness Severity Study (NCSS), the National Fire Incident Reporting System (NFIRS), data from the Highway Loss Data Institute, and the databases of state police-reported traffic accidents. Data from the Bureau of Motor Carrier Safety (BMCS) has been used in the study of fire in medium and heavy trucks. Studies based on multidisciplinary accident investigation projects have been performed by the University of Utah. In the United Kingdom, vehicle fires have been studied by the Transport and Road Research Laboratory.

Of the 27 research articles reviewed here, 24 were based in part on a statistical analysis of accident records, and 8 contained evaluation of the validity of the data sources. Several of these research reports focused on characterizing the frequency of vehicle fire and the relative frequency of accident circumstances, e.g., direction of impact and rollover associated with vehicle fire. The 1994 NHTSA technical report *An Analysis of Fires in Passenger Cars, Light Trucks, and Vans* by J. Tessmer characterizes the likelihood of postcollision fire for 1978 and later passenger vehicles as a function of crash, driver, and vehicle characteristics. This report is based primarily on FARS and Michigan state data. Multivariate statistical models as well as frequency distributions are provided in this research.

In the articles identified in the literature search, FARS and the Michigan state database were cited most frequently as data sources. FARS was used in 8 of the articles and Michigan in 6. NASS or its predecessor, the National Crash Severity Study (NCSS), was used in 5. The database from the Bureau of Motor Carrier Safety and the traffic accident database from the state of Illinois were each used in 3 of the studies. New York and Washington state traffic accident databases were each used in 2 of the reports. Insurance claims data from the Highway Loss Data Institute and traffic accident data from the states of Idaho, Maryland, North Carolina, Ohio, Oregon, Texas, Utah, and Pennsylvania were used in 1 study each.

All of the studies of passenger-vehicle fire that contained information on the cause and origin of motor vehicle fires were based upon either accident investigations or study of copies of accident reports. No information on the cause or origin of vehicle fires was found in computerized databases of traffic accident reports.

Statistical Data Sources Used in Evaluation of the Risk of Fire Accidents

Data Source	Number of Times Used
Bureau of Motor Carrier Safety	3
Fatal Accident Reporting System	8
Highway Loss Data Institute, Insurance Claims Data	1
National Accident Sampling System	2
National Crash Severity Study	3
Police-Reported Traffic Accidents, Idaho	1
Police-Reported Traffic Accidents, Illinois	3
Police-Reported Traffic Accidents, Maryland	1
Police-Reported Traffic Accidents, Michigan	6
Police-Reported Traffic Accidents, New York	2
Police-Reported Traffic Accidents, North Carolina	1
Police-Reported Traffic Accidents, Ohio	1
Police-Reported Traffic Accidents, Oregon	1
Police-Reported Traffic Accidents, Texas	1
Police-Reported Traffic Accidents, Utah	1
Police-Reported Traffic Accidents, Pennsylvania	1
Police-Reported Traffic Accidents, Washington	2
Swedish Motor Vehicle Accidents	1
Automotive Crash Injury Research Program	1
National Fire Incident Reporting System	1

An overview of the literature reviewed here and a summary of each of the research papers reviewed appears in Appendix A.

In addition to the literature review, researchers contacted state departments of transportation to determine what information suitable for the study of the causes of vehicle fire is available. California, Colorado, Georgia, Idaho, Kansas, Oklahoma, and Tennessee maintain computerized traffic accident databases, but no indication of vehicle fire is recorded in them. The states listed in the following table reported that information on vehicle fire, vehicle identification, and accident description is available in their computerized databases.

Information Available in State Databases

State	Fire Information	Vehicle Identification	Direction of Impact	Accident Reports Available	Comments
Alabama	yes	VIN	yes	yes	-
Arizona	yes	none	no	yes	-
Arkansas	yes	VIN	yes	yes	-
Florida	yes	VIN	yes	yes	-
Illinois	yes	VIN available for model year 1981 and later only	no	yes	-
Iowa	yes	VIN	yes	yes	accident reports not available
Kentucky	yes	VIN (high percentage missing)	yes	yes	-
Louisiana	yes	VIN	yes	no	database not available to public
Maryland	yes	VIN	yes	yes	-
Michigan	yes	VIN	yes	yes	as of 1992, VIN information is not available to public
Minnesota	yes	in separate files	yes	yes	-
Missouri	yes	VIN	yes	yes	-
New Hampshire	yes	make/model for NH vehicles only	yes	yes	-
New York	yes	VIN	yes	yes	-
North Carolina	yes	VIN	yes	yes	-
Ohio	yes	make/model, VIN after 1990	yes	yes	cost is $10,000 per year
Oregon	yes	none	no	yes	-
Pennsylvania	yes	VIN	yes	yes	-
South Carolina	yes	1994 and later	1994 and later	yes	-
Texas	yes	make/model	yes	yes	-
Virginia	yes	make/model	yes	yes	last 3 years available
Washington	yes	make/model	no	yes	-
Wisconsin	yes	VIN in 1994 and later	yes	yes	database not available to public

The 9 states of Alabama, Arkansas, Florida, Maryland, Michigan, New York, North Carolina, Pennsylvania, and Texas were chosen for detailed evaluation. These 9 states were chosen for quality of vehicle identification information, database size, availability of the computerized database, and availability of copies of the original accident reports.

3.2 Database Evaluations

Summary

Vehicle fires, including noncollision, precollision, and postcollision fire, occurred in 0.1% to 0.6% of the police-reported traffic accidents in the states studied here. The method of verifying the fire coding used in this study identifies "false positive" police reports, that is, cases in which the database indicates a vehicle fire but no vehicle fire is mentioned anywhere on the traffic accident report. To check for "false negatives," that is, cases in which there was a vehicle fire but no fire was identified in the database, fatal fire-involved accidents from FARS were matched to the state database records. This method of verification provides only a partial check on the rate at which vehicle fires are missed in the state databases because it only checks for missing *fatal* accidents with fire. Vehicle fires are reported at a rate of 1-5 per 1,000 vehicles involved in traffic accidents. Thus, it was not feasible to review original police reports for a large enough sample of cases that were not recorded as fire in the state database to be able to obtain an accurate estimate of the rate of false negatives.

The accuracy of the fire coding in the state databases varies widely from no false positives in the states of Texas and Pennsylvania, to 63% false positives in North Carolina and 79% false positives Arkansas. There is also wide variation in the capture of fatal fire cases by the states. More than 80% of the fatal accidents with fire were identified in the Pennsylvania, North Carolina, and Maryland databases, while only 25% were identified in New York.

All of the 79 FARS records that indicate accident vehicles with fire were correct with respect to the fire information when compared to copies of the original traffic accident reports. No check was made to determine whether fatal vehicles with fire were not recorded as fire cases in the FARS data. It is worth noting here that in several cases the state computerized databases did not record fire, but the FARS records correctly identified fire on the basis of the report narrative or other notes on the traffic accident report. (For example, New York and Alabama only record fires that are either first harmful event or most harmful event, but FARS correctly identified fires that were neither first nor most harmful event.)

The NFIRS data contains information about the location of the fire in the vehicle and also contains some information about factors involved in ignition and materials first ignited. The vehicle identification information is very sketchy, however (e.g., *automobile* versus *truck*). Information on make, model, and model year is captured in a free-form text field, and, furthermore, in the 1993 file this information is missing or unusable in 23% of the cases. There is no information about the nature of the accident for collision fires.

The results of the database evaluation are summarized in the following table. Detailed evaluation of each database follows.

Database Summary Table

	FARS	AL	AR	FL	MD	MI	NC	NY	PA	TX
Fire fields	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fire field independent of other variables *	Y	N	Y	N	77-92 N; 93 Y,N	81-91 Y; 92-94 N	Y	N	N	N
Fire fields specific to individual vehicles?	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
How many of state sample are really fires?	n/a	30	6	29	25	29	11	26	30	30
What percent of state sample are really fires?	n/a	100%	21%	97%	89%	100%	37%	93%	100%	100%
What percent of the state sample recorded the fire in the wrong vehicle?	n/a	0%	0%	0%	0%	0%	0%	0%	0%	0%
How many FARS fires are coded as fire in the state db?	n/a	4/12	2/7	7/11	4/5	1/1	10/12	2/8	10/12	8/12
What percent of FARS fires are coded as fire in the state db?	n/a	33%	28.6	63%	80%	100%	83%	25%	83.3%	67%
Coded as postcollision fire *vs.* noncollision/precollision?	N	N	N	N	N	N	N	N	Y	Y
Annual number of fire accidents	900-1200	370	301	667	260-765	1263	882	203	1165	450
Annual percentage of fire accidents	3-4%	0.3%	0.68%	0.2-0.3%	0.3-0.6%	0.35%	0.3%	0.06-0.10%	0.8%	0.1%
Data/trends consistent over time?	Y	Y	N	N	N	Y	N	Y	Y	N
FHE & MHE consistent with fire codes?	Y	Y	N	Y	N	n/a	N	Y	Y	n/a
Other consistency questions?	N	N	N	N	N	N	N	N	N	N
Code for VIN?	Y	Y	Y	Y	Y	81-91 only	Y	Y	Y	N
% with VIN	100.0%	89.7%	100%	97%	89%	98%	98.8%	90.2%	5-90%	n/a
% of VINs decodable	88.4%	77.6%	79.8%	98%	74.6%	87%	83.9%	75.6%	87.6%	n/a
Independent coding for make, model, and model year?	Y	Y	make & year	make & year	Y	make & year	make & year	Y	Y	Y
Crash severity coded?	Y	Y	N	Y	Y	TAD	TAD	Y	N	TAD
% missing	0.9%	0.4%	-	3%	1.0%	3.4%	⬆	0.3%	-	0%

⬆ 12.6% missing or *no damage*.

* an independent fire field is a database variable devoted exclusively to identifying the presence or absence of vehicle as opposed to a field such as harmful event which may identify fire as one of several possible events in the accident sequence.

	FARS	AL	AR	FL	MD	MI	NC	NY	PA	TX
Accident type coded?	Y	Y	Y	N	Y	Y	N‡	Y	Y	N‡
% missing	0.1%	0%	6.4%	-	0.03%	24.3%	-	0.5%	0.4%	-
Vehicle role coded?	Y	N	N	N	N	N	N‡	N	N	N
% missing	0.0%	-	-	-	-	-	-	-	-	-
Travel speed coded?	Y	Y	N	Y	N	N	Y	N	Y	N
% missing	63.6%	0.5%	-	21%	-	-	13%	-	0.4%	-
Location of fire coded?	N	N	N	N	N	N	N	N	N	N
% missing	-	-	-	-	-	-	-	-	-	-
Environment coded?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
% missing	0.4%	0.1%	0.6%	0.1%	1.2%	0.2%	0.6%	8.3%	0.4%	*
Temperature coded?	N	N	N	N	N	N	N	N	N	N
% missing	-	-	-	-	-	-	-	-	-	-
Additional information on report, not coded in database.	n/a	Y	Y	Y	Y	N	N	Y	N	Y

* Not available at this time.

‡ Can possibly be inferred from other codes.

Alabama

How accurately is fire information captured?

There is no independent variable for fire in the Alabama database. Fire is identified as "first harmful event" coded *fire or explosion* at the accident level and as "most harmful event" *fire or explosion* for each vehicle. Obviously, fires that are neither the first nor the most harmful events in accidents will not be identified.

Of the random sample of 30 police reports that was obtained for study, 100% of the reports indicate that fire occurred. Twenty-two (73%) contain a description of the fire in the accident narrative. The remaining 8 are coded as fire in "first harmful event" or "most harmful event" on the police report. In 2 of the 22 cases, the "first harmful event" is coded as *fire or explosion*, which would imply a noncollision fire, but the accidents describe postcollision fire. There are no cases for which the database records fire in the wrong vehicle.

Of the sample of 12 Alabama fire accidents from FARS, 100% of the accidents have indication of fire on the police traffic report. However, 8 (67%) are not recorded as either first- or most-harmful-event fires in the Alabama database. This coding is consistent with the "first harmful event" and "most harmful event" as coded in FARS and illustrates the limitation of the Alabama database. Vehicles for which fire is neither the first nor the most harmful event will not be identified in the computerized state database.

How consistent is the coded fire information?

When "most harmful event" is coded as *fire or explosion*, 64% of the vehicles are coded with "first harmful event" as *fire or explosion*. When fire is coded as the "first harmful event," 83% of the vehicles have fire as the "most harmful event." There are no other fire-related fields to verify the consistency of the codes.

The rate of accidents involving fire is 0.3% in every year from 1983 through 1993.

How complete is the database in helping us understand fire?

Vehicle Identification

VIN is recorded on the Alabama police report and in the database for calendar years 1983 and later. The VIN is sufficiently precise to decode make in 89% of the records, vehicle series in 78% of the records, subseries in 78% of the records, and body style in 76% of the records. The database also contains vehicle make coded as a 4-character abbreviation of the manufacturer's name and a 3-character model code as the first 3 digits of the model name. There is a body-type code for automobiles (*2-door*, *4-door*, *convertible*, etc.), a code for vehicle type (*auto*, *station wagon*, *pickup*, *van*, etc.), and a model year field.

Accident Circumstances

The database contains codes for "weather" and "first harmful event" for each accident. For each vehicle, "most harmful event" and "initial impact point" are coded. The impact points are not clock points: There are 8 codes around the circumference of the vehicle.

There is no independent code that indicates noncollision, precollision, or postcollision fire, but "first harmful event" coded *fire or explosion* indicates a noncollision or precollision fire. The initial impact point may be used to distinguish collision fires from noncollision fires. The fact that fire is only indicated through the codes for first harmful event and most harmful event limits their usefulness in understanding fire circumstances.

There is no information about where in the vehicle the fire occurred. Vehicle travel speed is indicated in 99.5% of the records. Thirteen percent of the vehicles are coded with travel speed of 0. Posted speed limit is also available in the database.

Injury information on the KABC0 scale is recorded for all occupants. Crash severity is recorded for each vehicle on a 3-point scale: *none*, *not disabled*, and *disabled*. Over 80% of the vehicles are coded as *disabled*, 17% are recorded as *not disabled*, and 2% as *no damage*. Fewer than 1% of the vehicles are missing data for this variable.

Additional Information Available on the Police Report

Narrative descriptions of the fire are present in 76% of the police reports obtained. These narratives can contain such relevant details as "Engine compartment on fire," "Fire due to electrical problem," and "Left rear brakes and tires were on fire." These narratives are not added to the computerized state database. Descriptions of the accidents studied appear in Appendix B.

Arkansas

How accurately is fire information captured?

There is an independent variable "fire occurrence" for each vehicle in the Arkansas database. In 1984-1986 fire occurrence is coded as *fire occurred* or *fire did not occur*. In 1987-1993 the codes were changed to *fire*, *no fire*, and *unknown*. In addition, *fire or explosion* can be identified as "first harmful event" for the entire accident and as "most harmful event" for each vehicle.

There are serious inconsistencies in these codes. During the years 1987 to 1992 the code values for the "first harmful event" and for the "most harmful event" are not the same. For example, "first harmful event" of *10* indicates *rollover*, but a "most harmful event" of *10* indicates *fire*. The traffic accident report form allows the investigating officer to simply check off the number for the "first harmful event." But the officer must write down the code number for "most harmful event," and the code values for "most harmful event" are not listed on the traffic report form.

As a working definition of vehicle fire, records were selected as fire cases if either "fire occurrence" was coded *fire occurred*, or "most harmful event" was coded as *fire* or *explosion*, or "first harmful event" was coded as *fire*. If the only indication of fire is "first harmful event," which describes the accident as a whole, it is not possible to determine which vehicle in a multiple-vehicle accident experienced fire.

Of the random sample of 30 police reports that was requested for study, 29 reports were received. One of the 29 displays the accident record number of the report that was requested, but it appears to be a completely different accident. Of the remaining 28 reports, 22 (79%) contain no indication of a fire.

Of the 6 accident reports that indicate vehicle fires, 5 are coded as *fire occurred* in the database, 4 are coded as "most harmful event" *fire or explosion*, and 3 are coded as "first harmful event" *fire*. All 6 are noted as "vehicle damage" *burned* on the police report, but this information is not captured in the computerized database.

The fact that the numerical code for *fire* in the "most harmful event" field is the same as the numerical code for *rollover* in the "first harmful event" field explains some of the incorrectly coded records (8 of the 22 nonfire cases are actually FHE or MHE rollovers). However, 13 of the nonfire cases are coded as *fire occurred* with neither "first harmful event" nor "most harmful event" as *rollover*. Eleven of the 13 nonrollovers are multiple-vehicle accidents. This consistent miscoding may indicate confusion in data entry over transcribing accident-level fire information on the police report to vehicle-level data codes in accidents that have more than 1 vehicle record. (One accident coded as "most harmful event" *fire* actually involved collision with a fire plug.)

In 1993 the codes for "first harmful event" and "most harmful event" were changed so that they were again the same, as they had been prior to 1987. Four accident reports from 1993 were obtained. Only 2 of them indicated that the accidents actually involved fire.

All 6 of the actual fire cases contain a description of the fire in the accident narrative.

Of the sample of 8 fatal fire accidents from FARS, 7 matching police reports were received. Of these 7, all have indication of fire on the police traffic report, but only 2 are coded as fire accidents in the state database.

How consistent is the coded fire information?

The recorded rate of vehicles with fire is inconsistent from year to year. In 1984-1986 and 1992-1993, the rate is 0.1%. In 1987-1990 the rate is 04.%-0.5%, and in 1991 the rate is 0.2%. If cases with "first harmful event" *rollover* are excluded from the count of fire vehicles, the fire rate is more stable at 0.1%-0.2% in each year from 1984 through 1993. This is further confirmation that most of the cases recorded as "first harmful event" *rollover* and "most harmful event" *fire* are not actually fire vehicles. There is no evidence of month-to-month variation in the number of vehicle fires recorded.

How complete is the database in helping us understand fire?

Vehicle Identification

VIN is recorded on the Arkansas police report and in the database for calendar years 1984 and later. The VIN is sufficiently precise to decode make in more than 99% of the records, vehicle series in 80% of the records, subseries in 80%, and body style in 77%. The database also contains a 2-digit vehicle make code defined by the Arkansas State Highway and Transportation Department, a vehicle type/body style code, and a model year code.

Accident Circumstances

The database includes first harmful event in the accident, manner of collision, weather, time of day, and speed limit. Temperature is noted on the accident report but not captured in the computerized database. The most harmful event, impact point, and vehicle damage are recorded for each vehicle.

There is no independent code that indicates whether fire was noncollision, precollision, or postcollision, but "first harmful event" of *fire or explosion* indicates a noncollision or precollision fire. The point of impact can be used to distinguish collision fires from noncollision fires.

There is no information about where in the vehicle fire occurred. Vehicle travel speed is not included in the database, but posted speed limit is recorded. Posted speed limit is recorded for 93% of the accidents.

Injury information on the KABC0 scale is recorded for all occupants. From 1987 to 1993, crash severity is recorded for each vehicle on a 3-point scale: *unknown*, *functional*, and *disabled*. Over 24.5% of the vehicles are recorded as *disabled*, and 72.8% are recorded as *functional*. Fewer than 2.6% of the vehicles are missing data for this variable.

Additional Information Available on the Police Report

Narrative descriptions of the fire are present in all of the 13 police reports obtained for accidents in which there actually were fires. These narratives can contain such relevant details as "left road, overturned, rolled and landed in a ditch. Gasoline tank ignited, fire spread and consumed V1 entirely." These narratives are not entered into the computerized state database. Descriptions of the accidents studied appear in Appendix B.

Florida

How accurately is fire information captured?

Fire information can be found in 2 places in the Florida database. First, fire is coded as 1 of the 36 possibilities in the 2 harmful event fields at the accident level ("first harmful

event" and "subsequent harmful event"). Coded values are *fire* and *explosion*. Second, fire can be coded as one of the values for "point of impact" at the vehicle level, the other values being codes for the different regions of the vehicle (i.e., *front*, *left*, *rear*). There is no independent field in the database to capture fire information exclusively.

Of the random sample of 30 vehicles coded in the database as being fire-involved (i.e., impact point or at least 1 harmful event coded as *fire*), examination of the police reports confirmed that 29 involved fire. The single remaining accident is a vehicle arson fire that did not involve a traffic accident.

A random sample of 11 police reports for FARS-reported fire-involved accidents was obtained from Florida. All of the 11 completed forms describe accidents involving fire. However, 4 of the 11 could not be identified from the Florida database as fire accidents. Three of the 4 only mention fire in the accident narrative, and the other accident involved both collision and fire but has its impact point coded as something other than *fire*.

There is no direct way to distinguish between postcollision fires and noncollision or precollision fires in the Florida database. A noncollision fire accident could be interpreted as one with an impact point of *fire* (thus no other impact damage), "first harmful event" *fire*, and "subsequent harmful event" either *fire* or blank; that is, there is no event other than the fire. The number of such cases is small, however, suggesting that noncollision fires may not be captured well under the existing coding system. Precollision or postcollision fire could possibly be distinguished by the order of the fire in the 2 harmful events; that is, if "first harmful event" is coded *fire* then it is precollision, and if "subsequent harmful event" is *fire* and "first harmful event" is some collision event other than fire, then the fire is a postcollision event. The data shows that about two-thirds of the accidents studied indicate fire as the first event and one-third indicate fire as the second event.

How consistent is the coded fire information?

Between 1986 and 1993, there are 5,341 accident fires or about 667 fires per year. Fire-involved vehicles are present in about 0.2-0.3% of all accidents.

The proportion of fire-involved accidents (0.2-0.3%) appears generally consistent from 1986 to 1993. The percentages fall into 2 ranges, with 1986-1989 at 0.3% and 1990-1993 at 0.2%; there is no change within those 2 ranges. This is consistent with the change in reporting threshold in those 2 ranges of years. For 1986-1989 the dollar damage threshold is $100, and from October 1989 onward it is $500. The higher limit effectively filters out minor accidents, including minor vehicle fires. There is no clear month-to-month trend in the number of fire accidents.

Indication of fire in the harmful event codes is consistent with the impact codes. Of accidents in which "point of impact" is coded as *fire* for at least 1 vehicle, 95% are also coded *fire* for either first or subsequent harmful event.

Because the Florida database has no independent code for fire, the fire competes with other events for recognition and coding. Most accidents are composed of multiple events, fire being one of them. The undercounting of fire is evident in the small sample of FARS accidents. Of the 11 fire accidents, 4 were not captured as fires by the Florida coding system. Perhaps there are other, more harmful, events in these accidents. If there are competing events, it is not clear what rule, if any, the officer follows in determining which to code. A single field is used to capture both point of impact and area of damage. The dual use of this field appears to be a possible source of confusion. For example, if a fire occurs in the engine compartment, it may be entered as *damage in engine*, and *fire* may not be coded. The officer often circles more than 1 impact code (perhaps including *fire*) on the report form, but he or she must select only 1 code to be entered into the database.

How complete is the database in helping us understand fire?

Vehicle Identification

VIN is part of the Florida database. Among vehicles involved in fire accidents in 1986-1993, 3% have no VIN recorded in the database, and an additional 17% cannot be decoded at least to the level of vehicle series.

Accident Circumstances

Crash severity can be characterized from the highest level of occupant injury in the accident (KABC0 scale) and from "damage type," which is coded as *disabling*, *functional*, or *no damage*. "Point of impact" is coded using variations of the clock-point scheme, but this field also includes coding for "area of damage," such as *undercarriage*, *overturn*, *windshield*, *trailer*, and *fire*.

Speed limit (unknown or irrelevant in less than 10% of the accidents studied) and estimated vehicle speed (unknown or irrelevant in about 21%) are coded. Vehicle role (e.g., striking vehicle, struck vehicle) is not directly coded but may be deduced (possibly incorrectly because of the limited information) from the first and subsequent harmful events.

Weather condition is coded, but temperature is not. Time of day is coded. Location of fire in the vehicle is not coded.

Additional Information Available on the Police Report

Narrative descriptions of the accidents are present in all of the police reports obtained. These narratives can contain such relevant details as "Due to some unknown mechanical problem the engine compartment caught on fire," "The right rear inside tire blew causing the tire to catch on fire," and "After the crash driver or other person removed the gas cap and put unknown object in filler neck and set it on fire." These narratives are not added to

the computerized state database. Descriptions of the accidents studied appear in Appendix B.

Maryland

How accurately is fire information captured?

There is no independent variable for fire in the Maryland database from 1977 to 1992. In 1993, an independent variable "caught fire," coded *yes* or *no*, was added for each vehicle. In addition, a code for *fire or explosion* was added to the accident-level "harmful event" list. In 1977-1992, fire is coded for each accident-involved vehicle as either "area damaged" or "contributing circumstance." The variables for "primary cause" and "secondary cause" indicate fire in the accident, but these are not vehicle-specific. "Contributing circumstance" of fire and primary/secondary cause of *fire* are only used when fire is the only event that caused further damage; these are not used when the fire is the result of the collision. Thus, contributing circumstances or primary/secondary cause may be used to identify noncollision fires.

Twenty-eight of the random sample of 30 accident reports requested from the state of Maryland were received. Of these 28 police reports, 25 (or 89%) indicate fire on the report. Two of the 3 nonfire cases are from 1993, after the change in the coding system. All but 3 of the 25 reports mention fire in the accident narrative. In all cases, the database records fire in the correct vehicle.

Of the random sample of 5 Maryland fatal fire accidents in FARS, 4 (80%) are recorded as fire in the Maryland state database. The accident that escaped the state database apparently did so because fire is noted only in the narrative description of the police report. The accident is coded in FARS as "first harmful event" fire, which indicates noncollision or precollision fire, but the accident narrative indicates a postcollision fire.

How consistent is the coded fire information?

Only 45% of vehicles in which "area damaged" is coded as *fire* were coded with "contributing circumstance" equal to *fire*, while 95% of the vehicles with "contributing circumstance" coded as *fire* are also coded with "first harmful event" equal to *other noncollision*. However, only 82% of the vehicles with "contributing circumstance" coded as fire are coded with "area damaged" equal to fire. This is consistent with "area damaged" coded as fire indicating any fire damage, and "contributing circumstance" coded as fire indicating noncollision fires. If fire damage is always recorded, these results would indicate that there is no fire damage in 18% of the noncollision fires.

In 61% of accidents in which the primary or secondary cause of the accident is fire, at least one vehicle in the accident is coded as having "contributing circumstance" as fire. In the 1993 data, 1 of 2 (50%) of the vehicles coded with "harmful event" as fire/explosion

is coded as "caught fire" *yes*, and 0.4% of the vehicles coded as "caught fire" *yes* are also coded with either first or second harmful event as *explosion or fire*.

The coding of the several variables that indicate vehicle fire or vehicle burn damage appears to be generally consistent. It is noteworthy that 18% of the "noncollision" fire vehicles appear to suffer no burn damage.

The rate of accidents with fire is 0.4% in 1977-1980, and it increases to 0.5% to 0.6% in 1981-1992. The fire rate in 1993, after the addition of the fire occurrence code, is 0.3%, substantially lower than in earlier years.

How complete is the database in helping us understand fire?

Vehicle Identification

VIN is recorded on the Maryland police report and in the database for calendar years 1977 and later. The VIN is sufficiently precise to decode make in 99% of the records, vehicle series in 75% of the records, subseries in 75% of the records, and body style in 72% of the records. The database also contains a vehicle make coded as a 4-character abbreviation of the manufacturer's name. Vehicle model is recorded in a free-form text field. There is a very general vehicle body type code (automobile, pickup truck, moped, etc.) and a field for "model year."

Accident Circumstances

The database contains codes for weather and "harmful events" 1 and 2 for each accident. For each vehicle, "object hit" and "first impact point" are coded. The impact points are not clock points. In 1977-1992 there are 8 codes around the circumference of the vehicle and 16 beginning in 1993.

There is no independent code that indicates noncollision, precollision, or postcollision fire, but "contributing circumstances" or primary/secondary cause coded as *fire* indicates a noncollision fire in years 1977-1992. As many as 45% of the vehicles with fire damage are coded with "contributing circumstances" as *fire*. These codes indicate that as many as 45% of the vehicles with fire damage may have experienced noncollision fires. In 1993, noncollision fires may be inferred as cases with "first harmful event" coded as *fire/explosion*, and postcollision fires can be defined as those in which the first harmful event is not *fire/explosion*.

There is no information about where in the vehicle the fire occurred. Posted speed limit is coded in the database, but there is no information on vehicle speed.

Injury information on the KABC0 scale is recorded for all occupants. Crash severity is coded on a 4-point scale in 1977-1992 and a 5-point scale in 1993. About 85% of the vehicles are coded as *disabled* or *disabled/destroyed*.

Additional Information Available on the Police Report

Narrative descriptions of the fire are present in 90% of the police reports obtained. These narratives can contain such relevant details as "engine problems then caught fire," "fire caused by faulty electrical wiring under the dashboard," "Vehicle #1 engine compartment on fire before impact; smoke poured out of car's rear; after impact car burst into flames." These narratives are not added to the computerized state database. Descriptions of the accidents studied appear in Appendix B.

Michigan

How accurately is fire information captured?

An independent variable, "fuel leak or fire," is available in calendar years 1981-1991. Michigan is the only state database that captures information on fuel leaks. Each accident vehicle is classified as fuel leak without fire, fuel leak with fire, fire without fuel leak, or neither fuel leak nor fire. This variable was dropped in 1992. In 1992 information about fire was captured as a code (02) for *fire/explosion* in the "event" codes. In 1993 and 1994 the "event" code for *fire/explosion* was changed to 08. In 1992-1994, up to 4 events are coded for each vehicle. Thus, *fire/explosion* may be identified for each vehicle, but only if no more than 3 other events were deemed more important.

Only 1994 and later police reports were available from Michigan. Of the random sample of 30 police reports that were requested, 29 were obtained for study. All of the 29 had indication of a fire on the report, and all but 1 had some narrative comments. However, only 10 of the reports mentioned fire in the narrative. In addition, one of the narratives appears inconsistent with a vehicle fire, although vehicle fire/explosion was recorded on the accident report. ("The driver of V1 struck a pedestrian without realizing what had happened. The pedestrian, who had been drinking, suffered a hand injury but was able to move and walk afterwards.")

The sample of fatal fire accidents from FARS contained only 1 Michigan case. This case was recorded as a fire accident in the Michigan database and on the accident report. No mention of fire was present in the narrative section of this report.

How consistent is the coded fire information?

The rate of vehicles with fire is consistent at 0.2% for the period 1981 through 1991. Despite the change in recording method, the vehicle fire rate in 1992 is similar to earlier years at 0.2%; however, with the second change in recording method in 1993, the fire rate increases to 0.3% in 1993 and 1994. There is no evidence of a change in the rate of vehicle fires reported as a function of calendar month.

From 1981 through 1991 there are no event codes with which to check the consistency of the code for fire/fuel leak. In the 1992-1994 period, there is no independent measure of

fire or fuel leak with which to check the consistency of the "event" code for fire/explosion.

How complete is the database in helping us understand fire?

Vehicle Identification

VIN is recorded on the Michigan police report and in the database for calendar years 1981-1991. The VIN is sufficiently precise to decode make in 98% of the records, vehicle series in 87% of the records, subseries in 86%, and body style in 87%. The database also contains a Michigan state department of transportation code for vehicle make/model year and a general code for vehicle type, such as *passenger car*, *van*, *motorcycle*, etc. There is no state code for vehicle series or subseries (model).

Starting in 1992, the VIN and all other make and model information is not available in the public copy of the computerized accident database.

Accident Circumstances

The database contains a code for "accident type" on each accident, containing values such as *collision with motor vehicle*, *collision with fixed object*, and *overturned*. There are also fields for "accident analysis," and "two vehicle accident subscript," which contains codes such as *head-on*, *rear-end*, and *sideswipe*. Weather and time of day are also coded.

For vehicles, the database contains fields for "object hit" and "impact code." The impact codes are not clock points; there are 8 codes around the circumference of the vehicle. Commercial vehicles are also coded for "type of truck cargo being transported," including *flammable or explosive, no cargo* (unloaded) and *flammable or explosive with cargo* (loaded).

There is no independent code that indicates whether fire was noncollision, precollision, or postcollision. The data on accident type and direction of impact indicates that 98% of the vehicle fires are either postcollision or precollision fires.

No information on vehicle speed or posted speed limit is available in the database. There is no information on temperature.

Injury information on the KABC0 scale is recorded for all occupants. Crash severity is recorded for each vehicle on the state 8-point vehicle damage scale for traffic investigators, which corresponds to the TAD scale. In addition, the variable "vehicle drivable" indicates whether the vehicle was driven or towed from the accident scene.

Additional Information Available on the Police Report

Narrative descriptions of fire were available in 33% of the 30 police reports obtained. These narratives can contain such relevant details as "V1 began to smoke from under the

hood and eventually caught fire. The fire was the cause of a mechanical failure [sic]. Damage was located under the hood area and front portion of the cab area." These narratives are not added to the computerized state database. Descriptions of the accidents studied appear in Appendix B.

New York

How accurately is fire information captured?

Fire information can be found in the first and second "harmful event" codes as *fire or explosion*. Secondarily, the occupant field for "type of physical complaint" also may contain fire-related information. Potential fire-related complaints include separate codes for *minor burns*, *moderate burns*, or *severe burns*. (Burn injury is not, however, a definitive indication of vehicle fire, since it could indicate cigarette burn or burn by contact with hot engine parts or fluid.)

There is no independent field to capture vehicle fire information exclusively.

The first harmful event field is coded for the entire accident and is therefore not specific to a vehicle. The second harmful event is at the vehicle level and thus is vehicle-specific.

Of the random sample of 30 police reports, 28 were obtained for this study. Of the 28, 21 (75%) contain a description of the fire in the accident narrative. Of the remaining 7, 5 are correctly coded *fire* in the first or second harmful event; 2 accidents did not involve fire at all, and the indication of fire by the code for *fire or explosion* appears to be a typographical error in the data entry. There are no accidents for which the database recorded fire in the wrong vehicle.

Of the random sample of 8 reports of fatal fire-involved accidents in FARS from New York, all the handwritten police reports indicate that the accidents involved fire. However, only 2 were coded as *fire or explosion* by the harmful event codes in the state database. The other 6 accidents had different kinds of collision events (e.g., *collision with trees*) coded in the "first harmful event" or the "second harmful event" fields.

Postcollision fire may be inferred for those accidents whose first harmful event is a collision of some kind and whose second harmful event is *fire or explosion*. A precollision or noncollision fire may be deduced by observing those accidents where the fire is coded as the first harmful event. If the second event is a type of collision, those accidents may be called precollision fire accidents, and if there is no second harmful event then they may be considered noncollision fires. Of all the fire-involved vehicles studied (1975-1993), 36% were found to have fire as the first harmful event and the remainder have fire coded in the second harmful event.

How consistent is the coded fire information?

Between 1975 and 1993, there are 3,863 fire accidents or about 203 fires per year. Fire accidents account for about 0.08% of all accidents. (The first year of computerized data, 1975, appears to have an incomplete year of accident data, having a substantially smaller number of accident records.)

The proportion of fire accidents (0.06-0.10%) appears consistent in the years studied and does not follow any trend. The month-to-month variation does show a peak in the months of July and August, tapering off on either side. This may correspond to increased traffic volume during the summer vacation season.

Coding of fire in the first and second harmful events appears to have been used with almost mutual exclusion: When "first harmful event" is coded as *fire or explosion*, all but one "second harmful event" is either some other nonfire event or blank (no second event). The converse is also true. This is consistent with the meaning and procedure for the coding of the two events.

The proportion of fire accidents appears to be substantially lower than those reported in other states. The number of actual fires may be significantly more than the number reported based on the codes in the database. This possibility suggested itself in the comparison made with the FARS data: Only 25% of the sample of fire-involved New York accidents identified in FARS are so coded in the state database. The lack of an independent field for fire-only information may be partly responsible. The fire codes in the first or second harmful events, having to compete for the coder's or officer's recognition, may often be used to capture other collision events such as rollover or collision with other vehicles.

How complete is the database in helping us understand fire?

Vehicle Identification

VIN is coded in the New York database. About 10% of the vehicles in fire accidents do not have VINs coded. One should note that New York police officers do not actually transcribe the VINs from the accident vehicles. Only license plate numbers are recorded on the police report, and the VIN is extracted from New York Department of Motor Vehicles records through the license plate. Thus, the 10% would include vehicles with out-of-state license plates involved in accidents in New York. The VIN is sufficiently precise to decode make in 89% of the records, series in 76%, subseries in 76%, and body style in 75% of the records.

Accident Circumstances

Crash severity is characterized in the "accident class" field. For accidents involving fire we have *fatal* 39.2%, *injury* 21.9%, *property damage only* 26.8%, and *property damage and injury* 11.8%.

Damage area is coded on the police reports but is not included in the copy of database that Failure Analysis Associates received, ostensibly because of budget controls at the state of New York.

Speed limit and travel speed are not coded. Vehicle role (e.g., striking vehicle, struck vehicle) is not directly coded, but some of that information may be inferred from the "collision type" (e.g., *head-on*, *rear-ended*).

Weather condition (missing in 8.3% of the accidents) and light condition are coded, but temperature is not. Location of fire in the vehicle is not coded.

Besides injury level on the KABC0 scale, occupant injury is identified as to the type of physical complaint, location of most severe complaint, and the victim's physical and emotional state. This type of detailed information is not usually found in other motor vehicle databases.

Additional Information Available on the Police Report

Narrative descriptions of the fires are present in 82% of the police reports obtained. These narratives can contain such relevant details as "Fire in engine compartment," and "Struck tree, then caught fire." These narratives are not added to the computerized state database. Descriptions of the accidents studied appear in Appendix B.

North Carolina

How accurately is fire information captured?

Only 1 field in the North Carolina database, "post-crash fire," captures the occurrence of vehicle fire. This code is available starting in calendar year 1986. The possible values for this field are *yes*, *no*, and *not stated*. "Post-crash fire" is an independent field, and each vehicle is independently marked as to the occurrence of post-crash fire. Prior to 1986, no specific code indicates the occurrence of fire, and all fire is lumped into the harmful event field under the code *other collision/non-collision*.

Of the 30 vehicles coded *yes* for postcollision fire in the database (from a random sample of 30 fire-involved accidents, 51 total vehicles), only 11 vehicles in 11 accidents are marked "yes" for postcollision fire in the police accident report.

The original accident reports of a random sample of 12 FARS fire-involved accidents were obtained from North Carolina. Of the 12, all are true fire accidents according to the officers' descriptions, but only 10 are coded *yes* for "post-crash fire" code in the North Carolina database.

Given the design of the North Carolina system, only postcollision fire accidents can be identified. Precollision or noncollision fire cannot be uniquely identified.

How consistent is the coded fire information?

Between 1986 and 1993, 8,467 vehicle fires were recorded, or about 1,000 fires per year. Fire-involved vehicles compose about 0.3% of all accident vehicles.

There is a distinct increase in reports of vehicle fire starting in 1992. Between 1986 and 1991, there are 5,291 vehicle fires or about 882 fires per year. However, in 1992 and 1993, there are 3,176 total vehicle fires or 1,588 fires per year. This increase is not accompanied by a corresponding increase in the number of accident vehicles, and thus the fire vehicle percentage nearly doubled that of the early years.

"First harmful event" and "most harmful event" are available in the North Carolina database, but fire is not a value for either of these 2 variables.

How complete is the database in helping us understand fire?

Vehicle Identification

VIN is part of the North Carolina database. Of the vehicles coded as fire-involved, 98.8% have some VIN (though some are incomplete or miscoded). Overall, 83.9% appear to be well transcribed and are decodable to vehicle series and subseries. In addition to VIN, the North Carolina database provides vehicle model year, make, and type (e.g., *station wagon* and *schoolbus*).

Accident Circumstances

Crash severity is characterized according to the 8-point TAD scale. Damage area and damage severity are coded in the same variable, with up to 3 areas permitted per vehicle. The field for "vehicle drivable," coded *yes* or *no*, is another indicator of severity. It is an independent field. The accident can also be characterized according to the codes for first harmful event and most harmful event.

Speed limit, vehicle travel speed (unknown in 12% of the accidents), and vehicle speed at impact (about 15% unknown) are coded. Vehicle role (e.g., striking vehicle, struck vehicle) is not directly coded but may possibly be inferred from other coded fields. Weather condition is coded, but temperature is not. Location of fire in the vehicle is not coded.

Additional Information Available on the Police Report

Among all the states studied, North Carolina is unique in that it enters many accident narratives into an electronic database. This database is completely separate from the rest of the accident data, however, and the 2 databases have only the state-assigned accident record number in common. In addition, the state computerizes only about one-third of the accident narratives, presumably due to budgetary constraints.

Of the fire accidents for which police reports were obtained, accident narratives are present on all; only 68% were present in the state's adjunct computerized database. The narratives that were not computerized included such relevant details as "[V1 overturned and] then burst into flames," and, "[V1] was at a very high idle before it caught fire." Descriptions of all accidents reviewed in the study appear in Appendix B.

Pennsylvania

How accurately is fire information captured?

Fire information can be found in 3 places in the database. First, fire is coded as one of the 59 possibilities in the "event" field. There is no limit on the number of events that can be coded for an accident; fire can be coded in any one of the events as 01 *fire* or 02 *explosion*. Second, fire can also be coded in the "most harmful event" field (1 MHE per accident). The MHE uses the same coding as in events, i.e., 01 *fire*, 02 *explosion*. Third, the "occupant injury type" field accepts a code for *burn*, an injury that may or may not be a result of vehicle fire.

It should be noted, however, that "events" and are not coded by the investigating officer but by the analyst, based on the police report. The analyst then chooses one event as "most harmful." Codes for "event" and "MHE" are thus based on the same information and are not entirely independent data.

The "event" code is vehicle-specific, and if fire is one of the events, a researcher should be able to determine which vehicle is associated with that event. MHE is coded at the accident level and is not vehicle-specific.

The database does not include an independent fire-only field.

Of the 30 vehicles coded in the database as being fire-involved (i.e., "events" coded as *fire* or *explosion*), examination of the police reports confirmed that all were fire-involved.

Twelve police reports for FARS-reported fire-involved accidents were obtained from Pennsylvania. All of the 12 completed forms describe accidents involving fire. However, only 10 of the 12 are coded as fire by the "event" code in the state database.

Postcollision versus precollision or noncollision fire can be determined by reviewing the sequence of events leading to the one "event" that is coded *fire* or *explosion*. If there is no collision event preceding the fire event, that fire can be considered precollision. If there is also no subsequent collision after the fire, then it is a noncollision fire. If one or more collision events are coded prior to the fire event, the accident is considered postcollision. Among the fire-involved vehicles studied in the Pennsylvania accidents, 75% have fire as the first event.

How consistent is the coded fire information?

Between 1986 and 1993, there are 9,418 vehicle fires or about 1,177 vehicle fires per year. Fire-involved vehicles make up about 0.4-0.6% of all accident vehicles.

The proportion of fire-involved vehicles (0.4-0.6%) shows a mild but consistent increase from 1986 to 1993. The proportion of fire accidents also exhibits a mild increase from 0.4-0.5% in 1986-1988 to about 0.5-0.6 in 1991-1993. There is month-to-month variation in the number of vehicle fires that shows a peak at July and a tapering off on either side. This may correspond to increased driving during the warm summer months.

Indication of fire in the MHE codes is consistent with the event codes. (There is no code for first harmful event in Pennsylvania.) Nearly 80% of fire-involved vehicles are involved in accidents in which fire is also coded as the most harmful event.

How complete is the database in helping us understand fire?

Vehicle Identification

VIN is coded in the Pennsylvania database. Pennsylvania also has a system of make/model codes that were most consistently used in earlier years; VIN was often not coded in the early years (less than 5% in 1986-1987 and about 50% in 1988-1989). Starting with 1990, VIN coding is substantially more consistent, and in 1990-1993 over 90% of the vehicles have an entry in the database VIN field. Among vehicles involved in fire accidents in 1990-1993, 87.6% can be decoded to vehicle series or better. In the years 1986-1989, 86% of the vehicles have a known make/model code.

Accident Circumstances

Crash severity can be characterized from the "accident severity" field, which is coded as the highest level of occupant injury in the accident (KABC0 scale). In addition, Pennsylvania is a "towaway" state; that is, fatal or injury accidents are always reported, but when no fatality or injury results from the accident, a vehicle must be damaged enough to require towing in order for the accident to be reportable. This essentially guarantees a minimum level of crash severity in any accident that appears in the database.

Damage area is coded in 1 field, according to clock point. Speed limit (unknown in less than 5% of the accidents studied) and vehicle travel speed (about 42% unknown) are coded. Vehicle role (e.g., striking vehicle, struck vehicle) is not directly coded but may be inferred from the event. Weather condition is coded, but temperature is not. Location of fire in the vehicle is not coded.

Additional Information Available on the Police Report

Narrative descriptions of the accidents are present in all of the police reports obtained. These narratives can contain such relevant details as "Operator stopped and exited V1 when he saw smoke and flames coming from the dashboard," "An impact occurred and

V1's fuel tank caught fire on impact due to the batteries being pushed into the fuel tank," and "Operator of V1 heard an explosion from under the hood and saw flames shoot out." These narratives are not added to the computerized state database. Descriptions of the accidents studied appear in Appendix B.

Texas

How accurately is fire information captured?

There is no independent variable that captures fire information in the Texas database. Fire information is captured in the "vehicle damage rating" variable, which otherwise records information on the direction of impact and crash severity. This variable is specific to each vehicle in the accident. Fire in the vehicle is indicated by the codes VB1 for noncollision fire and VB7 for collision fire. These codes are not recorded by the police officer on the scene but are entered into the computerized database by the Texas Department of Transportation data analysts who read the accident report. This means that when fire is recorded in the database, information on direction of impact and crash severity is not included in the computerized database.

Of the random sample of 30 police reports that were obtained for study, 100% have indication of a fire on the report. Of the sample of 12 fatal fire accidents from FARS, 4 accidents are not recorded as fire in the Texas state database, but all of these 4 are noted as fire in the police report narrative.

How consistent is the coded fire information?

The rate of vehicle fires is 0.1% for years 1979 through 1992. In 1978, vehicle fire was not recorded in January through June. In 1993 and 1994 the rate of vehicle fires dropped to 0.075%.

The Texas database does not contain any variables with fire or burn information other than the vehicle damage variable.

How complete is the database in helping us understand fire?

Vehicle Identification

VIN is recorded on the Texas police report, but it is not captured in the database. The database does contain vehicle year, make/model, vehicle type, and body type variables that record this information using codes developed by the state of Texas. Vehicle make/model and vehicle type (*passenger car*, *truck*, *motorcycle*, etc.) and model year are recorded in 99% of the records. Vehicle body style (*2-door coupe*, *station wagon*, etc.) is recorded in 91.5% of the records. Not all vehicle makes and models can be clearly distinguished by the make/model code. For example, the make/model code for *Ford Bronco* does not distinguish the large Ford Bronco from the Bronco II. The code for

Chevrolet Blazer does not distinguish the full-size Blazer from the smaller S Blazer. In general, it is not possible to distinguish sport utility vehicles from full-size utility vehicles, nor full-size pickups from compact pickups.

Accident Circumstances

The database contains information on such accident circumstances as "first harmful event," "vehicle movements/manner of collision," "object struck," and "other factor." These variables are recorded at the accident level, which limits their usefulness. For example, when the record for a multiple-vehicle accident indicates that a vehicle hit a utility pole, it is not possible to tell which vehicle hit the pole.

No information on vehicle speed or speed limit is available in the database. The time of the accident and weather are available in the database; temperature is not.

Injury information is recorded for all occupants on the KABC0 scale. Other information (e.g., *sex, age*) is available for all occupants beginning with calendar year 1986. Prior to 1986, such information was not collected for accidents in which no injury occurred and where all vehicles involved had a TAD rating of less than 5. Inasmuch as Texas rates all collision-burn damage as TAD level 7, information should be available for all occupants in collision-fire vehicles for all years. Approximately 58% of vehicle fires are collision-related.

Additional Information Available on the Police Report

The police report contains a precollision "accident contributing factor" code (*vehicle fire*) that is not captured in the database. Also, the posted speed limit is noted on the police report but does not appear in the database. In addition, since the fire code overrides other damage indicators, direction of impact and crash severity may be noted on the accident report but would not be found in the database for burned vehicles.

The accident narratives are usually detailed and contain relevant information such as "V1 ran over box springs and they hung underneath the vehicle. Apprx. two miles later, the driver stopped when he noticed sparks coming from underneath the vehicle. Became engulfed in flames." Twenty-eight of the 30 accident reports studied here contain some narrative description of the fire. These narratives are not added to the computerized state database. Descriptions of the accidents studied appear in Appendix B.

FARS

How accurately is fire information captured?

The Fatal Accident Reporting System (FARS) database includes an independent variable for fire in all years. In addition, the "first harmful event" variable provides a code for fire for each accident. Starting in 1979, the "most harmful event" variable also provided a code for fire for each vehicle.

A random sample of police reports for FARS accidents was requested from each of the 9 states whose databases were evaluated in this study. Of the police reports that were obtained, every one indicates that fire was involved in the accidents.

How consistent is the coded fire information?

In fatal accidents, which are by definition the most severe crashes, the percentage of vehicles with fire is much higher than it is in accidents of all severity. The percentage of fatal vehicles with fire is consistent at 4% per year.

How complete is the database in helping us understand fire?

