



DEVELOPMENT OF A CONCEPTUAL INTEGRATED TRAFFIC SAFETY PROBLEM IDENTIFICATION DATABASE

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13. ABSTRACT (Maximum 200 words) <p>The project conceptualized a traffic safety risk management information system and statistical database for improved problem-driver identification, countermeasure development, and resource allocation.</p> <p>The California Department of Motor Vehicles Driver License (DL) and Vehicle Registration (VR) database systems, the California Highway Patrol Statewide Integrated Traffic Records System (SWITRS), and the National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS) each provide valuable information on crashes in California for conducting problem identification analyses, developing and evaluating traffic safety programs, and allocating resources. The project explored these four primary systems and investigated several additional data sources suggested by the project advisory committee, including the California Department of Transportation Traffic Accident Surveillance and Analysis System, the Department of Health Services Hospital Discharge Database, and the Department of Justice Criminal Justice Information System.</p> <p>Based on a review of the existing systems and inputs from a project advisory committee of representatives of leading national and state traffic safety research interests, the department has decided to develop a prototype ITSPID system that would integrate the DL, VR, SWITRS, and FARS databases.</p>				
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PREFACE

This report is the final product of a project entitled *Development of a Conceptual Integrated Traffic Safety Problem Identification Database*. This project is part of the California Traffic Safety Program and was funded by the National Highway Traffic Safety Administration through the California Office of Traffic Safety (Engineering and Traffic Records, Traffic Records Project TR9902).

This report includes information and advice provided by many individuals. Although the author attempted to represent their inputs as accurately as possible, some details may not be fully presented or stated in the context or form originally provided. The opinions, findings, and conclusions expressed in this report are those of the author and not necessarily those of the State of California or the National Highway Traffic Safety Administration.

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Thanks are extended to representatives of the many data systems that were investigated during this project. Foremost are Gus Callao and Bev Christ of the California Highway Patrol (CHP) who produced Statewide Integrated Traffic Records System (SWITRS) datasets for the project, provided relevant documentation, and answered many questions about the system. Shell Culp of CHP invited the author to participate in the SWITRS redesign project, which provided much information of value to the Integrated Traffic Safety Problem Identification Database (ITSPID) project. Barry Eisemann of National Highway Traffic Safety Administration (NHTSA) provided information about the operations of the Fatality Analysis Reporting System (FARS). Michael Sowvlen of CHP spent several hours discussing the California FARS unit processes, providing much insight and helpful documentation.

Special thanks are given to several representatives of the Department of Motor Vehicles (DMV). Mike Gebers explained the details of DMV's Driver License (DL) automated record system. Len Marowitz, Patrice Rogers, and Helen Tashima also helped explain DL system components. Bart Furtado explained the mechanics of the department's Vehicle Registration (VR) automated record system. Chris Terwilliger supplied the VR file documentation, a data extract, and suggested additional reading on the VR system. Jan Ochida gave detailed explanations of the financial responsibility crash reporting system and the process for creating records for unlicensed drivers. Diana Lacroix explained DMV procedures for processing unlicensed drivers identified on CHP crash reports.

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The project was guided in part by an advisory committee of individuals selected to represent leading state and national traffic safety interests. Committee members are thanked for their generous and insightful responses in both project surveys: Craig Anderson and Phyllis Agran, University of California at Irvine, Health Policy and Research; Jesse Bhullar, California Department of Transportation; Ray Biancalana and Chris Murphy, California Office of Traffic Safety; Daniel Blower, University of Michigan, Transportation Research Institute; Mike Calvin, American Association of Motor Vehicle Administrators; Bev Christ, California Highway Patrol, Information Management; Craig A. Copelan, California Department of Transportation; Forrest Council, University of North Carolina, Highway Safety Research Center; Bernie Jones, Oregon Department of Transportation, Transportation Development; Bill Kennedy, Michigan Department of State; Jess F. Kraus, University of California at Los Angeles' Southern California Injury Prevention Research Center; Ed Milton, United States Department of Transportation, National Highway Traffic Safety Administration; Phil Salzberg, Washington State Traffic Safety Commission; Allan F. Williams, Insurance Institute for Highway Safety; and John J. Zogby, Transportation Safety, Policy and Management.