Vehicle Identification

VIN is recorded in the FARS data for all years from 1975 to the present. The VIN is sufficiently precise to decode make in more than 98% of the records, series in 84%, and body style in 78%. The database also contains a code for vehicle make/model, a code for model year, and a code for body style.

Accident Circumstances

The FARS database records first harmful event in the accident, manner of collision, weather, time of day, and speed limit. Temperature is not included. The most harmful event, initial impact point, principal impact point, vehicle role in the accident, and vehicle damage are recorded for each vehicle.

There is no independent code that indicates noncollision, precollision, or postcollision fire, but "first harmful event" coded as fire indicates a noncollision or precollision fire. Fire as a first harmful event is rare among fatal accidents; only 0.03% of all fatal accidents are coded with first-harmful-event fires. The codes for impact points may be used to distinguish collision fires from noncollision fires.

The FARS coding of "most harmful event" fire does not appear to distinguish fatalities attributable to fire from fatalities attributable to crash forces. General Motors investigated this issue as it related to fatalities in C/K and Ford pickup trucks and reported as follows: "Neary two-thirds of the fatalities for which 'fire' was coded in FARS as the 'most harmful event' were actually recorded in the MCOD data as deaths caused by injuries other than or in addition to fire."[2] (MCOD refers to the Multiple Cause of Death data file compiled by the National Institutes of Health from death certificates.)

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[2] *Evaluation of the Safety of GM 1973-87 C/K Pickup Trucks, Part I: Initial Response of General Motors Corporation to NHTSA Letter of April 9, 1993.* EA 92-041.

There is no information in FARS about where in the vehicle the fire occurred.

Vehicle travel speed is included in the database; it is unknown or missing for 62% of the vehicles. Posted speed limit is available and is present in 92% of the accidents studied.

Injury information on the KABC0 scale is recorded for all occupants. Crash severity is recorded for each vehicle on a 4-point scale with codes for *no damage*, *other* (minor), *functional* (moderate), and *disabled*. Over 88% of the vehicles are coded as *disabled*, 7% are coded as *functional*, and 3% as minor or *no damage*. Fewer than 2% of the vehicles are missing data for this variable.

Additional Information Available on the Police Report

Police reports and other background records are not available to the public through NHTSA. Police reports must be obtained by matching the FARS accident records to state records of traffic accident reports and then ordering the reports directly from the state. The additional information recorded on the state traffic accident reports is summarized in the preceding sections for each of the 9 states studied.

NFIRS

How accurately is fire information captured?

The National Fire Incident Reporting System (NFIRS) is a database of information taken from fire department reports. Fire department calls are of several types, including fires or explosions, emergency rescues, and false alarms. These situations are distinguished by the variable "situation found." Codes are available to indicate fire or explosion, and another indicates vehicle fire. Motor vehicle fires are further distinguished by variable "fixed property use": codes 960-969 distinguish between roads and property used for parking. The variable "mobile property use" distinguishes passenger vehicles from freight vehicles. Rail, water, air transport, heavy equipment, and special vehicles are identified by codes 30-70. The variable "equipment involved in ignition" includes a code for *vehicle*, which can also be used to identify vehicle fires.

Analysis of the NFIRS data for 1993 identified 258 vehicle fires that involved 1 or more fatalities. These NFIRS records were compared to FARS accident records. Only about 50% were successfully matched. A match was considered successful if the accident matched on date, state, and vehicle make and model.

Some of the failure to match NFIRS record with those in FARS is due to the fact that vehicle fire fatalities that do not occur on public roadways are not included in the FARS database. In other cases, the vehicle identification information in NFIRS is insufficient to allow matching with the FARS data. Still, 32 NFIRS cases of clearly identified vehicle fires on public roadways were not found in FARS. This could be the result of incorrect coding of accident dates or counties of occurrence.

How consistent is the coded fire information?

NFIRS is a voluntary reporting system. The number of states and fire departments participating varies from year to year. In 1979, about one-third of U.S. fire departments reported to NFIRS. In 1993, 13,700 of 34,000 U.S. fire departments (40%) reported in to the system. Using the data from NFIRS combined with the annual sample survey of fire departments, the National Fire Protection Associate estimates that between 400,000 and 450,000 fires occur in highway vehicles each year. The number of highway vehicle fires has been declining since a high of 451,000 in 1987.

How complete is the database in helping us understand fire?

Vehicle Identification

Vehicle identification is minimal in NFIRS. The database contains fields for make, model, model year, and license number. This data is filled in as free-form text. Frequently the fields are lumped together as 1 large text field; for example, part of the model information may be in the make field. California, which contributed 10% of the 1993 records and nearly a third of all of the fire reports in the NFIRS system from 1979 through 1988, does not provide any vehicle identification information.

Accident Circumstances

The only information in the database on accident circumstances is general location of the incident (e.g., on *paved roadway, in parking lot*).

NASS/CDS

The National Accident Sampling System (NASS) is maintained by NHTSA, and data from NASS investigations is gathered into the Crashworthiness Data System (CDS). The database comprises data collected by trained accident investigation teams who review traffic reports and hospital records and interview witnesses. According to NASS staff, these analyses are performed under strict quality control standards.

The NASS/CDS database contains a code for vehicle fire in the years 1991-1993. These records provide the most detailed study of traffic accidents in which a fire occurred. However, the relatively small size of the database (approximately 5,000 towaway accidents investigated each year), coupled with the low rate of vehicle fire accidents (less than 0.5%), limits the usefulness of NASS data for study of the causes of vehicle fire.

The NASS/CDS data file contains information on the magnitude of the fire (*major, minor, unknown*) and the origin of the fire (*vehicle exterior, exhaust system, fuel tank, engine compartment, cargo/trunk compartment, instrument panel, passenger compartment*). However, electrical fires are not distinguished from fuel-fed fires except as may be inferred from the origin of the fire.

Copies of the original accident reports for records in the CDS database are not available publicly, although versions produced by NHTSA with personal information removed can be obtained through them. No further evaluation of the quality of the NASS data was performed for the study documented in this report.

NASS/GES

The NASS General Estimate System (GES) is a nationally representative sample of traffic accidents that has been maintained by NHTSA since 1988. It contains uniformly coded information extracted from police reports. The data is checked by NHTSA analysts for validity and consistency. Approximately 50,000 accident reports are collected each year.

At the accident level, this database contains information on first harmful event, manner of collision, and atmospheric condition. At the vehicle level, information includes initial point of impact and vehicle speed.

Fires are noted in 0.2% of the accident vehicles in NASS. This rate of fire is consistent in every year. Vehicles can be identified through NHTSA codes for make, model, and body type, and through VIN, which is coded in the database. VIN is recorded in 68% of the GES records.

Copies of original police reports are not available for GES records. No further evaluation of the GES database was performed.

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Copies of original police reports are not available for GES records. No further evaluation of the GES database was performed.

4. Discussion

Accurate, consistent, and complete identification of vehicle fire from motor vehicle accident databases is a complicated endeavor. It is subject to the peculiarities of the design of the police accident reports as well as to the latitude with which coding systems are applied by individual police officers.

Databases that have an independent fire code — a field that is devoted exclusively to identifying the presence or absence of vehicle fire — are demonstrably superior in this endeavor. The comparison of the FARS database and corresponding state accident records shows that FARS, with its independent fire code, captures fire accidents far more accurately and consistently than most state-level databases.

The many state databases evaluated here display a wide range of accuracy and consistency. The annual number of vehicle fires captured by the state databases ranges from a high of about 1,200 in Pennsylvania and Michigan to a low of only 200 in New York. A state as large as Texas reports only 450 vehicle fires per year, which is not much more than the 370 per year reported by the substantially smaller state of Alabama. The low frequencies of vehicle fires in New York and Texas, for example, are clearly inconsistent with the vehicle populations in those states; the low frequencies, therefore, merely reflect the limitations of the states' respective coding systems.

The presence of an independent fire code in Michigan and a relatively unrestricted coding of accident events in Pennsylvania permit what appears to be significantly more complete recording of fire-involved accidents in those states. In databases where fire is one of many possibilities in the impact, harmful event, or other similar fields, fire information must compete for the recognition of the officer or coder. Review of sample accident reports from these states shows that other events such as rollover or collision with another vehicle are often coded instead of fire. To various degrees, databases of such design underrepresent the frequency of vehicle fires.

An accurate accounting of vehicle fires is important and necessary, but it is not sufficient to provide researchers and manufacturers with a means to understand the causes of vehicle fire. For example, none of the traffic databases evaluated provides information on the location or origin of fire (e.g., engine compartment, occupant interior, trunk, fuel tank).

Other factors that are essential for an accurate and complete understanding of vehicle fire include the ability to distinguish whether a fire results from a collision, and whether a fire-involved vehicle is the striking vehicle or struck vehicle in a collision. None of this information is well coded in state-level databases. Only in North Carolina is postcollision fire explicitly recorded. For other databases, postcollision or precollision fires may be inferred from the sequence of harmful events coded. A vehicle's role (e.g., striking or struck) is explicitly recorded only in FARS. In other databases examined in this study, the relationship among vehicles involved in an accident can, at best, only be inferred.

This study also found that police reports contain a wealth of useful information that may point to the cause of fire but is not captured by the coding system. In one example, a vehicle was ignited by an arsonist, but nothing in the coding system of that state would have alerted a researcher to arson as the origin of fire. Only review of the original police report revealed the circumstances. Ideally, such fires would be excluded from the fire rates, since they have nothing to do with collision or the particular design of the vehicle.

This study enables researchers to maximize the usefulness of each database and improve on the validity and reliability of fire-related studies by capitalizing on databases' strengths and devising ways to avoid their weaknesses. For example, the databases from Arkansas and North Carolina appear to substantially overestimate the number of vehicle fires. This seems to be due to possible miskeying of adjacent fields during data entry or confusion between similar fields (e.g., first harmful event and most harmful event) that have different numerical codes for fire. Thus, it would be wise, for example, to restrict research that uses these databases to data from more recent years (e.g., 1993 and later for Arkansas), when the potential sources of confusion have been rectified by the states.

This study also confirms that the restricted nature of FARS makes it difficult to identify the relative contribution of environmental and operator factors that result in severe crashes (e.g., adverse driving conditions, alcohol involvement, excessive speed) on the one hand, and vehicle design differences that may contribute to the likelihood of fire on the other. Although FARS has one of the most complete and accurate coding systems for capturing fire accidents, the selective nature of FARS makes it difficult to isolate the cause of fire and to ascertain whether fatal injury is caused by the ensuing fire, by the crushing force of the collision, or by a combination of these factors.

Despite the limitations in the various databases, the fuel system integrity of the vehicle population, which the FMVSS 301 addresses, can be evaluated by a detailed examination of some of these databases. Databases that provide adequate identification of vehicle type and model year and that have sufficient data to perform a historical trend analysis are well suited for such an evaluation.

Analyses of the following types are envisioned. Comparison of the rates of post collision and non collision fire for vehicles prior to the change in FMVSS 301 standards with model years after the change in standards. Matched pair analyses, in which the vehicles models are essentially the same, except for a change to the fuel system design to meet the revised FMVSS are the most powerful. The pairs must, of course, span the period over which the fuel system design change is made, not simply before and after the effective date of the standard. If possible a set of control pairs, for which the revised FMVSS301 did not require a fuel system design change can be used to estimate changes in motor vehicle fire rates which are correlated with the passage of time but unrelated to changes in fuel system design. In addition, analyses should be performed specific to various types of impacts to evaluate whether observed changes in postcollision fire rates are directly related to the changes in FMVSS 301 requirements. In addition, analyses should be performed specific to various types of impacts to evaluate whether observed changes in

postcollision fire rates are directly related to the changes in FMVSS 301 requirements. Data analyses should be performed using FARS and several of the states: Michigan, Pennsylvania, Florida, Alabama and Maryland. The Michigan data cannot be used for vehicle specific comparisons after 1991 as vehicle identification information is no longer recorded in the computerized data after December 31, 1991. As there are shortcomings associated with each of the databases, it is recommended that separate analyses be performed for each database and the information be combined via statistical meta-analysis techniques. A consistent pattern of results across several analyses and databases is a more powerful demonstration of the effect (or lack thereof) of FMVSS 301 than a single statistically significant result.

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APPENDIX A

Appendix A:
Summary of Literature Reviewed

Appendix in Chronological Order

Date	Author	Title	Biblio ref	Statistics		Source of stat. data:
11/01/68	Garrett, J.W.; Stern, A.	A Study of Volkswagen Accidents in the United States		Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	Yes	
01/01/70		1969 Analysis of Accident Reports Involving Fire	Motor Carrier Safety Bureau/US/	Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	Yes	
01/01/73	Raangtell, H.	Traffic Accidents Causing Petrol Fires in Vehicles 1969-71	National Swedish Road & Traffic Research Institute, Rpt. No 23, R & D Rpt.	Statistical study?		
				Validity of data checked?		
				Info on cause and origin of fire?		
01/01/74	Austin, J.A.; Wagner, F.R.	A Statistical Study of Post-Crash Phenomena in Automobile Accidents	J: Am. Asso. for Automotive Medicine Conf. Proc., Vol 18	Statistical study?	Yes	Public records Special study
				Validity of data checked?	Yes	
				Info on cause and origin of fire?	Yes	
04/01/75	Austin, J.A.; Wagner, F.R.; Hogan, A; Bryner, G.	Study of Post-Crash Factors in Automobile Collisions. Volume 2	Utah Auto Crash Research Team, NHTSA. NTIS PB-242044/6ST	Statistical study?	Yes	Appendices to report
				Validity of data checked?	Yes	
				Info on cause and origin of fire?	Yes	
04/01/75	Austin, J.A., Wagner, F.R.; Hogan, A.; Bryner, G.	Study of Post-Crash Factors in Automobile Collisions, Vol. I	Utah Auto Crash Team, NHTSA. NTIS PB-24158/9ST	Statistical study?	Yes	Public records Special study
				Validity of data checked?	Yes	
				Info on cause and origin of fire?	Yes	
01/01/77		Spread of Fire From Carburettor Fires in Cars	Maschinenschaden Vol: 50, Issue No. 2	Statistical study?	No	
				Validity of data checked?		
				Info on cause and origin of fire?		

Appendix in Chronological Order

Date	Author	Title	Biblio ref	Statistics		Source of stat. data:
01/01/81	Guenther, D.A.; Goodwin, L.G.; Thaman, R.N.	Forensic Analysis of Automobile Fires	SAE 810011	Statistical study?	No	
				Validity of data checked?	No	
				Info on cause and origin of fire?	Yes	
04/01/81	Bondy, Nancy	Incidence of Fire in Plastic Fuel Tank Vehicles		Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	Yes	
06/01/81	Flora, J.D.; O'Day, J.	An Estimate of the Effect of FMVSS 301-Fuel System Integrity	J: Accident Analysis and Prevention, Vol 13, Issue No.2, Rpt No. HS-032 497	Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	Yes	
06/01/81	Reinfurt, DW	Statistical Evaluation of the Effectiveness of FMVSS 301: Fuel System Integrity		Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	No	
01/01/82	McDonald, R.; Ingram, G.K.	Diesel Car Regulation and Traffic Casualties	NRC, EPA, DEA, DOT - NTIS PB82-212705	Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	No	
03/01/82	Flora, J.D., Jr.; O'Day, J.	Evaluation of FMVSS 301-Fuel System Integrity--Using Police Accident Data	UMTRI, UM-HSRI-82-11, Final Report; HS-806 362	Statistical study?	Yes	Public records
				Validity of data checked?	Yes	
				Info on cause and origin of fire?	Yes	
01/01/83	Parsons, GG	Evaluation of Federal Motor Vehicle Safety Standard 301-75, Fuel System Integrity: Passenger Cars	NHTSA, Tech Rpt HS-806 335	Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	Yes	

Appendix in Chronological Order

Date	Author	Title	Biblio ref	Statistics		Source of stat. data:
05/01/83	Flora, J.D. (Interview)	Automobile Fires in Traffic Crashes	University of Michigan Transportation Research Institute, UMTRI Research Review, Rpt No. HS-036 241	Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	Yes	
09/01/83	O'Day, J.	Fires and Fatalities in Tractor-Semitrailer Accidents	UMTRI Research Review, Vol 14, Issue #2	Statistical study?	Yes	Public records
				Validity of data checked?	Yes	
				Info on cause and origin of fire?	Yes	
09/01/83	Scott, R.E.; O'Day, J.	I Do Not Wear Safety Belts Because...	UMTRI-83-42 Final Rpt; HS-036 240	Statistical study?	Yes	Public records Special study
				Validity of data checked?	No	
				Info on cause and origin of fire?	No	
01/01/85	Warner, C.Y.; James, M.B.; Woolley, R.L.	Perspective on Automobile Crashes	SAE 850092; HS-039 224	Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	No	
04/01/85	O'Day, J.; Ruthazer, R.; Gonzales, T.	An In-Depth Study of Truck Fire Accident Data. Appendix G: Dictionary/Codebook for the Accident File. Final Report	UMTRI-85-17-2; HS-039 433	Statistical study?	Yes	(Appendices to report)
				Validity of data checked?	No	
				Info on cause and origin of fire?		
04/01/85	O'Day, J.; Ruthazer, R.; Gonzales, T.	An In-Depth Study of Truck Fire Accident Data (Including Appendices A-F). Final Report	UMTRI-85-17-1; HS-039 432	Statistical study?	Yes	Public records Special study
				Validity of data checked?	Yes	
				Info on cause and origin of fire?	Yes	
02/01/87	Kahane C.J.	A Preliminary Evaluation of Seat Back Locks for Two-Door Passenger Cars with Folding Front Seatbacks	NHTSA HS-807 067	Statistical study?	Yes	Public records Special study
				Validity of data checked?	Yes	
				Info on cause and origin of fire?	No	

Appendix in Chronological Order

Date	Author	Title	Biblio ref	Statistics		Source of stat. data:
09/01/89	Whitaker, E	Vehicle Fires - looking behind the statistics	Journal: Fire Prevention, Issue No. 222	Statistical study?	Yes	Public records (UK)
				Validity of data checked?	Yes	
				Info on cause and origin of fire?	Yes	
12/01/89		Insurance Special Report, A-33, Non-crash Fire Losses, 1986-88	Highway Loss Data Institute, 1005 North Glebe Road, Arlington, VA 22201	Statistical study?	Yes	Private study (insurance industry) non-crash only
				Validity of data checked?	No	
				Info on cause and origin of fire?	Yes	
01/01/90	Powell, A.H.	A Review of the Electrical Causes of Fires in Cars. Final Report	ERA Technology Limited; Cleeve Road; Leatherhead, Surrey; England	Statistical study?	No	No statistics
				Validity of data checked?		
				Info on cause and origin of fire?		
8/1/90		Fire in the United States: 1983 - 1987 and Highlights for 1988		Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	Yes	
08/01/93	Robertson, Leon	Fatal Car Fires from Rear-End Crashes: The Effects of Fuel Tank Placement before and after Regulation	American Journal of Public Health, Vol. 83, No.8	Statistical study?	Yes	Public records Private study
				Validity of data checked?	No	
				Info on cause and origin of fire?	Yes	
12/01/94	Tessmer, J.	An Analysis of Fires in Passenger Cars, Light Trucks, and Vans	NHTSA Technical Report HS-808 208	Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	Yes	
05/01/95		Insurance Special Report, May 1995, A-48, Non-crash Fire Losses for 1986-94 Model Year Vehicles		Statistical study?	Yes	Public records
				Validity of data checked?	No	
				Info on cause and origin of fire?	No	

Author Garrett, J.W.; Stern, A.

Title A Study of Volkswagen Accidents in the United States

Corporate Source Calspan Field Services, Inc. Automotive Crash Injury Research (ACIR) of Cornell Aeronautical Laboratory, Inc.

Report No. Cal Rpt No. VJ-1823-R32 **Date** 11/01/68

Journal

Abstract The performance of 879 Volkswagen two-door sedan "beetle" models was compared with that of 26,673 American and imported cars involved in rural injury-producing accidents in 30 states. Rollover, with its associated high incidence of dangerous ejection, occurred more frequently for Volkswagen, Renault and other small foreign sedans than for American cars. Among late-model American cars, Corvair overturned most frequently. The greater frequency of ejection, and not car size alone, is the primary reason for sharply increased hazards of injury to occupants of pre-1966 Volkswagens. Volkswagen and Corvair had the lowest frequency of front "firewall" damage in frontal impacts. The frequency of fire among Volkswagens, after the accident took place, was among the lowest of all cars studied. Leading causes of injury are discussed, and some differences between Volkswagens and U.S. cars are noted. Study did not indicate whether Volkswagens are involved in accidents any more or less often than any other car, but rather what did take place once an injury accident occurred.

Statistical study? Yes **Check of data validity?** No

Statistical data sources Data from rural, injury-producing accidents in 30 states reported through the Automotive Crash Injury Research program. The majority of the cars studied were manufactured prior to 1966.

Conclusions Volkswagen had one of the lowest frequencies of fire after an accident of any car studied. In general, the frequency of fire ranged from .2 to .9 percent in the cars studied. See p. 34, Table 2.8: Frequency of fire according to area of impact. Also, the fire record for front fuel tank cars was as good as rear fuel tank cars, even though 60% of impacts (excluding rollovers) involve the front of the car.

Author

Title **1969 Analysis of Accident Reports Involving Fire**

Corporate Source Motor Carrier Safety Bureau /US/; 18 pp

Report No.

Date 01/01/70

Journal

Abstract Data are extracted from 775 accident reports in which fire was involved in the accident. Part I deals with property- carrying vehicles which accounted for 765 of the accidents covered. These accidents resulted in 126 fatalities, 363 injuries and $8,926,260 property damage. Part II deals with passenger vehicles which accounted for 10 of the accidents, 25 injuries and $156,450 property damage. /hsl/
file reference: NHTSA HS-008717 FLD

Statistical study? Yes **Check of data validity?** No

Statistical data sources Data from reports to the Bureau of Motor Carrier Safety, Federal Highway Administration, Dept. of Transportation. All motor carriers, except private carriers, operating in interstate or foreign commerce are required to report accidents to the Bureau of Motor Carrier Safety...which result in fatality, personal injury or $250 or more property damage.

Conclusions A total of 50,657 reports were received in 1969. 765 of the 48,643 accidents reported by property carriers involved fire (1.57 percent). For passenger carriers, 10 accidents of the 2,014 reported involved fire (0.50 percent). The cause of fire was reported for 549 of 765 property carriers with fire.

Author Raangtell, H.

Title Traffic Accidents Causing Petrol Fires in Vehicles 1969-71

Corporate Source National Swedish Road & Traffic Research Institute; Drottning Kristinas Vag 41; S-11428 Stockholm; Sweden

Report No. No. 23 R&D Rpt. Pag: 21 pp **Date** 01/01/73

Journal

Abstract A total of 79 passenger car accidents involving petrol fires from the 1st of January 1969 to the 31st of December 1971, was studied. The main purpose of this investigation was to study the connection between the location of the fuel tank in the car, (front tank cars or rear tank cars), and the risk of petrol fire. A special study was made of the Volkswagen cars. The results are compared with previous studies of petrol fires in cars, starting in 1966. The accidents were investigated with regard to: type of car, accident type, time of year, severity of injuries and cause of fire. This study confirms previous investigation results, that front tank cars are over represented in accidents with petrol fires, compared to their total number of cars (in Sweden). As for the Volkswagen cars their relative share has remained constant or decreased slightly, probably due to an improved tank installation. The number of accidents causing severe injuries and fatal burns were considerably larger for front tank cars than for rear tank cars.

Statistical study? **Check of data validity?**

Statistical data sources

Conclusions Swedish language article

Author Austin, J.A.; Wagner, F.R.

Title A Statistical Study of Post-Crash Phenomena in Automobile Accidents

Corporate Source American Association for Automotive Medicine; 801 Green Bay Road ; Lake Bluff; IL; 60044

Report No. **Date** 01/01/74

Journal American Association for Auto Medicine Conf Proc Vol: 18, 15 pp

Abstract Of the three major facets of an automobile collision, i.e., accident causation, injury causation, and post-crash phenomena, the latter has received significantly less attention than the first two facets and is one for which there is presently a large public outcry. A post-crash phenomena is an event which occurs after and is not related to the cause of the collision or impact induced injuries, but which can result in an increase in the severity of the injuries incurred or the possibility of additional injury. It includes such events as post-crash fires, extrication difficulties, submergence, emergency medical care, and fuel leakage (the threat of a post-crash fire). As a part of its DOT-sponsored, multidisciplinary accident investigation project, the University of Utah undertook a one-year study of the role of fuel-leakage, post-crash fire, submergence, and extrication difficulties in automobile collisions. This was a five-county study in which the assistance of local law enforcement agencies was secured to provide data on all automobile accidents in the study area and then a more detailed follow-up investigation was conducted on a sampling of those accidents which included a post-crash phenomena of interest. A comparison of the accidents in the study population with State and National accident statistics showed that the sample was a good representation of automobile accidents in general. Data from the special study has been combined with data from the in-depth studies of the multidisciplinary study to produce (1) incidence rates, (2) occurrence mechanisms, and (3) ultimate consequences of the various post-crash phenomena.

Statistical study? Yes **Check of data validity?** Yes

Statistical data sources University of Utah study. For one year in five-county area, law enforcement officers filled out supplementary data sheet on post-crash phenomena. Supplemental data sheet requested a "yes/no" response to 4 questions. Additional data was requested for "yes" responses.

Conclusions Only 29 or the 43 fires noted in the sample were collision induced. This produces a collision-induced, post-crash fire incidence rate of 0.22 percent based on the 12,909 accidents in the accident sample and 0.12 percent based on the 23,624 vehicles in the sample. Table 2 is a summary of data on collision-induced fires in passenger cars. (Type of fire: fuel fed, tires, electrical, trailer, other)
14 vehicle fires were not related to a collision (Table 3 lists location of fire initiation).

Author Austin, J.A.; Wagner, F.R.; Hogan, A; Bryner, G.

Title Study of Post-Crash Factors in Automobile Collisions. Volume 2

Corporate Source Utah Auto Crash Research Team; Salt Lake City; UT;
National Highway Traffic Safety Administration; 400 7th Street, SW ;
Washington; DC; 20590

Report No. PB-242044/6ST **Date** 04/01/75

Journal

Abstract This is the final report of the results of a study into post-crash factors, fire, submergence, fuel leakage, and extrication-evacuation in automobile collisions. This is a special studies effort as a part of the Utah Multidisciplinary Highway Crash Investigation Research. The report presents the study area statistics with respect to the driving population, vehicle population, and accident population; and compares these statistics to the State of Utah and national statistics in order to assess the study area representativeness. The incidence rates for each of the four post-crash factors was assessed based on data collected over a one-year period.

Statistical study? Yes **Check of data validity?** Yes

Statistical data sources

Conclusions These are the appendices to the preceding report.

Author Austin, J.A., Wagner, F.R.; Hogan, A.; Bryner, G.

Title Study of Post-Crash Factors in Automobile Collisions, Vol. I

Corporate Source Utah Auto Crash Research Team; Salt Lake City; UT;
National Highway Traffic Safety Administration; 400 7th Street, SW ;
Washington; DC; 20590

Report No. PB-241585/9ST **Date** 04/01/75

Journal

Abstract The authors investigated post-crash factors such as fire, submergence, fuel leakage, and extrication-evacuation in automobile collisions. The study presents statistics with respect to the driving population, vehicle population, and accident population of the 5-county area surveyed and compares these statistics to the state of Utah and national statistics. The incidence rates for each of the four post-crash factors was assessed based on data collected over a one-year period. The standard police report and a supplemental accident report were used to identify the post-crash factors of interest.

Statistical study? Yes **Check of data validity?** Yes Reliability check of data collected was done by calling the driver of vehicle to verify information collected.

Statistical data sources University of Utah study. For one year in five-county area, law enforcement officers filled out supplementary data sheet on post-crash phenomena. Supplemental data sheet requested a "yes/no" response to 4 questions. Additional data was requested for "yes" responses.

Conclusions "Twenty-nine of the 43 fires were collision-induced yielding an incidence rate of 0.12 percent in terms of vehicles. The incidence rate for the total number of accidents involving vehicles with collision-induced fires is 0.22 percent. The percentage are based on the estimated 23,624 vehicles and 12,909 accidents in the UACR study area. Fuel-fed fires were the most numerous type of collision-induced fires (23 out of 29 incidents)...Of the 43 vehicle fires, 14 were noncollision."

Author

Title **Spread of Fire From Carburettor Fires in Cars**

Corporate Source Allianz Versicherungs AG; Koeniginstrasse 28, Postfach 24 ; Munich ; West Germany

Report No. IRRD DOCUMENT NUMBER: IRRD 307982 **Date** 01/01/77

Journal Maschinenschaden Vol: 50 Issue Number: 2 Pag: pp 61-66

Abstract Carburettor fires were simulated experimentally for four cars. Special attention was paid to the speed of spread of the fire. Statistical accident cause research resulting in fire is discussed. An exact fire description and its chronological progress provide the authorities with the most valuable information.

Statistical study? No **Check of data validity?**

Statistical data sources

Conclusions German language article

Author Guenther, D.A.; Goodwin, L.G.; Thaman, R.N.

Title Forensic Analysis of Automobile Fires

Corporate Source Society of Automotive Engineers; 400 Commonwealth Drive; Warrendale ; PA; 15096

Report No. SAE 810011 **Date** 01/01/81

Journal Society of Automotive Engineers Preprints Pag: 15p

Abstract This paper presents the methodology of the investigative techniques for examining vehicular fires. Discussion illustrating the mechanical "finger prints" that show the investigating team the mechanism of fire spread is presented. The common causes of vehicular fires and examples of each are discussed. The techniques used by the forensic chemist in determining incendiary fires and the use of specialized equipment in the investigation are illustrated. Tests are discussed to show the theories postulated in the investigative stages of the vehicle examination. Lastly, the interdisciplinary team approach to the investigation is discussed showing the validity of "forensic" engineering and chemistry in examining vehicle fires.

Statistical study? No **Check of data validity?** No

Statistical data sources No statistics

Conclusions Emphasis is on the investigation and documentation of the "fingerprints" of the fire.

Author Bondy, Nancy

Title **Incidence of Fire in Plastic Fuel Tank Vehicles**

Corporate Source National Center for Statistics and Analysis, Collected Technical Studies, Vol 1: Accident Data Analysis of Vehicle Crashworthiness - Ten Papers; National Highway Traffic Safety Administration

Report No. DOT-HS-805 883, 14 pages, Vol 1 **Date** 04/01/81

Journal

Abstract This analysis compares the rate of fire occurrence in vehicles having a plastic fuel tank to those vehicles having a metal fuel tank. The Ford and Chrysler vehicles equipped with plastic fuel tanks either as standard equipment or as regular production options show no difference in their behavior in fire related accidents compared to the same vehicles equipped with metal fuel tanks. The analysis supports the conclusion that plastic fuel tanks do not present a safety problem.

Statistical study? Yes **Check of data validity?** No

Statistical data sources FARS, NCSS

Conclusions See above

Author Flora, J.D.; O'Day, J.

Title An Estimate of the Effect of FMVSS 301-Fuel System Integrity

Corporate Source Pergamon Press Limited; Headington Hill Hall; Oxford OX3 0BW ; England

Report No. HS-032 497 **Date** 06/01/81

Journal Accident Analysis and Prevention Vol: 13 Issue Number: 2 Pag: pp 117-132

Abstract Federal Motor Safety Standard No. 301-Fuel System Integrity- was first promulgated, effective 1 January 1968. Its purpose was to reduce the fatalities, injuries and damage caused by fires occurring in automobile crashes. It was subsequently strengthened (1 September 1975 and again 1 September 1976) and extended to all four wheel vehicles of Gross Vehicle Weight less than 10,000 pounds (1 September 1976). This paper uses existing police accident and fire department data from a total of 10 states to estimate the effects of FMVSS 301 on the passenger car crash population. Only very limited information on the rates of fuel spillage were found, so the paper concentrates on the rate of fires in crashes involving passenger cars. Some information on fatalities from the Fatal Accident Reporting System (FARS) is also used. Post-crash passenger car fires are rare. Reported rates ranged from less than one per thousand crashes up to nearly five per thousand crashes. Rates averaged about two fires per thousand police reported crashes or about three fires per thousand towaway crashes. Fatalities are also quite rare. In 1976, 814 persons were killed in 683 vehicles that caught fire after a crash. In 1977, 982 persons died in 858 such vehicles. Fire department data proved only of supplemental use, because a car fire could not be identified with a crash. Police accident data showed smaller post-crash fire rates with newer model year cars. While this is consistent with a beneficial effect of FMVSS 301, it could also be caused by an increasing likelihood of fire in a crash for older cars. A linear trend in age for car fire rates was statistically significant only in the Illinois data. Combining the data from 6 states showed a 16% reduction in post-crash passenger car fire rates coincident with the first promulgation of the FMVSS 301 in 1968. An additional 14% reduction occurred coincidently with the later version starting with the 1976 model year. A total reduction of 25% was estimated comparing pre-standard models with the current standard. These reductions were all statistically significant. While it was not possible to eliminate the possibility that aging contributed to the observed reductions or that other other factors could have influenced these reductions, it seems reasonable to conclude that some of the benefit resulted from the standard.

Statistical study? Yes **Check of data validity?** No

Statistical data sources Police accident data from Idaho, Illinois, Michigan, New York, Oregon, Washington . NFIRS data from Michigan, Missouri, New York, Ohio, Maryland and Oregon was used (but was of limited use because it was not possible to identify car fires with crashes (p120).Only Michigan state police records from 1978 and NCSS (National Crash Severity Study) had info on fuel spillage in crashes (p.118). FARS

Conclusions "FMVSS 301 appears to have been effective in reducing the incidence of post-crash fires by about 25% compared to pre-standard vehicles; by about 13% for the latest version of the standard, compared to the first version of the standard: and by about 16% for the first version of the standard compared to pre-standard vehicles. Other factors may have contributed to the reduction, but several possible factors apparently did not. While a reduction in post-crash fire rates associated with the standard seems reasonable, a similar reduction in fatalities could not be demonstrated. Thus, there is some question of the effect of the standard on its primary goal. The data on fatalities are far from conclusive and it is possible that a reduction may be evident when more data are available."

Author Reinfurt, DW

Title Statistical Evaluation of the Effectiveness of FMVSS 301: Fuel System Integrity

Corporate Source Center for the Environment and Man, Incorporated; 275 Windsor Street ; Hartford; CT; 06120; NHTSA, 400 7th St., S.W., Washington, D.C. 20890

Report No. DOT-HS-805969 Pag: 96p, NTIS PB82-101965 **Date** 06/01/81

Journal

Abstract This is the final report of the statistical evaluation of (FMVSS) 301 fuel system integrity. FMVSS 301 is a death-and-injury reduction standard which includes requirements (effective 1 January 1968) on the limits of leakage from the fuel tank, filler pipes, and fuel tank connections during and after 30 mph frontal barrier crashes. The data available for analysis did not permit examining the frequency of fuel system rupture and/or fuel spillage nor the bottom line result of injury and death reduction due to FMVSS 301. The 109 post-crash fire cases available from the National Crash Severity Study file permitted a descriptive analysis by standard period, car weight, impact site, object struck, type of collision, driver injury, etc. On the other hand, data from mid-1971 through 1978 crashes in North Carolina did permit an analysis of the effectiveness of FMVSS 301 through logistic regression procedures. The logistic regression models controlled for speed, impact site, and vehicle age within standard status. The first model provided a negative estimate (-0.28 with a standard error of 0.143) of the effectiveness of FMVSS 301 where the effectiveness estimate represented the percentage reduction in post-crash fire rates for the post-standard cars (ie., 1969-75 model year vehicles). Clearly the initial version of FMVSS 301 did not have the desired effect of reduced post-crash fire rates

Statistical study? Yes **Check of data validity?** No

Statistical data sources NCSS, North Carolina police accident data

Conclusions "Of the 16,610 cars in the NCSS file, 109 were involved in post-crash fires. This rules out a detailed statistical analysis for evaluating the effectiveness of FMVSS 301....In general, comparisons by various measures of accident severity indicated that post-crash fire rates were higher for more severe accidents...In summary, even considering the sample size limitations of the NCSS data file, the post-crash fire rates are elevated for those crash types, impact sites, environmental conditions, and accident severity (as measured by driver injury) where expected. Nevertheless, there is no evidence of any effectiveness of FMVSS 301 in reducing the incidence of post-crash fires in Post-Standard cars on the 109 post-crash fire NCSS cases."

Author O'Day, J.; Ruthazer, R.; Gonzales, T.

Title An In-Depth Study of Truck Fire Accident Data (Including Appendices A-F). Final Report

Corporate Source University of Michigan Transp Research Institute; 2901 Baxter Road ; Ann Arbor; MI; 48109-2150; Transportation Systems Center; 55 Broadway, Kendall Square ; Cambridge; MA; 02142

Report No. UMTRI-85-17-1;HS-039 432 **Date** 04/01/85

Journal

Abstract Truck fires which occurred in connection with fatal traffic accidents in the U.S. during 1982 are examined in detail. Additional information has been derived from a Fatal Accident Reporting System (FARS) file covering the period 1975-1982.
Fires are associated with tractor-trailers involved in fatal accidents in more than 5% of the cases, compared with about 2.5% for passenger cars. Large straight trucks exhibit a fire incidence in fatal accidents on the order of 4%.
About half of the truck fires involve burning of the truck fuel, which follows from rupture or leakage associated with severe crashes. In the long-term data a correlation is observed between the incidence of truck fires and factors relating to ambient temperature. Cause of fatal injury to truck occupants was attributed to the fire (smoke or burns) alone in 20 out of 214 burned vehicles. In another 53 cases, fire was reported as a contributing factor to an occupant fatality; in these latter cases it was generally not possible to determine from the available data whether the truck occupant would have died from traumatic injuries alone. This is the final report which also contains appendices A-F.

Statistical study? Yes **Check of data validity?** Yes

Statistical data sources FARS data for 1975-1982, UMTRI data file of 1982 FARS and BMCS information called "Truck Involvement in Fatal Accidents (TIFA)" (p.5 footnote). Data about diesel fuel flash point from U.S. Motor Vehicle Manufacturers Association. Truck fuel temperature measured in California truck inspection stations. Exposure data from R.L.Polk.

Conclusions "Over the 8-year period from 1975 to 1982 there were 29,678 combination vehicles reported in U.S. fatal accidents; of these 1,543 (or about 5%) sustained a fire...Among truck occupants who are fatally injured, approximately one of every six is in a truck which sustained a fire. Fifteen percent of truck occupant fatalities occur in connection with crash fires; large trucks leak fuel in about 6% of the cases. There is a correlation between truck crash fires and temperature related factors."

Author Kahane C.J.

Title **A Preliminary Evaluation of Seat Back Locks for Two-Door Passenger Cars with Folding Front Seatbacks**

Corporate Source National Highway Traffic Safety Administration; Office of Standards Evaluation, 400 7th Street, SW; Washington; DC; 20590;

Report No. HS-807 067 **Date** 02/01/87

Journal

Abstract The objectives of this evaluation are to determine if seat back locks (a requirement of the Federal Motor Vehicle Safety Standard 207) are effective in reducing deaths or injuries and to measure the actual cost of the locks. The study is based on statistical analyses of Washington, Texas, New York, Fatal Accident Reporting System and Multidisciplinary Accident Investigation data (with emphasis on back seat occupants, frontal crashes, and crashes involving occupant ejection or vehicle fire), sled test analyses and a cost study of production lock assemblies. It was found that the locks hold seatbacks in place in crashes when the back seat is unoccupied, but locks or other seat components often separate at moderate crash speeds when there are unrestrained back seat occupants. No statistically significant injury or fatality reductions were found for seat back locks in any of the accident data files or in the sled tests. The locks add about $14 (1985 dollars) to the lifetime cost of owning and operating a car

Statistical study? Yes **Check of data validity?** Yes

Statistical data sources FARS, Washington, Texas and New York state accident data. MDAI and NCSS. Exposure data from Polk

Conclusions 1. FARS's sample is not statistically significant to assess the effect of seat back locks on fatality risk in vehicle fires. 2. Seat back locks do not have much overall effect on occupant injuries.

Author Whitaker, E

Title Vehicle Fires - looking behind the statistics

Corporate Source BRITISH SAFETY COUNCIL; 62 CHANCELLOR'S ROAD; LONDON; W6 9RS ; UNITED KINGDOM

Report No.

Date 09/01/89

Journal FIRE PREVENTION Issue Number: 222 Pag: 33-38

Abstract The interpretation of statistics on vehicle fires can vary considerably, depending on different viewpoints. Eric Whitaker, a fire safety consultant currently working in the transportation industry, argues that the figures are often misquoted.

Statistical study? Yes **Check of data validity?** Yes

Statistical data sources

Conclusions More in-depth data taken on vehicle fires in databases may indicate that crash fires in the U.K are not rising as exponentially as they seem.

Author

Title **Insurance Special Report, A-33, Non-crash Fire Losses, 1986-88**

Corporate Source Highway Loss Data Institute, 1005 North Glebe Road, Arlington, VA 22201

Report No. Research Report HLDI A-33 **Date** 12/01/89

Journal

Abstract

Summary:
This Highway Loss Data Institute special report presents results of the noncrash fire loss experience of 1986-88 model year vehicles under comprehensive automobile insurance coverage.

Principal Findings:
-- The noncrash fire loss experience of different vehicles varied greatly. The 1986 Chevrolet Corvette registered the worst results, with losses more than seven times the average. The 1988 Chevrolet Nova had the best results with losses less than 1/10 the average.
-- For both 1986 and 1987 models, the Yugo two-door recorded the highest noncrash fire claim frequency.
-- Some models with low claim frequencies experiences very high average loss payments per claim. For example, the 1987 Mercedes-Benz 260/300 series registered a claim frequency about 1/2 the all -passenger vehicle average but an average loss payment per claim of $25,000, about seven times the average.
-- Among passenger vehicles the sports and specialty model had higher fire losses than other body styles, and regular four-door models had the lowest loss levels.
-- For all three model years, vans, pickups, and utility vehicles had much higher levels of noncrash fire losses than did passenger vehicles.
-- Four-wheel drive vehicles accounted for eight of the eleven van, pickup, and utility vehicle series with the largest noncrash fire losses.

Statistical study? Yes **Check of data validity?** No

Statistical data sources The Highway Loss Data Institute (HLDI), at the request of NHTSA, compiled the noncrash fire loss experience of 1986-88 private passenger vehicles as well as vans, pickups and utility vehicles. The report is based on data supplied by 12 insurers. The loss results presented are based on 13.6 million insured vehicle years of exposure for 1986 models, 9.4 million years for 1987 models, and 4.1 million years for 1988 models.
Source for Appendix B: NHTSA Monthly Defect Investigation Reports 1/86 - 8/89

Conclusions See "Principal Findings" above

Author Powell, A.H.

Title A Review of the Electrical Causes of Fires in Cars. Final Report

Corporate Source ERA Technology Limited; Cleeve Road; Leatherhead, Surrey; England

Report No.

Date 01/01/90

Journal

Abstract Electrical faults are believed to be the cause of 40% of non deliberate car fires in the United Kingdom. This report details work carried out by ERA Technology for the Transport and Road Research Laboratory (TRRL) to examine and identify possible causes of such fires and provide guidance towards good design practice. The main areas covered are: 1) the fire risk associated with vehicle fuses and wiring; 2) fire risks peculiar to crash and collision conditions; 3) other factors identified as being possible causes of vehicle fires; 4) a tentative listing of the factors most likely to cause electrical fires in cars; 5) initial outline design guidance to distinguish between good and bad design practices, and 6) recommendations for further work. The work was confined to passenger motor cars, and did not include vehicle testing or analysis of fire statistics .

Statistical study? No **Check of data validity?**

Statistical data sources No statistics

Conclusions In order to reduce fire risk, provide effective barriers between engine and passenger compartments, use fire retardant materials for fuel system components, protect circuits and fuses, reduce leakage and spillage from engine components like fuel pump and carburetor, insulate terminals and wires, ventilate engine compartment, and properly position ignition sources vs. flammable materials in the engine.

Author Robertson, Leon

Title **Fatal Car Fires from Rear-End Crashes: The Effects of Fuel Tank Placement before and after Regulation**

Corporate Source

Report No. **Date** 08/01/93

Journal American Journal of Public Health, Vol. 83, No.8

Abstract A federal standard for fuel tank integrity in cars was applied to 1977 and subsequent models. National data indicate that fatalities per 10,000 occupants in rear-end crashes of small cars, where fire was the most harmful event, were reduced by approximately 57% if the fuel tank was located behind the rear axle and 77% if the tank was situated directly above or in front of the rear axle.

Statistical study? Yes **Check of data validity?** No

Statistical data sources FARS, a sample of cars in used car lots, unpublished Ford Motor Co. study of tank placement in its vehicles and those of other manufacturers. Exposure data from NASS,.

Conclusions Fuel tank placement had a substantial effect on the reduction of fire-related death rates for occupants of cars struck in the rear, particularly in smaller cars. Fire-related deaths would have increased substantially as vehicles were "down-sized" had there been no change in vehicle design.

Author Tessmer, J.

Title An Analysis of Fires in Passenger Cars, Light Trucks, and Vans

Corporate Source National Center for Statistics and Analysis; Mathematical Analysis Division, 400 7th Street, SW; Washington; DC; 20590; National Highway Traffic Safety Administration; 400 7th Street, SW ; Washington; DC; 20590

Report No. HS-808 208 Pag: 97p **Date** 12/01/94

Journal

Abstract This report contains an analysis of historical data on fire occurrence in fatal and less serious crashes as a function of crash, vehicle, and driver characteristics that influence the likelihood of post collision vehicle fires. The report is organized into four sections. Data on the vehicles included in the study are for 1978 and later model years. The first two sections use 1979 through 1992 data from the Fatal Accident Reporting System (FARS). The first section contains raw cross tabulations of the data. The second section constructs multivariate statistical models. Section Three examines raw cross tabulations of data from the State of Michigan from 1982 to 1991. The Michigan police accident report (PAR) collects data on fuel leaks which are used to estimate the relationship between fires and fuel leaks. Section four is based on the National Accident Sampling System Crashworthiness Data System (NASS CDS) for burn injuries from 1988 to 1993.

Statistical study? Yes **Check of data validity?** No

Statistical data sources FARS, State of Michigan police accident reports, NASS.

Conclusions The vehicle age of cars has a statistically significant effect on fires, as does vehicle weight, higher speed limits, area of damage, rollover and objects struck. Most burn injuries occur in crashes with Delta V in excess of 20 mph. Virtually all fires that start in the fuel system (rather than the engine) are major fires.

Author

Title **Insurance Special Report, May 1995, A-48, Non-crash Fire Losses for 1986-94 Model Year Vehicles**

Corporate Source Highway Loss Data Institute, 1005 North Glebe Road, Arlington, VA 22201

Report No. Research Report HLDI A-48 **Date** 05/01/95

Journal

Abstract

Summary:
This Highway Loss Data Institute special report presents noncrash fire losses of 1986-94 model year vehicles. Losses are assessed and presented in terms of claim frequencies, average loss payments per claim, and average loss payments per insured vehicle year. All results are based on the initial three years of availability, except for 1993 models, which have available data for their initial two years, and 1994 models, which have data for one year. Although noncrash fire claims account for less than one percent of all comprehensive claims, fire losses are important due to their potential for injury to vehicle occupants and others.
--Newer models have fewer noncrash fire losses. Claim frequencies declined by 59 percent from model year 1986 to 1994 for passenger cars and 60 percent for pickups, utility vehicles and cargo vans. Overall losses decreased 30 percent from model year 1986 to 1994 for passenger cars and 38 percent for pickups, utility vehicles, and cargo vans.
--Passenger cars have a claim frequency of 3.0 claims per 10,000 insured vehicle years and average loss payment per claim of $5,755, resulting in overall losses of $1.70 per insured vehicle year for 1992-94 models. Pickups, utility vehicles, and cargo vans have a claim frequency of 4.40 claims per 10,000 insured vehicle years and average loss payment per claim of $6, 746, resulting in overall losses of $3.00 per insured vehicle year for 1992-94 models.
-- Noncrash fire losses were consistently lower for passenger cars than for pickups, utility vehicles, and cargo vans for model years 1986-94.
-- Among passenger cars, midsize station wagons and passenger vans have the lowest overall losses, and sports and luxury models have the highest overall losses.
--The Infiniti Q45 and BMW 5 Series four-door have the highest overall noncrash fire losses with results more than four times the all-passenger-car average. For pickups, utility vehicle, and cargo vans, Chevrolet Suburban 1500 four-wheel drive utility vehicles and Ford F-250 Series four-wheel drive pickups have the highest overall losses with results that are also more than four times the all-passenger-car average.
--Pickups and utility vehicles with four-wheel drive have higher overall losses than their two-wheel drive counterparts for 18 our of 21 vehicle pairs listed in this report.

Statistical study? Yes **Check of data validity?** No

Statistical data sources HLDI report is based on comprehensive coverage and loss data supplied by 14 insurers. HLDI estimates that data from these companies cover more than 50% of all new cars privately insured.

Conclusions Presents non-crash fire loss experience, with an average loss payment per insured vehicle year higher for pickups, utility vehicles and cargo vans than for passenger cars.

Author McDonald, R.; Ingram, G.K.