The study was conducted under the guidance of Robert Hagge, Research Manager in R&D's Research and Development Branch. The project was originally conceived

and generally directed by Raymond C. Peck, Chief of Research (retired), Department of Motor Vehicles. Mary Janke, Acting Chief of Research, reviewed and suggested edits to an early draft of this report. Mark Bertacchi of the Office of Traffic Safety was very helpful in guiding the project's grant process. Finally, appreciation goes to Debbie McKenzie, Associate Government Program Analyst, and Douglas Luong, Management Services Technician, of the DMV for their help in producing and distributing the surveys and project reports.

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EXECUTIVE SUMMARY

Background

California's high volume of drivers and vehicles and dependence on the automobile make traffic safety an important concern to the state. In 1998 1.5 million California drivers were involved in reported crashes resulting in 3,478 deaths and 291,731 injuries. During the same year, approximately 1 million drivers were under license suspension or revocation.

The only management information mechanism presently available in California to obtain both current driver record statistics and crash-risk indices is the Department of Motor Vehicles (DMV) Driver Record Study Database, which contains a one-percent longitudinal sample of driving history records extracted from the Driver License (DL) automated record system. This sample database does not include enough crash-event cases to adequately study very small subgroups of drivers.

The DL system provides driver population data that can be used by management and other decision-makers for identifying general safety problems and allocating resources. However, driver record data for specific driver groups (e.g., commercial drivers, motorcycle operators, handicapped drivers, young drivers, aged drivers, and drunk drivers) are not readily available from this system, and can only be obtained through expensive and complex data extraction and processing programs. Data that have been extracted from this system for past projects are usually very outdated and may not be in a form that makes them of much practical use in contemporary research projects.

California Highway Patrol's (CHP's) Statewide Integrated Traffic Records System (SWITRS) is a good source of data on fatal/injury crashes and provides annual statistics for some driver groups, but it does not contain information on each driver's prior driving record or license status.

National Highway Traffic Safety Administration's (NHTSA's) Fatality Analysis Reporting System (FARS) provides very detailed crash information but only on crashes involving fatalities. Like SWITRS, the FARS database contains data on the characteristics of all involved parties, vehicles, traffic conditions, and other variables

related to the crash. FARS also contains some information that is not available in SWITRS, such as driver license status.

DMV's Vehicle Registration (VR) system contains detailed data on all motor vehicles registered in the state, including information on registered- and legal-owners. The importance of vehicle information has increased greatly with the enactment of vehicle impoundment and forfeiture laws. Combining information on the characteristics of vehicles involved in crashes with information on the involved parties and traffic conditions would enable more comprehensive research to be conducted on the contributing causes of traffic crashes. Assessing the incidence of registered and non-insured vehicles in injury and fatal crashes would also be helpful in identifying traffic safety problems, developing countermeasures, and allocating resources.

Several other systems are known to contain relevant traffic safety information. Among them are the California Department of Transportation (CalTrans) Traffic Accident Surveillance and Analysis System (TASAS), the Department of Health Services (DHS) Hospital Discharge Database, emergency transportation and treatment databases, and Department of Justice (DOJ) files. All of these data sources were investigated during this project.

Combining data from SWITRS, FARS, the DL and VR systems, and possibly other traffic safety-related information sources into a single unified management information system would provide California with a rich and presently untapped resource for conducting problem-identification analyses, developing and evaluating traffic safety programs, and allocating resources. The integrated database would include all injury and non-injury police reported crashes contained in SWITRS, plus all self-reported crashes identified by DMV's financial responsibility reporting system that are not included in the SWITRS database. This increased crash volume would make possible the creation of problem identification indicators that would be much broader in scope and more accurate than those achievable from the smaller volume of crashes recorded in SWITRS (and FARS) alone. It is also envisioned that the ITSPID system would produce an annual report for California similar to the annual FARS report.

Three traffic safety information systems were considered as possible models for this project: FARS, the Federal Highway Administration Highway Safety Information System (HSIS) and the NHTSA Crash Outcome Data Evaluation System (CODES). Each of these systems was investigated during this project.

Methods

The project was guided by an advisory committee of representatives from national and state traffic safety and research organizations through two surveys. The first survey provided committee members with a description of the source data systems under consideration and obtained their input on the selection of data elements to include in ITSPID, how these data would be organized, and whether additional database systems should be explored for possible integration into ITSPID. The second survey summarized the results from the first survey, described the additional systems that were explored, described the two ITSPID designs that were selected for use in developing a prototype system, and questioned the committee regarding the likely utility, value, and user demand for each system design option.

For each source or model data system that was explored in this project, representatives were contacted, documentation was requested, and the processes used to extract and provide data were investigated. Extracts were requested and, if available, reviewed for content. Where possible, the data extracted from the different source systems were compared and investigated for common linkage identifiers. Data matching (linkage) rates between systems were calculated, and a description of the crash universe was created. The department's financial responsibility reporting system was also reviewed, and the crash data reported by that system were scrutinized and compared to data in SWITRS.

Results

The project originally proposed integrating data from the DL, VR, SWITRS, and FARS systems. Based on advice received from the advisory committee in the first survey, five additional systems were explored as possible sources of data that could be included in ITSPID.

All of the additional data systems recommended by the committee offered potentially useful information. Medical injury-recovery data and roadway data were considered as the top candidates for inclusion in ITSPID because of their

significance to policy-level decision making. Many of the data systems were found to have identifiers that would enable file information to be linked to ITSPID. The chief obstacles to linking to these systems are the additional resources that would be needed to collect, integrate, and maintain this additional information. The health and justice data systems were found to require very stringent approval processes for release of data, which would be a problem. The emergency treatment information system is under development and will not be implemented until at least year 2002.

The committee also recommended the FARS, HGIS, and CODES systems as models for the ITSPID project. Each of these systems were found to be very large projects employing several programming, research, and administrative staff devoted to data collection, linkage, storage, retrieval, and dissemination. In contrast, ITSPID as currently conceived would be significantly limited in the resources available to it, possibly employing only a single staff position.

Conclusions and Recommendations

Based on a review of the systems and inputs from the advisory committee, the department has decided to develop a prototype ITSPID system that will integrate data only from SWITRS, FARS, and the DL and VR systems. It has also been decided that the full contents and formats of the FARS and SWITRS files will be preserved in ITSPID so that responsibility for their accuracy, reliability, and documentation can be assumed by the administrators of those systems. Two versions of a prototype system will be developed. One will keep the four source data files separated but linked by a fifth file containing linkage identifiers and summary information. The other will interleave all five files into a single database.

OTS funding for the development of the prototype system has been requested as an extension (Stage II) of the current project.

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INTRODUCTION

Background

The Department of Motor Vehicles (DMV) Research and Development Branch (R&D) uses data from a variety of sources for its traffic safety research projects. These sources include the department's Driver License (DL) and Vehicle Registration (VR) automated record systems, California Highway Patrol's (CHP's) Statewide Integrated Traffic Records System (SWITRS), National Highway Traffic Safety Administration's (NHTSA's) Fatality Analysis Reporting System (FARS), and ad hoc sources including process-oriented datasets from DMV field offices, justice records from local courts, hospital patient records, and crash reports from other states.

The DL system is the primary data resource used by R&D for conducting traffic safety research. This database contains driving-history records for over 20 million drivers, including information on crash involvements, traffic law violations, licensing actions, and driver demographic characteristics. In addition to capturing data on selected drivers directly from the DL system, R&D occasionally extracts a 1% random sample of driver records from the system and stores them in an offline database for research purposes, such as developing longitudinal and cross-sectional profiles of the California driver population and high-risk driver groups. The branch has also developed several computer software programs that process data extracted from the DL system into a format that makes them useful for traffic safety research studies. For example, the software programs create counts of crashes, citations, and other driving incidents occurring within specified time periods for use in risk modeling and program impact studies.