Title Diesel Car Regulation and Traffic Casualties

Corporate Source National Research Council; 2101 Constitution Avenue, NW; Washington ; DC; 20418; Environmental Protection Agency; 401 M Street, SW; Washington; DC ; 20460; Department of Energy; 1000 Independence Avenue, SW; Washington; DC ; 20585; Department of Transportation; 400 7th Street, SW; Washington; DC ; 20590

Report No. NTIS PB82-212705, 53 ppgs. **Date** 01/01/82

Journal

Abstract Requested by the White House Office of Science and Technology, the National Research Council made a comprehensive study of the human health effects and public policy issues associated with the prospective increase in the use of diesel-powered light-duty vehicles in the US. The authors examined the implications of the increasing use of diesel cars on traffic fatalities. Reducing vehicle weight improves fuel economy but indications are that probability of injuries or fatalities to drivers and passengers in traffic accidents is increased. In the 1990s when diesels are estimated to constitute perhaps as much as 25% of light-duty-vehicle miles traveled, several hundred fewer fatalities and several thousand fewer injuries are likely to occur per year. However, current policy is to accept potential increases in traffic casualties that accompany vehicle downsizing. If the safety features of passenger cars are not altered, a reduction in average vehicle weight of 100 pounds is estimated to increase the annual number of traffic accident fatalities by approximately 1000. Under certain circumstances these projections of fatality rates could be reduced, i.e. introduction of passive restraint systems and the potential of increased use of diesels for reducing fire -related automobile deaths.

Statistical study? Yes **Check of data validity?** No

Statistical data sources FARS, Highway Safety Research Center at the University of North Carolina, HLDI, EPA

Conclusions In autos and other motor vehicles, reducing the vehicle weight improves fuel economy....Unfortunately, when vehicle weight is reduced, the probability of injuries or fatalities in traffic accidents is increased. If safety features of passenger cars are not altered then a reduction in average vehicle weight of 100 lbs. is estimated to increase fatalities by approx. 1,000.
"...diesel vehicles appear to have a significantly lower incidence of fiery collisions."

Author Flora, J.D., Jr.; O'Day, J.

Title **Evaluation of FMVSS 301-Fuel System Integrity--Using Police Accident Data**

Corporate Source University of Michigan Highway Safety Research Institute; 2901 Baxter Road ; Ann Arbor; MI; 48109; National Highway Traffic Safety Administration; 400 7th Street, SW ; Washington; DC; 20590

Report No. UM-HSRI-82-11 Final Rpt.;HS-806 362 Pag: 136p, **Date** 03/01/82

Journal

Abstract Police accident data from Illinois (for six years) and from Michigan (for three years) were used to estimate the effect of FMVSS 301 in real crashes. The effect to be observed was a change in crash fire or fuel leakage rates associated with model years of cars or light trucks subject to the current version of FMVSS 301. Leakage data were only available in Michigan.

Fire rates were found to be quite low for current models. Passenger car crash fire rates were estimated to be about 1.5 fires per thousand crashes and light truck fire rates were about 2.4 per thousand crashes. Missing data rates could not be estimated in Michigan, but in Illinois were much larger than fire rates, ranging from 17 percent to 30 percent over the six years.

Significant reductions in passenger car crash fire rates corresponding to the 1976 version of FMVSS 301 were observed in both data sets, after adjusting for crash type, severity, and vehicle age. Leakage rates appear more directly related to other changes in models than to the standard. However, even after estimating other effects, significant reductions in leakage rates corresponding to the standard were observed. Average reductions ranged from 12 percent to 27 percent. Light truck data showed no effect in fire rates, but some reduction in leakage rates corresponding to the standard.

While it cannot be proven that the standard caused these reductions, many other possible explanations were ruled out. General changes in car design in response to litigation may have contributed to the observed reductions, particularly in leak rates.

Statistical study? Yes **Check of data validity?** Yes (p.23) Interviews with police officers on coding

Statistical data sources Michigan and Illinois police accident data

Conclusions "Whether the observed reduction in fires and leaks should be attributed to the FMVSS 301 standard, design modifications relating to fuel economy, changes dictated by the market, or to the results of litigation cannot be definitely determined. However, after adjusting for other factors such as age and crash severity, significant reductions in fire and leak rates occurred for models first subject to the FMVSS 301. It seems reasonable to conclude that the standard contributed to these reductions."

Author Parsons, GG

Title **Evaluation of Federal Motor Vehicle Safety Standard 301-75, Fuel System Integrity: Passenger Cars**

Corporate Source National Highway Traffic Safety Administration; Office of Program Evaluation, 400 7th Street, SW; Washington; DC; 20590;

Report No. Tech Rpt.;HS-806 335 Pag: 176p **Date** 01/01/83

Journal

Abstract To reduce the hazard caused by motor vehicle crash fires, Federal Motor Vehicle Safety Standard 301, Fuel System Integrity, was promulgated. Various vehicle modifications were made in response to the Standard, all intended to increase the crashworthiness of the fuel system. The objectives of this evaluation of Standard 301 are to estimate: (1) its effectiveness in reducing crash fires, injuries, and fatalities (2) the consumer cost of the Standard; (3) the cost-effectiveness of the Standard. The evaluation addresses the major version of the Standard (301-75) as it applies to passenger cars. The study is based on statistical analysis of crash fire data from five states, with primary emphasis given to data from the State of Michigan. Cost estimates are based on information obtained from the motor vehicle manufacturers. The study found that: (1) Standard 301 has significantly reduced post-crash fires in passenger car crashes; the greater reductions have occurred in the more severe crashes in terms of vehicle damage. (2) The reduction in crash fires has resulted annually in: 400 fewer fatalities, 520 fewer serious injuries, 110 fewer moderate injuries, and 6,500 fewer crash fires. (3) The Standard has increased the consumer cost of owning and operating a vehicle by $8.50.

Statistical study? Yes **Check of data validity?** No

Statistical data sources FARS, NASS, police accident data from Michigan, Illinois, North Carolina, Maryland and Pennsylvania. Cost estimates of standard implementation are derived by NHTSA on the basis of information obtained from the motor vehicle manufacturers.

Conclusions "The various vehicle modifications made in response to the standard appear to have substantially achieved their goal of reducing the problem of crash-fires."

Author

Title **Fire in the United States: 1983 - 1987 and Highlights for 1988**

Corporate Source United States Fire Administration, Federal Emergency Management Agency

Report No. FEMA - 7th edition **Date** 8/1/90

Journal

Abstract "Vehicles and other types of mobile properties include all means of transportation. They account for a larger portion of the fire problem than most people realize: 18 percent of fire deaths, 13 percent of fire losses, and 24 percent of all reported fires, nearly one in four fires ...
The vast majority of fire, casualties , and property loss from mobile property involves cars and trucks, with cars being by far the most numerous type of vehicle involved in firres. Fire department go to about as many fires involving vehicles as they do involving residences.
Mobile property fire deaths trended upwards by 11 percent over the 5-year period 1983-1987 according to the NFPA annual surveys (Figure 218). According to NFIRS, they trended upward from 1984-1987, but were higher in 1983 than 1987. It is unclear which trend is correct. Nevertheless, by either measure they involve 700-800 deaths per year.
Mobile property injuries trended downward sharply, somewhat surprising in light of the increase in deaths (Figure 219). Mobile property loss increased by 6 percent (Figure 220), and the number of mobile property fires by 5 percent (Figure 221)."

Statistical study? Yes **Check of data validity?** No

Statistical data sources NFIRS, NFPA data

Conclusions See abstract

Author Flora, J.D. (Interview)

Title **Automobile Fires in Traffic Crashes**

Corporate Source

Report No. HS-036 241 **Date** 05/01/83

Journal UMTRI Research Review Vol: 13 Issue Number: 6 Pag: 8p

Abstract How frequently do automobiles in traffic crashes catch fire, and how much has Federal Motor Vehicle Safety Standard 301 reduced post-crash vehicle fire? In this interview Dr. Jairus D. Flora discusses his examination of those questions in a research study he conducted under sponsorship of the National Highway Traffic Safety Administration.

Statistical study? Yes **Check of data validity?** No

Statistical data sources Research study on effectiveness of FMVSS 301. "We analyzed all police-reported traffic accidents that occurred in Michigan during 1978, 1979 and 1980 and in Illinois during the years 1975 through 1980."... That included "about 2.4 million passenger cars and not quite half a million light trucks...in all nine years of data." Both the Michigan and the Illinois accident report forms contain a specific question that must be answered yes or no for whether a fire occurred after a crash.

Conclusions "We were able to establish that vehicle fire rates decreased in car models manufactured after various versions of Standard 301 were put into effect. In the Illinois data on passenger cars, we found significant reductions in crash fire rates that coincided with the 1976-1977 effective dates of FMVSS 301. Light trucks did not have much evidence for effect (p.5) Fuel leakage more related to the age of the trucks.
Post-crash fires are relatively rare. They occur at rates of from 1.5 to 2.3 fires per thousand crashes of passenger cars. The rates for light trucks are slightly higher. Fuel spillage is much more frequent than fire, but still relatively rare: about 11 to 14 times per thousand police-reported crashes of passenger cars, and 16 to 19 times per thousand crashes of light trucks. Fire and leakage rates are much higher for severe crashes.
I think we can conclude from the analyses of traffic accident data that FMVSS 301 contributed, along with other influences, to reduced fire and leak rates, but we cannot reach any definite conclusion regarding the numbers of fatalities or injuries it is preventing.

Author O'Day, J.

Title **Fires and Fatalities in Tractor-Semitrailer Accidents**

Corporate Source University of Michigan Transp Research Institute; 2901 Baxter Road ; Ann Arbor; MI; 48109;

Report No. HS-036 530 **Date** 09/01/83

Journal UMTRI Research Review, Vol. 14, Issue 2, Pag.: 16p

Abstract An analysis of all 3,296 fatal traffic accidents involving tractor-semitrailer combination vehicles in 1980 established that 780 occupants of 724 road tractors were fatally injured. Among those fatalities were 125 occupants, or one in six, who were fatally injured in accidents in which the tractor caught fire. That incidence of fire-associated fatalities among occupants of diesel-fueled road tractors is 15 times as high as the corresponding fatality rate among passenger car occupants (per registered vehicles per year) and three times as high on a per-mile basis. The putative causes and some potential solutions are discussed here.

Statistical study? Yes **Check of data validity?** Yes Telephone interviews, mailed surveys

Statistical data sources UMTRI FARS/BMCS (Bureau of Motor Carrier Safety) file (created by computer-merging FARS and BMCS for 1980, then supplementing data w/ telephone interviews and mailed surveys), FARS (for 1975-1980), hard-copy police reports for 1980 for nearly all large-truck fatal involvements in the U.S. and detailed computerized data in the Collision Performance and Injury Report truck file.

Conclusions See abstract

Author Scott, R.E.; O'Day, J.

Title I Do Not Wear Safety Belts Because...

Corporate Source University of Michigan Transp Research Institute; 2901 Baxter Road ; Ann Arbor; MI; 48109; Office of Highway Safety Planning ; 111 S Capitol Avenue, Lower Level ; Lansing; MI; 48913

Report No. UMTRI-83-42 Final Rpt.;HS-036 240, 19 ppgas **Date** 09/01/83

Journal

Abstract The most frequently stated reason for not wearing safety belts given in a recent survey of Michigan licensed drivers was that they might trap an occupant in a car which had either caught on fire or was immersed in water. This report presents a series of analyses intended to explore the incidence of death from automobile fires and immersions and the association between belt usage and such deaths. A number of sources of accident data are used in the study. The Fatal Accident Reporting System (FARS), the National Crash Severity Study (NCSS), and the National Accident Sampling System (NASS), all provided by the National Highway Traffic Safety Administration (NHTSA) are used to provide nationally representative statistics. The national data are augmented by data from the states of Michigan, Pennsylvania, and Washington for a number of analyses for which these sources provide specific advantages. The analyses indicate that deaths from fire or immersion accidents are rare among traffic fatalities. The capability of self-rescue in an emergency such as fire or immersion is preserved by measures which increase the likelihood of remaining conscious. Not using restraints approximately doubles the probability of losing consciousness after a crash. The likelihood of death is over 40 times as great if one is ejected than if one remains in the car. In contrast to the low incidence of death from fire or immersion, 22 percent of the fatally injured passenger car occupants are ejected, and restraints nearly eliminate ejection.

Statistical study? Yes **Check of data validity?** No

Statistical data sources FARS, NCSS, NASS, Michigan State Police traffic accident files

Conclusions "1) Death from either fire or immersions is rare. 2) When either immersion or fire occurs, the likelihood of losing consciousness, and thus the capability of self-rescue, is approximately doubled when restraints are not used. 3) The virtue of being thrown clear is a myth. 4) In a comparison of ejected and unejected occupants of the same car, more than one-fifth of the ejected persons were killed while none of the persons remaining in cars was fatally injured. 5) Ejection is nearly eliminated by using the restraints that are currently installed in automobiles."

Author Warner, C.Y.; James, M.B.; Woolley, R.L.

Title Perspective on Automobile Crashes

Corporate Source Society of Automotive Engineers, Incorporated; 400 Commonwealth Drive; Warrendale; PA; 15096

Report No. SAE 850092;HS-039 224 Pag: pp 51-64 **Date** 01/01/85

Journal

Abstract The relatively rare occurrence of injury or fatality in fuel-fed fires has received considerable attention in automotive safety rulemaking and products liability litigation. The literature related to fatalities associated with fire is confirmed by recent FARS data, and there are no reliable field data which confirm a need for further injury-reducing effect related to FMVSS 301. NHTSA has acknowledged this by removing crash fire rulemaking from its priorities plan. The police-reported crash fire data now available must be supplemented with in-depth investigation by trained teams before informed judgements can be made regarding further safety improvements with respect to crash fire injury.

Statistical study? Yes **Check of data validity?** No

Statistical data sources FARS, Michigan state accident data

Conclusions "1) Automobile collision induced fires are statistically very rare events. 2) The literature relating to fuel-fed fire injury had not developed to an extent necessary to admit valid conclusions regarding the safety need until after the effective date of FMVSS 301-75. 3) The available accident data do not provide any statistical justification for increased performance requirements with regard to fuel system safety. 4) The 720 to 1250 annual fire-associated fatalities reported in Cooley's exhaustive 1974 study are well-substantiated by the more recent FARS data. Recent trends in this FARS statistic show a downturn since 1979. 5) The police-reported data employed for analysis in most of the crash fire statistical studies are suspect."

Author O'Day, J.; Ruthazer, R.; Gonzales, T.

Title An In-Depth Study of Truck Fire Accident Data. Appendix G: Dictionary/Codebook for the Accident File. Final Report

Corporate Source University of Michigan Transp Research Institute; 2901 Baxter Road ; Ann Arbor; MI; 48109-2150; Transportation Systems Center; 55 Broadway, Kendall Square ; Cambridge; MA; 02142

Report No. UMTRI-85-17-2;HS-039 433 **Date** 04/01/85

Journal

Abstract Truck fires which occurred in connection with fatal traffic accidents in the U.S. during 1982 are examined in detail. Additional information has been derived from a Fatal Accident Reporting System (FARS) file covering the period 1975-1982. Fires are associated with tractor-trailers involved in fatal accidents in more than 5% of the cases, compared with about 2.5% for passenger cars . Large straight trucks exhibit a fire incidence in fatal accidents on the order of 4%. About half of the truck fires involve burning of the truck fuel, which follows from rupture or leakage associated with severe crashes. In the long-term data a correlation is observed between the incidence of truck fires and factors relating to ambient temperature. Cause of fatal injury to truck occupants was attributed to the fire (smoke or burns) alone in 20 out of 214 burned vehicles. In another 53 cases, fire was reported as a contributing factor to an occupant fatality; in these latter cases it was generally not possible to determine from the available data whether the truck occupant would have died from traumatic injuries alone. This is Appendix G, which is the dictionary/codebook for the accident file.

Statistical study? Yes **Check of data validity?** No

Statistical data sources

Conclusions

Appendix B:
Information on Validation of Vehicle Fire Codes in State Databases

Alabama Sample of Fire Accidents

ARN	Date	First Harmful Event	Most Harmful Event-Vehicle 1	Most Harmful Event-Vehicle 2	Description - Fire	Others
91003520	012191	02	20	02	Vehicle 2 with no lights struck vehicle 1 then caught fire	
91008185	021091	74	02	-	Vehicle ran off roadway into ditch; after attempts to drive out of ditch, vehicle caught fire	Contributing defect: fuel system
91041134	052291	01	02	-	No mention of fire: vehicle left roadway, struck telephone service box and utility pole, and overturned twice	
91050051	062391	02	02	-	Engine compartment on fire	Contributing defect: fuel system
91078665	092191	02	02	-	Smoke and sparks dropped on floorboard from under dash; vehicle was engulfed in flames	
91088077	100591	02	20	-	Engine fire	Contributing defect: power plant
91100267	120791	02	01	-	No mention of fire: vehicle left roadway, then driver overcorrected resulting in an overturn	
92023624	032792	02	02	-	Vehicle smoke then fire	
92032115	042892	02	02	-	Vehicle left roadway, struck median, then caught on fire	
92039835	051492	02	02	-	Driver report of mechanical problems prior to fire; engine compartment fire	
92039885	052392	02	02	-	Smoke from under hood; then, vehicle burst into flames	
92043478	060292	74	02	-	Van carried an open can of gasoline; the driver who was under the influence of alcohol drove van off roadway and struck a ditch; As driver await for help, he lit up a cigarette causing van to burst into flames	
92046274	061492	02	02	-	Fire due to electrical problem	
92065831	080492	02	02	-	Engine compartment was engulfed in flames	
92085848	092392	02	02	-	Transmission exploded; fluid on the exhaust system set vehicle on fire	Contributing defect: power plant
92092467	102392	02	02	-	Odor of fuel in the passenger compartment	
92112830	102692	20	97	02	Rear end collision; no mention of fire	

Alabama Sample of Fire Accidents

ARN	Date	First Harmful Event	Most Harmful Event-Vehicle 1	Most Harmful Event-Vehicle 2	Description - Fire	Others
93001847	010793	72	02	-	Vehicle skidded off roadway and struck fence before being consumed by fire	
93015617	030493	55	02	-	Brakes locked causing vehicle to veer off road and strike tree; no mention of fire	
93020505	021193	20	20	02	Unit 1 struck unit 2 at right rear; no mention of fire	
93037081	042993	20	20	20,20,2,20	Five-vehicle collision; no mention of fire	
93046446	052793	02	02	-	Smoke; vehicle was engulfed in flames	
93051782	052793	02	02	-	Smoke from seat	
93053015	061193	02	02	-	Vehicle caught fire and burned	
93056840	070693	02	02	-	Left rear brakes and tires were on fire	
93065169	062293	20	02	97	Side collision; no mention of fire	
93065467	072393	02	02	-	Flames under the hood	
93065481	072393	02	02	-	Fire in the engine compartment	
93101932	111193	02	02	-	Smoke then fire	
93119235	121093	20	20	02	Head on collision; no mention of fire	

Alabama Fatal Fire Accidents

ARN	Date	First Harmful Event	Most Harmful Event-Vehicle 1	Most Harmful Event-Vehicle 2	Description - Fire	Other
93048933	061193	01	02	-	Vehicle ran off road and overturned; no mention of fire	
93025872	032393	55	55	-	Vehicle hit tree, overturned and caught on fire	
93007804	012393	20	20	20	Unit 1 struck cargo(logs) and semi-trailer of unit 2; then unit 1 caught on fire	
92104820	120392	55	02	-	Vehicle left roadway, collided into a tree line and burned	
92079815	091692	74	02	-	Vehicle went off road then back across road into ditch; no mention of fire	
92053992	051092	59	55	-	Vehicle struck a warning sign, then struck a pine tree before vehicle ignited and burned	
92042059	050592	61	61	-	Vehicle ran off road, struck mailboxes, continued through fence, struck a tree then caught on fire after impact	
92002172	011392	20	20	20	Vehicle struck tractor then caught on fire	
91073707	090291	55	55	-	Speeding car ran off road, and struck a tree with great impact that it split in half; after impact, vehicle caught on fire	
91036235	050191	71	71	-	Vehicle ran off road, faintly skidded before impact; engine fire	
91007982	020291	20	02	20	After head-on collision, unit 1 caught on fire	
91002767	011491	20	20	20	Vehicle 1 ran up behind slowing vehicle 2; after impact, both vehicles burned	

Note: Of the 12 fire accidents, 8 do not code FHE/MHE as fire.

Arkansas Sample of Fire Accidents

		Fire Occurrence		FHE		MHE			
ARN	Accident Date	Accident Report	Database	Accident Report	Database	Accident Report	Database	Description-Fire	Vehicle Damage Coded as Burned
654	1/7/91	0 (no fire)	1 (no fire)	10 (overturned)	10 (overturned)	V1: Overturning	10 (fire)	**Not a fire accident.**	No
949	1/7/91	0 (no fire)	1 (no fire V1) 2 (fire V2)	4 (MV in transport)	4 (MV in transport V1 & V2)	V1: Impact with V2, V2: impact with V1	4 (MV in transport V1 & V2)	**Not a fire accident.**	No
4414	1/8/91	0 (no fire)	2 (fire V1) 1 (no fire V2)	4 (MV in transport)	4 (MV in transport V1 & V2)	V1: Getting struck by V2, V2: striking V1	1 (collision with pedestrian V1) 4 (MV in transport V2)	**Not a fire accident.**	No
2452	1/25/91	0 (no fire)	1 (no fire V1) 2 (fire V2)	4 (MV in transport)	4 (MV in transport V1 & V2)	V1: Impact with V2, V2: impact with V1	4 (MV in transport V1 & V2)	**Not a fire accident.**	No
5786	2/14/91	0 (no fire)	1 (no fire)	10 (overturned)	10 (overturned)	V1: Too fast, lost control	10 (fire)	**Not a fire accident.**	No
7720	3/2/91	0 (no fire)	1 (nofire)	10 (overturned)	10 (overturned)	V1: Overturned	10 (fire)	**Not a fire accident.**	No
12831	3/7/91	0 (no fire)	2 (fire V1) 1 (no fire V2)	4 (MV in transport)	4 (MV in transport V1 & V2)	V1 & V2: Collision with MV in transport	4 (MV in transport V1 & V2)	**Not a fire accident.**	No
14285	3/9/91	0 (no fire)	1 (no fire)	10 (overturned)	10 (overturned)	V1: Overturned	10 (fire)	**Not a fire accident.**	No
16840	4/14/91	0 (no fire)	1 (no fire)	10 (overturned)	10 (overturned)	V1: Overturned	10 (fire)	**Not a fire accident.**	No

Arkansas Sample of Fire Accidents

		Fire Occurrence		FHE		MHE			
ARN	Accident Date	Accident Report	Database	Accident Report	Database	Accident Report	Database	Description-Fire	Vehicle Damage Coded as Burned
18355	4/27/91	0 (no fire)	1 (no fire V1) 2 (fire V2)	4 (MV in transport)	4 (MV in transport V1 & V2)	V1 & V2: Collision with MV in transport	4 (MV in transport V1 & V2)	**Not a fire accident.**	No
21184	5/12/91	0 (no fire)	1 (no fire V1) 2 (fire V2)	4 (MV in transport)	4 (MV in transport V1 & V2)	V1: Collision with V2; V2: collision with V1	4 (MV in transport V1 & V2)	**Not a fire accident.**	No
37712	8/9/91	0 (no fire)	1 (no fire V1 & V3) 2 (fire V2)	4 (MV in transport)	4 (MV in transport V1, V2 & V3)	V1: Impact w/V2; V2: impact w/V1 & V3; V3: impact w/V2	4 (MV in transport V1, V2 & V3)	**Not a fire accident.**	No
37790	8/13/91	0 (no fire)	2 (fire)	20 (collision with fix object ditch and fence)	19 (ditch)	V1: Struck a ditch/fence	18 (ditch)	**Not a fire accident.**	No
46510	10/4/91	0 (no fire)	1 (no fire)	20 (collision with fix object culvert)	20 (culvert)	V1: Overturned	11 (explosion)	**Not a fire accident.**	No
63062	12/3/91	0 (no fire)	1 (no fire V1) 2 (fire V2)	4 (MV in transport)	4 (MV in transport V1 & V2)	V1 & V2: Collision with MV in transport	4 (MV in transport V1) 14 (fell from vehicle V2)	**Not a fire accident.**	No
1720	1/12/92	0 (no fire)	2 (fire)	10 (overturned)	10 (overturned)	MV overturned	9 (overturned)	**Not a fire accident**	No
7926	2/26/92	0 (no fire)	1 (no fire)	4 (MV in transport)	4 (MV in transport)	V1: Hit fire plug	10 (fire)	**Not a fire accident**	No
25100	5/5/92	0 (no fire)	1 (no fire V1) 2 (fire V2)	4 (MV in transport)	4 (MV in transport V1 & V2)	V1 & V2: ST	4 (MV in transport V1 & V2)	**Not a fire accident**	No

Arkansas Sample of Fire Accidents

		Fire Occurrence		FHE		MHE			
ARN	Accident Date	Accident Report	Database	Accident Report	Database	Accident Report	Database	Description-Fire	Vehicle Damage Coded as Burned
56713	11/25/92	0 (no fire)	2 (fire)	10 (overturned)	10 (overturned)	V1: Overturned	9 (overturned)	**Not a fire accident**	No
2972	1/27/93	(no fire)	1 (no fire V1) 2 (fire V2)	4 (MV in transport)	4 (MV in transport V1 & V2)	V1 & V2: Coll. with MV in trans.	4 (MV in transport V1 & V2)	**Not a fire accident**	No
6610	2/15/93	0 (no fire)	1 (no fire)	17 (Other Non-Collision)	12 (explosion)	Submerged in water	13 (immersion)	**Not a fire accident**	No
16973	3/8/93	0 (no fire)	1 (no fire V2) 2 (fire V1)	4 (MV in transport)	4 (MV in transport V1 & V2)	V1: struck V2 V2: struck by V1	4 (MV in transport V1 & V2)	**Not a fire accident**	No

Arkansas Fatal Fire Accidents

ARN	Accident Date	Fire Occurrence	FHE	MHE	Description-Fire	Vehicle Damage Coded as Burned
23201	5/22/91	1 (fire-V1)	4 (MV in transport)	V1: Impact with V2, V2: impact with V1	V1 was traveling southbound and V2 northbound. V2 crossed the center line and the left front of V1 impacted with the left front of V2. V1 caught fire.	No
15102	4/9/91	1 (fire-V1)	4 (MV in transport)	V1: Impact with V2, V2: impact with V1	V1 was southbound and the driver fell asleep. V1 collided with V2, a northbound vehicle. V2 overturned and V1 caught fire.	Yes
29900	6/29/91	1 (fire-V1)	20 (collision with embankment)	V1: Struck embankment, caught fire	V1 was westbound and traveled into the median. the vehicle overturned, the operator was ejected. The vehicle landed on top of the operator. (MHE mentions that V1 hit the embankment and caught fire)	Yes
9305	2/28/92	1 (fire-V1) 2 (fire-V2)	4 (MV in transport)	V1: Fire occurrence, result of impact V2: Fire occurrence, result of impact	V1 was northbound and V2 was southbound. V1 attempted to pass another northbound vehicle and collided with V2. Both vehicles caught fire and were completely destroyed by fire.	Yes
11505	3/3/93	1 (fire-V1)	20 (collision with tree)	V1: Struck tree	V1 was northbound when the driver lost control and ran off the road and struck a tree. The vehicle then caught fire before witnesses could get to the occupants.	Yes
38401	7/29/93	1 (fire-V1)	20 (collision with culvert & tree)	V1: Collision with tree	V1 was going too fast and slid off the roadway, driver turned to get back on the road but the vehicle slid across the road and hit a culvert, then a tree, rolled over and caught fire.	Unknown
54103	10/12/93	1 (fire-V1)	11 (fire)	V1: Overturning and burning	V1 was traveling southbound when he lost control of his vehicle and struck a pole, gate and fence. The vehicle overturned several times and came to rest upside down and burned.	Yes

Florida Sample of Fire Accidents

ARN	Accident Date	POI – Area of Damage	FHE	FHE 2	Description	Vehicle Damage (Coded)
10917224	5/24/92	21 (fire V1)	24 (fire)	Blank	**Fire started under vehicle's hood** while in operation.	Disabling
11265353	12/18/92	21 (fire V1)	24 (fire)	Blank	While driving, driver smelled gas & smoke and pulled over. Driver left vehicle and "**the vehicle became engulfed in flames from the engine compartment.**" Metro Dade Fire Engineer #18 responded.	Disabling
12379578	10/25/91	21 (fire V1)	24 (fire)	Blank	"**The vehicle did catch on fire under the hood, in the engine compartment** area. Damage was confined to the wiring to the police radio."	Functional
12844906	3/15/91	21 (fire V1)	24 (fire)	Blank	Driver observed **smoke from engine compartment**. Driver pulled off road and fire was extinguished. Temple Terrace Fire Dept. responded. "The fire possibly started due to faulty electrical wiring, however, the exact cause is unknown."	Disabling
13223823	6/23/91	21 (fire V1)	16 (ran into ditch/culvert)	Blank	Veh, traveling at excessive speed, traveled across centerline. Driver attempted to correct and traveled onto shoulder. Veh lost control and traveled into a ditch. "**After Veh came to rest, the engine compartment caught fire as a result of the crash.**"	Functional
13315860	1/12/91	6 (V1) 2 (V2) 1 (V3)	03 (collision w/ MV left turn)	03 (collision w/ MV left turn)	V1 turned in front of V2. V2 struck V1 which caused V1 to spin. V1 was then struck by V3. "..**at which time a small fire broke out in the vehicle.**" (V1)	Disabling
13846826	9/18/91	21 (fire V1)	Blank	Blank	While traveling, **smoke was observed exiting the front end area of** the **vehicle**. Driver & passenger got out of vehicle. Engine 32 personnel responded.	Disabling

Florida Sample of Fire Accidents

ARN	Accident Date	POI – Area of Damage	FHE	FHE 2	Description	Vehicle Damage (Coded)
13873520	3/24/92	21 (fire V1)	24 (fire)	Blank	While traveling **"the engine to the vehicle caught on fire."** Jacksonville Fire Dept. Fire Unit #9 responded.	Disabling
13934283	5/29/91	21 (fire V1)	21 (MV hit sign/sign post)	24 (Fire)	Veh ran off road and struck sign and **"caught on fire."** Driver fled the scene. H.C.F.D. Eng 20 Cpt. Morrison responded to put out fire. Morrision did not think it was arson.	Disabling
14796941	5/6/92	21 (fire V1)	24 (fire)	Blank	While traveling driver smelled gas and saw smoke inside vehicle. "D1 stopped V1 and **V1 burned from the engine area to the front passenger seat."**	Disabling
15107333	5/17/92	02 (V1)	18 (overturned)	24 (fire)	Driver fell asleep, ran a stop sign and traveled across intersection. Veh dropped into large drainage culvert and turned upside down. **Veh "caught fire and was mostly consumed by fire** before St. Lucie Fire Unit #6 engine which had responded.." Driver	Disabling
15170397	4/21/92	21 (fire V1)	25 (collision w/ animal)	13 (MV hit tree/ shrubbery)	Veh struck an alligator in the roadway. Veh began to skid and slid into some trees. Veh came to a final rest.	Disabling
15231456	2/11/92	21 (fire V1)	24 (fire)	Blank	Vehicle "..**caught on fire for no apparent reason**, driver then pulled over and called the fire department."	Disabling
15231702	4/16/92	21 (fire V1)	24 (fire)	Blank	Veh stopped at traffic light. **"due to unknown reasons, veh 1 began to burn in the engine area making the vehicle inoperable."**	Disabling
16402680	8/9/92	21 (fire V1)	09 (MV hit utility pole/light post)	Blank	Vehicle hit a light pole. Fire Rescue # 9 on scene. Driver under the influence.	Disabling
301190830	1/12/93	4 (V1) 1 (V2)	03 (collision w/ MV in transport - angle)	34 (fire)	V1 drove in front of V2, V2 applied brakes but was unable to stop. V2's front struck V1's right side (**V1 is a '80 chev truck w/ gas tank unprotected**). **"Both V1 and V2 caught fire."**	Disabling

Florida Sample of Fire Accidents

ARN	Accident Date	POI – Area of Damage	FHE	FHE 2	Description	Vehicle Damage (Coded)
301193100	10/30/93	1 (V1) 1 (V2)	02 (collision w/ MV in transport/ head-on)	34 (fire)	Driver 1 saw V2 traveling head-on. Both vehicles turned to avoid collision. Both vehicles collided head-on. **V2 "caught fire at final rest."** Sunrise Fire Rescue on scene.	Disabling
301494230	12/19/93	1 (V1) 8 (V2)	03 (collision w/MV in transport-angle	Blank	V2 stopped, waiting to make turn . V1 did not have headlights on, failed to see V2 and struck V2.	Disabling
302059110	12/22/93	1 (V1)	29 (MV ran into ditch/culvert)	34 (fire)	Veh being pursued by Sheriff. Veh drove through several public parking lots and struck a culvert. **"The interior of Veh then caught on fire."**	Disabling
303706700	4/2/93	6 (V1)	34 (fire)	Blank	Right wheel tire of Veh began to smoke. **"The right rear inside tire blew causing the tire to catch on fire."** Veh pulled off road. Fire was extinguished by Engine 30, Jacksonville Fire Dept. Veh was towed from scene.	Disabling
304656940	4/24/93	21 (fire V1)	34 (fire)	Blank	"...**when veh caught fire**. Driver pulled veh to emergency lane and **veh burst into flames.**"	Disabling
305867790	4/26/93	15 (V1)	34 (Fire)	Blank	According to driver, "..**vehicle lost power & caught fire**..." Driver came to controlled stop.	Disabling
307124150	12/10/93	2 (V1)	29 (MV ran into ditch/culvert)	34 (fire)	Veh, traveling at excessive speed, crashed into a ditch. "After the crash driver or other person **removed the gas cap and put unknown object in filler neck and set it on fire"**. Fire damage was contained in the trunk. Macclenny Fire Dept. on scene.	Disabling
308999530	10/14/93	21 (fire V1)	34 (fire)	Blank	Driver noticed smoke coming from under the hood and pulled over. **"The vehicle caught on fire."** Fire Engine 4 responded.	Disabling

Florida Sample of Fire Accidents

ARN	Accident Date	POI – Area of Damage	FHE	FHE 2	Description	Vehicle Damage (Coded)
310084620	11/25/93	21 (fire V1)	34 (fire)	Blank	"**Due to some unknown mechanical problem the engine compartment caught on fire.**" Fire was extinguished by the Hillsborough County Fire Dept. - Riverview Station #16.	Disabling
310352520	3/21/93	21 (fire V1)	34 (fire)	Blank	Driver stated that while driving, the vehicle's engine stopped. Driver saw "**smoke and flames coming from underneath the hood.**" Quincy Fire Dept. responded.	Disabling
310352900	5/8/93	21 (fire V1)	34 (fire)	Blank	Driver stated that the vehicle stalled. "**At this time she noticed that the vehicle was on fire in the engine department.**" Fire was extinguished by Quincy Public Safety Dept. Fire truck. Cause of fire unknown.	Disabling
310797940	7/6/93	21 (fire V1)	34 (fire)	Blank	"**Due to unknown reasons caught on fire within engine compartment.**" Tampa Fire responded.	Disabling
314703790	9/6/93	3 (V1)	31 (overturn)	35 (explosion)	V1 overturned, striking the roadway with it's right front. Vehicle slid across three lanes and came to rest on the shoulder, "**where it burst into flames and burned.**"	Disabling
317052730	11/30/93	1 (V1) 8 (V2)	01 (collision w/ MV in transport/ rear-end)	34 (fire)	V1 rear ended V2. "**Veh 2 (a propane truck) caught fire due to impact** but was extinguished when driver turned valves off."	Functional

Florida Fatal Fire Accidents

ARN	Accident Date	POI – Area of Damage	FHE	FHE 2	Description	Vehicle Damage (Coded)
113094601	02/16/91	14 (V1)	23 (collision w/ fixed object above road)	18 (overturned)	V1, at high rate of speed, drove into median strip divider. Left front end struck a concrete pole structure. V1 rolled over. **"V1 caught on fire and burned." "Interior of V1 completely burnt..". "Third harmful event "24" fire."**	Disabling
133913517	03/05/91	1(V1)	13 (MV hit tree/shrubbery)	24 (fire)	Driver of V1 drove off the roadway and onto the grass shoulder. V1 struck a speed limit sign and continued on grass shoulder and struck a large tree head-on. **"V1 caught fire a few moments later."**	Disabling
15638553	06/09/91	1 (V1) 14 (V2)	10 (collision w/ MV in transport head-on)	18 (overturned)	"V1 crossed centerline into path of V2. V1's front struck V2 left front causing V2 to run off roadway & overturned. **"After V2 overturned it then caught on fire and was completely destroyed."**	Disabling
15239865	07/29/91	1 (V1) 8 (V2)	1 (collision w/ MV in transport rearend)	Blank	V1 failed to slow down as it was approaching V2 from the rear and rearended V2. V2 came to stop on shoulder. **"D1 was removed from V1 prior to my arrival, due to a car fire."**	Disabling
130340730	08/04/91	9 (V1) 2 (V2)	03 (collision w/ MV in transport left turn)	24 (fire)	V1 failed to yield right of way to V2; V2 rearended V1. **"V1 spun 2 or 3 times and caught fire." "Both vehicles sustained heavy damage."**	Disabling
15051621	09/21/91	10 (V1) 1 (V2)	02 (collision w/ MV in transport angle)	24 (fire)	V1, traveling at high rate of speed, lost control of vehicle. V1 slid off roadway and across median into path of V2. Front of V2 struck left rear of V1. **"The driver of V1 was ejected from the vehicle. The collision started a fire and V1 completely burned."** After impact V2 slid off road onto shoulder.	Disabling

Florida Fatal Fire Accidents

ARN	Accident Date	POI – Area of Damage	FHE	FHE 2	Description	Vehicle Damage (Coded)
125801555	05/17/92	21 (fire V1))	16 (MV ran into ditch/culvert)	Blank	V1, at an undetermined high rate of speed, failed to negotiate a right turn onto exit ramp. V1 left roadway veering into grass median & struck a concrete culvert. **"The impact was head on. The vehicle then caught on fire with driver & passenger still inside the vehicle."**	Disabling
14946538	09/19/92	1 (V1) 1 (V1)	10 (collision w/ MV in transport head-on)	24 (fire)	V1 drove off onto shoulder & back into lane. Both V1 & V2 applied brakes. V1 & V2 struck right front to right front causing V1 to rotated. **"V1 ignited and burned until flames were extinguished."**	Disabling
30347031	03/14/93	2 (V1)	26 (collision w/fixed object above road)	31 (overturned)	V1 left roadway striking a decorated light building. V1 "flipped over while going down an embankment." Driver 1 was ejected. V1 came to rest on top of driver. "V1 caught fire and burned." Unknown if any vehicle defects.	Disabling
31534217	10/27/93	5 (V1)	27 (MV hit other fixed object)	17 (MV hit utility pole/light pole)	For some unknown reason V1 veered off pavement onto should. V1 began to rotate on grass should & struck a mailbox and cactus. V1 continued striking culvert. V1 went airborne & struck a power pole. V1 rolled over striking a fence post coming to rest in grass field. **"V1 then caught fire where it consumed V1 and V1 driver."**	Disabling
30845337	11/04/93	12 (V1)	29 (MV ran into ditch/culvert)	22 (MV hit tree/ shrubbery)	V1 drove to the centerline and into ditch. V1 continued in the ditch and struck a tree with left side. **"V1 caught fire and burned due to the crash."**	Disabling

Maryland Sample of Fire Accidents (1977-92)

				Vehicle #1				Vehicle #2				
ARN	Date	Primary Cause	Second Cause	Damage 1	Damage 2	Damage 3	Contributing Circumstance	Damage 1	Damage 2	Damage 3	Contributing Circumstance	Description - Fire
5006350	062291	52	95	13			52					Engine problems then caught on fire
5134646	050492	13	06	02	10	13	95					Vehicle hit island light pole to avoid collision. One witness noted fire.
5166741	072491	52	50	13	12		52					Vehicle overheat; engine compartment on fire
5171220	101691	52	94	12			52					Flames emerging underneath the hood; Vehicle became engulfed in flames
5185101	011891	05	95	06	13		05	02			95	
5207160	083191	52		13			95					Smoke from engine; vehicle consumed by flames
5208508	031791	03	20	12	13		03	12			95	Vehicle was on fire after impact; after two days, smell of burnt marihuana inside vehicle noted
5272195	101291	06	52	02	03	01	06	04	02		95	Vehicle #1 engine compartment on fire before impact; smoke poured out of car's rear; after impact, car burst into flames
5334920	100491	52	50	14	13		95					Fire caused by faulty electrical wiring under dashboard

Maryland Sample of Fire Accidents (1977-92)

				Vehicle #1				Vehicle #2				
ARN	Date	Primary Cause	Second Cause	Damage 1	Damage 2	Damage 3	Contributing Circumstance	Damage 1	Damage 2	Damage 3	Contributing Circumstance	Description - Fire
5456799	011491	52	95	13			52					Relay box in the conversion van caught fire
5457287	052591	52	52	13			52					Engine oil leaked out; engine overheated causing fire
5521559	021592	50	52	02	13		50					Fire from engine compartment
5575124	050592	03	21	11	13		03					After striking an embankment and rolling over, vehicle was engulfed in flames caused by contact of oil with hot exhaust manifold
5635584	042891	52	50	13			52					Flames erupted from the engine compartment
5640833	103092	06	21	02	01	03	06	04	12	13	95	
5677067	041992	52	94	02			52					Engine caught fire
5704982	011892	92	20	01	02		92	06			95	**NOT FIRE ACCIDENT**
5707686	071491	52	50	13			52					Small electrical fire underneath the hood
5739096	100591	73	52	12	13		73	13			20	Motorcycle burst into flames after hitting a deer; vehicle from other direction ran through fire and caught fire in front.
5742419	031692	52	52	14	13		52					Small engine fire underneath the hood

Maryland Sample of Fire Accidents (1977-92)

				Vehicle #1				Vehicle #2				
ARN	Date	Primary Cause	Second Cause	Damage 1	Damage 2	Damage 3	Contributing Circumstance	Damage 1	Damage 2	Damage 3	Contributing Circumstance	Description - Fire
5754705	102192	52		13			52					Smoke from console before flames erupted
5838931	061791	52	94	13			52					Fire in bed of pickup; burned finger

Maryland Sample of Fire Accidents (1993)

ARN	Date	FHE	SHE	Vehicle #1		Vehicle #2		Description - Fire
				Caught Fire	Hazardous Material Spill	Caught Fire	Hazardous Material Spill	
6002907	60293	01	00	N	N	N	N	**NOT FIRE ACCIDENT**
6168122	100793	15	00	Y	N			Engine trouble then caught fire
6574251	71693	15	00	Y	N			Fire started under dash near firewall separating engine comp. from passenger comp.
6581323	71093	15	00	Y	N			Smoke from dash then flames
6651365	92993	01	00	Y	N	N	N	
6665555	91093	01	00	N	N	N	N	**NOT FIRE ACCIDENT- typing error for caught fire**

Maryland Fatal Fire Accidents

				Vehicle #1				Vehicle #2				
ARN	Date	Primary Cause	Secondary Cause	Damage 1	Damage 2	Damage 3	Contributing Circumstance	Damage 1	Damage 2	Damage 3	Contributing Circumstance	Description - Fire
4261044	11/7/91	01	12	12			01					Vehicle did 360 degree turn before sliding into median and becoming engulfed in flames
5194092	4/2/91	12	20	11	12	13	12					Vehicle struck guardrail, flipped end over end down over the embankment; Veh. overturned & caught fire
5490441	12/13/92	02	21	02	08	13	02					Struck a tree; rotated off tree & rear struck a 2nd tree. Fire started in the engine compartment & burned interior of vehicle
5589771	2/28/92	01	20	13			01					Speeding car struck a dirt embankment, and rear struck a road sign then a tree; vehicle was destroyed by fire

Maryland Fatal Fire Accidents

ARN	Date	Primary Cause	Secondary Cause	Vehicle #1 Damage 1	Vehicle #1 Damage 2	Vehicle #1 Damage 3	Vehicle #1 Contributing Circumstance	Vehicle #2 Damage 1	Vehicle #2 Damage 2	Vehicle #2 Damage 3	Vehicle #2 Contributing Circumstance	Description - Fire
5624897	4/9/92	12	94	12	13		12					Vehicle struck a guardrail, then a sign support pole, then a linear post, then a tree; vehicle became engulfed in flames

Notes:
1. Vehicle damage coded 13 = fire/explosion
2. Primary & secondary cause coded 52 = fire
3. Contributing circumstances coded 52 = fire

Michigan Sample of Fire Accidents

ARN	Accident Date	FHE 1	FHE 2	FHE 3	Description
45999	1/20/94	V1=17 (MV in trans) V2=08 (fire/explosion) V3=17 (MV in trans)			V3 applied brakes and skidded sideways across 3 lanes. Was struck by V1 and V2.
65355	2/4/94	V1=08 (fire/explosion)			V1 became stuck in a snow drift. The driver was attempting to free the vehicle when it **caught fire**.
74703	1/6/94	V1= 08 (fire/explosion) V2=17 (MV in trans)	V1=17 (MV in trans)		V1 slid through stop sign and struck V2 in left side.
87669	3/29/94	V1=01 (loss of control) V2=01 (loss of control)	V1=08 (fire/explosion)		Note: No remarks concerning the accident.
98473	3/6/94				Note: Wrong report sent.
102445	3/29/94	V1=08 (fire/explosion)	V1=15 (pedestrian)		The driver of V1 struck a pedestrian without realizing what had happened. The pedestrian, who had been drinking, suffered a hand injury but was able to move and walk afterwards.
103699	4/7/94	V1=08 (fire/explosion) V2=17 (MV in trans)	V1=17 (MV in trans)		V1 could not stop in time and struck V2 while traveling in rush hour stop and go traffic.
132071	4/30/94	V1=08 (fire/explosion) V2=08 (fire/explosion)	V2=17 (MV in trans)		V2 slowed down for traffic and was hit by V1. Both drivers attempted to avoid the accident but could not. The roadway was wet.
156757	5/21/94	V1=08 (fire/explosion) V2=17 (MV in trans)	V1=03 (ran off road right)		V1 struck V2 and continued into a ditch where it then **started on fire**.
161987	5/26/94	V1=08 (fire/explosion) V2=17 (MV in trans)	V1=17 (MV in trans)		When the vehicle in front of V2 stopped suddenly, V2 stopped suddenly and was struck in the rear by V1.
164103	4/5/94	V1=01 (loss of control) V2=08 (fire/explosion)			V2 was stopped in the roadway. V1 attempted to stop, but lost traction on the wet pavement and struck V2. Weather was rain mixed with snow.
167274	6/4/94	V1=35 (ditch)	V1=08 (fire/explosion)		V1 was found in a ditch partially **destroyed by fire**. The driver had fled the scene (alcohol was suspected).

Michigan Sample of Fire Accidents

ARN	Accident Date	FHE 1	FHE 2	FHE 3	Description
176002	3/14/94	V1=08 (fire/explosion)			V1 was stopped when the engine stalled. Attempts to restart the motor caused the engine to **start on fire**.
176274	6/24/94	V1=03 (ran off road right) V2=08 (fire/explosion)	V2=17 (MV in trans)		V1 stopped for traffic and was rear-ended by V2.
179118	5/10/94	V1=08 (fire/explosion)			V1 began to smoke from under the hood and eventually **caught fire**. The fire was the cause of a mechanical failure. Damage was located under the hood area and front portion of the cab area.
180603	6/3/94	V1= 08 (fire/explosion) V2= 08 (fire/explosion)	V1=17 (MV in trans) V2=17 (MV in trans)		V2 stopped for a vehicle that had made a quick stop and was then rear-ended by V1 which could not stop in time.
187671	4/28/94	V1=08 (fire/explosion) V2=17 (MV in trans)			V2 slowed for traffic and was rear-ended by V1.
204840	7/8/94	V1=08 (fire/explosion)	V1=01 (loss of control)	V1=25 (guardrail face)	V1 failed to see a curve. The posted speed for the curve was 20 MPH; damage to the vehicle indicated thedriver was exceeding this speed.
210637	7/18/94	V1=08 (fire/explosion)	V1=03 (ran off road right)	V1=35 (ditch)	When V1's engine began to knock loudly, the driver pulled onto the shoulder. Both occupants exited V1 when **flames were noticed** coming out of the engine compartment. Since they could not put it into park, the vehicle rolled off the roadway into a ditch.
218716	6/11/94	V1=08 (fire/explosion)			V1's engine **caught on fire** for an unknown reason. The driver was able to steer the vehicle onto the shoulder of the road and exit without any harm. The fire was extinguished by the fire department
230177	8/6/94	V1=08 (fire/explosion)			A "big thump" was heard and then V1 began **smoking**. The driver stopped the vehicle on the shoulder but it was **burning**.