The VR system contains detailed data on all motor vehicles registered in the state, including information on registered- and legal-owners. The importance of vehicle information has increased greatly with the enactment of vehicle impoundment and forfeiture laws. As noted in a recent paper by Simon (*Is license plate impoundment easier, faster and just as effective as vehicle impoundment?* Transportation Research Board, Session 314, January 1997), the incidence of driving unregistered vehicles is increasing, particularly among high-risk drivers. Combining information on the characteristics of vehicles involved in crashes (e.g., body type,

weight, and model year) with information on the involved parties and traffic conditions would enable more comprehensive research to be conducted on the contributing causes of crashes. Assessing the incidence of unregistered and uninsured vehicles in injury and fatal crashes would also be helpful in identifying problems, developing countermeasures, and allocating resources.

SWITRS contains records on all CHP-reported fatal and injury crashes in California. The system stores information on all parties involved in the crash, the severity of injuries, the use or non-use of restraints and safety equipment, the date and time of the crash, whether alcohol or drugs were involved, and other data useful to traffic safety research. R&D relies heavily on SWITRS data for many of its studies. In the past R&D would typically request CHP to make a special extraction from SWITRS to capture the data needed from this system. These requests require special programming by CHP that can delay DMV from getting the data for several weeks. More recently, however, R&D has been requesting the entire SWITRS file for selected years and writing its own computer programs to obtain the needed data more quickly.

FARS provides information on fatal crashes occurring throughout the nation. Like SWITRS, it contains detailed data on characteristics of all involved parties, vehicles, traffic conditions, and other variables related to the crash. Although the annual national report produced by FARS contains limited information for individual states, the system makes available a separate data file that can be accessed by requesters who wish to generate more in-depth statistics and data at the state level.

An example of a federally funded project involving the linkage of data from multiple data sources is the Crash Outcome Data Evaluation System (CODES) project, which evolved from the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA). The ISTEA legislation mandated NHTSA to prepare a report to Congress evaluating the benefits of using safety belts and motorcycle helmets. To obtain the crash and bodily injury criterion measures for the study, NHTSA sponsored the CODES project, awarding grants to Hawaii, Maine, Missouri, New York, Pennsylvania, Utah, and Wisconsin. Each grantee linked available crash, hospital emergency, hospital discharge, insurance, and other records related to traffic crashes occurring in their state. The project demonstrated that use of the integrated data system resulted in more useful information being available at a lower cost and

with less delay than would normally be the case when capturing data from each source separately.

Problem Statement

A primary function of R&D is to provide information to departmental management for identifying safety problems and allocating resources. The DL masterfile provides a wealth of driver information for this purpose. However, driver record data on specific driver groups (e.g., commercial drivers, motorcycle operators, low-vision drivers, young drivers, elderly drivers, and drunk drivers) are not readily available from this system and can only be obtained through complex programming and extraction processes that are very expensive and time consuming. Such data often come from driver record samples that were originally selected for purposes other than those of the current application and are usually several years old. Studies using such data often must, out of practical necessity, imitate the design characteristics of the predecessor project, which in many instances are not adequate. Another limitation of the DL record system is that it provides a restricted view of crash events. For example, it does not contain information on the characteristics of involved vehicles nor on environmental and ecological factors such as traffic and road conditions and geographical location.

CHP provides annual statistics for some driver subgroups, but this information is confined to fatal and injury crash data it collects or that are reported to it by local allied law enforcement agencies. An additional limitation of SWITRS is that it does not contain information on each driver's prior driving record or license status.

Solution Statement

This project investigated the possibility of integrating available California and national traffic crash data resources into a single unified information system that will support crash analysis, driver risk modeling, and program evaluation studies. The proposed system would include data from the department's DL and VR master record files, SWITRS, and FARS. The project also explored the possibility of establishing linkages with several other databases including the California Office of Statewide Health Planning and Development's Hospital Discharge database and the California Department of Transportation's Traffic Accident Surveillance and Analysis System. The project as originally proposed was also to include an evaluation of the feasibility of establishing a central record system for identifying all

impounded and forfeited vehicles, but this effort was discontinued because it will be undertaken as part of a separate Office of Traffic Safety project that is being proposed by R&D, *Feasibility of a Statewide Vehicle Impoundment Database* (2000 OTS project number TR0007).

The proposed system, to be named the Integrated Traffic Safety Problem Identification Database (ITSPID), would provide a wide array of data from historically disjointed systems for conducting comprehensive problem identification analyses, pinpointing targets of opportunity for developing risk countermeasures, and deciding how resources will be allocated. In California, prospective users would include DMV, OTS, CHP, University of California researchers, and insurance companies among others. In addition, it is envisioned that the system would make possible the production of an annual report for California, similar to NHTSA's FARS report and CHP's *Annual Report of Fatal and Injury Motor Vehicle Traffic Crashes*.

This project represents the first of three planned stages to conceptualize and develop an ITSPID system. The second stage would involve collecting a full year of data from each source database, creating linkage records for matching the data between systems, and producing mock-up reports to be generated by ITSPID. The final operational ITSPID system would be developed in the third stage.

Project Goal and Objectives

The degree to which the purposes of this project are achieved are evidenced by how well the project goal and objectives were met. The project goal and each objective are presented.

Project goal. To develop a conceptual model of a risk management information system and statistical database for improved problem driver identification, countermeasure development, and resource allocation.

Project objectives. Project objectives are the steps that need to be taken to meet the project goal. For this project, the objectives were to:

1. Identify the major potential end users of the system.

2. Determine the data needs of potential end users.
3. Identify available data sources and evaluate the suitability of the data and the feasibility of obtaining and using data from each source.
4. Determine the data elements to be contained in the system.
5. Determine the general system configuration (data and reporting structures, indexing methods, etc.).
6. Determine the general data processing requirements for data linkages, data structuring, and other system functions.
7. Evaluate end-user acceptability of the proposed data elements and system design.
8. Identify the task-flow schedule and resource requirements necessary to implement a prototype of the conceptualized system.
9. Prepare a report documenting the work products completed pursuant to project objectives and recommending whether to further develop and implement a prototype of the conceptualized system.
10. Fax to OTS, at least 2 weeks in advance, a short description of any new traffic safety event or program related to the project; addressing the FAX to the OTS public information officer and OTS program coordinator.
11. Perform all activities outlined in the "Method of Procedure" in accordance with the project agreement.
12. Ensure the project is cost effective.

Operational Phases

This project involved the following five phases:

Phase I – Determine data needs, identify data sources, and determine database contents. A sample of major public and private traffic safety research organizations, traffic safety program administrators, and other likely primary end users of ITSPID was surveyed to determine what types and formats of data would be of value to them. Each survey participant (i.e., advisory committee member) was sent a list of data elements currently available from SWITRS, FARS, and the department's DL and VR files and asked to rate the potential usefulness of the data items and to identify any additional information that they would like to have included in the system.

This phase of the project also included a search for additional existing data sources (hospital record systems, census data, transportation databases, etc.) that might help meet or supplement user information needs identified in the survey.

A final list of data elements to be included in the system was developed based on a consideration of identified user needs, available data sources, and the suitability of data from each source.

Phase II – Determine system configuration and data processing requirements. Alternative system configurations and data structures were considered, and an optimal solution was selected for further development. In addition, a determination was made of the requirements and computer software tools for processing (matching, cleaning, formatting, etc.) the data elements extracted from the various source databases, creating the desired file configuration, generating output reports, and performing other system functions. Input from data processing experts involved with the model data systems was solicited during this phase of the project. It is emphasized that the work product was to be a conceptualization of the system design and processing requirements and not the computer programs that would be necessary to actually create and maintain the system.

Phase III – Evaluate user acceptability of proposed system. The members of the advisory committee were sent a final list of data elements to be included in the system and an outline of the proposed system design emanating from Phase II of this project. Each participant was asked to evaluate the potential usefulness of the system to themselves and others involved in traffic safety programs and research,

and to give their opinion on which configuration would best meet their information needs.