Michigan Sample of Fire Accidents

ARN	Accident Date	FHE 1	FHE 2	FHE 3	Description
233231	8/17/94	V1=08 (fire/explosion)			While traveling, V1 **caught fire** and the driver pulled over; the fire was put out by the fire department.
262430	8/24/94	V1=08 (fire/explosion) V2=08 (fire/explosion)	V1=17 (MV in trans) V2=17 (MV in trans)		The driver of V1 wanted to switch lanes and did not see V2 which had entered the left turn lane and was slowing for the light. V1 ran onto V2.
271176	9/9/94	V1=08 (fire/explosion)			When V1 began to overheat, the driver stopped at a service station and was advised that it would be okay to continue traveling with caution. V1 **caught fire** however, apprx. 78 miles later.
276442	9/23/94	V1=08 (fire/explosion)	V2=17 (MV in trans)		V1 slowed down and stopped for another vehicle with a flat tire and was struck in the rear by V2.
296288	7/28/94	V1=00 (uncoded)	V2=08 (fire/explosion)		V1 ran a red light and struck V2 as it proceeded through an intersection with a green light.
307833	10/15/94	V1=08 (fire/explosion) V2=08 (fire/explosion)	V1=17 (MV in trans) V2=17 (MV in trans)		The driver of V2 started to make a left turn but stopped for V1 as it ran a red light. V1 struck her vehicle in the rear bumper (minor damage).
329301	10/31/94	V1=08 (fire/explosion) V2=08 (fire/explosion)	V1=17 (MV in trans) V2=17 (MV in trans)		V1 and V2 were both eastbound. When V2 slowed for traffic, V1 attempted to stop but slid into the back of V2 causing minor damage to both vehicles. V1 had a small utility trailer attached.
351598	11/6/94	V1=08 (fire/explosion) V2=08 (fire/explosion)			V2 stopped for traffic and was struck by V1.
423920	12/22/94	V1=08 (fire/explosion)			Two deer ran out in front of V1. The driver was able to avoid the first one but the second deer hit the left front of the vehicle and bounced back, striking the left front door and window. This caused the glass to shatter and severe damage to the door.

Michigan Fatal Fire Accident

ARN	Accident Date	FHE 1	FHE 2	FHE 3	Description
382258	12/6/94	V1=17 (MV in trans) V2=17 (MV in trans)	V1=03 (ran off road left)	V1=08 (fire/explosion)	V2 was slowing to make a left turn when it was rear-ended by V1.

New York Sample of Fire Accidents

ARN	Date	First Harmful Event	Second Harmful Event-Vehicle 1	Second Harmful Event-Vehicle 2	Description - Fire	Description - Vehicle Damage
2210357	030592	23	32	-		
2258006	040292	32			Flames shooting out underneath the hood	Interior burnt; engine burnt; exterior damaged/burnt
2339403	052392	32	-	-	Fire in engine compartment; cause of fire: faulty fuel line; hazardous material 10 lb. liquid propane in rear of vehicle not involved	
2365682	060692	23	32	-	After hitting a ditch, impact caused electrical short resulting in vehicle fire	
2386060	061492	32	-	-	Engine compartment caught fire	
2387407	061592	-	32	32	Collision of passenger car with motor bike	
2410046	062892	01	32	-	Vehicle was first struck before striking a parked vehicle; caught fire afterwards	
2573323	100192	15	32	-	To avoid collision with other vehicle, vehicle struck tree before bursting into flames	
2575674	100392	32			Smoke came out; As driver tried to stop car, car was backing hitting another car	
2649325	111292	32	-	-	Engine fire	
2663004	111792	12	32	-	Vehicle slipped on icy roadway, struck guide rail, flipped over, then caught fire	
2725797	121392	22	31	-	NOT A FIRE ACCIDENT (FHE=22 looked like a 32)	
2736867	121892	01	32	-	Collision between speeding car and school bus resulted in fire	Fire damage in vehicle 1
3206698	030393	32			White smoke under the hood and dashboard	Caught on fire; burned up
3226730	031393	32			Car stuck in snow then went on fire	Fire damage
3277889	041193	01	-	32	After car struck the rear of other car, it veered off the road, then struck a tree and burst into flames	
3324447	050993	01	32	-	Vehicle 1 struck vehicle 2 (no mention of fire in description)	
3332875	051493	30	-	-	NOT A FIRE ACCIDENT (mistyped FHE=30)	
3382925	061193	31	32	-	No mention of fire; driver error caused vehicle to leave roadway and come to rest on its side	

New York Sample of Fire Accidents

ARN	Date	First Harmful Event	Second Harmful Event-Vehicle 1	Second Harmful Event-Vehicle 2	Description - Fire	Description - Vehicle Damage
3542633	090893	12	32	-	Tractor struck guide rail, sign, and bridge rails; then caught fire; tractor with load of lumber was destroyed by the fire	
3576825	090493	01	-	32	Head on collision but no mention of fire	
3583141	092993	15	32	-	Struck tree, then caught fire	
3641183	101493	01	23	32	After being struck by vehicle 1, vehicle 2 becomes engulfed in fire	
3634828	102593	31	32	-	Steering wheel locked causing vehicle to roll over and catch on fire	
3638043	102793	01	32	23	After striking vehicle 1, vehicle 2 veered off, came to rest on embankment and became consumed by fire	
3650089	110193	32	-	-	Smoke from dashboard; then vehicle became engulfed in flames	
3680568	111793	32			Smoke coming out of hood	Electrical wiring melted
3682634	111893	30	32	-	Vehicle struck house; engine compartment ???	

New York Fatal Fire Accidents

ARN	Date	First Harmful Event	Second Harmful Event-Vehicle 1	Second Harmful Event-Vehicle 2	Description - Fire	Description - Vehicle Damage
2185093	050292	12	11	-	Vehicle veered off striking a guide rail, then a pole; vehicle was engulfed in flames	
2383706	071092	12	15	-	Vehicle drove off highway, struck guide rail, then a tree; vehicle burst into flames	
2383714	080792	15	32	-	Vehicle drove off roadway, struck several trees before igniting and becoming fully engulfed in flames	
2424046	091292	15	-	-	Vehicle veered off roadway striking a large tree; after impact, vehicle caught on fire	
2613394	121892	1	32	22	Two-vehicle collision; page 2 of accident description not attached	
3100288	030693	11	15	-	Speeding car left roadway, struck a utility pole, then a tree; after coming to a stop, vehicle burst into flames	
3282289	081593	21	15	-	Vehicle left roadway, struck a tree, overturned, and caught on fire	
3367616	092493	14	15	-	Speeding car left road, struck a street sign, a tree then a second tree; shortly after, car started on fire	

North Carolina Sample of Fire Accidents

ARN	Accident Date	Post Crash Fire (Yes or No)	Rollover (Yes or No)	Description - Fire	Vehicle Drivable (Yes or No)
006189	1/12/93	(V1) N (V2) N	(V1) N (V2) N	V2 sideswiped V1. No mention of fire.	(V1) Y (V2) Y
013795	1/30/92	(V1) Y	(V1) N	V1 ran off road, struck a ditch." **V1 caught on fire after impact.**" Driver fell asleep.	(V1) N
024079	2/16/93	(V1) N (V2) N	(V1) N (V2) N	V1 struck by V2. Noted V1 excessive speeding. Discrepancies in narrative and coded info between V1 and V2. No mention of fire.	(V1) N (V2) Y
029562	2/26/93	(V1) N (V2) N	(V1) Y (V2) N	V2 rear ended V1. V1 came to rest in ditch. V2 came to stop on shoulder. No mention of fire.	(V1) N (V2) N
031251	3/5/92	(V1) Y (V2) N	(V1) Y (V2) N	1 failed to see V2 and struck V2 in right rear. V1 went off road, striking ditch embankment and overturned in ditch. No mention of fire.	(V1) N (V2)Y
044942	4/6/91	(V1) N (V2) N	(V1) N (V2) N	V1 struck V2. V1 came to rest on shoulder. V2 spun around and stayed on freeway. No mention of fire.	(V1) Y (V2) Y
052087	4/19/91	(V1) N (V2) Y	(V1) N (V2) N	V1 failed to see V2 causing the accident. Diagram shows V1 striking V2. No mention of fire.	(V1) Y (V2) Y
064625	5/13/91	(V1) N (V2) Y	(V1) N (V2) N	V1 collided with V2. No mention of fire.	(V1) N (V2) not coded.
067108	5/3/93	(V1) N (V2) N	(V1) N (V2) N	V1 (bicycle) was traveling on sidewalk. V2 struck V1. No mention of fire.	(V1) Y (V2) Y

North Carolina Sample of Fire Accidents

ARN	Accident Date	Post Crash Fire (Yes or No)	Rollover (Yes or No)	Description - Fire	Vehicle Drivable (Yes or No)
067642	5/4/93	(V1) N (V2) N	(V1) N (V2) N	V1 attempted to pass V2, and V2 sped up. When V1 tried to pass V2, V2 sped up and V1 struck V2. No mention of fire.	(V1) Y (V2) Y
071725	5/11/93	(V1) N (V2) N	(V1) N (V2) N	V1 pulled out in the path of V2 and both vehicles collided. No mention of fire.	(V1) Y (V2) Y
071836	5/21/92	(V1) Y	(V1) Y	V1 accelerator ?, went out of control and struck a ditch. V1 overturned and **"then burst into flames"**. Deputy said V1 " was at a very high idle **before it caught fire."**	(V1) N
082824	5/30/93	(V1) N	(V1) Y	V1 ran off road and lost control. V1 traveled onto the shoulder, overturned and came to rest. Alcohol used. No mention of fire.	(V1) N
086971	6/24/91	(V1) N (V2) Y	(V1) not coded (V2) not coded	V1 pulled out in front of V2. No mention of fire.	(V1) Y (V2) N
088617	6/20/92	(V1) N (V2) N	(V1) N (V2) N	V1 stopped for traffic. V2, unable to reduce speed, rear ended V1. No mention of fire.	(V1) Y (V2) Y
098395	6/27/93	(V1) N	(V1) Y	V1, unable to stop for stopped vehicle, swerved to avoid striking vehicle. V1 lost control . V1 traveled into ditch causing vehicle to overturn & coming to rest in ditch. No mention of fire.	(V1) N
113992	7/24/93	(V1) N	(V1) Y	V1 ran off road and driver lost control. As V1 "traveled off the shoulder V1 flipped and turned over on its top." Driver stated she attempted to avoid oncoming traffic and lost control. No mention of fire.	(V1) N

North Carolina Sample of Fire Accidents

ARN	Accident Date	Post Crash Fire (Yes or No)	Rollover (Yes or No)	Description - Fire	Vehicle Drivable (Yes or No)
119314	8/3/93	(V1) Y (V2) N	(V1) N (V2) N	V2 failed to see V1 and collided with V1. No mention of fire.	(V1) N (V2) N
119319	8/15/92	(V1) N (V2) Y	(V1) N (V2) N	V1 ran off roadway, crossing the median and collided with V2. No mention of fire.	(V1) N (V2) N
119712	8/3/93	(V1) N (V2) N	(V1) N (V2) N	V2 slowed to turn into private driveway. V1 started passing V2 and collided with V2 on left side. V1 came to stop on highway & V2 came to stop on a private driveway. Alcohol use noted. No mention of fire.	(V1) N (V2) Y
123227	8/9/93	(V1) N (V2) N	(V1) N (V2) N	V1 ran stop sign and struck V2 on right passenger side. The impact caused V2 to spin and strike a fence (??). Driver 1 stated he did not see V2. No mention of fire.	(V1) Y (V2) Y
126973	9/7/91	(V1) Y	(V1) Y	V1 lost control, ran off roadway, came back on road, and went off other side of road into a field. V1 overturned "**caught on fire.**" Unable to locate driver." Several violations noted including exceeding speed limit.	(V1) N
153092	10/14/92	(V1) N (V2) N	(V1) N (V2) N	V2 slowed for traffic and V1 rear ended V2. Failure to reduce speed was noted. No mention of fire.	(V1) Y (V2) Y
153547	10/26/91	(V1) N (V2) N	(V1) N (V2) N	V1 attempted to pass V2. At same time V1 attempted to make a right turn and V1 struck V2. V1 was found at fault. No mention of fire.	(V1) Y (V2 Y

North Carolina Sample of Fire Accidents

ARN	Accident Date	Post Crash Fire (Yes or No)	Rollover (Yes or No)	Description - Fire	Vehicle Drivable (Yes or No)
161716	10/12/93	(V1) N (V2) N (V3) N	(V1) N (V2) N (V3) N	V2 and V3 were stopped for a fire traffic signal. V1 rear ended V2 causing V2 to collide with V3. No mention of fire.	(V1) Y (V2) Y (V3) Y
164751	11/2/92	(V1) N	(V1) Y	V1 traveling on construction site when the dirt road gave away causing the tractor trailer to overturn. No mention of fire.	(V1) N
175022	11/17/92	(V1) N (V2) N (V3) N	(V1) N (V2) N (V3) N	V2 (tractor trailer) was stopped at light. V1 stopped behind V2. V3 (another tractor trailer) did not see V1 and pushed V1 under and onto the back of V2 trailer. No mention of fire.	(V1) Y (V2) Y (V3) Y
175044	10/30/93	(V1) Y	(V1) Y	V1 was attempting to make a turn at excessive speed. Driver applied brakes, skidded and came to stop on steep embankment. V1 rolled over one time and came to rest on passenger side. No mention of fire.	(V1) N
197429	12/2/93	(V1) N	(V1) N	V1 struck a deer. No mention of fire.	(V1) Y
204522	12/12/93	(V1) Y	(V1) Y	V1 ran off roadway, struck a telephone junction box. V1 flipped over several times. Driver stated he was very tired. No mention of fire.	(V1) N

North Carolina Fatal Fire Accidents

ARN	Accident Date	Post Crash Fire (Yes or No)	Rollover (Yes or No)	Description - Fire	Vehicle Drivable (Yes or No)
038113	3/24/91	(V1) Y	(V1) Y	Speeding, V1 lost control on a curve and skidded into a tree. Became airborne, flipped 33 ft. in the air and struck a utility pole. Came to rest on the top and then **burst into flames.**	(V1) N
064290	5/12/91	(V1) Y	(V1) Y	Traveling at excessive speed, V1 ran off road and struck a guardrail and then a ditch bank. Overturned twice and **was engulfed in flames** prior to coming to a rest on its wheels.	(V1) N
146624	10/13/91	(V1) Y	(V1) N	Speeding, V1 ran off the road and sideswiped a tree. Went airborne, striking 2 more trees. **Caught fire after impact and burned completely**.	(V1) N
169031	11/22/91	(V1) Y (v2) N (V3) N	(V1) N (V2) N (V3) N	V1 crossed centerline and collided head-on with V2. V1 then collided with V3. V1 & V3 came to a rest and V1 **caught on fire**.	(V1) N (V2) N (V3) N
017153	2/7/92	(V1) Y (V2) N	(V1) N (V2) Y	V1 ran a stop sign and struck V2 in an intersection. After impact, V1 slid 55 ft. onto the shoulder and **caught fire**. V2 rolled over 62 ft. from the point of impact.	(V1) N (V2) N
018148	2/9/92	(V1) Y	(V1) N	Traveling at excessive speed, V1 ran off the road and **burst into flames** after striking a tree.	(V1) N
168654	11/7/92	(V1) Y	(V1) N	V1 ran off road and struck a tree head-on. Came to rest down a ditch bank and **caught fire**.	(V1) N
185739	12/4/92	(V1) Y	(V1) N	Traveling at high rate of speed, V1 ran off the road and struck a dirt mound. Went airborne 34 ft., striking a utility pole and telephone box. Continued on, struck a tree, came to a rest and then **caught fire.**	(V1) N

North Carolina Fatal Fire Accidents

ARN	Accident Date	Post Crash Fire (Yes or No)	Rollover (Yes or No)	Description - Fire	Vehicle Drivable (Yes or No)
062476	4/25/93	(V1) Y	(V1) N	V1 ran off the road and struck a bridge support. Continued on under the bridge and **caught fire** after coming to a rest but **was extinguished quickly**.	(V1) N
073498	5/14/93	(V1) N (V2) Y (V3) N	(V1) N (V2) N (V3) N	V1 collided with V2 from the rear. This caused V2 to spin sideways out of control, cross the median and run into V3. A **fire** in V2's engine compartment **was extinguished**.	(V1) N (V2) N (V3) N
143472	9/13/93	(V1) Y	(V1) Y	V1 crossed the centerline, skidded, and ran off the side of the road. Struck a cement bridge rail end, rolled down an embankment, and then **burst into flames.** Came to rest on driver's side.	(V1) N
174011	10/29/93	(V1) Y	(V1) N	V1 ran off the roadway and struck a bridge abutment head-on. Upon impact, it **caught fire** and burned.	(V1) N

Pennsylvania Sample of Fire Accidents

ARN	Accident Date	Event	Description - Fire	Description - Vehicle Damage
1400005	1/3/91	42, 42, 02	V1 traveling at high rate of speed left the road striking 2 trees. Vehicle was severed in two. Fire personnel came to the accident scene but no mention of a fire was made in the narrative.	Front and rear compartments separated.
1021624	3/9/91	02	V1 encountered mechanical problems and **caught on fire**. Fire was extinguished by Fire Dept.	
1036815	4/26/91	02	V1 had **a fire start** in the engine compartment. Fire was extinguished by Fire Dept.	
1047612	5/21/91	02	V1 **caught on fire** while being driven; operator pulled off the road. The gas line had rusted through and gas went into the motor.	The vehicle was completely destroyed.
1049597	5/29/91	V1: 14, 02 V2: 73	V1 was following V2 (both tractor trailers). V2 braked suddenly & V1 was unable to stop in time. An impact occurred and V1's **fuel tank caught fire** on impact due to the batteries being pushed into the fuel tank.	Fuel tank was ruptured and 100 gallons of diesel fuel spilled. Impact occurred with the right side of V1's tractor cab and the left rear corner of V2's trailer. Fire was extinguished by Fire Dept.
1077949	8/14/91	02	**Smoke was observed** coming out of V1's engine compartment. Operator pulled over and the fire was extinguished by the Fire Dept.	Operator indicated the vehicle had been running funny & he had tried to accelerate just before noticing the smoke.
1096541	10/1/91	02	**Smoke was observed** coming from the dash of V1. The operator stopped and the vehicle became **engulfed in flames**. The fire was extinguished by Fire Dept.	
1110517	11/18/91	42, 02	V1 lost control and began to sway after coming over the top of a hill. Impacted a tree causing it to spin and skid around. **Caught fire** when it came to a rest and became fully **engulfed in flames.**	Loss of control was due to bad struts.
2030237	4/3/92	02	**Smoke started coming** from under the hood of V1. By the time the operator pulled to the side of the road, **flames were coming** from under the hood. The fire was extinguished by Fire Dept.	Damage to engine front end and interior of vehicle.
2400593	7/5/92	V1: 14, 02 V2: 73	V1 accelerated quickly, started to fishtail and impacted V2's outside left trailer wheels. V2's wheels drove over the left front of V1 and the impact caused V1's engine to **catch on fire**.	

Pennsylvania Sample of Fire Accidents

ARN	Accident Date	Event	Description - Fire	Description - Vehicle Damage
2072482	7/17/92	02	Operator of V1 heard an **explosion** from under the hood and saw **flames shoot out**. He pulled to the side of the road and the fire dept. was called.	Completely destroyed by the fire.
2083282	8/4/92	02	After stopping for a red light, **smoke was noticed** coming from under the dash.	
2084659	8/5/92	02	While attempting to negotiate a hill, V1 's carburetor possibly backfired and a **fire started in the engine** compartment and spread to the passenger compartment. The operator fled the scene.	Carburetor problems (sputtering, backfiring) prior to the engine catching fire.
2084999	8/8/92	02	V1's temperature light went on and the operator pulled over. A lot of **smoke was noticed** coming from under the hood and a **small fire started**. The occupants attempted to extinguish the fire but could not and V1 became fully engulfed in flames.	Fire was noticed by the oil dipstick.
2073637	8/31/92	43, 02	Narrative indicates that the Police and Fire Dept. were dispatched to the accident because of a reported vehicle fire. Fire was not further described.	V1 had struck a utility pole with the passenger side front fender.
2089813	9/7/92	29, 02	V1 swerved to avoid a large animal and struck a concrete catch basin. The right front tire blew out and subsequently the **vehicle caught on fire** and was extinguished by responding officer.	Fire was contained to the engine compartment.
2103436	10/9/92	02	When V1 began to lose power, the operator stopped and looked under the hood. The transmission was **engulfed in flames**.	
2103120	10/10/92	02	V1's operator noticed **smoke and then fire** coming from the engine compartment. By the time he got out and was able to get help, the vehicle was completely destroyed by the fire.	
3011233	2/12/93	02	Operator of V1 noticed the loss of engine power. Upon turning off the engine, **smoke and flames grew** from the engine and started to spread through the vehicle. Fire Dept. extinguished the fire.	
3029611	3/10/93	02	Operator **observed smoke** coming from the rear of V1. After he stopped and got out, the vehicle became **engulfed in flames**.	Totally destroyed by the fire - source of the fire could not be determined.
3031492	3/31/93	02	When V1 stopped at signal, **smoke** was seen coming from under the hood.	

Pennsylvania Sample of Fire Accidents

ARN	Accident Date	Event	Description - Fire	Description - Vehicle Damage
3054221	6/2/93	02, 44	When **a fire developed** in V1's engine, the operator pulled over. The vehicle burned severely and the heat from the fire melted two nearby mailboxes.	Vehicle backfired and then started on fire.
3069846	7/21/93	02	V1 became **engulfed in black smoke** for unknown reason. Operator drove onto berm and the vehicle became **engulfed in flames**.	
3400731	8/5/93	42, 02	Traveling at high rate of speed, V1 lost control and struck a large tree. Became **engulfed in flames** and was burned beyond recognition.	Severe damage to the front end.
3084049	8/21/93	02	**A fire started** in V1's engine compartment so operator pulled off. Fire Dept. assisted and vehicle was towed to garage.	Wires were burning.
3084479	8/27/93	02	V1's operator heard a loud noise and observed **smoke and flames** emerging from the engine compartment.	Motor had just been installed; engine compartment burnt.
3100924	9/23/93	02	V1 was enroute to have a leaking fuel line repaired when it **caught fire**. Fire Dept. extinguished the fire.	Sustained severe damage to the front area and engine compartment.
3104866	10/7/93	02	Operator stopped and exited V1 when he saw **smoke and flames** coming from the dashboard.	
3106123	10/11/93	02	V1 was running roughly and the operator heard a clanging, banging noise. When **gray smoke** was noticed coming from the engine compartment, he pulled over and the Fire Dept. extinguished the fire.	
3114317	10/23/93	28, 02	V1 hit the rear of a building when the gas pedal got stuck and the operator lost control. The vehicle **caught fire** but the Fire Dept. was able to extinguish it.	

ARN	Accident Date	Description - Fire	Description - Vehicle Damage
1400001	1/1/91	While traveling at an excessive speed, V1 struck the median while passing another vehicle. After crossing back across the road, the front of V1 struck a tree "like a missile, uprooting it" and **burst into flames**. The fire engulfed the whole unit, which came to a rest on its side.	
1400101	2/8/91	While rounding a curve, a northbound V1 crossed over into southbound V2's lane. Both swerved to avoid a collision, but the left front of V2 struck the left rear side of V1. The rear section of V1 was torn off in the impact and the fuel tank was ruptured. Fuel on the roadway as well as in V1 **ignited on impact**, and the unit was **fully engulfed in flames** upon coming to a rest. V2 did not catch fire itself, although the roadway around it was burning from V1's fuel.	Impact area was found at the left rear side of V1; the rear section of V1 was torn off and the fuel tank was ruptured. Fuel was scattered throughout the interior of V1 as well as on the roadway. The front section of V1 was badly damaged due to the extreme heat from the fire; only the wire frame of the seats remained. Damage to V2 was localized at the left front.
1400219	3/9/91	V1 went out of control while attempting to elude the police. Slid off the roadway and collided head-on with a large tree while still accelerating. The collision disabled the engine and V1 came to a rest at that point. Upon impact, V1 became involved in a fire that extinguished itself.	
1400432	5/16/91	V1 cut V2 off short during a pass, forcing V2 off the road. V2 then lost control and collided with the right (door) side of V1. V1 traveled off the embankment, through a fence and rolled over. Came to rest upright **totally engulfed in flames**.	
2400096	2/10/92	For unknown reason, V1 continued straight when approaching a curve in the roadway. Struck a tree head-on in the middle of the front bumper and came to a final rest in this position. A **small fire** at the scene was extinguished shortly after the accident.	
2400180	2/18/92	Traveling at excessive speed, V1 did not notice V2 pulling out of a truck stop until it was too late. The left front of V1 made contact with the outer wheel/axle of V2 and V1 rotated counterclockwise. The engine area of V1 **caught fire** and was extinguished.	

Pennsylvania Fatal Fire Accidents

ARN	Accident Date	Description - Fire	Description - Vehicle Damage
2400121	2/19/92	V1 slid broadside on the ice covered roadway. Crossed the roadway and was struck in the center of its left side by V2's front end. Both units left the road and went down a 30 ft. embankment. V1 **caught fire** and its front half was engulfed.	V1's fuel pump was damaged by the collision. Spilled gasoline was evident for several feet, starting at the initial point of impact and ran down a hill for apprx. 30 ft. Several gallons of diesel from V2 also leaked out of its fuel tanks.
2400194	3/1/92	Traveling at high speed, V1 lost control on curve in the roadway and contacted the embankment and a tree. The left front of the vehicle began to embed in the embankment causing the rear end to rise sharply in the air. V1 began to rotate violently counterclockwise, became airborn, and **an electrical fire** immediately broke out after it came to a final rest.	The electrical fire started within the door post/roof support directly behind the driver's seat and severe fire damage was contained to this immediate area.
3400149	2/19/93	V1 swerved off the road for an unknown reason and struck a guiderail. After then striking a bridge overpass, V1 flipped over and came to rest on its roof. The unit became **engulfed in flames** at an unknown time.	
3400326	4/14/93	V1 traveling north, crossed the southbound lane and traveled across the berm (for unknown reason). Drove across a field and then the unit's left front area impacted a utility pole, which broke into two pieces. V1 became airborne and landed on its roof ; was discovered **fully involved with fire** (no witnesses).	
3400600	6/27/93	V1 crossed the centerline and collided head-on into the left front portion of V2. Upon impact, V1 spun counterclockwise, and traveled 16 ft.before coming to a rest. Was found completely **engulfed in flames**.	
3401000	9/29/93	V1 traveling at a high rate of speed, lost control going around a curve. Crossed the center of the road at the same time that V2 was passing V3. The driver's side of V1 struck the left front of V2. This impact then pushed the right rear side of V2 into V3. V1 spun around counterclockwise and came to a rest in the middle of the road and **burst into flames**.	"V1 was totally engulfed from the passenger compartment back, not under the hood" per the driver of V3.

Texas Sample of Fire Accidents

ARN	Accident Date	Vehicle Damage Rating	Description - Fire	Description - Vehicle
2000722	1/2/92	5-BR-7 (V1)	The rear of V1 impacted a concrete culvert. The gas tank ruptured **and fire ignited.**	Interior and rear of vehicle burned.
2000724	1/2/92	12-FL-7 (V1)	V1 went off-road, struck a tree and **caught fire**.	Severe impact damage as well as fire damage.
2031871	2/4/92	FD, burned (V1) B&LD, burned (V2)BD-2 (V3) not coded (V4-V6)	V1 had brake failure, turned into a gas station and hit V2, V3, V4, V5 & V6 in a chain reaction. V1, V4, V5 in flames; V2 & V3 **partially in flames**.	
2054738	2/28/92	8-L&T-2 (V1)	V1 entered a ditch, rolled over onto its left side and **caught fire.**	
2107226	3/21/92	Burnt, 12-FD-6 (V1)	V1 lost control on a very wet road while traveling at a very unsafe speed. Slid into a ditch and hit a tree. Fire was not described.	
2118959	4/3/92	FC-1/burned (V1)	V1 lost control while speeding and collided with a gas meter. **Burst into flames;** operator left the scene on foot.	
2094290	4/7/92	3-R&T-7, burned (V1)	V1 left the road into median, overturned, and came to a rest on its top against guardrail. **Burned after the accident.**	
2125329	5/8/92	FD-2, burned (V1)	V1 speeding, unable to make turn. Ran through a guardrail and **caught fire**.	
2134216	5/15/92	LP-2, burned (V1)	V1 lost control and struck a stop sign and building. Driver fled on foot and **vehicle burned**.	
2254944	8/23/92	FD-2 (V1)	V1 drove through a chain link fence into drainage culvert. **Was completely destroyed by fire.**	
2295962	10/16/92	12-FD4 (V1)	V1 traveled 400 ft. down a ditch, jumped across a creek, and struck a bridge wing. **Burst into flames** on impact.	Passenger compartment was destroyed.
2304385	10/24/92	Burnt, 1-FR-4 (V1)	V1 ran off the road, collided with a large tree and **caught on fire.**	Totally burnt
2332137	11/16/92	1-FR-3, 2-RF-Q (V1)	V1 lost control, hit a concrete culvert and then a tree. Landed on left side and became **totally engulfed in flames.**	Fuel tank ruptured

Texas Sample of Fire Accidents

ARN	Accident Date	Vehicle Damage Rating	Description - Fire	Description - Vehicle
3074597	2/27/93	Burned (V1)	V1 ran over box springs and they hung underneath the vehicle. Approx. 2 miles later, the driver stopped when he noticed sparks coming from underneath the vehicle. **Became engulfed in flames.**	
3195937	7/6/93	12-FD-7 (V1) 9-LD-4 (V2) 9-LD-4, T-7 (V3)	V1 was struck by an out of control V3, which was being towed by V2. V2 and V3 then overturned and V1 **caught on fire.**	
3243100	8/23/93	12-FD-7 (V1)	V1 struck a berm and tin culvert. Landed on its top and **burst into flames.**	
3271835	8/29/93	Burned, 9-LP-4 (V1) 12-FD-5 (V2)	V1 failed to stop at an intersection; was struck broadside by V2 and then **caught on fire.**	
3275969	9/24/93	12-FR-4, Burned (V1)	V1 ran off the road, hit a guardrail and went off a concrete bridge abutment. Overturned onto its left side and **caught fire.**	Totally burned.
3367940	12/15/93	12-FC-5 (V1)	V1 lost control and struck a tree head-on. Driver was thrown out upon impact and **vehicle caught fire.**	
4051271	2/24/94	Burned (V1) burned (V2) 9 LS 4 (V3) 9 LS 4 (V4) 6 BD 1 (V5) 6 BD 3 (V6)	V1 (towing V2) struck V3, V4, V5 and V6 (all parked legally); V1 and V2 **burned to the ground.**	Diesel spill was noted at the scene.
4161369	5/30/94	8-LD-4 (V1)	V1 struck a deer and then a concrete bridge rail. Fell into creek, coming to rest upside down in 4 ft. of water. **Burned.**	
4236691	7/10/94	FD-6 (V1) RP-6 (V2)	V2 was struck in the right front passenger door by V1. V2's interior **caught fire** and the vehicle **became engulfed in flames.**	Interior caught fire.
4265516	8/18/94	FC-burnt (V1)	V1 started on fire and the operator jumped out. Vehicle traveled another 330 ft. and **burst into flames.**	
4255283	8/22/94	12-FD-7(V1) 12-FD-7 (V2)	V1 collided head-on with V2 causing V1 to flip over and eventually **become ablaze.**	

Texas Sample of Fire Accidents

ARN	Accident Date	Vehicle Damage Rating	Description - Fire	Description - Vehicle
4257788	8/24/94	LFQ-3, burned (V1)	V1 lost control an struck the center barrier causing the tractor & trailer to rollover on its right side. No mention of fire in narrative.	
4271072	9/6/94	12-L&T-4 (V1)	After V1 had a blowout, the driver hit the brakes. Ran off the road and struck a cement culvert, overturned, and **caught fire**.	
4274783	9/9/94	FD-4 (V1)	V1 lost control striking a concrete barrier and light pole. Came to a rest, **caught fire and burned**.	
4304005	10/4/94	12FC4 (V1)	V1 ran off road while attempting a slight curve. Slid across lanes, struck a tree, and **then caught fire**.	
4330851	10/28/94	12-FC-1, burned (V1)	V1 ran off the road, struck a tree, and **then burned**.	
4379449	12/6/94	3-RFQ-2, 6-BD-7 (V1)	V1 went into the median striking a tree and a sign. Continued on, shearing 3 trees and **became totally engulfed in flames** when it came to a rest.	

Texas Fatal Fire Accidents

ARN	Accident Date	Vehicle Damage Rating	Description - Fire	Description - Vehicle
2055781	2/29/92	FD-3, LP-3 (V1) RFQ-4, RP-4(V2)	V1 & V2 approached 4-way stop, entered intersection, disregarded stop sign and collided. Both vehicles then collided into a building. "Victims were pulled from their vehicles by passerbys and shortly thereafter both vehicle **caught fire and burned."**	
2071675	5/8/92	10-LD-7 (V1) 11-LFO-5 (V2)	V1 was being pursued by DPS unit after V1 was reported driving dangerously. V1, traveling in excess of 100 MPH was cutting in and out of light traffic. V1 lost control causing V1 to go into a right rotation spin. V1 crossed center line and collided with V2. V2, off the shoulder, was impacted by V1. "After collision V1 split in half, with the front end rolling to the center of the roadway and **caught fire."**	
2188409	5/8/92	FL-5, L&T-4, & BD-3 (V1)	V1 "..lost control of vehicle and rolled several times striking several objects then **caught fire."**	
2150909	5/30/92	12-FC-7 (V1)	V1 entered a curve and left the roadway, sliding into a ditch. Struck an embankment, rotated clockwise and struck a large pine tree with the front of the vehicle. After the impact, V1 **caught fire**.	
3066171	3/10/93	1-RD-6 (V1)	V1 failed to negotiate a sharp left hand curve and ran off the roadway. Struck a grove of trees and sustained heavy damage to its right side **and caught fire**.	
3095855	4/7/93	BR-7 + burn (V1)	Fleeing from police at high speed, V1 ran a red light, went airborne and lost control after landing. Skidded counterclockwise and spun around backwards, left the road and struck and broke a light pole. The gas tank was ruptured and V1 **caught on fire,** then went airborne, struck a sign and ended up in some brush.	Gas tank ruptured.

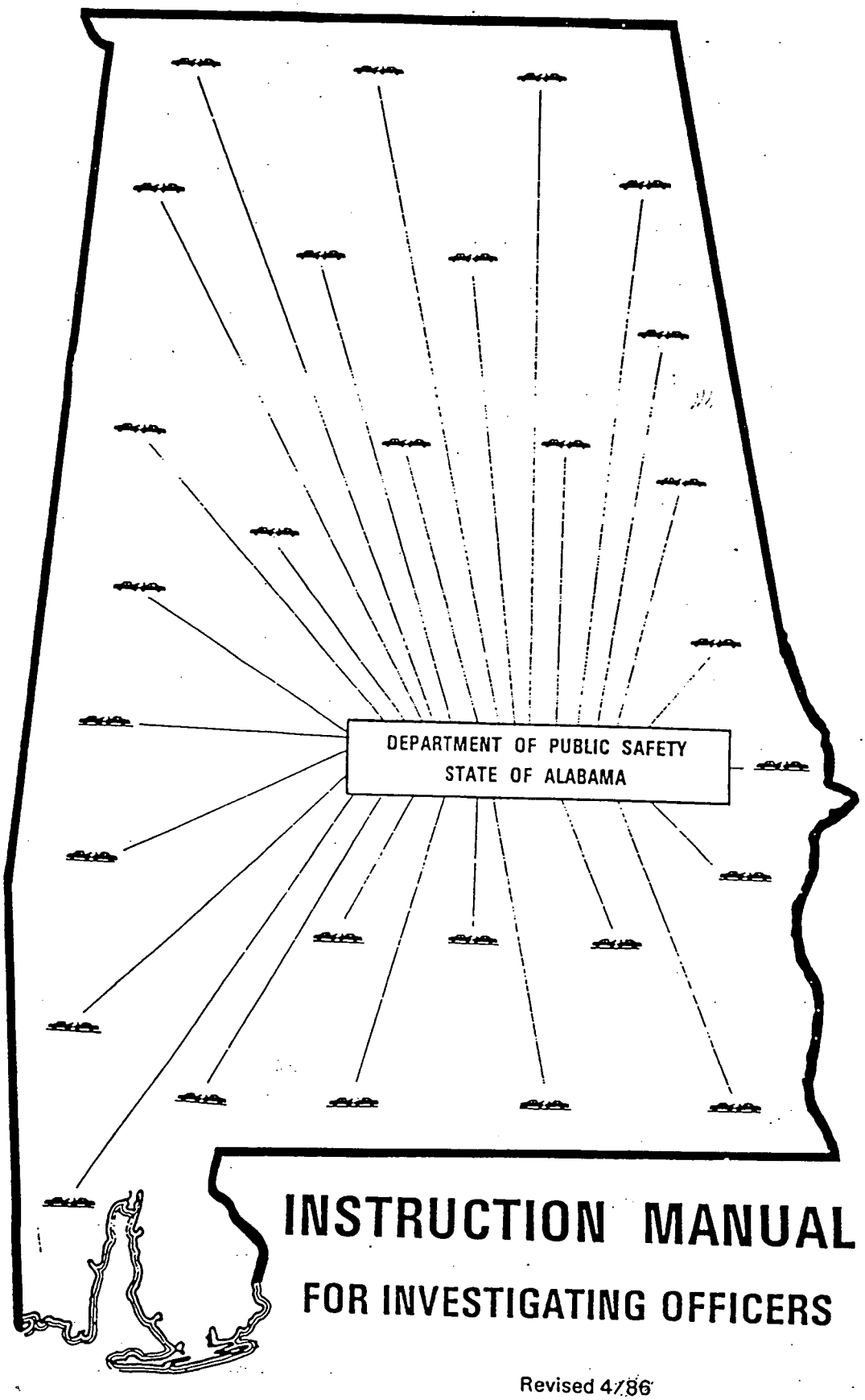
Texas Fatal Fire Accidents

ARN	Accident Date	Vehicle Damage Rating	Description - Fire	Description - Vehicle
3101731	4/12/93	FL-2/LP-7 (V1)	V1 was traveling at excessive speed in the center lane. Operator lost control and collided front left with concrete median divider. Continued traveling, overturned and collided left panel to overhead street light standard. Continued to final resting point on its roof **and burned.**	
3158446	6/4/93	11-FR-6 (V1) 1-FD-6 (V2)	As V2 came out of a slight curve, it crossed the center stripe into the path of the oncoming V1. Both drivers took evasive action but struck nearly head-on. V1 veered into a ditch **and burned**; V2 spun around clockwise before coming to a rest.	
4045166	2/18/94	3-RP&T-4, burned (V1)	Traveling at a high rate of speed, the driver of V1 lost control when the unit went off the road and overcorrected. Went across road, along a barditch and across a culvert. V1 hit an embankment on the side of the culvert, causing it to flip into the air through some trees. **Caught on fire.**	
4063146	3/6/94	12-FD-2, 6-BD-1, 3-R&T-1 (V1)	V1 drove off the roadway and traveled down the barditch before striking a tinhorn culvert. V1 was ramped up in the air, rolling. Upon striking the ground, V1 bounced forward to left front and then bounced back where it came to rest on its wheels. **Caught fire and burnt completely.**	
4097664	3/19/94	RP-7/FD-7 (V1) FD-7/LP-5 (V2) FL-5/LP-3 (V3)	Traveling at a very high rate of speed without headlights, the driver of V1 lost control and the right tires went off the road. Overcompensated and started to side slip at high speed before colliding head-on with V2. Both units went airborne and V1 landed on top of parked V3. V1's gas tank went through V3's windshield **causing a major fire** on all the units.	
4100613	3/21/94	LFQ-5 (V1) LR-3 (V2)	Driver of V1 fell asleep and veered into the path of V2. V1 struck V2 and slid down its trailer frame, impacting the rear trailer axles. **V1 then burnt.**	

APPENDIX C

Appendix C:
Information Available in Selected State Databases

ALABAMA'S UNIFORM TRAFFIC ACCIDENT REPORT



INSTRUCTION MANUAL

FOR INVESTIGATING OFFICERS

Revised 4/86

ALABAMA

(23) **FIRST HARMFUL EVENT** - The first harmful event occurs at the moment of impact or when the first damage or injury occurs. For example, if a car hits a guardrail and then reenters the traffic flow and strikes another vehicle, the first harmful event is the collision with the guardrail. However, it does not require a collision of one vehicle with another vehicle or with any other object. If a driver stops suddenly and causes an occupant to crash into the windshield, this is considered to be the first harmful event (code = "12" for "Other") whether or not the vehicle hits any other object or person after the "injury" event" occurred.

Essentially, without the first harmful event the accident would merely have been an incident; i.e., no damage or injury would have taken place. Note that it is the officer's responsibility to make a distinction as to whether or not the first harmful event fell into the collision or non-collision classification and then to enter one - and only one - of the first harmful event codes given.

The first harmful event applies to the accident as opposed to any specific involved vehicle. Enter the one code in the block that best describes the event that initiated the accident.

Note: A "non-parked vehicle" (code = "20") is any vehicle in transport. This includes any vehicle in the trafficway whether in motion or stopped. For example, Unit 1 sideswipes, hits head on, or back-ends another vehicle in the traffic way. Enter "20" in the FIRST HARMFUL EVENT block.

See Appendix E for detailed examples of collision and non-collision events related to an accident.

Note: If an animal is hit, specify its type in the narrative.

First Harmful Event	Event Location	Distance to Fixed Object FT.	No. of Vehicles	No. Pedestrians	No. Injured	No. Fatalities	Unit 1 Type	Unit 2 Type

ALABAMA UNIFORM TRAFFIC ACCIDENT REPORT

DPS Accident No.

Sheet ____ of ____ Sheet(s) Microfilm No. _____ Local Case No.

Day of Week	County	City	Rural	Highway Classification:	Local Zone
M T W TH F S S				I—Interstate S—State F—Federal C—County M—Municipal P—Private Prop. O—Other	

At Intersection of or Between (Node 1)	And (Node 2)

1 2 Node Code

Feet Miles From Node 1 or 2 (Circle One)

Control Access Hway Loc	1 - Main Rd	3 - Interchange	5 - Exit Ramp	Prime Contr Circms	Prime Contr Unit No
	2 - Frontage Rd	4 - Entrance Ramp	6 - N/A		

First Harmful Event	Event Location	Distance to Fixed Object	No. of Vehicles	No. Pedestrians	No. Injured	No. Fatalities	Unit 1 Type	Unit 2 Type
		FT.						

NONCOLLISION EVENT

01 - Overturned
02 - Fire/Explosion
03 - Immersion
04 - Gas Inhalation
05 - Spill
06 - Road/Bridge Collapsed
07 - Jackknifed
08 - Parts/Cargo Fell From Moving Vehicle
09 - Trailer Hitch Came Loose
12 - Other

COLLISION EVENT

15 - Pedestrian(s)
20 - Non-parked Vehicle
30 - Parked Vehicle
35 - Train
40 - Pedal Cyclist
45 - Animal
51 - Guardrail
52 - Crash Cushion
53 - Utility Pole
54 - Non-breakaway Light
55 - Tree
56 - Fire Hydrant
57 - Pier or Column
59 - Non-breakaway Sign
61 - Mailbox(es)
62 - Gas Line
63 - Barricade
64 - Bridge Rail
65 - Culvert Headwall
66 - Curbing
67 - Retaining Wall
68 - Median Barrier
69 - Sideslope
71 - Building
72 - Fence
73 - Boulder
74 - Ditch
75 - Overpass/Underpass
76 - Other Fixed Object
77 - Breakaway Sign
78 - Manhole
79 - Telephone Booth
80 - Guy Wire
81 - Breakaway Light
82 - Overhead Object
84 - Bridge Abutment
87 - Animal with Rider
90 - Foreign Material in Road
93 - Pothole
97 - None
98 - Other

ALABAMA

(53) **PRIMARY (MOST) HARMFUL EVENT**- The officer will enter the most harmful event for the involved unit. This is the event attributed to the given unit that the officer determines resulted in the most serious personal injury or damage, respectively.

The codes to be used for this event are listed at the top right-hand corner of the Accident Form in the code section labelled "Non-Collision/Collision Event."

Note: A "Non-Parked Vehicle" (code = "20") is any vehicle in transport. This includes any vehicle in the trafficway whether in motion or stopped. For example, Unit 1 sideswipes, hits head-on, or back-ends another vehicle in the trafficway. Enter "20" in the PRIMARY HARMFUL EVENT block.

It should be noted that the event coded in the FIRST HARMFUL EVENT (Block No. 23 of Section 1) should be repeated if this event is also the most serious injury and/or damage causing event for the unit.

EXAMPLE 1: Unit 1 hit an oncoming car without causing major injury or damage and then continued off the road to hit a sign and finally ran into a bridge abutment, killing all occupants, while Unit 2 (after being hit) hit another vehicle.

SECTION 1 - FIRST HARMFUL EVENT:

First Harmful Event	Event Location
20	1

SECTION 2 - UNIT 1 - PRIMARY HARMFUL EVENT:

Prime Harm Event	Event Loc
84	2

SECTION 2 - UNIT 2 - PRIMARY HARMFUL EVENT:

Prime Harm Event	Event Loc
20	1

Since hitting the abutment did more injury damage than hitting the other vehicle or hitting the sign, the bridge abutment (code 84) would be entered as the "Primary Harmful Event" for Unit 1.

EXAMPLE 2: The driver of Unit 1 lost control of his car, left the road, and hit two parked vehicles.

SECTION 1 ENTRY - FIRST HARMFUL EVENT:

First Harmful Event	Event Location
30	2

SECTION 2 - UNIT 1 - PRIMARY HARMFUL EVENT:

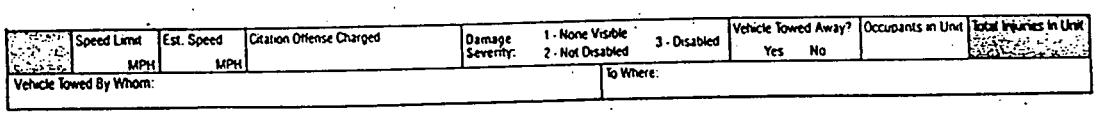
Prime Harm Event	Event Loc
30	2

ALABAMA

(67) **HAZARDOUS CARGO** - If the vehicle contains any hazardous materials as cargo, circle the code for the appropriate type. Otherwise, circle "1" (one) for "None."

Hazardous Cargo
1 - None
2 - Explosive
3 - Gas
4 - Flam/Combust Liq.
5 - Flammable Solids
6 - Oxidizer/Peroxide
7 - Poison
8 - Radioactive Matl.
9 - Corrosive Material
98 - Other

(71) **CONTRIBUTING VEHICLE DEFECT** - Circle the primary defect in the vehicle equipment that was present at the time of the accident if the defect contributed to the accident. If the defect is not listed, circle "98" (ninety-eight) for "Other." If you are unable to determine any defect because of damage, circle "99" (ninety-nine) for "Unknown." Circle "97" (ninety-seven) for "None" only when you are certain that no defect existed that contributed to the accident.



Contributing Defect
97 - None
1 - Brakes
2 - Steering
3 - Power Plant
4 - Suspension
5 - Tires
6 - Exhaust
7 - Lights
8 - Turn Signal
9 - Windows/ W. Shield
10 - Restraint Sys.
11 - Wheels
12 - Truck Coupling
13 - Cargo
14 - Fuel System
98 - Other
99 - Unknown

ALABAMA

121 **CONTRIBUTING MATERIAL IN ROADWAY** - Circle one number for each vehicle to indicate the type of material found in the road, if any, that most heavily contributed to the accident. If the material present is not listed, circle "8" (eight) for "Other." If there was no material in the road or if material was present but it was not a contributing factor to the accident, circle "1" (one) for "None."

Material In Roadway (Contributing)			
1	1 - None	5	5 - Gravel
2	2 - Rocks	6	6 - Oil/Petrol
3	3 - Trees/Limbs	8	8 - Other
4	4 - Dirt		

ALABAMA

SECTION 3: VEHICLE INFORMATION

Veh Year	Make	Model	Body	V.I.N	License Tag Number	State	Year

(55) **VEHICLE YEAR** - Enter the last two digits of the model year of the unit vehicle.

EXAMPLE: 1982 Oldsmobile - enter "82." Veh Year 82

If the vehicle year is not applicable (pedal cycle, ridden animal, train, farm equipment, homemade vehicle, etc.), enter "NA."

(56) **VEHICLE MAKE** - Enter the manufacturer's code for the make of the vehicle. Refer to Appendix D for a list of valid codes. If this field is not applicable, enter "NA" in this field.

EXAMPLE: The vehicle is a Chevrolet. Enter "CHEV."

If the unit type is coded "07-09," "13-16," "18," or "98," or is not listed in Appendix D, enter "OTHR" in this block.

If the unit type is "17 - Ridden Animal," enter "NA" in this block.

(57) **VEHICLE MODEL** - Enter the code for the model using the following rules:

1. If "NA" was entered in Block No. 56, enter "NA."

Make	Model
NA	NA

2. If the model code contains any numeric series, enter the first three (3) digits.

   EXAMPLE: If the vehicle is a DATSUN 280Z, enter "280."

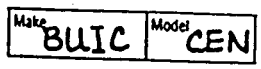
Make	Model
DATS	280

3. If the model code is a single word, enter the first three (3) characters.

(59) **VEHICLE IDENTIFICATION NUMBER (VIN)** - This information is **IMPORTANT.** Enter the vehicle identification number in the space provided. If not applicable, enter "NA." This information should be taken from the vehicle and not taken from vehicle registration files.

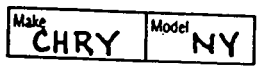
ALABAMA

EXAMPLE: If the vehicle is a Buick Century, enter "CEN."



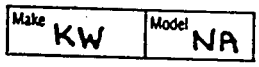
4. Otherwise, enter the first character of each word (up to three letters).

EXAMPLE: If the vehicle is a Chrysler New Yorker, enter "NY."



5. For vehicles not classified by a model, enter "NA."

EXAMPLE: If the vehicle is a Kenworth truck-tractor, enter "NA."



APPENDIX D — VEHICLE MAKES CODES

Common codes will be listed in the table below. If the vehicle make is not listed in the table, use the code "OTHR." If the make is unknown, use the code "UNK."

Alfa Romeo	ALFA	Lotus	LOTU
American Motors	AMER	Mazda	MAZD
Audi	AUDI	Mercedes-Benz	MERZ
Austin-Healy	AUHE	Mercury	MERC
BMW	BMW	Metropolitan	METR
Buick	BUIC	MG	MG
Cadillac	CADI	Mitsubishi	MITS
Checker	CHEC	Monarch	MONA
Chevrolet	CHEV	Morris	MORR
Chrysler	CHRY	Nash	NASH
Citicar	CITI	Nissan	NISS
Citroen	CITR	Oldsmobile	OLDS
Datsun	DATS	Opel	OPEL
Desoto	DESO	Peugeot	PEUG
Dodge	DODG	Plymouth	PLYM
Edsel	EDSE	Pontiac	PONT
English Ford	ENGF	Porsche	PORS
Ferrari	FERR	Puch	PUCH
Fiat	FIAT	Rambler	RAMB
Ford	FORD	Renault	RENA
GMC Sprint	GMSP	Rolls-Royce	ROL
Hillman	HILL	Saab	SAA
Honda	HOND	Simca	SIM
Imperial	IMPE	Studebaker	STU
Intrnl Harvester	INTL	Subaru	SUBA
Isuzu	ISUZ	Toyota	TOYT
Jaguar	JAGU	Triumph	TRIU
Jeep	JEEP	Volkswagon	VOLK
Lamborghina	LAMO	Volvo	VOLV
Lincoln	LINC	*Special	SPEC

*Any special type vehicle

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(108) **INJURY TYPE** - Enter the code that best describes the extent of the injury sustained by the victim from the codes listed below:

K - Killed

A - Visible signs of an injury such as a bleeding wound or a distorted member or if the victim had to be carried from the scene

B - Other visible injury such as bruises, abrasions, swelling, limping, etc.

C - No visible injury but the victim had a complaint of pain or was momentarily unconscious

---

(75) **VEHICULAR DAMAGE SEVERITY** - Indicate the nature of the vehicle damage by circling the appropriate code.

1 - No visible damage.

2 - Non-disabled. Vehicle can be driven safely from the scene.

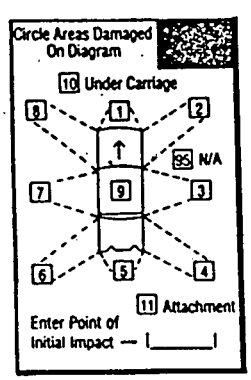
3 - Disabled. Vehicle cannot be driven safely from the scene.

(76) **VEHICLE TOWED AWAY** - Circle whether or not the vehicle was towed away from the accident scene.

(77) **TOTAL OCCUPANTS IN UNIT** - Enter the total number of occupants of the vehicle, including the driver, at the time of the accident. This section must correspond with Item #104 (Passenger Safety Equipment).

(78) **VEHICLE TOWED BY WHOM** - Enter the company or name of the person who removed the vehicle from the accident scene. If the vehicle was not towed from the scene, enter "NA."

(79) **TO WHERE** - Enter the vehicle storage place after the accident by entering the name of the company, city, and state. If local, enter the name of the company and "local." If the vehicle was not towed from the scene, enter "NA."



(80) **CIRCLE AREA(S) DAMAGED** - Circle all areas of the vehicle damaged in the accident on the diagram. If the vehicle was not damaged, circle "95" (ninety-five) for "NA." If the vehicle was totalled (not feasible to repair), write "Totalled" across the diagram. If attachment is damaged, circle "11."

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(81) **POINT OF INITIAL IMPACT** - By entering the number of the block, indicate the initial impact area of the vehicle. Enter only one. If this is a non-collision accident with no impact, e.g., car burning or load falling from the vehicle, enter "95" (ninety-five) for "NA."

Note: The vehicle described in the DAMAGE AND IMPACT DIAGRAM represents a complete unit regardless of size or attachments.

If the unit had an attachment and the attachment came loose and struck another unit, enter "11" for point of initial impact.

SECTION 9: INVESTIGATION

Light		Weather		Locale	
1 - Daylight	4 - Darkness—Road Not Lit	1 - Clear	5 - Sleet/Hail	1 - Open Country	5 - School
2 - Dawn		2 - Cloudy	6 - Crosswind	2 - Residential	6 - Playground
3 - Dusk	5 - Darkness—Road Lit	3 - Rain	7 - Fog	3 - Shop'g or Business	8 - Other
		4 - Snow	8 - Other	4 - Mfg. or Industrial	

(129) **LIGHT** - Circle only one number to indicate the light environment at the time of the accident.

(130) **WEATHER** - Circle only one number to indicate the weather condition at the time of the accident. Circle "8" (eight) for "Other" to describe a weather condition other than those listed.

Date			Time		Day of Week	County	City		Highway Classification:			Local Zone
Month	Day	Year		AM PM MT	M T W TH F S S			Rural	I—Interstate F—Federal	S—State C—County	M—Municipal P—Private Prop. O—Other	

(5) **DATE** - Enter the date on which the accident occurred giving month, day of month, and the last two digits of the year. Use two numerals in each block.

EXAMPLE: April 1, 1986

(6) **TIME** - Enter the time at which the accident occurred, as precisely as possible. If standard AM/PM time is used by the reporting agency, enter the time at which the accident occurred and circle AM or PM. If the accident occurred exactly at 12 Noon, indicate AM. If the accident occurred exactly at 12 Midnight, indicate PM. If 24-hour military clock conventions were used by the reporting agency, enter the time as hhmm where hh represents the hour and mm represents the minutes. Do not use a colon to separate the hours and minutes when using military time.

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MILITARY TIME EXAMPLES:

8:05 AM is entered as 0805

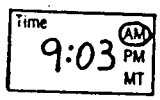
12:00 Noon is entered as 1200

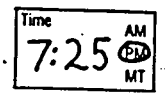
5:14 PM is entered as 1714

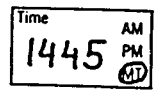
12:00 midnight is entered as 2400

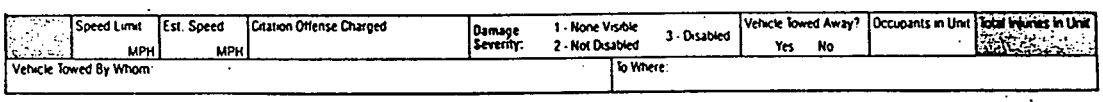
Fifteen minutes past midnight is entered as 0015

Note: Be sure to circle the time convention used: "AM," "PM," or "MT."









72 **SPEED LIMIT** - Enter the lawful speed limit (in miles per hour) for the road on which the vehicle was travelling at the site of the accident. If the vehicle was not on a roadway, enter "NA."

73 **ESTIMATED SPEED** - Enter the estimated speed (in miles per hour) that the vehicle was travelling immediately prior to the accident event. If the speed is unknown, enter "999." If the vehicle was stationary, enter "000."

```
*** WANG VS FILE DISPLAY UTILITY - VERSION  3.03.01 *** 08/19/85 10:00 PAGE     1
CONSECUTIVE FILE TARS001Y IN LIBRARY AHSCOPY  ON VOLUME SYSTEM

000100 FD  TARS001 - SCREEN 1
000200         RECORD CONTAINS 0261 CHARACTERS
000300         LABEL RECORDS ARE STANDARD,
000400         VALUE OF FILENAME IS "TARS001",
000500         VALUE OF LIBRARY IS "AHSDATA"
000600         VALUE OF VOLUME IS "SYSTEM".
000700 01  TARS001-RECORD-AREA.
000800     03  TARS1KEY.
000900         05  TARS1KEY-1.
001000             07  DATAYEAR  PICTURE IS XX.
001100             07  ARNNO     PICTURE IS X(5).
001200         05  TARS1KEY-2    PICTURE IS 99.-may be several records per accident
001300     03  ACDNDATE.
001400         05  MON  PICTURE IS 99. MONTH
001500         05  DAI  PICTURE IS 99. DAY  of accident
001600         05  YER  PICTURE IS 99. YEAR
001700     03  WEEKDAY  PICTURE IS  X(03).WEEKDAY
001800     03  ACDNTIME PICTURE IS  9(04).TIME
001900     03  AMPM     PICTURE IS  X(01). AMPM
002000     03  VEHINVCL PICTURE IS  9(02).VEHICLES INVOLVED
002100     03  FATALINJ PICTURE IS  9(02).# of FATALITIES
002200     03  OTHERINJ PICTURE IS  9(02).# of OTHER INJURIES
002300     03  OCUPNVCL PICTURE IS  9(02).OCCUPANTS INVOLVED
002400     03  CCUNTY   PICTURE IS  X(20).
002500     03  CITY     PICTURE IS  X(20).
002600     03  NCTCITY  PICTURE IS  X(10).   see
002700     03  NCTCITYN PICTURE IS  X(01).   screen 1
002800     03  NCTCITYS PICTURE IS  X(01).
002900     03  NCTCITYE PICTURE IS  X(01).
003000     03  NCTCITYW PICTURE IS  X(01).
003100     03  CTYLIMIT PICTURE IS  X(20).
003200     03  ACDNTST.
003210         05  HIWAY-3  PIC IS  X(3).
003220         05  HIWAY-27 PIC IS  X(27) > STREET NAME
003300     03  ROUTEDIR PICTURE IS  X(01). ROUTE DIRECTION
003400     03  SECTION.
003410         05  SECT-2   PIC IS  XX. SECTION
003420         05  ALT-1    PIC IS  X.  SECTION ALTERNATE
003500     03  LOGMILE.
003510         05  LOG1     PIC IS 999. LOGMILE
003520         05  LOG2     PIC IS 9(
003600     03  LOCLENGH PICTURE IS 9(04).
003700     03  SYSFUNCT.
003710         05  DIGIT-1  PIC IS  9.
003720         05  DIGIT-2  PIC IS  9.  SYSTEM FUNCTION
003730         05  DIGIT-3  PIC IS  9.
003740         05  DIGIT-4  PIC IS  9.
003800     03  POPGROUP PICTURE IS  9(01).POPULATION GROUP
003900     03  SYSCLASS PICTURE IS  X(01).SYSTEM CLASS
004000     03  INTERSEC PICTURE IS  X(30).INTERSECTION
004100     03  NOTNSECT PICTURE IS  X(10).NOT AT INTERSECTION BUT...
004200     03  NCTSECTN PICTURE IS  X(01).NORTH OF
```

ARKANSAS

TRAFFIC ACCIDENT REPORTING SYSTEM

MOST HARMFUL EVENT HELP SCREEN

```
        1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
                              MOST HARMFUL EVENT

          NON-COLLISION CODES                    COLLISION WITH CODES

      10  OVERTURN                           1  PEDESTRIAN
      11  FIRE                               2  PEDACYCLE
      12  EXPLOSION                          3  RAILWAY TRAIN
      13  IMMERSION                          4  MV IN TRANSPORT
      14  GAS INHALATION                     5  MV IN ROADWAY
      15  FELL FROM VEHICLE                  6  PARKED MOTOR VEHICLE
      16  INJURED IN VEHICLE                 7  ANIMAL
      17  OTHER NON-COLLISION                8  OTHER OBJECT NOT FIXED

                          FIXED OBJECTS CODES

      17     BUILDING                    26     LIGHT SUPPORT
      18     DITCH                       27     SIGN POST
      19     CULVERT                     28     TREE/SHRUBBERY
      20     CURB                        29     UTILITY POLE
      21     WALL                        30     OTHER POLES/SUPPORT
      22     DIVIDER                     31     IMPACT ATTENUATOR
      23     EMBANKMENT                  32     BRIDGE/BRIDGE ABUTMENT
      24     FENCE                       33     UNDERPASS/OVERPASS SUPPORT
      25     GUARD RAIL          PRESS ENTER TO RETURN
```

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

Dan Flowers
Director
Telephone (501) 569-2000

P.O. Box 2261
Little Rock, Arkansas 72203-2261
Telefax (501) 569-2400

July 12, 1994

Ms. Helene Williams
Failure Analysis Associates
149 Commonwealth Drive
Menlo Park, California 94025

Dear Ms. Williams:

This is in response to your request for the Arkansas motor vehicle accident data base for the year of 1993. The data are written in EBCDIC as requested.

The only change made during 1993 was the conversion of most harmful event codes to match first harmful event codes. These codes are enclosed.

Sincerely,

Mike Selig

Mike Selig
Coordinator of Arkansas' Highway Safety Program

Enclosure

ARKANSAS

MOST HARMFUL EVENT

NON-COLLISION CODES

10	OVERTURN
11	FIRE
12	EXPLOSION
13	IMMERSION
14	GAS INHALATION
15	FELL FROM VEHICLE
16	INJURED IN VEHICLE
17	OTHER NON-COLLISION

COLLISION WITH CODES

1	PEDESTRIAN
2	PEDACYCLE
3	RAILWAY TRAIN
4	MV IN TRANSPORT
5	MV IN OTHER ROADWAY
6	PARKED MOTOR VEHICLE
7	ANIMAL
8	OTHER OBJECT NOT FIXED

FIXED OBJECT CODES

18	BUILDING
19	DITCH
20	CULVERT
21	CURB
22	WALL
23	DIVIDER
24	EMBANKMENT
25	FENCE
26	GUARD RAIL
27	LIGHT SUPPORT
28	SIGN POST
29	TREE/SHRUBBERY
30	UTILITY POLE
31	OTHER POLE
32	IMPACT ATTENUATOR
33	BRIDGE/BRIDGE ABUTMENT
34	UNDERPASA/OVERPASS
35	MAILBOX
36	BRIDGE PARAPET/END
37	BRIDGE RAIL
38	MEDIAN BARRIER
39	OVERHEAD SIGN SUPPORT
50	OTHER

ARKANSAS STATE HIGHWAY
AND
TRANSPORTATION DEPARTMENT

Maurice Smith
Director
Telephone (501) 569-2000

P.O. Box 2261
Little Rock, Arkansas 72203
Telefax (501) 569-2400

February 25, 1993

Ms. Raluca M. Balaban
Failure Analysis Associates
149 Commonwealth Drive
Menlo Park, California 94025

Dear Ms. Balaban:

This is in response to your request for the Arkansas motor vehicle accident data base for the year of 1991. The data is written in EBCDIC as requested.

You will also find documentation per your request. Included are the coding manual, record layout and accident report forms. The only change made during 1991 was the addition of some vehicle make codes.

As you instructed, we are retaining the additional blank tape for use with 1992 data.

Sincerely,

Mike Selig

Mike Selig
Coordinator of Arkansas'
Highway Safety Program

ARKANSAS

TARS004 HELP CODES SCREEN
FOR FIELDS 5 THRU 10

5. LIGHT CONDITIONS

1 = DAYLIGHT
2 = DARK
3 = DAWN
4 = DUSK
5 = DARK BUT LIGHTED
6 = DARK, LIGHT NO FUNCTIONING
7 = UNKNOWN

6. ACCIDENT LOCALE

1 = RURAL
2 = URBAN

7. ROAD SURFACE CONDITIONS

1 = DRY
2 = WET
3 = ICE
4 = SAND
5 = DIRT
6 = OIL
7 = OTHER
8 = UNKNOWN

9. WAS SPEED LIMIT POSTED?

1 = YES
2 = NO
3 = UNKNOWN

ARKANSAS

TIME HELP SCREEN FOR HELP WITH CONVERTING REGULAR TIME TO 24 HR TIME

AM TIMES (AFTER MIDNIGHT)		PM TIMES (AFTERNOON/EVENING)	
24 HR TIME	REGULAR TIME	*24 HR TIME*	REGULAR TIME
*24:00	= MIDNIGHT	**13:00	= 1:00 PM
*00:30	= 12:30 AM	**14:00	= 2:00 PM
*01:00	= 01:00 AM	**15:00	= 3:00 PM
*02:00	= 02:00 AM	**16:00	= 4:00 PM
*03:00	= 03:00 AM	**17:00	= 5:00 PM
*04:00	= 04:00 AM	**18:00	= 6:00 PM
*05:00	= 05:00 AM	**19:00	= 7:00 PM
*06:00	= 06:00 AM	**20:00	= 8:00 PM
*07:00	= 07:00 AM	**21:00	= 9:00 PM
*08:00	= 08:00 AM	**22:00	= 10:00 PM
*09:00	= 09:00 AM	**23:00	= 11:00 PM
*10:00	= 10:00 AM	**23:59	= 11:59 PM
*11:00	= 11:00 AM		
*12:00	= 12:00(NOON)		

FIND TIME OF DAY ON RIGHT SIDE AND CONVERT TO TIME ON LEFT SIDE
ENTER ONLY 24 HR TIME INTO ACCIDENT TIME AND EMS TIME FIELDS

ATMOSPHERIC CONDITIONS

0	NO ADVERSE CONDITIONS
1	RAIN
2	SLEET
3	SNOW
4	FOG
5	HIGH WINDS
6	SMOKE
7	SMOG
8	DUST
9	OTHER
10	NOT KNOWN

ARKANSAS

ACTIONS OF FIRST 2 VEHICLES INVOLVED IN A 2 OR MORE VEHICLE ACCIDENT

* 2 VEH APPROACHING + AT ANGLE >>

1 - BOTH GOING STRAIGHT
2 - 1 STRAIGHT / 1 BACKING
3 - 1 STRAIGHT / 1 STOPPED
4 - 1 STRAIGHT / 1 RIGHT TURN
5 - 1 STRAIGHT / 1 LEFT TURN
6 - BOTH RIGHT TURN
7 - BOTH LEFT TURN
8 - 1 RIGHT TURN / 1 LEFT TURN
9 - 1 RIGHT TURN / 1 STOPPED
10 - 1 LEFT TURN / 1 STOPPED

* 2 VEH GOING SAME DIR. >>> >>>

11 - BOTH GOING STRAIGHT / REAR END
12 - BOTH GOING STRAIGHT / SIDESWIPE
13 - 1 STRAIGHT / 1 STOPPED
14 - 1 STRAIGHT / 1 RIGHT TURN
15 - 1 STRAIGHT / 1 LEFT TURN
16 - BOTH RIGHT TURN
17 - BOTH LEFT TURN
18 - 1 RIGHT TURN / 1 LEFT TURN
19 - 1 RIGHT TURN / 1 STOPPED
20 - 1 LEFT TURN / 1 STOPPED

* 2 VEH GOING OPPOSITE DIR. >>>><<<<

21 - BOTH GOING STRAIGHT / HEAD ON
22 - BOTH GOING STRAIGHT / SIDESWIPE
23 - 1 STRAIGHT / 1 BACKING UP
24 - 1 STRAIGHT / 1 STOPPED
25 - 1 STRAIGHT / 1 RIGHT TURN
26 - 1 STRAIGHT / 1 LEFT TURN
27 - 1 BACKING / 1 STOPPED
28 - 1 RIGHT TURN / 1 LEFT TURN
29 - 1 RIGHT TURN / 1 STOPPED
30 - 1 LEFT TURN / 1 STOPPED
31 - BOTH LEFT TURN

OTHERS

1 ENTERING OR LEAVING PARKING PLACE

32 - 1 STRAIGHT
33 - 1 RIGHT TURN
34 - 1 LEFT TURN
35. - 1 STOPPED
36. - BOTH

1 ENTERING OR LEAVING DRIVEWAY ACCESS

37 - 1 STRAIGHT
38 - 1 RIGHT TURN
39 - 1 LEFT TURN
40 - 1 STOPPED
41 - 1 CAR PARKED
42 - BOTH VEH. BACKING UP

ANY NOT LISTED ABOVE CODE -- 43

MOST HARMFUL EVENT

NON-COLLISION CODES

09 OVERTURN
10 FIRE
11 EXPLOSION
12 IMMERSION
13 GAS INHALATION
14 FELL FROM VEHICLE
15 INJURED IN VEHICLE
16 OTHER NON-COLLISION

COLLISION WITH CODES

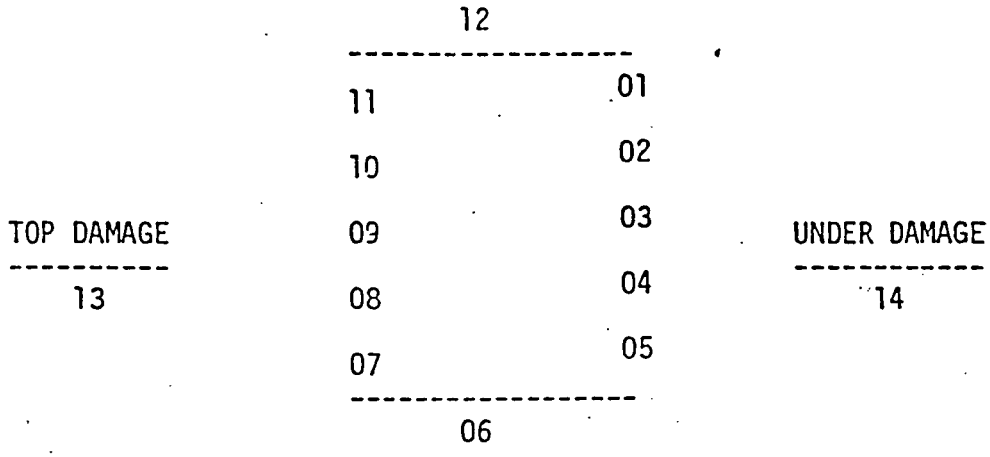
1 PEDESTRIAN
2 PEDACYCLE
3 RAILWAY TRAIN
4 MV IN TRANSPORT
5 MV IN OTHER ROADWAY
6 PARKED MOTOR VEHICLE
7 ANIMAL
8 OTHER OBJECT NOT FIXED

FIXED OBJECT CODES

17 BUILDING
18 DITCH
19 CULVERT
20 CURB
21 WALL
22 DIVIDER
23 EMBANKMENT
24 FENCE
25 GUARD RAIL
26 LIGHT SUPPORT
27 SIGN POST
28 TREE/SHRUBBERY
29 UTILITY POLE
30 OTHER POLES/SUPPORT
31 IMPACT ATTENUATOR
32 BRIDGE/BRIDGE ABUTMENT
33 UNDERPASS/OVERPASS SUPPORT
34 OTHER
35 ***MAILBOX***

ARKANSAS

THIS HELP SCREEN IS FOR DETERMINING THE VEHICLE DAMAGE CLOCK POINTS
THEY ARE INPUT IN FIELD NUMBER 28
YOU MAY ENTER UP TO THREE DAMAGE POINTS AND USE CODES 13, 14, AND 15
FOR TOP AND UNDER DAMAGE(SEE BOTTOM OF SCREEN)



TOP AND UNDER DAMAGE(ROLLOVERS)
----------15----------

THIS HELP SCREEN CONTAINS THE CODES FOR FIELDS
16, 17, 18, 20, 21, 22, AND 26
FOR TARS002 VEHICLE SCREEN
THE NUMBER TO BE ENTERED IS FOLLOWED BY ITS DEFINITION

16. TRAILER CARGO
    1 = NON-HAZARDOUS
    2 = HAZARDOUS
    3 = UNKNOWN

17. PRIOR VEH. DAMAGE
    1 = NO
    2 = YES
    3 = UNKNOWN

19

(18.) FUNCTIONAL/DISABLED
    1 = FUNCTIONAL
    2 = DISABLES
    3 = UNKNOWN

20. DAMAGE
    1 = OTHER DAMAGE
    2 = NO DAMAGE
    3 = UNKNOWN

21. DAMAGE COST
    EXAMPLES
    350 = $ 350.00
    2000 = $2000.00
    (ENTER NUMBERS ONLY)

22. DRIVER OR TOWED
    1 = DRIVEN AWAY
    2 = TOWED AWAY
    3 = UNKNOWN

26. FIRE OCCURENCE
    1 = NO FIRE
    2 = FIRE OCCRD.
    3 = UNKNOWN

ARKANSAS

TARS001 HELP SCREEN FOR CODES TO BE USED FOR
INJURY SEVERTIY AND SPECIAL ACCIDENT TYPE

****ACCIDENT INJURY CODES****	****SPECIAL ACCIDEHT TYPES****
1 - FATAL INJURY	0 - NOT APPLICABLE TO THIS ACCIDENT
2 - INCAPACITATING INJURY	1 - CONSTRUCTION ZONE ACCIDENT
3 - NON-INCAPACITATING INJURY	2 - TRUCK ACCIDENT
4 - POSSIBLE INJURY	3 - TRUCK ACCIDENT IN A CONSTRUCTION ZONE
5 - NO INJURIES - PROPERTY DAMAGE ONLY	

ARKANSAS

SUPPLEMENTAL TRUCK & BUS ACCIDENT REPORT

9. Sequence of Events (for this vehicle)
1 2 3 4 Ran off road
1 2 3 4 Jackknife
1 2 3 4 Overturn
1 2 3 4 Downhill runaway
1 2 3 4 Cargo loss or shift
1 2 3 4 Explosion or fire
1 2 3 4 Separation of units
1 2 3 4 Collision involving pedestrian
1 2 3 4 Collision involving motor vehicle in transport
1 2 3 4 Collision involving parked motor vehicle
1 2 3 4 Collision involving train
1 2 3 4 Collision involving pedalcycle
1 2 3 4 Collision involving animal
1 2 3 4 Collision involving fixed object
1 2 3 4 Collision involving other object
1 2 3 4 Other

	SEQUENCE NO	EVENT DESCRIPTION
*	1	RAN OFF ROAD
*	2	JACKKNIFE
*	3	OVERTURN
*	4	DOWNHILL RUNAWAY
*	5	CARGO LOSS OR SHIFT
*	6	EXPLOSION OF FIRE
*	7	SEPARATION OF UNITS
*	8	COLLISION INVOLVING PEDESTRIAN
*	9	COLLISION INVOLVING MOTOR VEHICLE IN TRANSPORT
*	10	COLLISION INVOLVING PARKED MOTOR VEHICLE
*	11	COLLISION INVOLVING TRAIN
*	12	COLLISION INVOLVING PEDALCYCLE
*	13	COLLISION INVOLVING ANIMAL
*	14	COLLISION INVOLVING FIXED OBJECT

ENTER) DISPLAY
5) NEXT /LAST 9) QUERY
2) MARK /CLEAR 6) ADD /DETAIL 10) MODIFY /DETAIL
15) OUTPUT
8) DELETE 16) RETURN

****

SEQUENCE OF EVENTS HELP/PICK SCREEN ONE (1)

Place cursor on correct value and press enter or press Pfkey 5 for next screen.

ARKANSAS

THIS HELP SCREEN CONTAINS THE CODES FOR FIELDS
16, 17, 18, 20, 21, 22, AND 26
FOR TARS002 VEHICLE SCREEN
THE NUMBER TO BE ENTERED IS FOLLOWED BY ITS DEFINITION

16. TRAILER CARGO
    1 = NON-HAZARDOUS
    2 = HAZARDOUS
    3 = UNKNOWN

17. PRIOR VEH. DAMAGE
    1 = NO
    2 = YES
    3 = UNKNOWN

19

(18.) FUNCTIONAL/DISABLED
    1 = FUNCTIONAL
    2 = DISABLES
    3 = UNKNOWN

20. DAMAGE
    1 = OTHER DAMAGE
    2 = NO DAMAGE
    3 = UNKNOWN

21. DAMAGE COST
    EXAMPLES
    350 = $ 350.00
    2000 = $2000.00
    (ENTER NUMBERS ONLY)

22. DRIVER OR TOWED
    1 = DRIVEN AWAY
    2 = TOWED AWAY
    3 = UNKNOWN

26. FIRE OCCURENCE
    1 = NO FIRE
    2 = FIRE OCCRD.
    3 = UNKNOWN

ARKANSAS

TARS004 HELP CODES SCREEN
FOR FIELDS 30 THRU 32

32. FIRST HARMFUL EVENT TYPE
1 = NON-COLLISION
2 = COLLISION WITH NON-FIXED OBJECT
3 = COLLISION WITH A FIXED OBJECT

33. FIRST HARMFUL EVENT CODES
(IF #32 = 2)
1 = PEDESTRIAN
2 = PEDACYCLE
3 = RAILWAY TRAIN
4 = MV IN TRANSPORT
5 = MV IN ROADWAY
6 = PARKED MV
7 = ANIMAL
8 = OTHER OBJECT-NOT FIXED

(IF #33 = 1)
10 = OVERTURN
11 = FIRE
12 = EXPLOSION
13 = IMMERSION
14 = GAS INHALATION
15 = FELL FROM VEH.
16 = INJURED IN VEH.
17 = OTHER NON-COLLISION

(IF #32 = 3)
18 = BUILDING
19 = DITCH
20 = CULVERT
21 = CURB
22 = WALL
23 = DIVIDER
24 = EMBANKMENT
25 = FENCE
26 = GUARD RAIL
27 = LIGHT SUPPORT
28 = SIGN POST
29 = TREE/SHRUBBERY
30 = UTILITY POLE
31 = OTHER POLES/SUPPORT
32 = IMPACT ATTENUATOR
33 = BRIDGE/BRIDGE ABUTMENT
34 = UNDERPASS/OVERPASS SUPPORT
35 = MAILBOX
36 = unknown/other

MOST HARMFUL EVENT

NON-COLLISION CODES

09 OVERTURN
10 FIRE
11 EXPLOSION
12 IMMERSION
13 GAS INHALATION
14 FELL FROM VEHICLE
15 INJURED IN VEHICLE
16 OTHER NON-COLLISION

COLLISION WITH CODES

1 PEDESTRIAN
2 PEDACYCLE
3 RAILWAY TRAIN
4 MV IN TRANSPORT
5 MV IN OTHER ROADWAY
6 PARKED MOTOR VEHICLE
7 ANIMAL
8 OTHER OBJECT NOT FIXED

FIXED OBJECT CODES

17 BUILDING
18 DITCH
19 CULVERT
20 CURB
21 WALL
22 DIVIDER
23 EMBANKMENT
24 FENCE
25 GUARD RAIL
26 LIGHT SUPPORT
27 SIGN POST
28 TREE/SHRUBBERY
29 UTILITY POLE
30 OTHER POLES/SUPPORT
31 IMPACT ATTENUATOR
32 BRIDGE/BRIDGE ABUTMENT
33 UNDERPASS/OVERPASS SUPPORT
34 OTHER
35 ***MAILBOX***

```
*** WANG VS FILE DISPLAY UTILITY - VERSION  3.03.01 *** 08/19/85 10:00 PAGE     1
CONSECUTIVE FILE TARS001Y IN LIBRARY AHSCOPY  ON VOLUME SYSTEM

000100 FD  TARS001 - SCREEN 1
000200         RECORD CONTAINS 0261 CHARACTERS
000300         LABEL RECORDS ARE STANDARD,
000400         VALUE OF FILENAME IS "TARS001",
000500         VALUE OF LIBRARY IS "AHSDATA"
000600         VALUE OF VOLUME IS "SYSTEM".
000700 01  TARS001-RECORD-AREA.
000800     03  TARS1KEY.
000900         05  TARS1KEY-1.
001000             07  DATAYEAR   PICTURE IS XX.
001100             07  ARNNO      PICTURE IS X(5).
001200         05  TARS1KEY-2     PICTURE IS 99.-may be several records per accident
001300     03  ACDNDATE.
001400         05  MON   PICTURE IS 99. MONTH
001500         05  DAI   PICTURE IS 99. DAY   of accident
001600         05  YER   PICTURE IS 99. YEAR
001700     03  WEEKDAY   PICTURE IS  X(03).WEEKDAY
001800     03  ACDNTIME PICTURE IS  9(04).TIME
001900     03  AMPM      PICTURE IS  X(01). AMPM
002000     03  VEHINVOL PICTURE IS  9(02).VEHICLES INVOLVED
002100     03  FATALINJ PICTURE IS  9(02).# of FATALITIES
002200     03  OTHERINJ PICTURE IS  9(02).# of OTHER INJURIES
002300     03  OCUPNVOL PICTURE IS  9(02).OCCUPANTS INVOLVED
002400     03  COUNTY    PICTURE IS  X(20).
002500     03  CITY      PICTURE IS  X(20).
002600     03  NOTCITY   PICTURE IS  X(10).   see
002700     03  NOTCITYN PICTURE IS  X(01).    screen 1
002800     03  NOTCITYS PICTURE IS  X(01).
002900     03  NOTCITYE PICTURE IS  X(01).
003000     03  NOTCITYW PICTURE IS  X(01).
003100     03  CTYLIMIT PICTURE IS  X(20).
003200     03  ACDNTST.
003210         05  HIWAY-3  PIC IS  X(3).
003220         05  HIWAY-27 PIC IS  X(27)  >STREET NAME
003300     03  ROUTEDIR PICTURE IS  X(01). ROUTE DIRECTION
003400     03  SECTION.
003410         05  SECT-2   PIC IS  XX. SECTION
003420         05  ALT-1    PIC IS  X.  SECTION ALTERNATE
003500     03  LOGMILE.
003510         05  LOG1     PIC IS 999. LOGMILE
003520         05  LOG2     PIC IS 9%.
003600     03  LOCLENGH PICTURE IS 9(04).
003700     03  SYSFUNCT.
003710         05  DIGIT-1  PIC IS  9.
003720         05  DIGIT-2  PIC IS  9.  >SYSTEM FUNCTION
003730         05  DIGIT-3  PIC IS  9.
003740         05  DIGIT-4  PIC IS  9.
003800     03  POPGROUP PICTURE IS  9(01).POPULATION GROUP
003900     03  SYSCLASS PICTURE IS  X(01).SYSTEM CLASS
004000     03  INTERSEC PICTURE IS  X(30).INTERSECTION
004100     03  NOTNSECT PICTURE IS  X(10).NOT AT INTERSECTION BUT...
004200     03  NOTSECTN PICTURE IS  X(01).NORTH OF
```

ARKANSAS

TRAFFIC ACCIDENT REPORTING SYSTEM

MOST HARMFUL EVENT HELP SCREEN

```
        1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
                              MOST HARMFUL EVENT

          NON-COLLISION CODES                    COLLISION WITH CODES

      10  OVERTURN                           1  PEDESTRIAN
      11  FIRE                               2  PEDACYCLE
      12  EXPLOSION                          3  RAILWAY TRAIN
      13  IMMERSION                          4  MV IN TRANSPORT
      14  GAS INHALATION                     5  MV IN ROADWAY
      15  FELL FROM VEHICLE                  6  PARKED MOTOR VEHICLE
      16  INJURED IN VEHICLE                 7  ANIMAL
      17  OTHER NON-COLLISION                8  OTHER OBJECT NOT FIXED

                           FIXED OBJECTS CODES

      17    BUILDING                        26    LIGHT SUPPORT
      18    DITCH                           27    SIGN POST
      19    CULVERT                         28    TREE/SHRUBBERY
      20    CURB                            29    UTILITY POLE
      21    WALL                            30    OTHER POLES/SUPPORT
      22    DIVIDER                         31    IMPACT ATTENUATOR
      23    EMBANKMENT                      32    BRIDGE/BRIDGE ABUTMENT
      24    FENCE                           33    UNDERPASS/OVERPASS SUPPORT
      25    GUARD RAIL          PRESS ENTER TO RETURN
```

FLORIDA

File Layout:

- File/Record Description (Long Form)

Coding Description/Instruction:

- Instructions for Accident Report HSMV-90003, HSMV-90005, HSMV-90004 & HSMV-90006
- R Section -- Guide to 1993 Revisions - effective January 1, 1993

Documentation received May 1995 with Florida 1994 Motor Vehicle Accident Database

FLORIDA

(13) First/Subsequent Harmful Event

01 Collision With MV in Transport (Rear-end)
02 Collision With MV in Transport (Head-on)
03 Collision With MV in Transport (Angle)
04 Collision With MV in Transport (Left Turn)
05 Collision With MV in Transport (Right Turn)
06 Collision With MV in Transport (Sideswipe)
07 Collision With MV in Transport (Backed Into)
08 Collision With Parked Car
09 Collision With MV on Other Roadway
10 Collision With Pedestrian
11 Collision With Bicycle
12 Collision With Bicycle (Bike Lane)
13 Collision With Moped
14 Collision With Train
15 Collision With Animal
16 MV Hit Sign/Sign Post
17 MV Hit Utility Pole/Light Pole
18 MV Hit Guardrail
19 MV Hit Fence
20 MV Hit Concrete Barrier Wall
21 MV Hit Bridge/Pier/Abutment Rail
22 MV Hit Tree/Shrubbery
23 Collision With Construction Barricade/Sign
24 Collision With Traffic Gate
25 Collision With Crash Attenuators
26 Collision With Fixed Object Above Road
27 MV Hit Other Fixed Object
28 Collision With Moveable Object On Road
29 MV Ran Into Ditch/Culvert
30 Ran Off Road Into Water
31 Overturned
32 Occupant Fell From Vehicle
33 Tractor/Trailer Jackknifed
34 Fire
35 Explosion
77 All Other (Explain)

Changes:

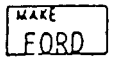
The **First/Subsequent Harmful Event** field remains the same as on previous forms except for the order of code choices. The codes have been reordered to group related choices together for easier selection. For example, all codes relating to single vehicle collisions with fixed objects are adjacent to one another in the revised list.

YEAR OF VEHICLE

- Enter the year of the vehicle. (If unknown, enter UK in the space provided.)
- If not applicable, draw a diagonal line in the space provided.

FLORIDA

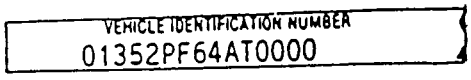
MAKE OF VEHICLE



This space is used to display the name of the manufacturer of the vehicle; for example, Ford, Chevrolet, Datsun, and Toyota.

- Enter the first four letters of the manufacturer's name; for example, Ford, Chev, Dats, and Toyo.
- Do not use the model name; for example, LTD, Monte Carlo, 280 Z, and Celica.
- If unknown, enter UK in the space provided.
- If not applicable, draw a diagonal line in the space provided.

VEHICLE IDENTIFICATION NUMBER (VIN)



The VIN is a unique set of numbers generated by the vehicle manufacturer which describes the characteristics of each vehicle in a coded format. The VIN is essential to determining proper ownership of a particular vehicle and it is imperative that the numbers are displayed in the proper sequence. All statewide law enforcement agencies have the capability to determine ownership of a vehicle by accessing the Department's data base via the VIN. The VIN is cross referenced with the vehicle license number and the vehicle title number.

- Enter the complete vehicle identification number in the space provided. (VIN's usually range between 10 and 25 numbers and letters.)

VEHICLE IDENTIFICATION NUMBER (VIN) Cont.

- If unknown, enter UK in the space provided.
- If not applicable, draw a diagonal line in the space provided.

FLORIDA

INJURY SEVERITY (INJ)

This space is used to identify injuries sustained by all passengers within or on a vehicle. The coding elements are contained in the "Code Information" section located on page one of the Florida Traffic Crash Report (Form Number HSMV-90003).

- Enter the appropriate code in the space provided.
- If not applicable, draw a diagonal line in the space provided.

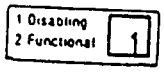
INJURY SEVERITY (INJ)

This space is used to capture and provide information pertaining to the injuries sustained by passengers within or on a vehicle. The coding elements are contained in the "Code Information" section located on page one of the Florida Traffic Accident Report (Form Number HSMV-90003).

- Enter the appropriate code in the space provided.
- If not applicable, draw a diagonal line in the space provided.

FLORIDA

DAMAGE SEVERITY



This data field is used to reflect the severity of the property damage sustained by a vehicle involved in a traffic accident. There are two classifications for damage severity:

1. Disabling damage requires the removal of the vehicle from the scene of the traffic accident by a wrecker or another means;and
2. Functional damage is any other damage which leaves the vehicle operable, and the vehicle can be driven away from the scene of the traffic accident.

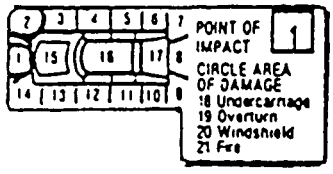
DAMAGE SEVERITY CONT.

This data field is extremely important since any traffic accident involving disabling damage to a vehicle must be investigated by a law enforcement officer and the outcome of the investigation reported to the Department on the Florida Traffic Accident Report (Form Number HSMV-90003). In addition, the Statewide Traffic Accident Management Information System programmatically scans this data field to determine if the vehicle owner and operator should be processed under the provisions of the Florida Financial Responsibility Law, Chapter 324.00,F.S., for the lack of motor vehicle liability insurance at the time of the traffic accident. Only the traffic accidents where disabling vehicle damage occurred are subject to the Financial Responsibility Law unless additional elements pursuant to section 316.066,(3)(a),F.S., are met which require an investigation by a law enforcement officer.

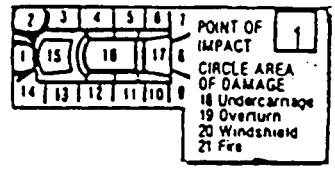
- If the vehicle is disabled and must be towed from the scene enter the number 1 in the space provided.
- If the vehicle is functional and is driven away from the scene, enter the number 2 in the space provided.
- If the vehicle is functional and is towed from the scene, enter the number 2 in the space provided.
- If no damage occurred, enter the number 2.
- If not applicable, draw a diagonal line in the space provided.

FLORIDA

AREA OF VEHICLE DAMAGE



POINT OF IMPACT

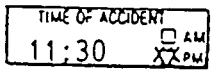


This diagram depicts the area(s) of damage sustained by the vehicle as a result of the traffic accident and the first point of impact. Identify the first point of impact by selecting the corresponding number from the area of vehicle damage diagram.

- Circle the damaged area(s) as required.
- Enter the first point of impact.

FLORIDA

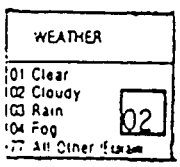
TIME OF ACCIDENT



Use Standard time. (This includes daylight saving time.)

- Enter the time of day, or the approximate time of day, the traffic accident occurred.
- Place an X in the A.M or P.M. box to reflect the time of day.
- Midnight is considered A.M., while noontime is considered P.M.

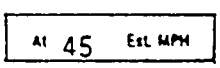
WEATHER



This classification is used to identify the weather conditions when the traffic accident occurred.

- Enter the appropriate weather code in the space provided.
- If Code 77 (all other) is used, explain and identify the weather conditions in the Narrative Report.

ESTIMATED SPEED



- Enter the estimated speed the vehicle was traveling prior to impact.
- If unknown, enter UK in the space provided.
- If not applicable, draw a diagonal line in the space provided.

FLORIDA

1986 - 1987

Record layout
Accident Report form
Instruction manual

FLORIDA

FIRST/SUBSEQUENT HARMFUL EVENT

FIRST/SUBSEQUENT HARMFUL EVENT					
01 Collision With MV in Transport (Rear-end)	15 Collision With Bicycle (Bike Lane)	F	S	27 MV Hit Concrete Barrier Wall	
02 Collision With MV in Transport (Angle)	16 MV Ran into Ditch/Culvert	02	19	28 MV Hit Bridge/ Pier/Abutment Rail	
03 Collision With MV in Transport (Left Turn)	17 Ran Off Road/Into Water			29 Occupant Fell From Vehicle	
04 Collison With Parked Car	18 Overturned			30 Tractor/Trailer Jackknifed	
05 Collision With MV in Transport (Sideswipe)	19 MV Hit Fence			31 Collision With Construction Barricade/Sign in Road	
06 Collision With MV in Transport (Backed Into)	20 Collision With MV on Other Roadway			32 Collision With Traffic Gate	
07 Collision With MV in Transport (Right Turn)	21 MV Hit Sign/Sign Post			33 Collision With Crash Attenuators	
08 MV Hit Other Fixed Object	22 MV Hit Guardrail			34 Collision With Train	
09 MV Hit Utility Pole/Light Pole	23 Collision With Fixed Object Above Road			35 Explosion	
10 Collision With MV in Transport (Head-on)	24 Fire			77 All Other (Explain)	
11 Collision With Pedestrian	25 Collision With Animal				
12 Collision With Moped	26 Collision With Moveable Object On Road				
13 MV Hit Tree/Shrubbery					
14 Collision With Bicycle					

This classification is used to describe a traffic accident in terms of the first and subsequent harmful events. The first and subsequent harmful events depict the type of traffic accident by identifying certain scene characteristics at the point of collision.

- Enter the first harmful event in the space provided.
- If applicable, enter the subsequent harmful event in the space provided. Generally speaking, the subsequent harmful event is directly influenced by the first harmful event.
- If Code 77 (all other) is used, explain and identify the first and subsequent harmful event in the Narrative Report.

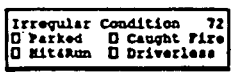
The Maryland Automated Accident Reporting System (*MAARS*)

Instruction and Reference Manual

Central Records Division
Maryland State Police
Pikesville, MD 21208-3899

January, 1993

MARYLAND



72 SPECIAL CONDITION CHECKBLOCKS FOR VEHICLES

Check any box that applies to vehicle. It is possible, but unlikely, that multiple blocks would apply.

- ☐ Parked applies to motor vehicles that are parked on a road or elsewhere.
- ☐ Hit & Run applies only to the striking vehicle, not for a vehicle struck by a Hit & Run unit. (Also see: Hit & Run Recording)
- ☐ Caught Fire indicates that a fire occurred either as a first or subsequent event. Check this box even if a fire breaks out in a vehicle which has been totally destroyed or a fire breaks out but is extinguished before significant damage occurs from the fire.
- ☐ Driverless applies to a motor vehicle in transport which does not have a driver in the vehicle at the time of the accident. A person in the vehicle capable of driving but not controlling or attempting to control the vehicle is not a driver.

MARYLAND

37 (FIRST) HARMFUL EVENT (1)

Identify the classification of the accident according to the categories described below following the instructions for Data Entry.

```
00 Not Applicable
01 Other Vehicle
02 Parked Vehicle
03 Pedestrian
04 Bicycle
05 Other Pedalcycle
06 Other Conveyance
07 Railway Train
08 Animal
09 Fixed Object
10 Other Object
```

```
11 Overturn
12 Spilled Cargo
13 Jackknife
14 Units Separated
15 Other Non-Coll.
16 Off Road
17 Downhill Runaway
18 Explosion or Fire
88 Other
99 Unknown
```

09 Fixed Object	"Fixed" is the key word. Examples are listed in the code set for TYPE OF FIXED OBJECT STRUCK (see Block 39).
10 Other Object	All collisions that qualify as accidents and are not included in the other categories of collision types (Proper selection of this category will be rare.)

Noncollision:

11 Overturn	The harmful event is a motor vehicle overturn.
12 Spilled Cargo	The harmful event is injury or damage resulting from a cargo spill.
13 Other Non-collision	All other noncollision harmful events including the following:

Fire
Explosion
Gas (e.g. carbon monoxide) Inhalation

38 HARMFUL EVENT 2

Follow the instructions for Block 37 above (and refer to the explanations beginning on Page 57 if necessary) to indicate the second harmful event.

↑ Reporting Data Entry ↓

Transcribe exactly the information from the report form into the data entry field illustrated. All explanations applying to Block 37 apply to this field.

MARYLAND

80 (VEH) MOST HARMFUL EVENT

Record the most harmful event which occurred to this vehicle. The code options are the same as those for blocks 37 and 38. If there is a question about which one of multiple events caused the most (greatest) harm or damage, apply your best judgment or select the first of those which you would judge to be equally harmful (whether or not the event you select is the first harmful event in the entire accident).

↑ Reporting ░░░░░░░░░░ Data Entry ↓

Transcribe exactly the information from the report form into the data entry field illustrated.

```
    Collision With:
 01 Other Motor Vehicle
    in Transport
 02 Parked Motor Vehicle
 03 Pedestrian
 04 Bicycle
 05 Other Pedalcycle
 06 Other Conveyance
 07 Railway Train
 08 Animal
 09 Fixed Object
 10 Other Object

    Non-collision:
 11 Overturn
 12 Spilled Cargo
 13 Jackknife
 14 Separation of Units
 15 Other Non-collision
```

73 HAZARDOUS MATERIALS SPILL

Check "N (No)" or "Y (Yes)" if any hazardous materials were released either as a cause or a result of the accident.

↑ Reporting ░░░░░░░░░░ Data Entry ↓

Transcribe exactly the information from the report form into the data entry field illustrated.

```
N No
Y Yes
```

MARYLAND

85 YEAR & MAKE of VEHICLE

Record the MODEL YEAR as shown on the vehicle registration. Record the VEHICLE MAKE (name of the vehicle manufacturer) or the NCIC abbreviation of 4 characters.

Examples of NCIC codes for the more common makes of vehicles are shown on the following page. Most, but not all, NCIC vehicle make codes are the first 4 letters of the name of the make.

NCIC CODES FOR COMMON AUTOMOBILE MAKES

ACUR Acura
AMER American Motors
AUDI Audi
BMW BMW
BUIC Buick
CADI Cadillac
CHEV Chevrolet
CHRY Chrysler
DATS Datsun
DODG Dodge
FIAT Fiat
FORD Ford
HOND Honda
HYUN Hyundai
LINC Lincoln
MAZD Mazda
MERZ Mercedes-Benz
MERC Mercury
MITS Mitsubishi
NISS Nissan
OLDS Oldsmobile
PLYM Plymouth
PONT Pontiac
PORS Porsche
RENA Renault
SUBA Subaru
TOYT Toyota
VOLK Volkswagen
VOLV Volvo

92 VEHICLE ID NUMBER (VIN)

Copy the full number from the VIN plate on the vehicle (showing through the lower part of the windshield on vehicles manufactured since the late 1960's) as the preferred source of this information. Copy the VIN from the registration form if direct observation is not a reasonable method of observing the VIN.

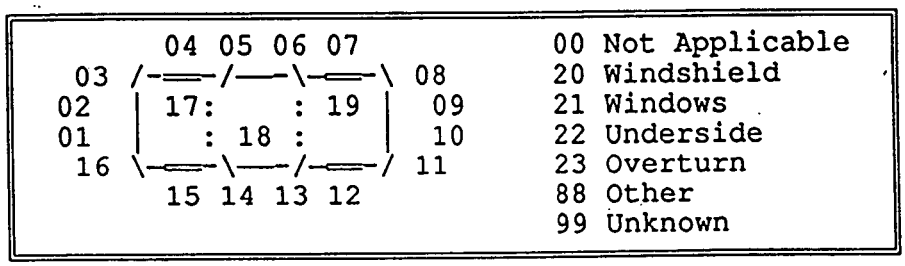
MARYLAND

90 AREAS DAMAGED

Enter up to three of the most appropriate codes to indicate the area(s) damaged using the same code references for the # 87 and # 88 data elements.

The codes for impact points and damage location areas are the same and are displayed in the reference style shown below.

A **range of damage** can be shown by identifying the beginning and ending points in the first and last parts (2-digit sets) and placing dashes in the middle. For example, if the entire right side of the vehicle is damaged, the entries would be "03 -- 08".



94 DAMAGE EXTENT

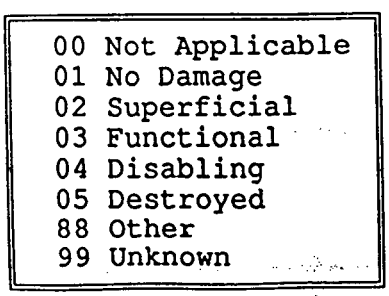
Enter one code for the vehicle damage. Notice that the higher code numbers reflect progressively greater damage. The first 3 definitions are from the Manual on Classification of Motor Vehicle Accidents:

Superficial or Minor: Superficial or minor damage is harm to property that reduces the monetary value of that property.

Functional: Functional damage is any road vehicle damage, other than disabling damage, which affects operation of the road vehicle or its parts.

Disabling: Disabling damage is road vehicle damage which precludes departure of the vehicle from the scene of the accident in its usual operating manner by daylight after simple repairs.

Destroyed: Salvage is not possible or reasonable. Excludes damage which may not be feasible only for economic reasons.



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5 REPORT TYPE

Check one box on the top line to indicate the nature of the accident: a fatality occurred, a non-fatal injury occurred, or no injury occurred—the accident involved Property Damage Only (PDO).

Check a box on the second line only if the accident had a hit & run involvement or it originated or occurred at a location other than a trafficway or is otherwise not a *motor vehicle traffic accident.*

FATALITY Check the Fatality box if any person involved in the accident is officially declared dead as a result of the accident at any time prior to filing the accident report. Do not also check the Injury or PDO boxes.

INJURY Check the Injury box if any person involved in the accident was injured but no person was declared dead as a result of the accident. Do not also check the Fatality or PDO boxes.

PDO Check the PDO box if the accident resulted in no injuries (but did result in damage to any vehicle(s) or other property. Do not also check the Fatality or Injury boxes.

HIT & RUN Always check the Hit & Run checkboxes at the top of the form and in the a traffic unit section for the vehicle which hit & ran, not for any vehicle struck by another and remains at the scene. Describe the hit & run vehicle completely when the information is obtainable. Otherwise, fill in the information available. Draw a line through spaces that cannot be answered. If no information is known about the hit & run vehicle, enter only a unit number. Descriptive information may be entered later if obtained. See the illustration at the end of the manual for completing a Traffic Unit section on a Hit & Run vehicle.

NON-TRAF Check the Non-Traf(fic) box if the accident is not to be classified as a traffic accident report.

MARYLAND

104 INJURY SEVERITY

Enter the most appropriate code for the injury observed at the scene of the accident or as reported by EMS providers.

INJURY CODES WITH DEFINITIONS

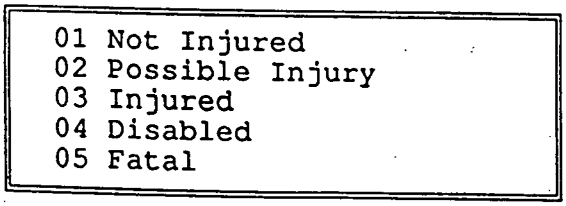
The code letters were selected to suggest the general extent of injury observed. The definitions on the following page are taken from the Manual on Classification of Motor Vehicle Traffic Accidents, American National Standard D16.1-1989.

The Accident Classification Manual gives examples and lists exclusions for some of the definitions.

01 Not injured/not known: No injury was evident, or the person in question departed from the scene (but was not transported by EMS as an injured person).
02 Possible Injury: A possible injury is any injury reported or claimed which is not a fatal injury, incapacitating injury, or non-incapacitating evident injury.
03 Injury, not incapacitating: A nonincapacitating evident injury is any injury, other than a fatal injury or an incapacitating injury, which is evident to observers at the scene of the accident in which the injury occurred.
04 Disabled (incapacitating): An incapacitating injury is any injury, other than a fatal injury, which prevents the injured person from walking, driving, or normally continuing the activities he was capable of performing before the injury occurred.
05 Fatal: A fatal injury is any injury that results in death.

↑ Reporting ▨▨▨ Data Entry ↓

Transcribe exactly the information from the report form into the data entry field illustrated.



```
01 Not Injured
02 Possible Injury
03 Injured
04 Disabled
05 Fatal
```

MARYLAND

40 VEH-VEH COLLISION TYPE

Use the code that best describes the vehicle-to-vehicle ***movement directions*** when the Harmful Event category is "01 (Collision With) Other Motor Vehicle." The *movement direction* of a vehicle is usually, but not necessarily the same as the orientation direction of the vehicle. A Head On collision type (→←) would be the correct answer for one vehicle going forward and striking another vehicle backing. The damage resulting from such a collision would be consistent with a typical Same Direction Rear End accident, but the movement directions would make the difference for this example.

The codes for this element consist of simple sketches of vehicle-to-vehicle interactions that match the codes and values to be used. If the Harmful Event category is anything other than "01 (Collision With) Other Motor Vehicle," the correct answer for VEH-VEH COLLISION TYPE is "00 - Not Applicable" or "17 Single Vehicle.

NOTE: The codes for Collision With Other Motor Vehicle, for Accident Location, and for Vehicle Maneuvers (in the lower part), must be mutually agreeable and consistent with the Collision Diagram to be acceptable.

↑ Reporting Data Entry ↓

Transcribe exactly the information from the report form into the data entry field illustrated.

00 Not Applicable
01 Head On
02 Head On Left Turn
03 Same Dir Rear End
04 Same Dir R-End Right Turn
05 Same Dir R-End Left Turn
06 Opposite Dir Sideswipe
07 Same Direction Sideswipe
08 Same Direction Right Turn
09 Same Direction Left Turn
10 Same Dir Both Left Turn
11 Straight Movement Angle
12 Angle Meets Right Turn
13 Angle Meets Left Turn
14 Angle Meets Left Head On
15 Opposite Dir Both Left
17 Single Vehicle
88 Other
99 Unknown

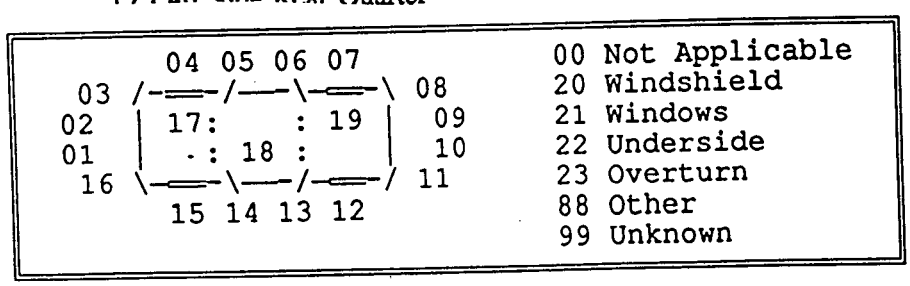
MARYLAND

87 1st IMPACT PT

Enter the code for the most specific location possible to determine for the first point of impact. This applies whether the vehicle in question struck another vehicle or object or was *struck by* another vehicle. The code set is on the underside of the coding overlay.

The codes for impact points and damage location areas are the same and are contained in the following set:

01 Front Left
02 Front Right
03 Front Right Corner
04 Right Side Front Quarter
05 Right Side 2nd Quarter
06 Right Side 3rd Quarter
07 Right Side Rear Quarter
08 Rear Right Corner
09 Rear Right
10 Rear Left
11 Rear Left Corner
12 Left Side Rear Quarter
13 Left Side 3rd Quarter
14 Left Side 2nd Quarter
15 Left Side Front Quarter
16 Front Left Corner
17 Hood
18 Roof/Top
19 Trunk
20 Windshield
21 Windows
22 Underside
23 Overturn (overall)

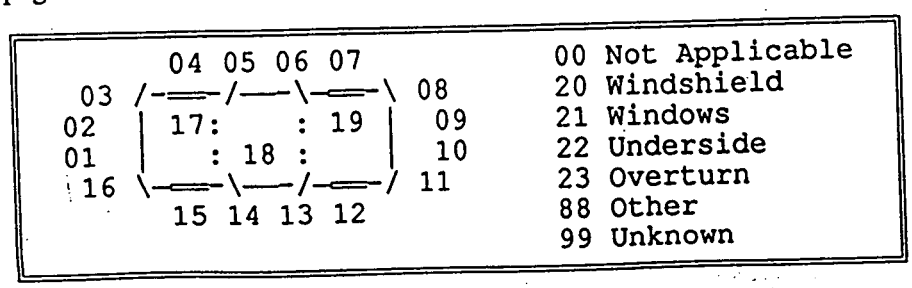


00 Not Applicable
20 Windshield
21 Windows
22 Underside
23 Overturn
88 Other
99 Unknown

88 Main Impact

Using the same code reference for the # 87 element, specify the main impact point (often the same as the first impact point).

The codes for impact points and damage location areas are the same and are displayed on the previous page.



00 Not Applicable
20 Windshield
21 Windows
22 Underside
23 Overturn
88 Other
99 Unknown

MARYLAND

39 FIXED OBJECT 1

Use the code that best describes the fixed object struck when a harmful event category is 09-Fixed Object. (Use "00" if *neither* harmful event was 09.) If both harmful events were 09-Fixed Object and the two events involved different fixed objects, record the *FIRST* of the fixed objects in this block.

▒▒▒ ↑ Reporting ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒ Data Entry ↓

Transcribe exactly the information from the report form into the data entry field illustrated.

00	Not Applicable
01	Bridge-Overpass
02	Building
03	Culvert-Ditch
04	Curb
05	Guardrail-Barrier
06	Embankment
07	Fence
08	Light Support Pole
09	Sign Support Pole
10	Other Pole
11	Tree-Shrubbery
12	Construction Barr.
13	Crash Attenuator
88	Other
99	Unknown

MARYLAND

4 ACCIDENT TIME

Specify the time of the accident in military style — 0001 (one minute after midnight) through 2359 (one minute before midnight) or 2400 (exactly midnight). Accident time is difficult to determine and is often estimated incorrectly. If EMS responders have been called, they are likely the first called, and their dispatch time — if available — is useful as an indicator of when the accident occurred. The accident time is always before the EMS unit was dispatched. If EMS times are available, be sure your record of the accident time is before the EMS unit was called or dispatched.

42 WEATHER

Enter the most appropriate code for the weather condition at the time of the accident.

↑ Reporting ▒▒▒▒▒▒▒▒▒▒ Data Entry ↓

Transcribe exactly the information from the report form into the data entry field illustrated. The Help window identifies all of the valid codes for this field.

```
00 Not Applicable
01 Clear/Cloudy
02 Foggy
03 Raining
04 Snow/Sleet
05 Severe Winds
88 Other
99 Unknown
```

---

60 SPEED LIMIT

Enter the posted speed limit which applies to this vehicle. If not posted, enter the speed limit established for that type of road or street by statute or regulation. If the traffic unit is a PED, enter "00".

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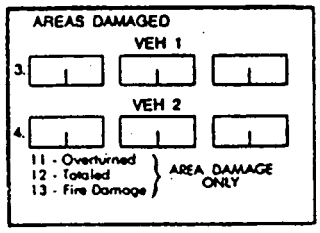

AREAS DAMAGED

From categories 1 through 15 below, enter the code or codes that best describe the "vehicle areas" that were damaged. Up to three codes can be entered for each vehicle. If more than three areas of a vehicle suffer noticeable damage, but repairs seem practical, three areas that appeared to have suffered the most extensive damage should be considered when selecting and entering codes. In other words, a vehicle suffering damage to more than three areas does not necessarily fall into the Totaled (code 12) category. Fire damage should always be listed where fire was present.

EXAMPLE:

01 - At or around the wheel and fender area, left front.

02 - At the grille and/or the hood.

03 - At or around the wheel and fender area, right front.

04 - At area between fenders and below the roof, left.

05 - Entire roof area, including convertibles.

06 - At area between fenders and below the roof, right.

07 - At or around the wheel and fender area, left rear.

08 - At the trunk or rear engine compartment.

09 - At or around the wheel and fender area, right rear.

10 - Any area on underside (excludes body panels).

11 - Partial (on roof) and complete rollovers.

12 - Damage so extensive or severe that repairs would be impractical.

13 - Fire Damage

14 - Other

15 - None/unknown

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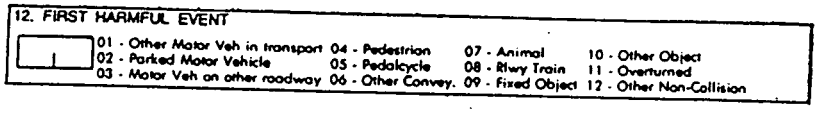

FIRST HARMFUL EVENT

Every motor vehicle traffic accident consists of a series of events. In classification by type, one of these events must be selected before further classification can be made. This event must be one which can be easily determined by whomever classified the accident. For uniformity in classification, select the event which is the first injury or damage producing event that can be determined to have happened in the accident, such as overturning, hitting a pedestrian, or other collision and enter its code in the box on the left.

The twelve categories describing the nature of the accident are applicable to both "On and Off Roadway" accidents.

Review the following definitions in order to make the best determination.

01. Other Motor Vehicle in Transport - Any collision accident involving at least two motor vehicles in transport upon the same roadway, or upon roadways within an intersection. This includes collision with a motor vehicle stopped, or abandoned on a roadway other than in an area designated for parking but does not include collision with a motor vehicle on another roadway.

02. Parked Motor Vehicle - Any collision involving a motor vehicle in transport and a motor vehicle not in transport. This includes legally or illegally parked or standing vehicles (where normal usage permits such stopping) and also loads in the process of falling from such vehicles. This excludes motor vehicles stopped or parked in traffic lanes.

03. Motor Vehicles on Other Roadway - Any accident in which a motor vehicle in transport leaves the roadway on which it is in transport and collides with another motor vehicle in transport on another roadway. This includes crossing the median and colliding on the opposite roadway; or crossing a shoulder and colliding on a frontage roadway but excludes crossing the center line of a multiple lane roadway, leaving a roadway and returning to the same roadway and collisions at the intersecting roadways.

04. Pedestrian - Any accident involving a motor vehicle in transport and a pedestrian. This does not include a person boarding or alighting, jumping or falling from a motor vehicle in transport.

05. Pedalcycle - Any accident involving a motor vehicle in transport and a pedalcyclist in transport. Pedalcycles include bicycles, tricycles, and unicycles and any trailers or sidecars attached to these cycles. A pedalcyclist is any person riding upon a pedalcycle or in a sidecar attached to a pedalcycle. A stopped pedalcycle is considered to be in transport if it is in readiness for transport.

06. Other Conveyance - Any accident involving a motor vehicle in transport and a person who is not classifiable as a pedestrian or as a pedalcyclist.

07. Animal - Any accident involving a motor vehicle in transport and an animal, herded or unattended.

08. Railway Train - Any accident involving a motor vehicle in transport and a railway train or railway vehicle.

EXAMPLE: This excludes human operated devices on railway tracks and accidents which occur because of derailment or some object or person falling or being thrown from a train.

09. Fixed Object - Any accident involving a motor vehicle in transport and a fixed object.

10. Other Object - Any accident involving a motor vehicle in transport and any other object which is moveable or moving, but not fixed. This excludes objects set in motion by aircraft, watercraft, or railway; objects set in motion by cataclysm, lightning, or other natural and environmental factors.

11. Overturned - Any accident in which a motor vehicle in transport overturns for any reason without an antecedent accident, or cause. This is a non-collision type accident.

12. Other Non-collision - Any accident involving a motor vehicle in transport, other than Overturning and Collision. This includes accidental poisoning from carbon monoxide generated by a motor vehicle in transport; breakage of any part of the motor vehicle resulting in injury or further property damage; explosion of any part of the motor vehicle; fire starting in the motor vehicle; falling, jumping or being pushed from a motor vehicle in transport; hit by, or thrown against some part of, or object in, the motor vehicle in transport; object falling from, in or on the motor vehicle in transport; toxic or corrosive chemicals leaking from the vehicle; striking holes or bumps on the roadway; driving into water with-

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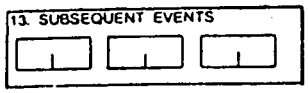


SUBSEQUENT EVENTS

There are other events which occur after the first damage or injury producing event which may be significant in describing the accident. If this is the case, enter appropriate codes for the next significant events in order of occurrence in the boxes.

Use Categories listed under FIRST HARMFUL EVENT

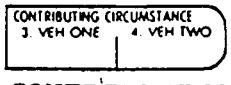
If a pedestrian or pedalcyclist was involved in a subsequent event that exceeds the number of spaces provided, enter the appropriate code in one of the last spaces, eliminating the least significant of the other subsequent events.

CAUSE OF ACCIDENT

1. PRIMARY 2. SECONDARY

Enter the code(s) from the PROBABLE CAUSE LIST that best defines the apparent cause(s) of the accident. The codes and their meanings are listed and explained in the appendix of this publication. The appendix also provides instructions, as well as examples, for

determining which causes are primary and secondary when multiple causes are in evidence. The degree of evidence necessary for the issuance of a citation is not required here. The best judgment or opinion of the investigator is all that is requested in selecting and entering the primary and secondary cause codes.



CONTRIBUTING CIRCUMSTANCES

Identify Primary and Secondary code with the appropriate vehicle. If Primary or Secondary code cannot be determined as to vehicle, enter code '95' (No contributing cause).

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CAUSE CODING
PRIMARY/SECONDARY

The terms Primary Cause and Secondary Cause deserve comment to eliminate any confusion that might exist. First, Primary and Secondary are of Equal importance. Primary as used here means the actual violation or event that caused the accident to occur. Secondary is the contributing violation or event.

EXAMPLE:

The operator of a motor vehicle, under the influence of alcohol, crosses the center lane and strikes another vehicle head-on. The primary or actual cause is Fail to Drive Right of Center and the secondary or contributing cause is Use of Alcohol.

23 - Leaving Vehicle Improperly Unattended

24 - Transporting Hazardous Substances w/o Required or Inadequate Safety Devices or Precautions.

25 - Blinded by Approaching Vehicle

26 - Drowsy or Asleep

27 - Physical or Mental Disability

28 - Right Turn On Red After Stop

VEHICLE RELATED

50 - Defective Vehicle Equipment

51 - Struck by Object from Moving Vehicle

52 - Fire

MARYLAND

MAKE (OF VEHICLE)

Enter the name (or the abbreviated name) of the "make" of the vehicle. The "make" of the vehicle is either the manufacturer of the vehicle, or in cases like General Motors, the major manufacturing division within the parent corporation. Examples of acceptable entries are:

Automobiles	Farm Equipment	Motorcycles
Buick	John Deere	Honda
Cadillac	Int'l Harv.	Harley-Davidson
Chevrolet		Vespa
Chrysler	Bus	BMW
Dodge		
Ford	Gen'l Motors	Trucks
Honda	Mercedes-Benz	
Porsche	White	Mack
Volkswagen		White
		Reo

MODEL (OF VEHICLE)

Enter the name (or abbreviated name), or the number, of the model of the vehicle involved in the accident. The model of vehicle is in reference to the specific type, or variation, within a manufacturer's (or manufacturing division's) product line. Examples of acceptable entries would be:

For Chevrolet - Bel Air, Biscayne, Camaro, Chevelle, Corvette, Impala, Nova, Vega, Etc.

For Chrysler - New Yorker, Saratoga, Windsor, Etc.

YEAR (OF VEHICLE)

Enter a two position numeric code that represents the Model Year of the motor vehicle.

MARYLAND

VEHICLE IDENTIFICATION NUMBER

Enter the vehicle identification number (VIN) in the space provided. This number can usually be obtained from the vehicle registration card, where it is referred to as a VIN number, or a serial number. If the number cannot be obtained from this source, the following guide could aid in acquiring the number from the vehicle:

1. In most vehicles manufactured prior to 1968, the VIN number can be found on the driver's door when opened.

2. In most vehicles manufactured from 1968 on, the VIN number can be found above the front dash area, at the base of the windshield.

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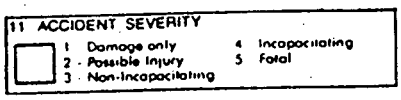


ACCIDENT SEVERITY

The determination of accident severity is actually a summary classification of the injury and damage events of the accident. Since accident severity is intended to describe the most severe aspect of the accident, it may be easier to fill out if the investigator has already entered the proper injury severity codes for all drivers, occupants, and pedestrians.

Review the following definitions to determine the one which best describes the situation.

1. DAMAGE only (No injury) - is any situation in which there is no reason to believe that any person suffered any bodily harm as a result of the motor vehicle traffic accident.

   This includes confusion, excitement, anger, and internal injuries unknown to the person until after leaving the scene.

2. POSSIBLE INJURY - is any injury, reported or claimed, which is neither FATAL, INCAPACITATING or NON-INCAPACITATING INJURY. This includes momentary unconsciousness, claims of injuries that are not evident, limping, complaint of pain, nausea, hysteria.

3. NON-INCAPACITATING (Evident Injury) - is any injury other than FATAL, and INCAPACITATING, which is evident to any person other than the injured, at the scene of the accident. This includes lump on head, abrasions, minor lacerations but excludes limping.

4. INCAPACITATING injury - is any injury, other than fatal, which prevents the injured person from walking, driving, or normally continuing the activities which he was capable of performing prior to the motor vehicle traffic accident. This includes severe lacerations, broken or distorted limbs, skull fracture, crushed chest, internal injuries, unconscious when taken from the accident scene, unable to leave the accident without assistance but excludes momentary unconsciousness.

5. FATAL injury - is any injury sustained in an accident, or as a result of an accident, that causes the death of the injured person.

14.INJ SEV

MARYLAND

INJURY SEVERITY (DRIVER)

Enter one of the below codes to categorize the driver's injury according to its most severe characteristic. Fatalities are more severe than injuries.

Injury Severity Determinations are to be made in compliance with the following:

1. No Injury - is when there is no reason to believe that the operator suffered any bodily harm as a result of the motor vehicle accident.

2. Possible Injury - is any injury, reported or claimed, which is not a Fatal, Incapacitating, or Non-Incapacitating (evident) Injury.

3. Non-Incapacitating Injury - is any evident injury, other than fatal and incapacitating, which is evident to any person, other than the injured, at the scene of the accident.

4. Incapacitating Injury - is any injury, other than fatal, which prevents the injured driver from walking, driving, or normally continuing the activities which he was capable of performing prior to the motor vehicle accident.

5. Fatal - is any injury sustained in an accident, or as a result of an accident, that causes the death of the injured.

---

3. DAMAGE SEVERITY
1 - No Damage 3 - Moderate
2 - Superficial 4 - Destroyed

DAMAGE SEVERITY (OBJECT)

Must be filled out if fixed object struck has been entered.

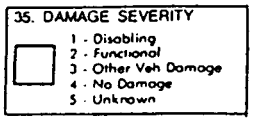
Select the code to describe the damage to property other than vehicles.

1. No damage.

2. Superficial: Damage which detracts from the appearance of the objects or causes the objects to depreciate in value, but does not necessitate repair to restore object's function.

3. Moderate: Damage which requires repairing to restore function.

4. Destroyed: Damage so extensive as to be irreparable, requiring replacement of the object.



DAMAGE SEVERITY

MARYLAND

Enter the code associated with the description which best describes the damage severity.

Refer to the following definitions to select the appropriate code.

1. Disabling Damage - Any damage to a motor vehicle such that it cannot be driven, or in the case of trailers, towed from the accident scene in the usual manner, without simple repairs. This includes a vehicle which could be driven, but would be further damaged thereby. It excludes simple tire disablement, even if a spare tire is not available; and damage to lights which would make night driving hazardous, but would not affect daytime driving.

2. Functional Damage - Any damage to a motor vehicle that affects its operation or the functioning of its parts, but is not disabling. This includes tire damage, even though the tire may be changed at the scene.

3. Other Vehicle Damage - Any damage to a motor vehicle, which is neither disabling, nor interferes with the function of the vehicle. Such damage usually affects either the appearance of the motor vehicle or the load on the motor vehicle. This excludes mud or dirt on the motor vehicle.

4. No Damage - Is a situation in which the motor vehicle did not suffer damage.

5. Unknown

MARYLAND

14. FIXED OBJECT STRUCK

[ ] [ ] [ ]

01 - Bridge/Overpass
02 - Building
03 - Culvert, Ditch
04 - Curb, Wall
05 - Guardrail/Barrier
06 - Embankment
07 - Fence
08 - Light support pole
09 - Sign support pole
10 - Other pole
11 - Tree, Shrubbery
12 - Construction Barrier
13 - Crash Attenuator
14 - Other

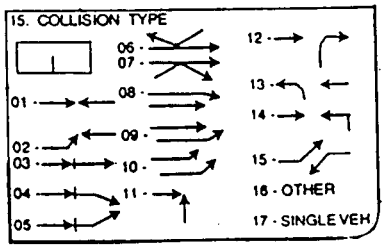
FIXED OBJECT STRUCK

Enter the code or codes which best describe the object or objects struck. If no fixed objects were struck leave blank. Make all positive entries in the sequence of occurrence.

COLLISION TYPE

In determining the collision type, consider the movement of the motor vehicles at the time of impact. Select the appropriate code and enter in the box.

Note: The collision type selected should closely resemble the accident diagram. (R.1)



MARYLAND

All single motor vehicle collisions will be coded '17'. Exception, if a single vehicle in transport strikes a parked vehicle, indicate '16' "other".

The following briefly describes the collision types:

01. Opposite directions, both vehicles going straight, head on.

02. Opposite directions, one vehicle going straight, one vehicle turning left.

03. Same directions, both vehicles going straight, rear end.

04. Same direction, one vehicle going straight, one vehicle turning right, rear end.

05. Same direction, one vehicle going straight, one vehicle turning left, rear end.

06. Opposite directions, both vehicles going straight, side-swipe.

07. Same direction, both vehicles going straight, side-swipe.

08. Same direction, one vehicle going straight, one vehicle turning right.

09. Same direction, one vehicle going straight, one vehicle turning left.

10. Same direction, both vehicles turning left.

11. Both vehicles going straight, approaching an angle.

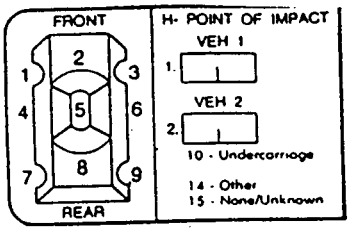
12. One vehicle going straight, one vehicle approaching from right, turning right.

13. One vehicle going straight, one vehicle approaching from left, turning left.

14. One vehicle going straight, one vehicle approaching from right, turning left.

15. Opposite directions, both vehicles turning left.

When more than two motor vehicles are involved, enter the collision type code for those two vehicles involved in the initial or first collision.



MARYLAND

POINT OF IMPACT

From categories 01 through 10, enter the code that best describes the "point of impact" area for each vehicle involved in the accident. If multiple areas of the vehicle are damaged, it is only required that best judgment be used in selecting a code. If the motor vehicle suffered multiple impacts, the first impact should be considered when selecting the code. It is not always necessary for a vehicle to reflect visible damage at the actual or apparent point of impact. High bumper cars and trucks frequently injure people and animals, and also damage fragile areas of other vehicles, without inflicting noticeable damage upon themselves. Code 14 and Code 15 can also be used when codes 01 through 10 do not apply.

EXAMPLE:

01 - At or around the wheel and fender area, left front.

02 - At the grille and/or the hood.

03 - At or around the wheel and fender area, right front.

04 - At area between fenders and below the roof, left.

05 - Entire roof area, including convertibles.

06 - At area between fenders and below the roof, right.

07 - At or around the wheel and fender area, left rear.

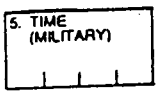
08 - At the trunk or rear engine compartment.

09 - At or around the wheel and fender area, right rear.

10 - Any area on underside (excludes body).

14 - Other

15 - None/unknown



MARYLAND

TIME (OF ACCIDENT)

Enter the time of the accident here using four digit military notation.

The way to calculate military time from clock time is given below:

1) If clock time is between midnight and 1:00 A.M., military time equals 00 + clock minutes.

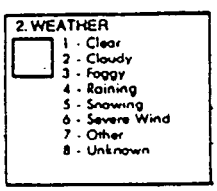
Example: 12:45 A.M. = 0045

2) If clock time is between 1:00 A.M. and 1:00 P.M., military time equals clock time.

Example: 3:45 A.M. = 0345

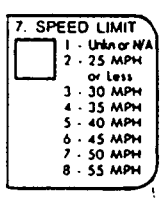
3) If clock time is from 1:00 P.M. to midnight, military time equals clock time + 12 hours.

Example: 2:45 P.M. = 1445



WEATHER

Enter the code that most accurately describes the weather conditions at the accident scene, at that time. When more than one code selection can be meaningfully selected, the investigator should choose and enter the code that represents the condition least favorable to traffic safety.



SPEED LIMIT

Enter applicable Code 1 through 8 that describe speed limit at the accident location.

MICHIGAN

1993 & 1994

Crash Data Tape Layout

Rcvd 8/14/95

MICHIGAN

POSITION DATA

086-095 VEHICLE HARMFUL EVENTS
086-087 EVENT #1

1993	1992
——————> NON COLLISION	<——————
00 = Uncoded & Errors	00 = Uncoded & Errors
01 = Loss of control	01 = Overturn
02 = Cross Center/median	02 = Fire/explosion
03 = Ran off road left	03 = Immersion
04 = Ran off road right	04 = Jackknife
05 = Re-enter road	05 = Ran off Road
06 = Overturn	06 = Downhill runaway
07 = Separation of Units	07 = Cargo loss/shift
08 = Fire/explosion	08 = Separation of Units
09 = Immersion	09 = Other non-collision
10 = Jackknife	
11 = Downhill runaway	
12 = Cargo loss/shift	
13 = Individual fell off	
14 = Other non-collision	
——————> COLLISION WITH NON FIXED	<——————
15 = Pedestrian	10 = Pedestrian
16 = Pedalcycle	11 = Pedalcycle
17 = Motor veh.in transp	12 = Train
18 = Parked vehicle	13 = Animal
19 = Train	14 = Motor veh.in transp
20 = Animal	15 = Parked vehicle
21 = Other non-fixed	16 = Other non-fixed
——————> COLLISION WITH FIXED	<——————
22 = Bridge/pier/abut.	17 = Fire Hydrant
23 = Bridge parapet end	18 = Impact attenuator
24 = Bridge rail	19 = Bridge/pier/abut.
25 = Guardrail face	20 = Bridge parapet end
26 = Guardrail end	21 = Bridge rail
27 = Median barrier	22 = Guardrail face
28 = Traffic sign post	23 = Guardrail end
29 = Signal post	24 = Median barrier
30 = Luminaire support	25 = Traffic sign post
31 = Utility pole	26 = Luminaire support
32 = Other pole	27 = Utility pole
33 = Culvert	28 = Other pole
34 = Curb	29 = Culvert
35 = Ditch	30 = Curb
36 = Embankment	31 = Ditch
37 = Fence	32 = Embankment
38 = Mailbox	33 = Fence
39 = tree	34 = Mailbox
40 = Rail cross. signal	35 = Tree
41 = Building	36 = Highway/rail signal
42 = Traffic Island	37 = Building
43 = Fire Hydrant	38 = Traffic Island
44 = Impact attenuator	39 = Other fixed object
45 = Other fixed object	

MICHIGAN

POSITION	DATA
088-089	EVENT #2 (Same as Event #1 positions 086-087)
090-091	EVENT #3 (Same as Event #1 positions 086-087)
092-093	EVENT #4 (Same as Event #1 positions 086-087)
094-095	EVENT MOST HARMFUL (Same as Event #1 positions 086-087) (1992 Only. Post-92 = 00. See pos. 183-186 for post-92)
096-112	VEHICLE ID NUMBER (VIN) (Not currently captured)(sanitized=0)
113-123	VEHICLE REGISTRATION NUMBER (Tag#) (sanitized = 0)
124-125	VEHICLE REGISTRATION STATE (Uncoded & Errors = "MI")
126-127	VEHICLE WORST IMPACT POINT 01 = Front center 02 = Front corner, passenger side 03 = Side, passenger 04 = Rear corner, passenger side 05 = Rear center 06 = Rear corner, driver side 07 = Side, driver 08 = Front corner, driver side 09 = Undercarriage 10 = Multiple areas 11 = Other/Unknown 12 = None (post-92) 99 = Uncoded & Errors
128	VEHICLE EXTENT OF DAMAGE (Based on photographic instruction scale in UD-10 instruction manual. Uncoded & Errors = 09)
129	VEHICLE DRIVABLE AFTER CRASH 0 = Uncoded & Errors 1 = Yes 2 = No
130-131	TOTAL NUMBER OF OCCUPANTS IN VEHICLE (Uncoded & Errors = 99)

MICHIGAN DEPARTMENT OF STATE POLICE

STATE OF MICHIGAN TRAFFIC ACCIDENT SYSTEM

DATA PROCESSING SECTION

CRIMINAL JUSTICE DATA CENTER

REVISED 02-05-88

MICHIGAN

057. FUEL LEAKS AND FIRES:

1 = FUEL LEAKED FROM VEHICLE.
2 = VEHICLE OR CARGO CAUGHT FIRE.
3 = FUEL LEAKED FROM VEHICLE AND THERE WAS A FIRE.
4 = NO VEHICLE FUEL LEAK OR FIRE OCCURRED.

008-009. VEHICLE TYPE SUBSCRIPT (INTERNALLY GENERATED):

01 = PASSENGER CAR.
02 = TRUCK.
03 = MOTORCYCLE, MOTOR SCOOTER, MOPED, ETC.
04 = SCHOOL BUS.
05 = COMMERCIAL BUS.
06 = FARM EQUIPMENT.
07 = CONSTRUCTION EQUIPMENT.
08 = AMBULANCE, POLICE EQUIPMENT, SNOWMOBILE, DUNE BUGGY, GO-KART, OTHER MOTOR VEHICLE OR NOT KNOWN.
09 = PEDESTRIAN OR PEDESTRIAN CONVEYANCE.
10 = PEDALCYCLE.
11 = OTHER ROAD VEHICLE EXCEPT PEDALCYCLE.

058-077. (VIN) VEHICLE ID NUMBER.

006-007. YEAR MANUFACTURED:

LAST TWO (2) DIGITS OF YEAR.
40 = 1940 AND PREVIOUS.
99 = NOT KNOWN OR NON-MOTOR-VEHICLE UNIT (PEDESTRIAN,PEDALCYCLIST,ETC).

MICHIGAN

005. DEGREE OF INJURY TO DRIVER,PEDESTRIAN,PEDALCYCLIST,ETC:

1 = FATAL INJURY.
2 = INCAPACITATING INJURY.
3 = NON-INCAPACITATING INJURY.
4 = POSSIBLE INJURY.
5 = NO INJURY.

043. VEHICLE DAMAGE SEVERITY CODE (TAD)

1 = NO DAMAGE
2-8 = INCREASING DAMAGE SEVERITY
9 = UNKNOWN

043-044. ACCIDENT TYPE:

01 = MOTOR VEHICLE OVERTURNED

NOTE: 02 THRU 09 INVOLVE COLLISION OF MOTOR VEHICLE WITH:

02 = RAILROAD TRAIN.
03 = PARKED MOTOR VEHICLE.
04 = ANOTHER MOTOR VEHICLE.
05 = PEDESTRIAN.
06 = FIXED OBJECT.
07 = OTHER OBJECT.
08 = ANIMAL.
09 = PEDALCYCLE. 10 = OTHER OR NOT KNOWN.

NOTE: AN ACCIDENT CONSISTING OF A SERIES OF COLLISIONS, OVERTURNING, ETC. IS TYPED ACCORDING TO THE FIRST EVENT IN THE SERIES.

080. TWO-VEHICLE-ACCIDENT SUBSCRIPT (INTERNALLY GENERATED):

0 = COLLISION OF MV WITH OTHER THAN ANOTHER MV.
1 = HEAD-ON.
2 = REAR-END.
3 = SIDESWIPE - MEETING.
4 = SIDESWIPE - PASSING.
5 = ANGLE.
6 = BACKED INTO.
7 = ALL OTHER.
8 = NOT STATED.

MICHIGAN

021-022. OBJECT HIT:

01 = NO OBJECT HIT.
02 = GUARDRAIL, GUARD POST.
03 = HIGHWAY SIGN.
04 = STREET LIGHT, UTILITY POLE.
05 = CULVERT.
06 = DITCH, EMBANKMENT, STREAM.
07 = BRIDGE PIER OR ABUTMENT.
08 = BRIDGE RAIL OR DECK.
09 = TREE.
10 = HIGHWAY OR RAILROAD SIGNAL.
11 = BUILDING.
12 = MAILBOX.
13 = FENCE.
14 = TRAFFIC ISLAND OR CURB.
15 = CONCRETE MEDIAN BARRIER.
16 = OTHER OR TRAFFICWAY OBJECT.
17 = OTHER OFF TRAFFICWAY OBJECT.
18 = OVER HEAD FIXED OBJECT.
19 = NOT KNOWN OR NON-MOTOR-VEHICLE UNIT
(PEDESTRIAN,PEDALCYCLIST,ETC).

NOTE: "TRAFFICWAY" IS THE ENTIRE WIDTH BETWEEN PROPERTY LINES OR OTHER BOUNDARY LINES.

023. VEHICLE CONDITION:

1 = DISABLED VEHICLE.
2 = PUNCTURE OR BLOWOUT.
3 = OTHER DEFECTIVE EQUIPMENT (BRAKES, LIGHTS, STEERING).
4 = NO DEFECT.
5 = NOT KNOWN OR NON-MOTOR-VEHICLE UNIT
(PEDESTRIAN,PEDALCYCLIST,ETC).

MICHIGAN

027-028. IMPACT CODE:
00 = NO IMPACT OR ROLLOVER
ALSO LOOK AT DEGREE OF DAMAGE TO VEHICLE;
NO DAMAGE WOULD THEN BE NO IMPACT,
WITH DAMAGE WOULD THEN BE A ROLLOVER.
01 = CENTER FRONT.
02 = RIGHT FRONT.
03 = RIGHT SIDE.
04 = RIGHT REAR.
05 = CENTER REAR.
06 = LEFT REAR.
07 = LEFT SIDE.
08 = LEFT FRONT.
09 = OTHER IMPACT.
~~10 = NOT USED~~
11 = BOTH FRONT AND REAR.
12 = NOT USED.
13 = NOT KNOWN OR NON-MOTOR-VEHICLE UNIT
(PEDESTRIAN,PEDALCYCLIST,ETC).

029. VEHICLE DRIVABLE:
1 = YES (DRIVEN AWAY).
2 = NO (TOWED AWAY).
3 = NOT KNOWN OR NON-MOTOR-VEHICLE UNIT
(PEDESTRIAN,PEDALCYCLIST,ETC).

MICHIGAN

026-027. TIME OF DAY:

01 = MIDNIGHT TO 1:00 AM.
02 = 1:00 AM. TO 2:00 AM.
03 = 2:00 AM. TO 3:00 AM.
04 = 3:00 AM. TO 4:00 AM.
05 = 4:00 AM. TO 5:00 AM.
06 = 5:00 AM. TO 6:00 AM.
07 = 6:00 AM. TO 7:00 AM.
08 = 7:00 AM. TO 8:00 AM.
09 = 8:00 AM. TO 9:00 AM.
10 = 9:00 AM. TO 10:00 AM.
11 = 10:00 AM. TO 11:00 AM.
12 = 11:00 AM. TO NOON
13 = NOON TO 1:00 PM.
14 = 1:00 PM. TO 2:00 PM.
15 = 2:00 PM. TO 3:00 PM.
16 = 3:00 PM. TO 4:00 PM.
17 = 4:00 PM. TO 5:00 PM.
18 = 5:00 PM. TO 6:00 PM.
19 = 6:00 PM. TO 7:00 PM.
20 = 7:00 PM. TO 8:00 PM.
21 = 8:00 PM. TO 9:00 PM.
22 = 9:00 PM. TO 10:00 PM.
23 = 10:00 PM. TO 11:00 PM.
24 = 11:00 PM. TO MIDNIGHT.
25 = NOT KNOWN.

032. WEATHER:

1 = CLEAR OR CLOUDY.
2 = FOG.
3 = RAINING.
4 = SNOWING.
5 = OTHER OR NOT KNOWN.

NEW YORK

LOCATION OF MOST SEVERE PHYSICAL COMPLAINT (COLUMN 14)

LOCATION OF MOST SEVERE PHYSICAL COMPLAINT
1. Head
2. Face
3. Eye
4. Neck
5. Chest
6. Back
7. Shoulder-Upper Arm
8. Elbow-Lower Arm-Hand
9. Abdomen - Pelvis
10. Hip-Upper Leg
11. Knee-Lower Leg-Foot
12. Entire Body

14

Enter the code for the part of the body which is most seriously injured.

If a person's injuries consist of a severe head wound, a broken arm, numerous contusions, etc., only the single most serious injury would be listed. The head injury would ordinarily be considered the most serious injury, and so a "1" would be entered on this person's line in Column 14.

TYPE OF PHYSICAL COMPLAINT (COLUMN 15)

Enter in this column the code which describes the type of physical injury sustained. The entry in this column for the injured person described in the previous paragraph as having a severe head wound would most likely be "5," "Severe Bleeding."

The following are definitions of the 13 types of "PHYSICAL COMPLAINT" which can be entered in Column 15:

TYPE OF PHYSICAL COMPLAINT
1. Amputation
2. Concussion
3. Internal
4. Minor Bleeding
5. Severe Bleeding
6. Minor Burn
7. Moderate Burn
8. Severe Burn
9. Fracture - Dislocation
10. Contusion - Bruise
11. Abrasion
12. Complaint of Pain
13. None Visible

15

1. Amputation--severed parts.
2. Concussion--dazed condition as a result of blow to head.
3. Internal--no visible injury but signs of anxiety, internal pain and thirst.
4. Minor Bleeding--slight discharge of blood.
5. Severe Bleeding--steady flow of blood that is not controlled.
6. Minor Burn--reddening of the skin.
7. Moderate Burn--reddening and blistering of the skin over a large area.
8. Severe Burn--reddening, blistering or charring of the skin over a large portion of the body.
9. Fracture/Dislocation--evidence of displacement of bones.
10. Contusion/Bruise--discoloration.
11. Abrasion--top layer of skin is scraped.

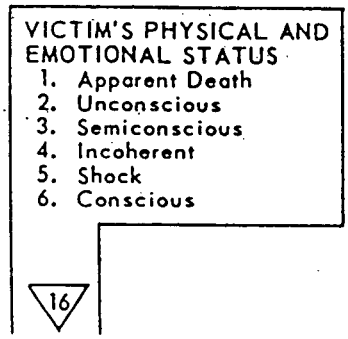
NEW YORK

12. Complaint of Pain--no visible injury noted, but victim complains of pain.
13. None Visible--no visible injuries, but victim is other than normal. DO NOT USE THIS CODE FOR UNINJURED PERSONS.

VICTIM'S PHYSICAL AND EMOTIONAL STATUS (COLUMN 16)

Enter in this column the code which describes the overall condition of each injured person. For example, "3" indicates an injured person is semiconscious.

A victim's status is defined as follows:

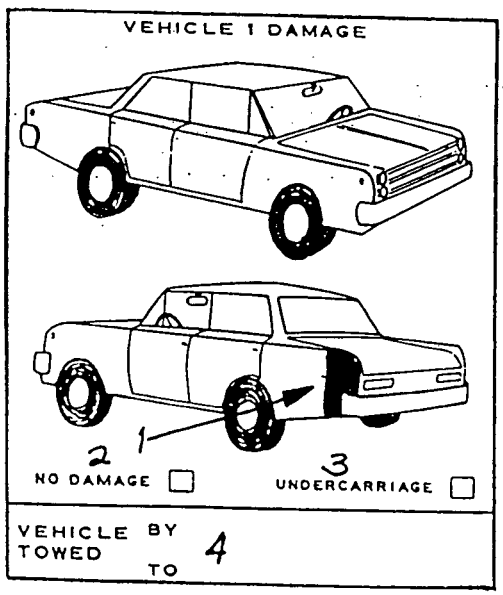


1. Apparent Death.
2. Unconscious--victim unaware of his surroundings and does not respond to stimuli, verbal or physical.
3. Semiconscious--victim not fully aware of his surroundings.
4. Incoherent--victim lacks orderly continuity of thought.
5. Shock--depressed condition of all body functions, resulting from serious injury or the incident.
6. Conscious--normal and aware of surroundings. DO NOT USE THIS CODE FOR UNINJURED PERSONS.

NEW YORK

VEHICLE DAMAGE DIAGRAMS

Indicate damage to vehicles caused by the accident in the appropriate blocks. "VEHICLE 1" refers to the vehicle of "OWNER 1" and "DRIVER 1" in preceding blocks. "VEHICLE 2" is the vehicle of "OWNER 2" and "DRIVER 2," etc. In the illustration, "VEHICLE 1" was damaged by being hit in the left rear fender. Damage to a vehicle is always indicated on the report by shading the specific area damaged. In the event a motorcycle, truck, bus or tractor-trailer is involved in an accident, assume the vehicle diagram represents that type of vehicle. If the vehicle is completely demolished, print "DEMOLISHED" across the diagram.



1. Indicate with an arrow the first point of impact on each vehicle. In the illustration, the point of impact is shown in this manner as the left rear fender.

2. If a vehicle is not damaged, check the "NO DAMAGE" box. It is possible that no damage will occur in a collision with a pedestrian, a slow-speed rear-end collision, etc.

3. If the undercarriage of a vehicle is damaged, check the "UNDERCARRIAGE" box.

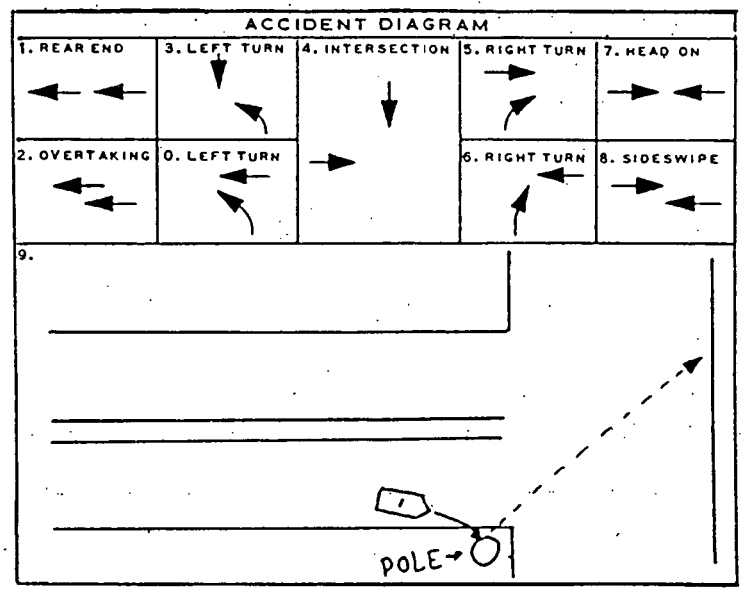
4. In the "VEHICLE TOWED" block, print the name of the garage, tow truck operator or other person who tows the vehicle and the location to which it is towed.

ACCIDENT DIAGRAM

Use one of the predrawn accident diagrams numbered 0 through 8 in this block to identify the nature of an accident involving TWO MOTOR VEHICLES ONLY. This is done by drawing a circle around one of the predrawn diagrams.

The blank space, number 9, must be used for single car accidents, accidents involving three or more motor vehicles, instances of a motor vehicle striking a

pedestrian, bicyclist or other conveyance that is not a motor vehicle, or for two-vehicle accidents which cannot be accurately depicted by one of the predrawn diagrams. The blank space may also be used by an investigating officer who

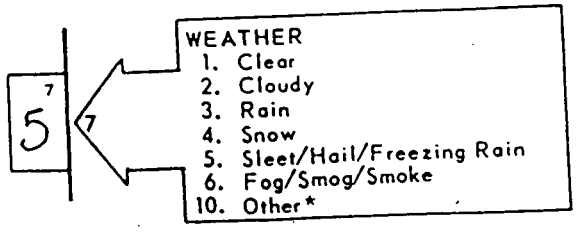


wishes to draw a more detailed accident diagram, in addition to circling one of the predrawn diagrams. It is recommended that any two-vehicle accidents that involve secondary events be drawn in number 9.

When drawing a diagram, draw each vehicle and number the vehicles to correspond with Vehicle 1, Vehicle 2, etc., depending on the number of vehicles involved. Take care to indicate roadway boundaries, crossings, intersections and any other information pertinent to the accident. A diagram **must** be drawn in space number 9 if a predrawn diagram is not circled.

WEATHER (BOX 7)

Indicate the weather condition at the accident scene at the time of the accident.



STATE OF NEW YORK

DEPARTMENT

OF

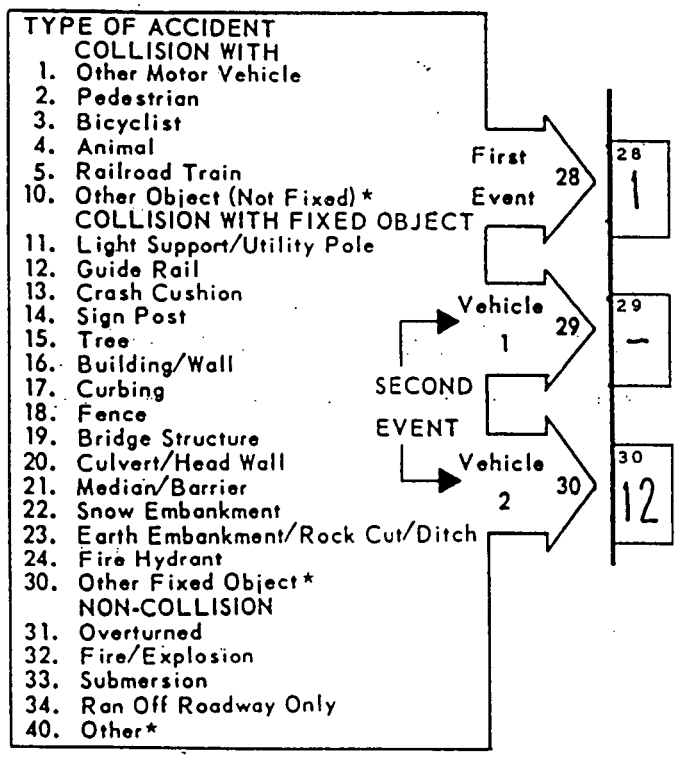
MOTOR VEHICLES

POLICE ACCIDENT REPORT MANUAL

NEW YORK

TYPE OF ACCIDENT (BOXES 28, 29 AND 30)

Boxes 28, 29 and 30 serve to indicate the type of accident which occurred, to answer the question "With what did the vehicle collide?", and to show any pertinent non-collision factor. Entries for Boxes 28, 29 and 30 are selected from



among the items numbered 1-40. Box 28, "First Event," is for the INITIAL DAMAGE OR INJURY PRODUCING ACTION which occurred. Boxes 29 and 30 are for the "Second Event." The "Second Event" is any collision or vehicle accident action which occurs as a direct result of the "First Event."

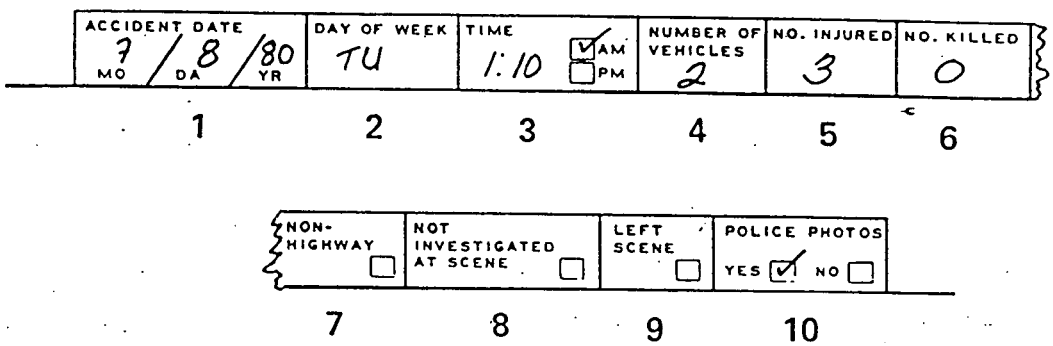
If Vehicle 1 strikes Vehicle 2, the "First Event" would be indicated in Box 28 as "1," collision with "Other Motor Vehicle." If both vehicles then stop, there is no "Second Event" and a dash (-) would be placed in Boxes 29 and 30. However, if Vehicle 2 continues on and hits a tree, another accident action took place. Vehicle 2 has produced a "Second Event" in striking the tree. Since only Vehicle 2 had a "Second Event," a dash would be entered in Box 29 for Vehicle 1 and code "15" would be entered in Box 30 for Vehicle 2's "Second Event" of "collision with a tree."

It could happen that, after their initial collision with each other, both vehicles could glance off and strike fixed objects. In such a case, both vehicles would have "Second Events." It is also possible for additional subsequent events to take place. One vehicle may strike another, then a fire hydrant, then overturn and finally ignite. This is four events. The first is its collision with a motor vehicle, the second its collision with the fixed object. Since there is no box to indicate a third or later event, the most serious "Second Event," based on the best judgment of the investigating officer, takes precedence. In the example, fire would probably be the most serious and, therefore, the entry in Box 29 (or Box 30, depending upon which vehicle it was) would properly be "32" for fire, rather than "24" for striking the fire hydrant, or "31" for overturning. All events in an accident of more than two events should be sequentially described in the "ACCIDENT DESCRIPTION/OFFICER'S NOTES" area.

NEW YORK

ACCIDENT IDENTIFICATION INFORMATION

Fill in the accident identification information required in the line along the top of the report as follows:



1. Indicate numerically the month, day and year that the accident took place, e.g., 7/8/80.

2. Indicate the day of the week, using the first two letters of the day on which the accident occurred, e.g., MO, TU, WE.

3. Enter the time the accident occurred. Indicate AM or PM by placing a check mark (√) in the appropriate box. Midnight is considered AM and noontime PM. An agency may use military time, rather than AM or PM, if it wishes.

4. Indicate the number of motor vehicles involved in the accident. If three or more, additional forms must be used.

5. Indicate the number of persons injured in the accident. Do not include any whose injuries were fatal.

6. Indicate the number of persons killed in the accident.

7. Check this box only if the accident occurred other than on a highway. Section 118 of the V & T Law defines a highway as: *"The entire width between the boundary lines of every way publicly maintained when any part thereof is open to the use of the public for purposes of vehicular travel."* Accidents occurring in shopping center parking lots, service stations, etc., are examples of "NON-HIGHWAY" accidents.

8. Check only if a police investigation did not take place at the accident scene. Generally, this involves an accident reported to a police station by a motorist some time after the accident occurred. (Walk In Report.)

9. Check only if the accident involved "leaving scene of an incident" as described in Section 600 of the V & T Law.

10. Check "YES" or "NO" to indicate whether photographs of the accident scene were taken by the investigating police agency.

North Carolina Department of Transportation
Division of Motor Vehicles

North Carolina Collision Report Instruction Manual

Collision Reports Section
In accordance with Section 20-166.1
Motor Vehicle Laws of North Carolina

Revised July, 1993

NORTH CAROLINA

Owner: _____

Address: _____

City: _____ State _____ Zip _____

VIN: _____

Plate # _____ State _____ Year _____

Veh. Year _____ Veh. Make _____ Veh. Type Code _____

Commercial Vehicle ☐ Yes ☐ No Trailer Type Code _____

Air Bag ☐ Yes ☐ No 1st Trailer No. of Axles _____

Deployed ☐ Yes ☐ No Width _____ inches

Vehicle Drivable ☐ Yes ☐ No Length _____ feet

Post Crash Fire ☐ Yes ☐ No 2nd Trailer No. of Axles _____

Rollover ☐ Yes ☐ No Width _____ inches

Hazardous Cargo ☐ Yes ☐ No Length _____ feet

Spilled ☐ Yes ☐ No TAD _____

Crossed Median ☐ Yes ☐ No Est. Damage $ _____

Removed to: _____

By: _____ Authority _____

N. Check appropriate box to indicate if there was a fire after the collision involving this vehicle.

P. Check appropriate box to indicate if this vehicle was transporting **hazardous cargo**. This is a change from hazardous material. A ruptured gas tank does not qualify for hazardous cargo.

FIRST HARMFUL EVENT

NORTH CAROLINA

ACCIDENT SEQUENCE	Veh. 1	Veh. 2 or Ped.
6. Veh. Maneuver/Ped. Action	A	
7. First Harmful Event	B	
7. Most Harmful Event	C	
8. Object Struck	D	
9. Distance to Object Struck	E	
10. Vehicle Defects	F	

B. Enter the appropriate code from section 7 of the code sheet at the top of DMV-349. **ONE CODE ONLY PER ACCIDENT IS TO BE ENTERED IN THIS BLOCK.**

The FIRST HARMFUL EVENT—is the *first* event in a continuous series of events which resulted in damage or personal injury.

For example, if a vehicle runs off the roadway to the right, returns to the roadway out of control, and runs head-on into another motor vehicle, the *First Harmful Event* is coded as "Ran off roadway, right". Use Collision Type codes given at top of form and defined below.

Ran off Roadway

1. Right—vehicle runs off right side of the roadway as first in series of harmful events.
2. Left—vehicle runs off left side of the roadway as first in series of harmful events.
3. Straight ahead—vehicle runs through "Y" or "T" intersection.

Non-Collision—Noncollision accident is any accident involving a motor vehicle in transport which may occur in any manner other than by collision. There are two types of noncollision accidents: overturning and other noncollision accidents.

4. Overturning Collision is any collision in which a motor vehicle in transport overturns for any reason without antecedent accident.

5. Other Noncollision Collision: is any collision involving a motor vehicle in transport, other than overturning and collision.

Includes: Accidental poisoning from carbon monoxide generated by a motor vehicle in transport.

Breakage of any part of the motor vehicle, resulting in injury or in further property damage.

Explosion of any part of the motor vehicle.

Fire starting in the motor vehicle.

Fall or jump from the motor vehicle.

Occupant hit by an object in, or thrown against some part of the motor vehicle.

Injury or damage from moving part of the motor vehicle.

Object falling from, or in the motor vehicle.

Toxic or corrosive chemicals leaking out of the motor vehicle.

Injury or damage involving only the motor vehicle that is of a noncollision nature, such as a bridge giving way under the weight of a motor vehicle, striking holes or bumps on the surface of the trafficway, or driving into water, without overturning

NORTH CAROLINA

ACCIDENT SEQUENCE	Veh. 1	Veh. 2 or Ped.
6. Veh. Maneuver/Ped. Action	A	
7. First Harmful Event	B	
7. Most Harmful Event	C	
8. Object Struck	D	
9. Distance to Object Struck	E	
10. Vehicle Defects	F	

C. **MOST HARMFUL EVENT**—Using the same collision type codes defined in No. 7 First Harmful. Identify for *each* vehicle or pedestrian the most harmful or serious event in the collision sequence. If there are no further events after the first harmful event or if later events are less serious, repeat the code given in "B".

Example: As in "B", Vehicle 1 runs off right side of the roadway, then swerves back onto the roadway and strikes Vehicle 2 head-on. Code "1" (ran off roadway, right) for the *first* harmful event and "20" (collision of motor vehicle with another motor vehicle head-on) for the *most* harmful event for Vehicle 1. Vehicle 2 is then knocked into a utility pole as a result of the impact. "12" (collision of motor vehicle with fixed object) would be coded for the most harmful event for Vehicle 2 *if* the collision with the utility pole was more harmful than the initial collision with Vehicle 1. Otherwise, a "20" would also be entered for Vehicle 2's most harmful event.

NORTH CAROLINA

Owner: A	Owner:
Address: B	Address:
City: State Zip	City: State Zip
VIN: C	VIN:
Plate # D State E Year F	Plate # State Year
Veh. Year G Veh. Make H Veh. Type Code I	Veh. Year Veh. Make Veh. Type Code
Commercial Vehicle ☐ Yes ☐ No Trailer Type Code S	Commercial Vehicle ☐ Yes ☐ No Trailer Type Code
Air Bag ☐ Yes ☐ No 1st Trailer No. of Axles T	Air Bag ☐ Yes ☐ No 1st Trailer No. of Axles
Deployed ☐ Yes ☐ No Width inches	Deployed ☐ Yes ☐ No Width inches
Vehicle Drivable ☐ Yes ☐ No Length feet	Vehicle Drivable ☐ Yes ☐ No Length feet
Post Crash Fire ☐ Yes ☐ No 2nd Trailer No. of Axles U	Post Crash Fire ☐ Yes ☐ No 2nd Trailer No. of Axles
Rollover ☐ Yes ☐ No Width inches	Rollover ☐ Yes ☐ No Width inches
Hazardous Cargo ☐ Yes ☐ No Length feet	Hazardous Cargo ☐ Yes ☐ No Length feet
Spilled ☐ Yes ☐ No TAD V	Spilled ☐ Yes ☐ No TAD
Crossed Median ☐ Yes ☐ No Est. Damage $ W	Crossed Median ☐ Yes ☐ No Est. Damage $
Removed to: X	Removed to:
By: Y Authority Z	By: Authority

Other Property Damaged: AA	Estimated Damage: $	Owner Name: Address:

A. Enter the vehicle owner's name. If the owner and operator are the same, enter "same as above". Use information from registration laws or other valid document.

B. Enter the address of the owner, using street or rural road number, city, state and zip code.

C. Enter the vehicle identification number (VIN) which may be found on or near the left front door post, or on or near the firewall and on the registration card. To insure accuracy, enter number and check it in reverse order.

D. Enter license plate number.

E. Enter the state in which license plate was issued.

F. Enter the year that the license plate was valid.

G. Enter the model year of the vehicle.

H. Enter the model make of the vehicle (Chev., Ford, etc.)

I. Enter the vehicle type code. Use abbreviations as shown below, cards with these codes are available from DMV.

P—Passenger Car
SW—Station Wagon (pass.)
SWT—Station Wagon (truck)
CB—Commercial Bus
SB—School Bus
AB—Activity Bus
PU—Pick Up Truck
VN—Van
T2A—Truck-2 Axles
T3A—Truck-3 Axles
T4A—Truck-4 Axles
TTT—Truck Tractor & Trailer
TAXI—Taxicab
FE—Farm Equipment
FTR—Farm Tractor
MC—Motorcycle
MP—Moped
MS—Motorscooter
AMB—Ambulance
BI—Bicycle
RV—Self-Contained Recreational Vehicle
TRV—Camper on 2 Axle Truck
PED—Pedestrian
OT—Other

NORTH CAROLINA

INJURIES — VEHICLE 1 OCCUPANTS

Seat	4. Inj. Class	5. Belt Hel.	Race Sex	Age	Injured Names and Addresses First Name	Last Name
Left Front	A	B	C	D	E	DRIVER 1
Center Front						
Right Front					F	
Left Rear						
Center Rear						
Right Rear						
Total Number Occupants				G	Total Number Injured	H

Occupant Section Instructions: Give Injury Class, Belt Usage, Race/Sex and Age of All Occupants in the space corresponding to the seat occupied (see codes at top of form). For motorcycles, enter helmet usage. Names and addresses are necessary for all occupants. (It may help later investigations to list name,. age and address of all passengers.)

A. *Injury Class*—Entries must be made to identify the injury classification of *each* occupant in Vehicle 1. Use injury definitions given at top of form and described further below:

K—Dead.

A—Injury obviously serious enough to prevent the person injured from performing his normal activities for at least one day beyond the day of the collision. Massive loss of blood, broken bone, unconsciousness of more than momentary duration are examples.

B—Obvious injury, other than Class K or Class A, which is evident at the scene. Bruises, swelling, limping, soreness, are examples. Class B injury would not necessarily prevent the person from carrying on his normal activities.

C—No visible injury, but person complains of pain, or has been momentarily unconscious.

O—No injury.

NORTH CAROLINA

V. Enter the areas of vehicle that were damaged in the collision. If more than one code is used to indicate primary damage in more than one area, separate the rating with a slash line (/). Cards are available from DMV with these codes.

TAD

FC—Front Center
FD—Front Distributed
FL—Front Left Corner
FR—Front Right Corner
BC—Rear Center
BD—Rear Distributed
BL—Rear Left Corner
BR—Rear Right Corner
LP—Left Side (door)
RP—Right Side (door)
LFQ—Left Side Quarter
RFQ—Right Side Quarter
LBQ—Left Side Rear Quarter
RBQ—Right Side Rear Quarter
LD—Left Side Distributed
RD—Right Side Distributed
L&T—Left Side & Top (rollover)
R&T—Right Side & Top (rollover)
TOP—Top

* Rate the Severity of Damage on a Scale of "0" being no damage and "7" being the most severe damage.

W. Enter a dollar estimate of the cost to restore the vehicle to its condition just prior to the collision or an estimate of the value of the vehicle before the crash—whichever is less. For "totaled" vehicle, enter a dollar estimate of the retail value of the vehicle prior to the crash. Do *not* enter the word "totaled". Note that a vehicle being towed by another is part of the towing vehicle and its damage should be included in the "Parts Damaged" and "Amount of Damage" categories.

X. Enter where the vehicle was moved to.

Y. Enter the name of person or company that removed the vehicle from the collision.

Z. Enter the person who gave the authority to remove vehicle. If owner or driver you may enter "owner or driver."

AA. Enter any property other than motor vehicles that was damaged, identify the property and its owner and enter an estimate of the dollar damage. Damage to signs, buildings, mailboxes, fences, etc., should be entered here.

* Copies of TAD manuals are available to investigating officers by calling 1-800-672-4527.

NORTH CAROLINA

ACCIDENT SEQUENCE

ACCIDENT SEQUENCE	Veh. 1	Veh. 2 or Ped.
6. Veh. Maneuver/Ped. Action	A	
7. First Harmful Event	B	
7. Most Harmful Event	C	
8. Object Struck	D	
9. Distance to Object Struck	E	
10. Vehicle Defects	F	

In filling out this section, use the codes given below:

A. VEHICLE MANEUVER/PEDESTRIAN ACTION—For each vehicle or pedestrian, enter the code number, for the item that best describes the actions of the driver or pedestrian, in the investigating officer's opinion, *just prior* to the collision.

Vehicle

1. Stopped in travel lane (driver still in vehicle)
2. Parked out of travel lanes
3. Parked in travel lanes
4. Going straight ahead
5. Changing lanes or merging
6. Passing
7. Making right turn
8. Making left turn
9. Making U turn
10. Backing (takes priority over other maneuvers)
11. Slowing or stopping
12. Starting in roadway (mostly from driveways, public or private)
13. Parking
14. Leaving parked position
15. Avoiding object in road
16. Other

Pedestrian

17. Crossing at intersection
18. Crossing not at intersection
19. Coming from behind parked vehicle
20. Walking with traffic
21. Walking against traffic
22. Getting on or off vehicle
23. Standing in roadway
24. Working in roadway
25. Playing in roadway
26. Lying in roadway
27. Other in roadway
28. Not in roadway

NORTH CAROLINA

ACCIDENT SEQUENCE	Veh. 1	Veh. 2 or Ped.
6. Veh. Maneuver/Ped. Action	A	
7. First Harmful Event	B	
7. Most Harmful Event	C	
8. Object Struck	D	
9. Distance to Object Struck	E	
10. Vehicle Defects	F	

OBJECT STRUCK INFORMATION, VEHICLE 1

D. OBJECT—(*excluding* another motor vehicle *in traffic*)—Identify object struck by entering appropriate code from the "Object Struck" list (now 8 on the code sheet of the DMV-349). If more than one object is struck (such as a mailbox and then a tree) enter code for object inflicting the greatest damage (in this case, most likely the tree). "1" signifies no object struck.

1. None
2. Parked Vehicle
3. Bicycle, moped
4. Pedestrian
5. Animal
6. Tree
7. Utility pole (with or without light) generally called "telephone pole"
8. Luminaire pole (non-breakaway) "light pole", not telephone pole
9. Luminaire pole (breakaway)
10. Official highway sign (non-breakaway)
11. Official highway sign (breakaway)
12. Commercial sign
13. Guardrail end on shoulder
14. Guardrail face on shoulder (face is portion between ends of guardrail)
15. Guardrail end in median
16. Guardrail face in median
17. Shoulder barrier end
18. Shoulder barrier face
19. Median barrier end
20. Median barrier face

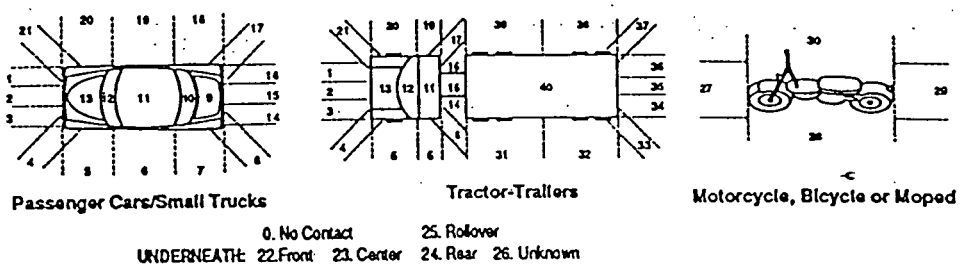
} Non-Guardrail

21. Bridge rail end
22. Bridge rail face
23. Overhead part of underpass
24. Pier on shoulder of underpass
25. Pier in median of underpass
26. Abutment (supporting wall of underpass)
27. Curb, median or traffic island
28. Catch basin or culvert on shoulder
29. Catch basin or culvert in median
30. Ditch bank
31. Mailbox
32. Fence or fence post
33. Construction barrier
34. Crash cushion
35. Other object (describe also in narrative)

NORTH CAROLINA

POINTS OF INITIAL CONTACT

POINTS OF INITIAL CONTACT (Write In Codes)	
VEH. 1	VEH. 2
A	B



A. Record number corresponding to the points of initial contact of Vehicle 1 with another vehicle, person or object. If contact overlaps areas, more than one number should be recorded. Example: For back distributed impact on an automobile, record "14, 15, 16".

If the vehicle r*olled over* and it is impossible to determine initial impact point, enter 25.

B. Record number corresponding to the points of initial contact of Vehicle 1 with another vehicle, person or object. If there is no contact, (fell from moving vehicle, for example), the entry should be a zero "O".

L. **Weather** (Sec. 22)—If weather conditions (for example, smoke or hail) were a causative factor in the collision, they should be further identified in the narrative.

1. Clear
2. Cloudy
3. Raining
4. Snowing
5. Fog, smog, smoke, dust
6. Sleet or hail

1993 PENNSYLVANIA

CODING MANUAL &

RECORD LAYOUT

PENNSYLVANIA

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*****************************************************************
* COBOL DECLARATION FOR ARS-DATA (ACCIDENT LEVEL).              *
* THE NUMBER OF FIELDS DESCRIBED BY THIS DECLARATION IS 50.     *
*****************************************************************
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			Codes References
01 ACCIDENT-LEVEL.			
10 ACC-REC-NO	PIC X(7).	(12-18)	
10 FILLER	PIC X(32).	(19-50)	
10 POLICE-TYPE	PIC X(1).	(51)	0007
10 POLICE-AGCY	PIC X(5).	(52-56)	
10 INCIDENT-NO	PIC X(10).	(57-66)	
10 PATROL-ZONE	PIC X(3).	(67-69)	
10 FILLER	PIC X(30).	(70-99)	
10 COUNTY	PIC X(2).	(100-101)	0017
10 MUNICIPALITY	PIC X(5).	(102-106)	
10 ACC-DATE	PIC X(8).	(107-114)	0019
10 FILLER	PIC X(2).	(115-116)	
10 ACC-TIME	PIC X(4).	(117-120)	0021
10 DAY-OF-WEEK	PIC X(1).	(121)	0023
10 ILLUMINATION	PIC X(1).	(122)	0024
10 WEATHER	PIC X(1).	(123)	0025
10 ROAD-SURFACE	PIC X(1).	(124)	0026
10 ACC-DESC	PIC X(1).	(125)	0027
10 REL-TO-ROAD	PIC X(1).	(126)	0028
10 CONSTRUCTION	PIC X(1).	(127)	0029
10 URBAN-RURAL	PIC X(1).	(128)	0030
10 INTERSECT-TYPE	PIC X(2).	(129-130)	0031
10 LOCATION-TYPE	PIC X(1).	(131)	0032
10 ACCURACY	PIC X(1).	(132)	0033
10 PRIME-FAC-SUB	PIC X(1).	(133)	0903
10 PRIME-FAC-NO	PIC 999V.	(134-136)	
10 PRIME-FACTOR	PIC X(2).	(137-138)	0905
10 ALC-DRUG-USE	PIC X(1).	(139)	0318
10 MOSTHARMEVENT	PIC X(3).	(140-142)	0038
10 SEVERITY	PIC X(1).	(143)	0040
10 NO-VEHICLES	PIC 999V.	(144-146)	
10 FATALITY-COUNT	PIC 999V.	(147-149)	
10 INJURY-COUNT	PIC 999V.	(150-152)	
10 INJURY-MAJ-COUNT	PIC 999V.	(153-155)	
10 INJURY-MOD-COUNT	PIC 999V.	(156-158)	
10 INJURY-MIN-COUNT	PIC 999V.	(159-161)	
10 INJURY-UNK-COUNT	PIC 999V.	(162-164)	
10 PERSON-COUNT	PIC 999V.	(165-167)	
10 PED-COUNT	PIC 999V.	(168-170)	
10 LOC-COUNT	PIC 999V.	(171-173)	
10 DELIM-COUNT	PIC 999V.	(174-176)	
10 SR-COUNT	PIC 999V.	(177-179)	
10 LRC-COUNT	PIC 999V.	(180-182)	
10 EVENT-COUNT	PIC 999V.	(183-185)	
10 CONTRIB-COUNT	PIC 999V.	(186-188)	
10 AUDIT-COUNT	PIC 999V.	(199-191)	
10 EXT-DESC-COUNT	PIC 999V.	(192-194)	
10 CMV-COUNT	PIC 999V.	(195-197)	
10 SS-COUNT	PIC 999V.	(198-200)	
10 DISTRICT	PIC X(2).	(201-202)	0059
10 FILLER	PIC X(58).	(203-260)	

PENNSYLVANIA

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*****************************************************************
* COBOL DECLARATION FOR ARS-DATA(VEHICLE LEVEL)                 *
* THE NUMBER OF FIELDS DESCRIBED BY THIS DECLARATION IS 47      *
*****************************************************************
      01  VEHICLE-LEVEL.
          10 ACC-REC-NO          PIC X(7).   (12-18)
          10 VEH-NO              PIC 999V.   (19-21)
          10 FILLER              PIC X(10).  (22-31)

          10 DRIVER-STATE        PIC X(2).   (32-33)        0205
          10 LICENSE-STATUS      PIC X(1).   (34)           0206
          10 PREV-SPEEDING       PIC 999V.   (35-37)
          10 LAST-SPEEDING       PIC X(8).   (38-45)
          10 PREV-DUI            PIC 999V.   (46-48)
          10 LAST-DUI            PIC X(8).   (49-56)
          10 PREV-SUSP           PIC 999V.   (57-59)
          10 LAST-SUSP           PIC X(8).   (60-67)
          10 PREV-ACC            PIC 999V.   (68-70)
          10 LAST-ACC            PIC X(8).   (71-78)
          10 PREV-VIOL           PIC 999V.   (79-81)
          10 LAST-VIOL           PIC X(8).   (82-89)
          10 OWNERSHIP           PIC X(2).   (90-91)        0217
          10 DRIVER-PRES         PIC X(1).   (92)           0218
          10 DRIVER-COND         PIC X(1).   (93)           0250
          10 SCHOOL-DIST         PIC X(8).   (94-101)       0219
          10 INSURED             PIC X(1).   (102)          0220
          10 VIN                 PIC X(21).  (103-123)      0221
          10 FILLER              PIC X(10).  (124-133)
          10 VEH-STATE           PIC X(2).   (134-135)      0224
          10 VEH-YEAR            PIC X(2).   (136-137)
          10 VEH-MAKE-MODEL      PIC X(4).   (138-141)      0226
          10 BODY-TYPE           PIC X(2).   (142-143)      0227
          10 WHEEL-BASE          PIC 9999V9. (144-148)
          10 VEH-USAGE           PIC X(2).   (149-150)      0231
          10 FILLER              PIC X(1).   (151)
          10 VEH-STATUS          PIC X(1).   (152)          0234
          10 VEH-MOVEMENT        PIC X(2).   (153-154)      0235
          10 VEH-POSITION        PIC X(2).   (155-156)      0236
          10 VEH-GRADE           PIC X(1).   (157)          0237
          10 ROAD-ID             PIC 999V.   (158-160)
          10 VEH-DIRECTION       PIC X(1).   (161)          0239
          10 VEH-SPEED           PIC 999V.   (162-164)
          10 IMPACT-POINT        PIC X(2).   (165-166)      0241
          10 DEFORMATION         PIC X(1).   (167)          0242
          10 TOW-A-WAY           PIC X(1).   (168)          0243
          10 PERSON-COUNT        PIC 999V.   (169-171)
          10 PED-COUNT           PIC 999V.   (172-174)
          10 EVENT-COUNT         PIC 999V.   (175-177)
          10 CONTRIB-COUNT       PIC 999V.   (178-180)
          10 CMV-COUNT           PIC 999V.   (181-183)
          10 VEH-TYPE            PIC X(1).   (184)          0248
          10 COUNTY-OF-ACC       PIC X(2).   (185-186)      0017
          10 FILLER              PIC X(74).  (187-260)
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PENNSYLVANIA

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*****************************************************************
* COBOL DECLARATION FOR ARS-DATA(COMMERCIAL VEHICLE LEVEL)      *
* THE NUMBER OF FIELDS DESCRIBED BY THIS DECLARATION IS 22      *
*****************************************************************
      01  COMMERCIAL-VEHICLE-LEVEL.
          10 ACC-REC-NO              PIC X(7).      (12-18
          10 VEH-NO                  PIC 999V.      (19-21)
          10 FILLER                  PIC X(21).     (22-42)
          10 DRIVER-STATE            PIC X(2).      (43-44)     1213



          10 FILLER                  PIC X(43).     (45-87)
          10 TAG-NUMBER              PIC X(9).      (88-96)
          10 USDOT-NUMBER            PIC X(7).      (97-103)
          10 ICC-NUMBER              PIC X(6).      (104-109)
          10 PUC-NUMBER              PIC X(12).     (110-121)
          10 CARRIER                 PIC X(40).     (122-161)
          10 ADDRESS                 PIC X(40).     (162-201)
          10 CITY                    PIC X(20).     (202-221)
          10 STATE                   PIC X(2)       (222-223)   1213
          10 ZIP-CODE                PIC X(9).      (224-232)
          10 VEH-CONFIG              PIC X(2).      (233-234)   1216
          10 CARGO-BODY              PIC X(2).      (235-236)   1217
          10 GVWR                    PIC 9999999V.  (237-243)
          10 AXLE-COUNT              PIC 999V.      (244-246)
          10 HAZARDOUS-MAT           PIC X(2).      (247-248)   1220
          10 HAZ-MAT-RELEASE         PIC X(1).      (249)       1221
          10 FILLER                  PIC X(9).      (250-258)
          10 COUNTY-OF-ACC           PIC X(2).      (257-260)   0017
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PENNSYLVANIA

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*****************************************************************
* COBOL DECLARATION FOR ARS-DATA(PED-LEVEL)                     *
* THE NUMBER OF FIELDS DESCRIBED BY THIS DECLARATION IS 21      *
*****************************************************************
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```
01  PED-LEVEL.
    10 ACC-REC-NO          PIC X(7).     (12-18)
    10 VEH-NO              PIC 999V.     (19-21)
    10 SEQ-NO              PIC 999V.     (22-24)
    10 SEQ-PERSON          PIC 999V.     (25-27)
    10 INJURY-SEVERITY     PIC X(1).     (28)        0305
    10 SEX                 PIC X(1).     (29)        0308
    10 AGE                 PIC 999V.     (30-32)
    10 ROAD-ID-VEH         PIC 999V.     (33-35)
    10 VEH-MOVEMENT        PIC X(2).     (36-37)     0235
    10 VEH-DIRECTION       PIC X(1).     (38)        0239
    10 VEH-POSITION        PIC X(2).     (39-40)     0236
    10 PED-ACTION          PIC X(2).     (41-42)     0314
    10 PED-LOCATION        PIC X(2).     (43-44)     0315
    10 PED-XING            PIC X(1).     (45)        0330
    10 PED-DIRECTION       PIC X(1).     (46)        0331
    10 ROAD-DI-PED         PIC 999V.     (47-49)
    10 CLOTHING            PIC X(1).     (50)        0332
    10 PED-SIGNAL          PIC X(1).     (51)        0333
    10 STRUCK              PIC X(1).     (52)        0334
    10 COUNTY-OF-ACC       PIC X(2).     (53-54)     0017
    10 FILLER              PIC X(206).   (55-260)
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PENNSYLVANIA

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*****************************************************************
* COBOL DECLARATION FOR ARS-DATA(LOCATION-LEVEL)                *
* THE NUMBER OF FIELDS DESCRIBED BY THIS DECLARATION IS 30      *
*****************************************************************
      01  LOCATION-LEVEL.
          10 ACC-REC-NO          PIC X(7).    (12-18)
          10 ROAD-ID             PIC 999V.    (19-21)
          10 PRIN-ROAD           PIC X(1).    (22)          0403
          10 ROAD-TYPE           PIC X(1).    (23)          0404
          10 COUNTY              PIC X(2).    (24-25)       0017
          10 STATE-ROUTE         PIC X(4).    (26-29)
          10 SEGMENT             PIC X(4).    (30-33)
          10 OFFSET              PIC X(4).    (34-37)
          10 STREET-NAME         PIC X(18).   (38-55)
          10 ALIGNMENT           PIC X(1).    (56)          0410
          10 ORIENTATION         PIC X(1).    (57)          0411
          10 SPEED-LIMIT         PIC 999V.    (58-60)       0412
          10 HIGHWAY-TYPE        PIC X(1).    (61)          0413
          10 ACCESS-CONTROL      PIC X(1).    (62)          0429
          10 TCD                 PIC X(2).    (63-64)       0414
          10 INTERSECT-COUNTY    PIC X(2).    (65-66)       0017
          10 INTERSECT-ROUTE     PIC X(4).    (67-70)
          10 INTERSECT-SEG       PIC X(4).    (71-74)
          10 INTERSECT-OFF       PIC X(4).    (75-78)
          10 DELIM-COUNT         PIC 999V.    (79-81)
          10 SR-COUNT            PIC 999V.    (82-84)
          10 LRC-COUNT           PIC 999V.    (85-87)
          10 VEH-COUNT           PIC 999V.    (88-90)
          10 CONTRIB-COUNT       PIC 999V.    (91-93)
          10 CUM-OFFSET          PIC 999999999v. (94-102)
          10 ADJ-DIRECTION       PIC X(1).    (103)

          10 CUM-OFFSET-INT      PIC 999999999V. (104-112)
          10 ADJ-DIR-INT         PIC X(1).    (113)
          10 COUNTY-OF-ACC       PIC X(2).    (114-115)     0017
          10 FILLER              PIC X(145).  (116-260)
```

PENNSYLVANIA

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*****************************************************************
* COBOL DECLARATION FOR ARS-DATA(SR-ATTRIB)                     *
* THE NUMBER OF FIELDS DESCRIBED BY THIS DECLARATION IS 23      *
*****************************************************************
     01  SR-ATTRIB.
         10 ACC-REC-NO          PIC X(7).      (12-18)
         10 ROAD-ID             PIC 999V.      (19-21)
         10 COUNTY              PIC X(2).      (22-23)      0017
         10 STATE-ROUTE         PIC X(4).      (24-27)
         10 SEGMENT             PIC X(4).      (28-31)
         10 OFFSET              PIC X(4).      (32-35)
         10 DIRECTION           PIC X(1).      (36)         8001
         10 DIVISOR             PIC X(1).      (37)         8002
         10 SEG-LENGTH          PIC 99999V.    (38-42)
         10 LANE-COUNT          PIC 999V.      (43-44)
         10 ROAD-WIDTH          PIC 999V.      (46-48)
         10 PAVEMENT-TYPE       PIC X(2).      (49-50)      8007
         10 TRAFFIC-ROUTE-1     PIC X(6).      (51-56)
         10 TRAFFIC-ROUTE-2     PIC X(6).      (57-62)
         10 TRAFFIC-ROUTE-3     PIC X(6).      (63-68)
         10 ADT                 PIC 9999999V.  (69-75)
         10 ADT-TRUCK           PIC 9999999V.  (76-82)
         10 DVMT                PIC 9999999V.  (83-89)
         10 DVMT-TRUCK          PIC 9999999V.  (90-96)
         10 FED-AID-SYSTEM      PIC X(1).      (97)         8004
         10 FUNCTION-CLASS      PIC X(2).      (98-99)      8005
         10 COUNTY-OF-ACC       PIC X(2).      (100-101)    0017
         10 FILLER              PIC X(159).    (102-260)

*****************************************************************
* COBOL DECLARATION FOR ARS-DATA(DELIM-ROAD-LEVEL)              *
* THE NUMBER OF FIELDS DESCRIBED BY THIS DECLARATION IS 7       *
*****************************************************************
     01  DELIM-LEVEL.
         10 ACC-REC-NO          PIC X(7).      (12-18)
         10 DELIM-STREET-1      PIC X(18).     (19-36)
         10 DISTANCE            PIC 99999V.    (37-41)
         10 MEASUREMENT         PIC X(1).      (42)         0704
         10 DELIM-STREET-2      PIC X(18).     (43-60)
         10 COUNTY-OF-ACC       PIC X(2).      (61-62)      0017
         10 FILLER              PIC X(198).    (63-260)

*****************************************************************
* COBOL DECLARATION FOR ARS-DATA(EVENT-LEVEL)                   *
* THE NUMBER OF FIELDS DESCRIBED BY THIS DECLARATION IS 7.      *
*****************************************************************
     01  EVENT-LEVEL.
         10 ACC-REC-NO          PIC X(7).      (12-18)
         10 SEQ-NO              PIC 999V.      (19-21)
         10 VEH-NO              PIC 999V.      (22-24)
         10 HARM-EVENT          PIC X(2).      (25-26)      0804
         10 COLLISION-DIR       PIC X(1).      (27)         0805
         10 COUNTY-OF-ACC       PIC X(2).      (28-29)      0017
         10 FILLER              PIC X(231).    (30-260)
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*****************************************************************
* COBOL DECLARATION FOR ARS-DATA(FACTOR-LEVEL)                  *
* THE NUMBER OF FIELDS DESCRIBED BY THIS DECLARATION IS 8       *
*****************************************************************
      01  FACTOR-LEVEL.
          10 ACC-REC-NO          PIC X(7).      (12-18)
          10 SEQ-NO              PIC 999V.      (19-21)
          10 CONTRIB-SUBJ        PIC X(1).      (22)          0903
          10 CONTRIB-SUBJ-NO     PIC 999V.      (23-25)
          10 CONTRIB-FACTOR      PIC X(2).      (26-27)       0905
          10 CHARGED             PIC X(1).      (28)          0906
          10 COUNTY-OF-ACC       PIC X(2).      (29-30)       0017
          10 FILLER              PIC X(230).    (31-260)

*****************************************************************
* COBOL DECLARATION FOR ARS-DATA(EXTENDED-DESCRIPTION-LEVEL)    *
* THE NUMBER OF FIELDS DESCRIBED BY THIS DECLARATION IS 6       *
*****************************************************************
      01  EXTENDED-DESCRIPTION-LEVEL.
          10 ACC-REC-NO          PIC X(7).      (12-18)
          10 SEQ-NO              PIC 999V.      (19-21)
          10 EXT-DESC-TYPE       PIC X(4).      (22-25)       1003
          10 DESCRIPTION         PIC X(60).     (26-85)
          10 COUNTY-OF-ACC       PIC X(2).      (86-87)       0017
          10 FILLER              PIC X(173).    (88-260)
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PENNSYLVANIA

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0804	01	EXPLOSION	EXPLOSION	
	02	FIRE	FIRE	
	03	IMMERSION	IMMERSION	
	04	OVERTURNED	OVERTURNED	
	05	FLYING/FALLING OBJ	STRUCK BY FLYING OR FALLING OBJECT	
	06	JACKKNIFED	JACKKNIFED	
	08	OTHER NON-COLLISION	OTHER NON-COLLISION	
	11	HIT DEER	STRUCK A DEER	
	12	HIT OTHER ANIMAL	STRUCK OTHER ANIMAL	
	13	HIT UNIT #1	STRUCK UNIT #1	
	14	HIT UNIT #2	STRUCK UNIT #2	
	15	HIT UNIT #3	STRUCK UNIT #3	
	16	HIT UNIT #4	STRUCK UNIT #4	
	17	HIT UNIT #5	STRUCK UNIT #5	
	18	HIT OTHER UNIT	STRUCK OTHER UNIT	
	19	HIT UNKNOWN UNIT	STRUCK UNKNOWN UNIT	
	20	HIT PEDESTRIAN	STRUCK A PEDESTRIAN	
	22	HIT PKD VEH-TOW UNK	HIT PARKED VEHICLE-TOWING UNKNOWN	
	23	HIT PKD VEH-TOWED	HIT PARKED VEHICLE-TOWED	
	24	HIT PKD VEH-NO TOW	HIT PARKED VEHICLE-NOT TOWED	
	25	HIT BRIDGE SUPPORT	STRUCK A BRIDGE SUPPORT	
	26	HIT BRIDGE WALL	STRUCK A BRIDGE WALL	
	27	HIT BRIDGE WALL END	STRUCK A BRIDGE WALL END	
	28	HIT BUILDING	STRUCK A BUILDING	
	29	HIT CULVERT	STRUCK A CULVERT (CONCRETE,ETC.)	
	30	HIT CURB	STRUCK A CURB	
	31	HIT DITCH	STRUCK A DITCH	
	32	HIT EMBANKMENT	STRUCK AN EMBANKMENT	
	34	HIT IMPACT ATTEN	STRUCK AN IMPACT ATTENUATOR	
	35	HIT MEDIAN BARRIER	STRUCK A MEDIAN BARRIER	
	36	HIT OBSTACLE ON RDWY	STRUCK AN OBSTACLE ON THE ROADWAY	
	37	HIT OVERHEAD STRUCT	STRUCK AN OVERHEAD STRUCTURE	
	38	HIT SIG/SIGN SUPPORT	STRUCK A SIGNAL/SIGN SUPPORT	
	39	HIT SNOW BANK	STRUCK A SNOW BANK	
	40	HIT TEMP CONS BARR	STRUCK A TEMPORARY CONSTRUCTION BARRIER	
	41	HIT TRAFFIC ISLAND	STRUCK TRAFFIC ISLAND OR CHANNELIZATION	
	42	HIT TREE(S)	STRUCK TREE(S)	
	43	HIT UTILITY POLE(S)	STRUCK UTILITY POLE(S)	
	44	HIT MAIL BOX(S)	STRUCK A MAIL BOX(S)	
	45	HIT ROCK(S)	STRUCK A ROCK(S)	
	46	HIT FENCE	STRUCK A FENCE	
	47	HIT WALL	STRUCK A WALL	
	48	HIT SHRUBS, HEDGES	STRUCK A SHRUB, HEDGE OR LAWN	
	49	HIT FIRE HYDRANT	STRUCK A FIRE HYDRANT	
	50	HIT GUIDERAIL	HIT GUIDERAIL	
	51	HIT GUIDERAIL END	HIT GUIDERAIL END	
	60	HIT OTHER FIXED OBJ	STRUCK OTHER FIXED OBJECT	
	69	HIT UNK FIXED OBJ	STRUCK UNKNOWN FIXED OBJECT	
	73	HIT BY UNIT 1	WAS STRUCK BY UNIT #1	
	74	HIT BY UNIT 2	WAS STRUCK BY UNIT #2	
	75	HIT BY UNIT 3	WAS STRUCK BY UNIT #3	
	76	HIT BY UNIT 4	WAS STRUCK BY UNIT #4	
	77	HIT BY UNIT 5	WAS STRUCK BY UNIT #5	

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0804	78	HIT BY OTHER UNIT	WAS STRUCK BY ANOTHER UNIT	
	79	HIT BY UNK UNIT	WAS STRUCK BY UNKNOWN UNIT	
	98	OTHER HARMFUL EVENT	OTHER HARMFUL EVENT	
	99	UNK HARMFUL EVENT	UNKNOWN HARMFUL EVENT	

PENNSYLVANIA

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0038	538	HIT SIG/SIGN SUPPORT	STRUCK A SIGNAL/SIGN SUPPORT	
	539	HIT SNOW BANK	STRUCK A SNOW BANK	
	540	HIT TEMP CONS BARR	STRUCK A TEMPORARY CONSTRUCTION BARRIER	
	541	HIT TRAFFIC ISLAND	STRUCK TRAFFIC ISLAND OR CHANNELIZATION	
	542	HIT TREE(S)	STRUCK TREE(S)	
	543	HIT UTILITY POLE(S)	STRUCK UTILITY POLE(S)	
	544	HIT MAIL BOX(S)	STRUCK A MAIL BOX(S)	
	545	HIT ROCK(S)	STRUCK A ROCK(S)	
	546	HIT FENCE	STRUCK A FENCE	
	547	HIT WALL	STRUCK A WALL	
	548	HIT SHRUBS, HEDGES	STRUCK A SHRUB, HEDGE OR LAWN	
	549	HIT FIRE HYDRANT	STRUCK A FIRE HYDRANT	
	550	HIT GUIDE RAIL	STRUCK A GUIDE RAIL	
	551	HIT GUIDE RAIL END	STRUCK A GUIDE RAIL END	
	568	HIT OTHER FIXED OBJ	STRUCK OTHER FIXED OBJECT	
	569	HIT UNK FIXED OBJ	STRUCK UNKNOWN FIXED OBJECT	
	573	HIT BY NON-MOTOR VEH	WAS STRUCK BY NON-MOTORIZED VEHICLE	
	574	HIT BY AUTO	WAS STRUCK BY AUTOMOBILE	
	575	HIT BY MOTORCYCLE	WAS STRUCK BY MOTORCYCLE	
	576	HIT BY BUS	WAS STRUCK BY BUS	
	577	HIT BY LT. TRUCK	WAS STRUCK BY LIGHT TRUCK	
	578	HIT BY HVY. TRUCK	WAS STRUCK BY HEAVY TRUCK	
	579	HIT BY OTHER VEH	WAS STRUCK BY OTHER/UNKNOWN VEHICLE	
	598	OTHER HARMFUL EVENT	OTHER HARMFUL EVENT	
	599	UNK HARMFUL EVENT	UNKNOWN HARMFUL EVENT	
	601	EXPLOSION	EXPLOSION	
	602	FIRE	FIRE	
	603	IMMERSION	IMMERSION	
	604	OVERTURNED	OVERTURNED	
	605	FLYING/FALLING OBJ	STRUCK BY FLYING OR FALLING OBJECT	
	606	JACKKNIFED	JACKKNIFED	
	608	OTHER NON-COLLISION	OTHER NON-COLLISION	
	611	HIT DEER	STRUCK A DEER	
	612	HIT OTHER ANIMAL	STRUCK OTHER ANIMAL	
	613	HIT NON-MOTOR VEH	STRUCK NON-MOTORIZED VEHICLE	
	614	HIT AUTO	STRUCK AUTOMOBILE	
	615	HIT MOTORCYCLE	STRUCK MOTORCYCLE	
	616	HIT BUS	STRUCK BUS	
	617	HIT LT. TRUCK	STRUCK LIGHT TRUCK	
	618	HIT HVY. TRUCK	STRUCK HEAVY TRUCK	
	619	HIT OTHER VEH	STRUCK OTHER/UNKNOWN VEHICLE	
	620	HIT PEDESTRIAN	STRUCK A PEDESTRIAN	
	622	HIT PKD VEH-TOW UNK	HIT PARKED VEHICLE-TOWING UNKNOWN	
	623	HIT PKD VEH-TOWED	HIT PARKED VEHICLE-TOWED	
	624	HIT PKD VEH-NO TOW	HIT PARKED VEHICLE-NOT TOWED	
	625	HIT BRIDGE SUPPORT	STRUCK A BRIDGE SUPPORT	
	626	HIT BRIDGE WALL	STRUCK A BRIDGE WALL	
	627	HIT BRIDGE WALL END	STRUCK A BRIDGE WALL END	
	628	HIT BUILDING	STRUCK A BUILDING	
	629	HIT CULVERT	STRUCK A CULVERT (CONCRETE,ETC.)	
	630	HIT CURB	STRUCK A CURB	
	631	HIT DITCH	STRUCK A DITCH	
	632	HIT EMBANKMENT	STRUCK AN EMBANKMENT	

PENNSYLVANIA

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0226	0000	NOT APPLICABLE	NOT APPLICABLE - NON-MOTORIZED VEHICLE	0
	0101	AMERICAN MOTORS	RAMBLER/AMERICAN	1
	0102	AMERICAN MOTORS	REBEL/MATADOR	1
	0103	AMERICAN MOTORS	AMBASSADOR	1
	0104	AMERICAN MOTORS	PACER	1
	0105	AMERICAN MOTORS	AMX	1
	0106	AMERICAN MOTORS	JAVELIN	1
	0107	AMERICAN MOTORS	HORNET/CONCORD	1
	0108	AMERICAN MOTORS	SPIRIT/GREMLIN	1
	0109	AMERICAN MOTORS	EAGLE	1
	0110	AMERICAN MOTORS	SX4/KAMMBACK	1
	0172	AMERICAN MOTORS	ESPACE (MINIVAN)	1
	0197	AMERICAN MOTORS	OTHER VEHICLE	4
	0198	AMERICAN MOTORS	OTHER (AUTOMOBILE)	6
	0199	AMERICAN MOTORS	UNKNOWN (AUTOMOBILE)	1
	0200	JEEP	UNKNOWN (JEEP)	1
	0201	JEEP	CJ-2/CJ-3/CJ-4	6
	0202	JEEP	CJ-5/CJ-6/CJ-7/CJ-8 (THRU 86; YJ 87 ON)	1
	0203	JEEP	WRANGLER	1
	0271	JEEP	CHEROKEE	1
	0273	JEEP	PICK-UP	4
	0276	JEEP	WAGONEER	4
	0277	JEEP	COMANCHE	4
	0278	JEEP	OTHER (LIGHT TRUCK)	4
	0279	JEEP	UNKNOWN (LIGHT TRUCK)	4
	0297	JEEP	OTHER VEHICLE	6
	0298	JEEP	OTHER (AUTOMOBILE)	1
	0299	JEEP	UNKNOWN (AUTOMOBILE)	1
	0300	AM GENERAL	UNKNOWN (AM GENERAL)	6
	0301	AM GENERAL	DISPATCHER (POST OFFICE, JEEP)	1
	0302	AMERICAN GENERAL	HUMMER	4
	0375	AM GENERAL	DISPATCHER (DJ-SERIES, P.O. DELIVERY VA	4
	0387	AM GENERAL	BUS (REAR ENGINE)	3
	0308	AM GENERAL	OTHER (TRUCK)	5
	0309	AM GENERAL	UNKNOWN (TRUCK)	5
	0397	AM GENERAL	OTHER VEHICLE	6
	0398	AM GENERAL	OTHER (AUTOMOBILE)	1
	0399	AM GENERAL	UNKNOWN (AUTOMOBILE)	1
	0607	CHRYSLER	LEBARON (S, MEDALLION, SALON)	1
	0609	CHRYSLER	CORDOBA	1
	0610	CHRYSLER	NEWPORT/NEW YORKER	1
	0614	CHRYSLER	E-CLASS	1
	0615	CHRYSLER	LASER	1
	0616	CHRYSLER	GTS	1
	0617	CHRYSLER	CONCORDE	1
	0618	CHRYSLER	EXECUTIVE	1
	0631	CHRYSLER	MASERATI	1
	0635	CHRYSLER	CONQUEST	1
	0697	CHRYSLER	OTHER VEHICLE	1
	0698	CHRYSLER	OTHER (AUTOMOBILE)	1
	0699	CHRYSLER	UNKNOWN (AUTOMOBILE)	1
	0700	DODGE	UNKNOWN (DODGE)	6
	0701	DODGE	DART	1

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0226	9850	OTHER HVY TRUCK	OTHER HEAVY TRUCK (EG, OSHKOSH, IVECO)	5
	9860	OTHER TRUCK	OTHER TRUCK (LIGHT/HEAVY UNKNOWN)	5
	9890	OTHER VEHICLE	OTHER VEHICLE (EG, SNOWMOBILE, GO-CART)	6
	9910	UNKNOWN AUTOMOBILE	UNKNOWN AUTOMOBILE	1
	9920	UNKNOWN MOTORCYCLE	UNKNOWN MOTORED CYCLE	2
	9930	UNKNOWN BUS	UNKNOWN BUS	3
	9940	UNKNOWN LIGHT TRUCK	UNKNOWN LIGHT TRUCK	4
	9950	UNKNOWN HVY TRUCK	UNKNOWN HEAVY TRUCK	5
	9960	UNKNOWN TRUCK	UNKNOWN TRUCK (LIGHT/HEAVY UNKNOWN)	5
	9990	UNKNOWN OTHER VEH	UNKNOWN OTHER VEHICLE	6
	9999	UNKNOWN	UNKNOWN	6

PENNSYLVANIA

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0306	00	NONE	NONE	
	01	FACE	FACE	
	02	HEAD	HEAD	
	03	NECK	NECK	
	04	BACK	BACK	
	05	ARM(S)	ARM(S)	
	06	LEG(S)	LEG(S)	
	07	CHEST/STOMACH	CHEST/STOMACH	
	08	INTERNAL	INTERNAL	
	09	ENTIRE BODY	ENTIRE BODY	
	98	OTHER	OTHER	
	99	UNKNOWN	UNKNOWN	

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0307	00	NO INJURY	NO INJURY	
	01	AMPUTATION	AMPUTATION	
	02	BLEEDING WOUND	BLEEDING WOUND	
	03	BROKEN BONES	BROKEN BONES	
	04	DISTORTED MEMBER	DISTORTED MEMBER	
	05	BRUISES AND ABRASION	BRUISES AND ABRASIONS	
	06	BURNS	BURNS	
	07	SWELLING	SWELLING	
	08	LIMPING	LIMPING	
	09	NO VISIBLE INJURIES	NO VISIBLE INJURIES/COMPLAINT OF PAIN	
	97	OTHER INCAPACITATING	OTHER INCAPACITATING	
	98	OTHER NON INCAPACITA	OTHER NON INCAPACITATING	
	99	UNKNOWN INJURY	UNKNOWN INJURY	

PENNSYLVANIA

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0242	0	NONE	NONE	
	1	LIGHT	LIGHT	
	2	MODERATE	MODERATE	
	3	SEVERE	SEVERE	
	9	UNKNOWN	UNKNOWN	

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0243	0	NO	NO	
	1	YES	YES	
	9	UNKNOWN	UNKNOWN	

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
17	0	NON-COLLISION	NON-COLLISION	
	1	REAR-END	REAR-END	
	2	HEAD-ON	HEAD-ON	
	3	BACKING UP	BACKING UP	
	4	ANGLE	ANGLE	
	5	SIDESWIPE	SIDESWIPE	
	6	HIT FIXED OBJECT	HIT FIXED OBJECT	
	7	HIT PEDESTRIAN	HIT PEDESTRIAN	
	8	ALL OTHERS	ALL OTHERS	
	9	UNKNOWN	UNKNOWN	

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0241	00	NONE	NONE	
	01	RIGHT FRONT	RIGHT FRONT	
	02	RIGHT SIDE FORWARD	RIGHT SIDE FORWARD	
	03	RIGHT SIDE CENTER	RIGHT SIDE CENTER	
	04	RIGHT SIDE REAR	RIGHT SIDE REAR	
	05	RIGHT REAR	RIGHT REAR	
	06	CENTER REAR	CENTER REAR	
	07	LEFT REAR	LEFT REAR	
	08	LEFT SIDE REAR	LEFT SIDE REAR	
	09	LEFT SIDE CENTER	LEFT SIDE CENTER	
	10	LEFT SIDE FORWARD	LEFT SIDE FORWARD	
	11	LEFT FRONT	LEFT FRONT	
	12	CENTER FRONT	CENTER FRONT	
	13	TOP	TOP	
	14	UNDERCARRIAGE	UNDERCARRIAGE	
	15	TOWED UNIT	TOWED UNIT	
	99	UNKNOWN	UNKNOWN	

PENNSYLVANIA

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0241	00	NONE	NONE	
	01	RIGHT FRONT	RIGHT FRONT	
	02	RIGHT SIDE FORWARD	RIGHT SIDE FORWARD	
	03	RIGHT SIDE CENTER	RIGHT SIDE CENTER	
	04	RIGHT SIDE REAR	RIGHT SIDE REAR	
	05	RIGHT REAR	RIGHT REAR	
	06	CENTER REAR	CENTER REAR	
	07	LEFT REAR	LEFT REAR	
	08	LEFT SIDE REAR	LEFT SIDE REAR	
	09	LEFT SIDE CENTER	LEFT SIDE CENTER	
	10	LEFT SIDE FORWARD	LEFT SIDE FORWARD	
	11	LEFT FRONT	LEFT FRONT	
	12	CENTER FRONT	CENTER FRONT	
	13	TOP	TOP	
	14	UNDERCARRIAGE	UNDERCARRIAGE	
	15	TOWED UNIT	TOWED UNIT	
	99	UNKNOWN	UNKNOWN	

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0025	0	NO ADVERSE CONDITION	NO ADVERSE CONDITIONS	
	1	RAINING	RAINING	
	2	SLEET/FREEZING RAIN	SLEET, HAIL, FREEZING RAIN	
	3	SNOWING	SNOWING	
	4	FOG, SMOKE, ETC.	FOG, SMOKE, ETC.	
	5	RAINING & FOG	RAINING AND FOG	
	9	UNKNOWN	UNKNOWN	

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0021	00	12:00 -12:59 AM	12:00 -12:59 AM	
	01	1:00 - 1:59 AM	1:00 - 1:59 AM	
	02	2:00 - 2:59 AM	2:00 - 2:59 AM	
	03	3:00 - 3:59 AM	3:00 - 3:59 AM	
	04	4:00 - 4:59 AM	4:00 - 4:59 AM	
	05	5:00 - 5:59 AM	5:00 - 5:59 AM	
	06	6:00 - 6:59 AM	6:00 - 6:59 AM	
	07	7:00 - 7:59 AM	7:00 - 7:59 AM	
	08	8:00 - 8:59 AM	8:00 - 8:59 AM	
	09	9:00 - 9:59 AM	9:00 - 9:59 AM	
	10	10:00 -10:59 AM	10:00 -10:59 AM	
	11	11:00 -11:59 AM	11:00 -11:59 AM	
	12	12:00 -12:59 PM	12:00 -12:59 PM	
	13	1:00 - 1:59 PM	1:00 - 1:59 PM	
	14	2:00 - 2:59 PM	2:00 - 2:59 PM	
	15	3:00 - 3:59 PM	3:00 - 3:59 PM	
	16	4:00 - 4:59 PM	4:00 - 4:59 PM	
	17	5:00 - 5:59 PM	5:00 - 5:59 PM	
	18	6:00 - 6:59 PM	6:00 - 6:59 PM	
	19	7:00 - 7:59 PM	7:00 - 7:59 PM	
	20	8:00 - 8:59 PM	8:00 - 8:59 PM	
	21	9:00 - 9:59 PM	9:00 - 9:59 PM	
	22	10:00 -10:59 PM	10:00 -10:59 PM	
	23	11:00 -11:59 PM	11:00 -11:59 PM	
	99	UNKNOWN HOUR	UNKNOWN HOUR	

PENNSYLVANIA

REFNOVAL	CODEVALUE	SHORTTEXT	LONGTEXT	RELATEDCODE
0412	05	SPEED LIMIT 05	SPEED LIMIT 05	
	10	SPEED LIMIT 10	SPEED LIMIT 10	
	15	SPEED LIMIT 15	SPEED LIMIT 15	
	20	SPEED LIMIT 20	SPEED LIMIT 20	
	25	SPEED LIMIT 25	SPEED LIMIT 25	
	30	SPEED LIMIT 30	SPEED LIMIT 30	
	35	SPEED LIMIT 35	SPEED LIMIT 35	
	40	SPEED LIMIT 40	SPEED LIMIT 40	
	45	SPEED LIMIT 45	SPEED LIMIT 45	
	50	SPEED LIMIT 50	SPEED LIMIT 50	
	55	SPEED LIMIT 55	SPEED LIMIT 55	
	99	UNKNOWN SPEED LIMIT	UNKNOWN SPEED LIMIT	

Texas

TEXAS

VEHICLE MOVEMENTS/MANNER OF COLLISION, Columns 40-41

These columns show the manner of collision and vehicular movements in accidents involving collisions between two motor vehicles and vehicular movements in all other accidents.

TWO MOTOR VEHICLES APPROACHING AT AN ANGLE

10 - Both going straight
11 - #1 straight - #2 backing
12 - #1 straight - #2 stopped
13 - #1 straight - #2 right turn
14 - #1 straight - #2 left turn
15 - Both right turn
16 - #1 right turn - #2 left turn
17 - #1 right turn - #2 stopped
18 - Both left turn
19 - #1 left - #2 stopped

TWO MOTOR VEHICLES - GOING SAME DIRECTION

20 - Both going straight - rear end
21 - Both going straight - sideswipe
22 - #1 straight - #2 stopped
23 - #1 straight - #2 right turn
24 - #1 straight - #2 left turn
25 - Both right turn
26 - #1 right turn - #2 left turn
27 - #1 right turn - #2 stopped
28 - Both left turn
29 - #1 left turn - #2 stopped

TWO MOTOR VEHICLES - GOING OPPOSITE DIRECTIONS

30 - Both going straight
31 - #1 straight - #2 backing
32 - #1 straight - #2 stopped
33 - #1 straight - #2 right turn
34 - #1 straight - #2 left turn
35 - #1 backing - #2 stopped
36 - #1 right turn - #2 left turn
37 - #1 right turn - #2 stopped
38 - Both left turn
39 - #1 left turn - #2 stopped

TEXAS

WO MOTOR VEHICLES - OTHER

40 - #1 straight - #2 entering or leaving parking space
41 - #1 right turn - #2 entering or leaving parking space
42 - #1 left turn - #2 entering or leaving parking space
43 - #1 entering or leaving parking space - #2 stopped
44 - Both entering or leaving parking space
45 - Both vehicles backing
46 - All Others

Movement of vehicle in other than motor with motor accidents:

01 - Vehicle going straight
02 - Vehicle turning right
03 - Vehicle turning left
04 - Vehicle backing
05 - Other

TEXAS

OBJECT STRUCK, Columns 42-43

These columns used in conjunction with column 28 (First Harmful Event) and Columns 40-41 (Vehicle Movement/Manner of Collision) will give a more detailed picture of the accident. The code in columns 42-43 may indicate either the first or second impact or collision depending on the first harmful event. For example: If column 28 shows collision with a fixed object,then the codes in these columns would indicate the first impact. If column 28 shows collision between two motor vehicles, then these columns may indicate a second impact, or may be used to show vehicle movement or specifically:

00 - No code shown is applicable
01 - Vehicle overturned
02 - Vehicle hit hole in road
03 - Vehicle jack-knifed
04 - Person fell or jumped from vehicle
09 - Vehicle hit train on tracks parallel to road - no crossing
10 - Vehicle hit train moving forward
11 - Vehicle hit train backing
12 - Vehicle hit train standing still
13 - Vehicle hit train - action unknown
20 - Vehicle hit highway sign
21 - Vehicle hit curb
22 - Vehicle hit culvert - headwall
23 - Vehicle hit guardrail
24 - Vehicle hit railroad signal pole or post
25 - Vehicle hit railroad crossing gates
26 - Vehicle hit traffic signal pole or post
27 - Vehicle hit overhead (signal light, wires, signs, etc.)
28 - Vehicle hit work zone barricade, cones, signs or material
29 - Vehicle hit luminaire pole
30 - Vehicle hit utility pole
31 - Vehicle hit mailbox
32 - Vehicle hit tree or shrub
33 - Vehicle hit fence
34 - Vehicle hit house, building or building fixture
35 - Vehicle hit commercial sign
36 - Vehicle hit other fixed object
37 -
38 - Vehicle hit work zone machinery or stockpiled materials
39 - Vehicle hit median barrier
40 - Vehicle hit end of bridge (abutment or rail end)
41 - Vehicle hit side of bridge (bridge rail)
42 - Vehicle hit pier or support at underpass, tunnel or overhead sign bridge
43 - Vehicle hit top of underpass or tunnel
44 - Vehicle hit bridge crossing gate
45 - Vehicle hit attenuation device
46 - Vehicle hit by fallen/blowing rocks from a truck

TEXAS

50 - Vehicle hit fallen trees or debris on road
51 - Vehicle hit object from another vehicle in road
52 - Vehicle hit previously wrecked vehicle
53 -
54 - Vehicle hit other machinery
55 - Vehicle hit other object
56 - Vehicle hit concrete traffic barrier
57 - Vehicle hit deliniator or marker post
58 - Vehicle hit retaining wall
59 - Vehicle hit HOV lane gate
60 - Vehicle hit guard post
61 - Fire hydrant
62 - Ditch (long narrow excavation dug in earth)
63 - Embankment (a raised strip of land or berm)

OTHER FACTOR; Column 44-45

Code any factor in these columns applicable to either vehicle. If more than factor is applicable, code the one pertinent to the accident.

00 - No code shown is applicable
01 - Lost control or skidded (icy or slick road, etc.)
02 - Passenger interfered with driver
03 - Attention diverted from driving (Delayed perception or lack of alertness)
04 - Open door or object projecting from vehicle
05 - Foot slipped off clutch or brake
06 - Gusty winds
10 - Vehicle passing or attempting to pass on left
11 - Vehicle passing or attempting to pass on right
12 - Vehicle changing lanes
* 13 - One vehicle parked improper location
* 14 - One vehicle forward from parking
* 15 - One vehicle backward from parking
* 16 - One vehicle entering driveway
* 17 - One vehicle leaving driveway

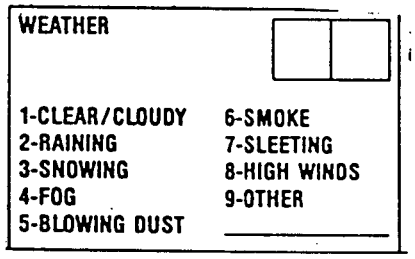
VISION OBSTRUCTED BY:

21 - Standing or parked vehicle
22 - Moving vehicle
23 - Embankment or ledge
24 - Commercial sign
25 - Highway sign
26 - Headlight or sun glare
27 - Hillcrest
28 - Trees, shrubs, weeds, etc.
29 - Other visual obstructions

TEXAS

TIME, Columns 25-26

00 - Midnight to 12:59AM
01 - 1:00 AM to 1:59 AM
02 - 2:00 AM to 2:59 AM
03 - 3:00 AM to 3:59 AM
04 - 4:00 AM to 4:59 AM
05 - 5:00 AM to 5:59 AM
06 - 6:00 AM to 6:59 AM
07 - 7:00 AM to 7:59 AM
08 - 8:00 AM to 8:59 AM
09 - 9:00 AM to 9:59 AM
10 - 10:00 AM to 10:59 AM
11 - 11:00 AM to 11:59 AM
12 - Noon to 12:59 PM
13 - 1:00 PM to 1:59 PM
14 - 2:00 PM to 2:59 PM
15 - 3:00 PM to 3:59 PM
16 - 4:00 PM to 4:59 PM
17 - 5:00 PM to 5:59 PM
18 - 6:00 PM to 6:59 PM
19 - 7:00 PM to 7:59 PM
20 - 8:00 PM to 8:59 PM
21 - 9:00 PM to 9:59 PM
22 - 10:00 PM to 10:59 PM
23 - 11:00 PM to 11:59 PM



WEATHER, Column 30

1 - Clear (cloudy)
2 - Raining
3 - Snowing
4 - Fog
5 - Blowing dust
6 - Smoke
7 - Other **ST-3 may indicate 9
8 - Sleeting **ST-3 may indicate 7

MOTOR VEHICLE TRAFFIC ACCIDENT CODING INSTRUCTIONS JANUARY 1, 1994

TEXAS DEPARTMENT OF PUBLIC SAFETY
TEXAS DEPARTMENT OF TRANSPORTATION

ST-101

TEXAS

DAMAGE SCALE, Columns 19-21 and Columns 57-59

The damage scale is designed to show damage to a passenger type (car or bus) or truck type vehicle and consists of 2 or 3 letters plus a number on the officers report. The letters will be entered in columns 19-20 and 57-58 as shown below. The number will be entered in column 21 and 59 as 0, 1-7 or + (unknown). When the damage scale is not applicable because of the type of vehicle (motorcycle, farm tractor, etc.) these columns will show "Not Applicable" (KK+). When the vehicle is of such type that a damage scale should be shown, but location and degree is unknown, these columns will show "Unknown" (JJ+). When the vehicle burns, NOT due to the collision, code VB1. (Engine catches fire, cigarette burns upholstery, etc.) When the vehicle burns, due to the collision, code VB7. (Vehicle collides with object or another vehicle and fire starts.) If the officer or driver indicates the vehicle was "Totalled", code VT-7. If top damage only is shown, code TP-0. If undercarriage damage is shown code VX-0.

OFFICER/CODE	OFFICER/CODE	OFFICER/CODE
FC - FC	BR - BR	RBQ - RB
FD - FD	LP - LP	LD - LD
FL - FL	RP - RP	RD - RD
FR - FR	LFQ - LF	L&T - LT
BC - BC	RFQ - RF	R&T - RT
BD - BD	LBQ - LB	Unknown - JJ
BL - BL		Not Applicable - KK

RST HARMFUL EVENT, Column 28

llision of a motor vehicle with:

1 - Pedestrian (4PED)
2 - Another motor vehicle in transport (4MVX)
3 - RR Train (4RRX)
4 - Parked car (4PKX)
5 - Pedalcyclist (4CYL)
6 - Animal (4ANX)
7 - Fixed Object (4FOX)
8 - Other Object (4OOX)

TEXAS

UNIT NO. 2 — MOTOR VEHICLE ☐ TRAIN ☐ PEDALCYCLIST ☐ TOWED ☐ PEDESTRIAN ☐ OTHER ☐ — VEH IDENT NO _____ — IF BODY STYLE = VAN OR BUS, INDICATE SEATING CAPACITY _____

YEAR MODEL _____ COLOR & MAKE _____ MODEL NAME _____ BODY STYLE _____ LICENSE PLATE _____ (YEAR / STATE / NUMBER)

DRIVER'S NAME _____ (LAST / FIRST / MIDDLE) ADDRESS _____ CITY _____ STATE _____ PHONE NUMBER _____

DRIVER'S LICENSE _____ (STATE / NUMBER / CLASS/TYPE) DOB _____ (MO / DAY / YEAR) RACE _____ SEX _____ OCCUPATION _____

VEHICLE MAKE OR MODEL, COLUMNS 12-14 & COLUMNS 50-52

@	448	ACURA INTEGRA
@	449	ACURA LEGEND
@	450	ACURA NSX
@@	474	ACURA VIGOR
###	393	ACURA NOT LISTED OR UNKNOWN
	001	ALFA ROMEO
	002	ALLIS CHAMLERS
	003	ALLSTATE
#	343	AMERICAN MOTORS ALLIANCE (RENAULT)
	004	AMERICAN MOTORS AMBASSADOR
**	274	AMERICAN MOTORS AMX
	005	AMERICAN MOTORS COMMANDO
*	223	AMERICAN MOTORS CONCORD
***	275	AMERICAN MOTORS EAGLE
@@@	497	AMERICAN MOTORS EAGLE VISION
#	344	AMERICAN MOTORS ENCORE (RENAULT)
#	345	AMERICAN MOTORS FUEGO (RENAULT)
	006	AMERICAN MOTORS GREMLIN
	007	AMERICAN MOTORS HORNET
	008	AMERICAN MOTORS JAVELIN
	009	AMERICAN MOTORS JEEP CHEROKEE
*	190	AMERICAN MOTORS JEEP J AND CJ SERIES
	010	AMERICAN MOTORS JEEP WAGONEER
	011	AMERICAN MOTORS JEEPSTER
	012	AMERICAN MOTORS MATADOR
####	398	AMERICAN MOTORS MEDALLION (RENAULT)
*	191	AMERICAN MOTORS PACER
######	418	AMERICAN MOTORS PREMIER (JEEP/EAGLE)
	013	AMERICAN MOTORS RAMBLER
***	298	AMERICAN MOTORS RENAULT 18i
**	267	AMERICAN MOTORS RENAULT GORDINI
**	268	AMERICAN MOTORS RENAULT LE CAR
**	244	AMERICAN MOTORS SPIRIT
#####	401	AMERICAN MOTORS SUMMIT (EAGLE)
######	419	AMERICAN MOTORS TALON (JEEP/EAGLE)
	014	AMERICAN MOTORS NOT LISTED OR UNKNOWN
**	245	ASTON MARTIN
	015	AUDI FOX

TEXAS

SEVERITY, Column 29

Coded in accordance with the highest degree of injury suffered in the accident:

1 - Incapacitating injury - not able to walk, drive, etc. (A)
2 - Nonincapacitating injury - bump on head, abrasions, minor lacerations (B)
3 - Possible injury - limping, complaint of pain (C)
4 - Fatal (F)
5 - Non-injury (P)

RIVER DEFECT, Columns 30 and 68

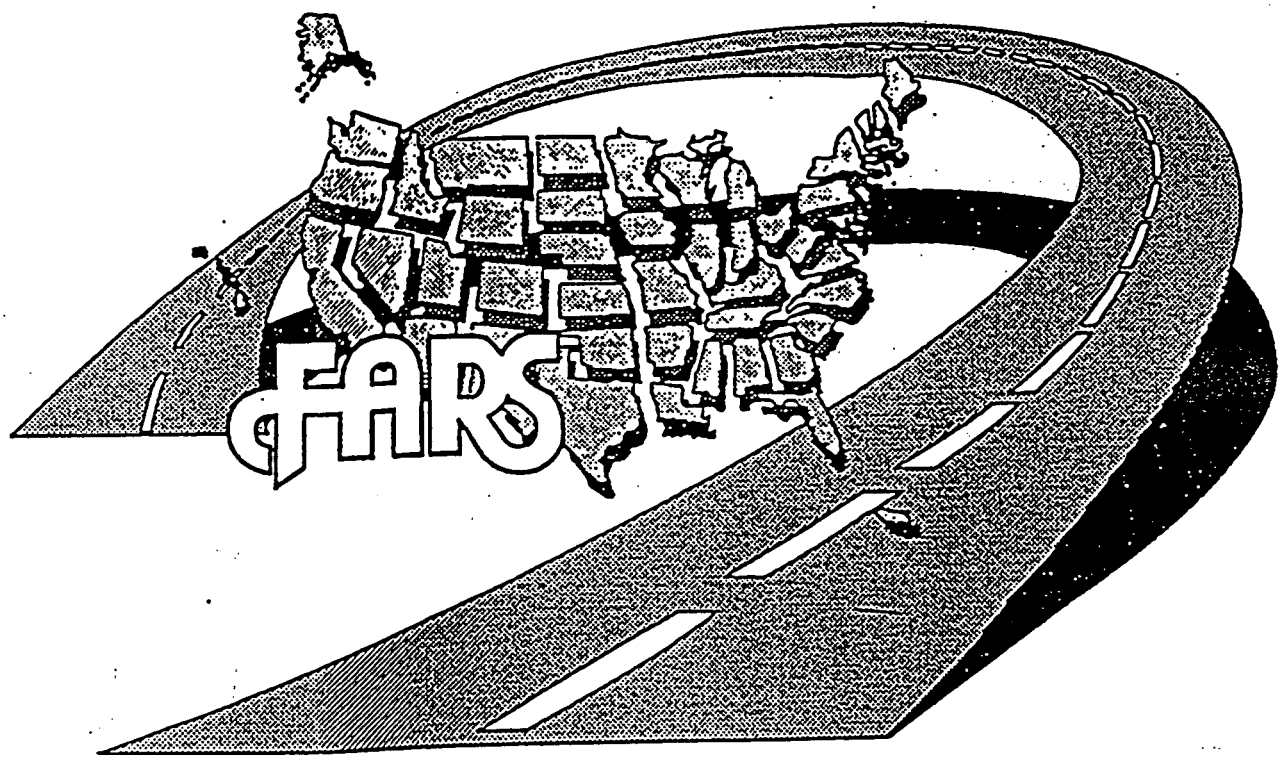
0 - No defects
1 - Eyesight defective
2 - Hearing defective
3 - Limbs missing
4 - Other physical defect
5 - Ill
6 - Fatigued or asleep
7 - Mentally defective
8 - Other handicap

PART OF BODY INJURED, Columns 38 and 76

This column must be coded for each driver of a passenger car, truck or bus who was killed and for each operator of a motorcycle, motorscooter or moped who was killed or injured. Otherwise leave blank. This column will indicate part of body receiving most severe injury.

0 - Not applicable
1 - Head
2 - Neck
3 - Trunk/torso (includes internal)
4 - Arms
5 - Legs
6 - Head and chest
7 - Multiple parts of body
8 - Head and neck
9 - Head and arms/legs
+ - Unknown

1994



Coding and Validation Manual

U.S. Department of Transportation
National Highway Traffic Safety Administration

FARS

FIRE OCCURRENCE

Format: 1 numeric

If coded 1, code cannot be changed.

Element Values:

Blank
0 No Fire
1 Fire Occurred in Vehicle During Accident

Remarks:

If it cannot be determined that a fire occurred in the vehicle during the accident, code 0-No Fire.

Consistency Checks:

	IF	THEN
(4Z0F)	1. MOST HARMFUL EVENT equals 02,	FIRE OCCURRENCE for this vehicle must equal 1 or blank.

Special Processing Rules:

(540F)	1. FIRST HARMFUL EVENT equals 02,	at least one vehicle must have FIRE OCCURRENCE equal to 1 or blank.

FARS

FIRST HARMFUL EVENT

Format: 2 numeric

Must be coded on an original submission
Must be blank on a change submission
May not be changed

Element Values:

Non-Collision

01 Overturn
02 Fire/Explosion*
03 Immersion
04 Gas Inhalation*
05 Fell/*Jumped* from Vehicle
06 Injured in Vehicle*
07 Other Non-Collision

16 Thrown or Falling Object

44 Pavement Surface Irregularity
(Pothole, Grooved, Grates)

Collision with Object Not Fixed

08 Pedestrian
09 Pedal cycle
10 Railway Train
11 Animal
12 Motor Vehicle in Transport
13 Motor Vehicle in Transport in Other Roadway
14 Parked Motor Vehicle
15 Other Type Non-Motorist

18 Other Object (not fixed)
45 Transport device used as equipment
* These values are unlikely occurrences and will raise an error flag.

FARS

MOST HARMFUL EVENT

Format: 2 numeric

Must be coded on an original submission
Must be blank on a change submission

Element Values:

Non-Collision

01 Overturn
02 Fire/Explosion
03 Immersion
04 Gas Inhalation*
05 Fell/*Jumped* from Vehicle
06 Injured in Vehicle
07 Other Non-Collision

16 Thrown or Falling Object

44 Pavement Surface Irregularity (Potholes, Grooved, Grates)

Collision with Object Not Fixed

08 Pedestrian
09 Pedal cycle
10 Railway Train
11 Animal
12 Motor Vehicle in Transport
13 Motor Vehicle in Transport in Other Roadway
14 Parked Motor Vehicle
15 Other Type Non-Motorist

18 Other Object (not fixed)
45 Transport Device Used as Equipment

Collision With Fixed Object

17 Boulder

*These values are unlikely occurrences and will raise an error flag.

NFIRS
national fire incident reporting system
HANDBOOK

VERSION IV, LAYOUT I
1/1/84
A product of The National Fire Information Council. (NFIC)
Sponsored by The U.S. Fire Administration, Federal Emergency Management Agency.

Type of Situation Found

NFIRS

Definition

A statement of the observed condition(s) when the first emergency unit arrived on the scene of the incident or the most serious condition that developed after arrival on the scene. An investigation may reveal that the situation at the scene changed from the time the alarm was given to the time the first emergency unit arrived. For example, a roast in the oven ignites, filling the house with smoke and causing a fire to be reported. Even though the lady of the house removed the roast from the house prior to the firefighters' arrival and there is no fire damage, a structural fire would be reported.

Purpose

This data element is used to identify the various types of incidents to which the fire department responds. The element can be used in analyzing the frequency of different types of fires, emergencies, and other problems that the fire department is called to attend in a community. The element is one of the most important items on the incident report as it identifies the specific type of incident.

Entry

Record the situation with which the fire department dealt upon arrival at the incident or the most serious condition that developed after arrival on the scene. Broad examples might include: a fire, overpressure rupture, rescue call, hazardous condition, service call, good intent call where the individual who made the call made an honest mistake, or a false call. However, be more explicit in stating the exact situation found. Indicate the type of fire or other incident condition in specific terms. Details of the change in situation after arrival on the scene should be included in the Remarks section. Note that the situation found is to be described as a "fire" if there is uncontrolled burning (combustion), regardless of whether there is any dollar loss. An entry is required for this element on all incidents.

Examples

A house fire.

TYPE OF SITUATION FOUND	TYPE OF ACTION TAKEN	MUTUAL AID
HOUSE FIRE		1☐RECD 2☐GIVEN

A false alarm at a nursing home because of alarm malfunction.

TYPE OF SITUATION FOUND	TYPE OF ACTION TAKEN	MUTUAL AID
ALARM MALFUNCTION		1☐RECD 2☐GIVEN

Codes • NFPA 1978

TYPE OF SITUATION FOUND

1. **Fire, Explosion**
   Included are fires out on arrival. Excluded are unauthorized burning (56) and controlled burning (63).

11. **Structure fire.**
    Included are any fires inside a building or structure whether or not there was structural damage to the building.

12. **Outside of structure fire** (not included in 13, 14, or 15 below). Included are yard storage, crops, and any fire outside a structure where the material burning has a value.
13. **Vehicle fire.**
14. **Trees, brush, grass fire.**
15. **Refuse fire.**
    Included are hostile fires outside a building where the material burning has no value.
16. **Explosion, no after-fire.**
17. **Outside spill, leak with ensuing fire.**
19. **Fire, Explosion not classified above.**
10. **Fire, Explosion; insufficient information available to classify further.**

Ignition Factor

NFIRS

Definition

The condition or situation that allowed the heat source and combustible material to combine to start a fire. For example, the ignition factor can be a deliberate act, a mechanical failure, or an act of nature.

Purpose

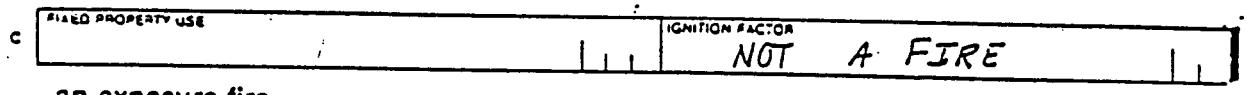
The ignition factor is crucial as a guide to fire prevention, because it can indicate whether the type of fire is potentially preventable by better education, inspections, investigations and prosecutions, or some other strategy. The ignition factor is also part of the description of the entire sequence which consists of of Area of Fire Origin, Equipment Involved In Ignition, Form of Heat of Ignition, and Type and Form of Material Ignited. The analysis of how these factors interact will provide valuable information on how the chain of events leading to ignition might best be broken.

Entry

Record the factor which best explains why the heat source and the material ignited were able to combine to initiate the fire. If the incident is a non-fire incident, leave blank.

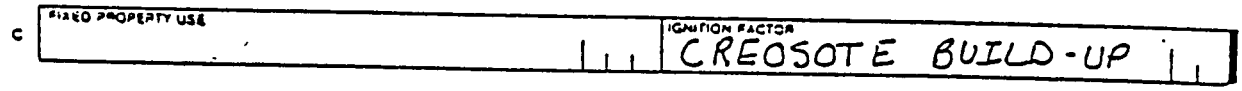
Examples

An emergency medical call.



an exposure fire

Failure to clean chimney



Codes • NFPA 1976

IGNITION FACTOR

1. **Incendiary**
   Legal decision or physical evidence indicates that the fire was deliberately set.
   - 11. Incendiary, not during civil disturbance.
   - 12. Incendiary, during civil disturbance.
2. **Suspicious**
   Circumstances indicate the possibility that the fire may have been deliberately set, multiple ignitions were found, or there were suspicious circumstances and no accidental or natural ignition factor could be found.
   - 21. Suspicious, not during civil disturbance.
   - 22. Suspicious, during civil disturbance.
3. **Misuse of Heat of Ignition**
   - 31. Abandoned, discarded material.
     Included are discarded cigarettes, cigars, and the like.
   - 32. Thawing.
   - 33. Falling asleep.
   - 34. Inadequate control of open fire.
     Included are smoking out animals.
   - 35. Cutting, welding too close to.
   - 36. Children with, child playing.
   - 37. Unconscious; mental, physical impairment; drug, alcohol stupor.
   - 39. Misuse of Heat of Ignition not classified above.
   - 30. Misuse of Heat of Ignition; insufficient information available to classify further.
4. **Misuse of Material Ignited**
   - 41. Fuel spilled, released accidentally.
   - 42. Improper fueling technique.

NFIRS

43. Flammable liquid used to kindle fire.
44. Washing part, cleaning, refinishing, painting.
45. Improper container.
46. Combustible too close to heat.
47. Improper storage.
48. Children with, child playing.
49. Misuse of Material Ignited not classified above.
40. Misuse of Material Ignited; insufficient information available to classify further.

5. Mechanical Failure, Malfunction
   51. Part failure, leak, break.
   52. Automatic control failure.
   Included are delayed ignitions of oil burners.
   53. Manual control failure.
   54. Short circuit, ground fault.
   55. Other electrical failure.
   56. Lack of maintenance, worn out.
   Included are failure to clean: grease or lint build-ups; chimneys or stove pipes.
   57. Backfire
   Included are ignitions outside the combustion chamber. Excluded are fires originating as a result of hot catalytic converters (61).
   59. Mechanical Failure, Malfunction not classified above.
   50. Mechanical Failure, Malfunction; insufficient information available to classify further.
6. Design, Construction, Installation Deficiency
   61. Design deficiency.
   Included are catalytic converters.
   62. Construction deficiency.
   63. Installed too close to combustibles.
   64. Other installation deficiency.
   65. Property too close to.
   Included are exposure fires.
   69. Design, Construction, Installation deficiency not classified above.
   60. Design, Construction, Installation deficiency; insufficient information available to classify further.
7. Operational Deficiency
   71. Collision, overturn, knockdown.
   72. Accidentally turned on, not turned off.
   73. Unattended.
   74. Overloaded
   75. Spontaneous heating.
   76. Improper startup, shutdown procedures.
   79. Operational Deficiency not classified above.
   70. Operational Deficiency; insufficient information available to classify further.
8. Natural Condition
   81. High wind.
   82. Earthquake.
   83. High water, including floods.
   84. Lightning.
   89. Natural Condition not classified above.
   80. Natural Condition; insufficient information available to classify further.
9. Other Ignition Factor
   91. Animal.
   92. Rekindled from a previous fire.
   99. Other Ignition Factor not classified above.
   00. Ignition Factor undertermined or not reported.

Coded Examples

An emergency medical call.

c | FIXED PROPERTY USE | | IGNITION FACTOR: NOT A FIRE | 00

An exposure fire.

c | FIXED PROPERTY USE | | IGNITION FACTOR: EXPOSURE FIRE | 65

Failure to clean chimney

c | FIXED PROPERTY USE | | IGNITION FACTOR: CREOSOTE BUILD-UP | 51

NFIRS

Mobile Property Type

This element provides a means to identify property which was designed to be movable, either under its own power or towed, whether in fact it still is moveable. Dumpsters (formerly 72) are no longer considered as Mobile Property.

Purpose

This element permits an analysis of the fire problem in vehicles and other mobile property. **Completing this entry also requires completing Line S.**

Entry

Enter a brief description of the mobile property and the proper code that best describes this property type. If no Mobile Property, enter n/a and Code '08'.

Examples

A fire in a mobile home.

COMPLEX	MOBILE PROPERTY TYPE
	MOBILE HOME

An automobile is involved in a fire.

COMPLEX	MOBILE PROPERTY TYPE
	AUTOMOBILE

No mobile property involved in a fire.

COMPLEX	MOBILE PROPERTY TYPE
	N/A

CODES • NFPA 1976

MOBILE PROPERTY USE

1. **PASSENGER ROAD TRANSPORT VEHICLES**
   Motor vehicles such as automobiles, buses, or mobile homes used primarily for transporting or housing people. Included are abandoned vehicles.
   - 11. **Automobile.** Included are taxicabs, limousines, race cars, and ambulances.
   - 12. **Bus, trackless trolley.** Included are school buses.
   - 13. **All terrain vehicles.** Included are motorcycles, golf carts, snowmobiles, and dune buggies.
   - 14. **Motor home.** A mobile unit containing its own motive power. Included are pickup truck mounted campers and bookmobiles.
   - 15. **Travel trailer.** A portable structure built or placed on a chassis and designed to be pulled by a vehicle.
   - 16. **Camping trailer.** A collapsible portable structure built on a chassis and designed to be pulled by a vehicle.
   - 17. **Mobile home, mobile building.** A structure built on a chassis and designed to be pulled by a vehicle to a semi-permanent site. Included are mobile classrooms, mobile banks, mobile office buildings, whether on wheels, off their wheels on jacks, or on a foundation.
   - 19. **Passenger Road Transport Vehicles not classified above.**
   - 10. **Passenger Road Transport Vehicles; insufficient information available to classify further.**
2. **FREIGHT ROAD TRANSPORT VEHICLES**
   Vehicles primarily for transporting goods. Included are abandoned vehicles. Excluded are materials handling equipment (63).

NFIRS

Area of Fire Origin

Definition

This data element specifically identifies the primary use of the area where the fire originated within the property. Previous data elements were concerned with the entire building or group of buildings (complex), and the portion of a complex having a fixed occupancy (fixed property use). The area of origin may be a room, an area or portion of a room, a vehicle or a portion of a vehicle or possibly some open area devoted to a specific use. For example, an office building may be the complex, a restaurant in that building the fixed property use, and the kitchen in that restaurant the area of origin. Every fire has an area of fire origin.

Purpose

This information when used with other causal factors describes the exact location and cause of the fire.

Entry

Enter a written description of the area of fire origin and the appropriate code number.

Examples

A fire started in the kitchen of a single family dwelling.

AREA OF FIRE ORIGIN	EQUIPMENT INVOLVED IN IGNITION
KITCHEN	

A fire starting in the bedroom closet of a home.

AREA OF FIRE ORIGIN	EQUIPMENT INVOLVED IN IGNITION
BED ROOM CLOSET	

A fire starting under the hood of an automobile.

AREA OF FIRE ORIGIN	EQUIPMENT INVOLVED IN IGNITION
ENGINE COMPARTMENT	

A fire starting in a vacant lot next to a dwelling.

AREA OF FIRE ORIGIN	EQUIPMENT INVOLVED IN IGNITION
VACANT LOT	

NFIRS

8. TRANSPORTATION, VEHICLE AREAS
   - 81. Passenger area of transportation equipment.
   - 82. Trunk, load carrying area of transportation equipment.
   - 83. Engine area, running gear, wheel area of transportation equipment.
   - 84. Fuel tank, fuel line area of transportation equipment.
   - 85. Operating, control area of transportation equipment.
     Included are the bridge of ships, cockpit of planes, cab of trucks, and the like.
   - 86. Exterior exposed surface of transportation equipment.
   - 89. Transportation, Vehicle Areas not classified above.

Type of Material Ignited

Definition

The composition of the material which was first ignited by the heat source. "Type of Material" refers to the raw, common, or natural state in which the material exists. The type of material ignited may be a gas, flammable liquid, chemical, plastic, wood, paper, fabric, or any number of other materials. The Type of Material and Form of Material should describe the same material. For example, the wood shingles on a roof would be: Type of Material, wood, (code 63) and Form of Material, roof covering.

Purpose

Knowing what type of material is first ignited is helpful in finding out why fires start. A study of this entry also assists in assessing the need for flammability standards and other materials standards. This information also can be helpful to manufacturers for product improvement.

Entry

Enter the exact type of material which was first ignited by the heat source. Assistance may be needed in identifying the specific material ignited. Be certain to enter the first material ignited: For example, if an arsonist ignites gasoline poured on a wooden floor, it is the gasoline and not the wood that is the material first ignited. If an insulated wire short-circuits, it may be the wire's insulation that is first ignited; on the other hand it may be the wood studs in the wall, thermal insulation nearby, or other material.

Examples

Kids ignite cotton curtains in a bedroom.

FORM OF HEAT OF IGNITION	TYPE OF MATERIAL IGNITED	FORM OF MATERIAL IGNITED
	COTTON CURTAINS	

A chimney fire ignited due to creosote build-up.

FORM OF HEAT OF IGNITION	TYPE OF MATERIAL IGNITED	FORM OF MATERIAL IGNITED
	CREOSOTE	

NFIRS

2. FLAMMABLE, COMBUSTIBLE LIQUID
Classification information is given in NFPA Nos. 321 and 325 M.

21. **Class IA flammable liquid.**
Flash point less than 73° F (22.8° C) and boiling point less than 100° F (37.8° C). Included are ethyl ether, pentane, and ethylene oxide.

22. **Class IB flammable liquid.**
Flashpoint less than 73° F (22.8° C) and boiling point at or above 100° F (37.8° C). Included are acetone, ethyl alcohol, JP-4 jet fuel, and methyl ethyl ketone. Excluded is gasoline (23).

23. **Gasoline.**

24. **Class IC flammable liquid.**
Flashpoint at or above 73° F (22.8° C) and below 100° F (37.8° C). Included are butyl alcohol, propyl alcohol, styrene, and turpentine.

25. **Class II combustible liquid.**
Flashpoint at or above 100° F (37.8° C) but less than 140° F (60° C). Included are kerosene, Nos. 1, 2, 4 and 5 fuel oil, and diesel fuel.

26. **Class IIIA combustible liquid.**
Flashpoint at or above 140° F (60° C) but less than 200° F (93.4° C). Included are No. 6 fuel oil, cottonseed oil, and creosote oil.

27. **Class IIIB combustible liquid.**
Flashpoint at or above 200° F (93.4° C). Included are cooking oil, transformer oil, and lubricating oil.

29. **Flammable, Combustible Liquid not classified above.**

20. **Flammable, Combustible Liquid; insufficient information available to classify further.**

3. VOLATILE SOLID, CHEMICAL
Volatile solids are materials with a melting point between 100° F and 200° F.

31. **Fat, grease (food).**
Included are butter, tallow, margarine, and lard.

32. **Grease (nonfood).**
Included are petroleum jellies.

33. **Polish.**
Included are paraffin and wax.

34. **Adhesive, resin, tar.**
Included are glue, gelatin, rosin, damas, elemi, kauri, asphalt, pitch, contact cement, soot, carbon and creosote.

35. **Applied paint, varnish.**

36. **Combustible metal.**
Included are magnesium, titanium, and zirconium.

37. **Solid chemical (specify type).**
Included are explosives. Excluded are liquid chemicals (division 2) and gaseous chemicals (division 1).

38. **Radioactive material.**

39. **Volatile Solid, Chemical not classified above.**

30. **Volatile Solid, Chemical; insufficient information available to classify further.**

4. PLASTIC
Included are all forms of plastic whether rigid, semi-rigid, flexible, or foamed.

41. **Polyurethane.**
Included are polyisocyanurates.

42. **Polystyrene.**
Included are styrene copolymers such as styrene-acrylonitrile (SAN), styrene-butadiene, and acrylonitrile-butadiene-styrene (ABS).

43. **Polyvinyl.**
Included are polyvinyl chloride (PVC), polyvinyl fluoride, polyvinylidene chloride, polyvinylidene fluoride, and vinyl chloride-acrylonitrile.

44. **Polyacrylic.**
Included is polymethyl methacrylate (PMMA).

45. **Polyester.**
Included are fiberglass reinforced polyesters.

46. **Polyolefin.**
Included are polyethylene and polypropylene.

49. **Plastic not classified above.**

40. **Plastic; insufficient information available to classify further.**

5. NATURAL PRODUCT

51. **Rubber.**
Included are synthetic rubbers.

52. **Cork.**

53. **Leather.**

NFIRS

If Mobile Property: Year, Make, Model, Serial Number, License Number

Definitions

a. "Mobile property" here refers to property that is designed and constructed to be mobile, movable under its own power, or towed; such as an airplane, automobile, boat, cargo trailer, farm vehicle, mobile home (even if placed on a permanent foundation), motorcycle, or recreation vehicle.

b. "Year" refers to the year the property was manufactured.

c. "Make refers to the name of the manufacturer of the property.

d. "Model" refers to the manufacturer's model name. If one does not exist, use the common physical description of the property which is commonly used to describe it, such as "three-bedroom" (mobile home) or "four dour" (sedan).

e. "Serial Number" refers to the manufacturer's serial number which is generally stamped on an identification plate on the property.

f. "License Number (if any)" refers to the state and number on the license plates affixed to the vehicle; these are generally issued by the State bureau of motor vehicles. License numbers may also be available for boats, airplanes, and farm vehicles.

Purpose

These data elements provide detailed information to identify the specific types of mobile property involved in an incident, and can be used to determine whether particular brands or models are more often a problem than others. Some mobile properties such as mobile homes, buses, and airplanes are supposed to comply with fire codes, standards, and/or Federal regulations. Data on make, model, year, and other information are useful in determining the compliance to standards of mobile properties involved in fires and for analyzing the effectiveness of these codes, standards, and regulations. The data also can be used to see if the public needs to be alerted to special hazards and if more regulation is needed.

Entry

Be as specific as possible in making these entries. Place additional information in the Remarks section if necessary.

Examples

	IF MOBILE PROPERTY	YEAR	MAKE	MODEL	SERIAL NO	LICENSE NO
S	NO MOBILE PROP					

	IF MOBILE PROPERTY	YEAR	MAKE	MODEL	SERIAL NO	LICENSE NO
S	AUTOMOBILE	1974	BUICK	2 DR. LA SABRE	1442137162	BGH 664