Phase IV – Develop system implementation schedule. The tasks that would be necessary to actually design, create, implement, debug, and evaluate a prototype of the conceptualized system were determined and put into a time schedule. The personnel, hardware, and software resources that would be necessary to put the prototype system into operation and to produce report prototypes, and the funding required to implement these downstream tasks, were also determined during this phase of the project.

Phase V – Report preparation. A final report (this one) was produced that documents the work products completed during Phases I - IV of the project. The report contains conclusions and recommends the development and testing of a prototype ITSPID system.

METHODS

Advisory Committee

An advisory committee was formed consisting of representatives from a wide variety of national and state traffic safety research interests. An initial list of 350 potential end-users was compiled from a Traffic Safety Research Board membership list, research bibliographies, DMV mailing lists, a California traffic safety researcher list developed for an earlier study, and personal contacts of the department's Research Chief (Raymond C. Peck). From this initial candidate pool, 15 individuals were selected and accepted an invitation to be part of the ITSPID advisory committee. These individuals represented the following transportation and safety research organizations:

- American Association of Motor Vehicle Administrators
- California Department of Transportation
- California Highway Patrol
- California Office of Traffic Safety
- Health Policy and Research, University of California at Irvine
- Highway Safety Research Center, University of North Carolina
- Insurance Institute for Highway Safety
- National Highway Traffic Safety Administration, United States Department of Transportation
- Oregon Department of Transportation
- Southern California Injury Prevention Research Center, University of California at Los Angeles
- Traffic Safety and Research, Office of Planning and Policy, Michigan Department of State
- Transportation Research Institute, University of Michigan
- Transportation Safety Policy and Management, Pennsylvania
- Washington State Traffic Safety Commission

Two surveys of the advisory committee were made to guide the project. The responses were used to identify and choose existing systems to use as models for the project, to choose source data systems for exploration, to develop alternative system designs, to estimate the effort in manpower and funds that would be required for

different ITSPID designs, to choose software and hardware platforms that would integrate well with existing methodologies, and to rate the relative value of the alternative system designs under consideration.

First Survey

The first survey presented advisory committee members with a description of the source data systems under consideration, and asked them to rate the value of the separate data elements and identify additional data sources they believed should be explored. The full text of the survey is presented in Appendix A. The survey had the following five parts.

Part I, *Determining Data Usefulness*, requested respondents to assess the traffic safety research value of data elements from the DL, VR, SWITRS, and FARS systems, and to describe how any of the elements might be recombined or modified to be of greater research value.

Part II, *Organization of Accident Data*, described a proposed categorization of the data elements into a logical framework corresponding to crash event, location, participants, injuries, and vehicles. The committee members were asked to judge the usefulness of this ITSPID data structure and were asked to describe alternative formats that they thought might be better.

Part III, *Other Data Items and Systems*, explored data elements and systems outside of the original four proposed systems (DL, VR, SWITRS, and FARS). Respondents were asked if they knew of other sources of the listed data elements or of additional data resources.

Part IV, *Utility and Value*, investigated possible applications of the ITSPID database and the value of such a system. Respondents were asked whether the proposed integrated database would be of substantially greater value than individual existing systems, and also to comment on the increased utility and value an integrated system might provide.

Part V, *Comments*, requested additional insights or opinions regarding the project.

Second Survey

The second survey presented advisory committee members with the results of the first survey, a proposed set of data elements to be included in ITSPID, and two alternative ITSPID designs, and then questioned them about the usefulness of the proposed data and system designs. The survey had the following three parts.

Part I, *Summary of First Survey*, presented the committee's earlier inputs on the usefulness of data elements, other data items and systems that should be explored in the project, organization of data in ITSPID, and the likely utility and value of the system.

Part II, *Proposed Initial System Design*, presented the committee members with two proposed ITSPID system designs. This presentation included a description of the data contents, file structure, and collision case-matching identifiers for each design option.

Part III, *Survey Questions*, asked respondents to give their preferences between the two ITSPID design options and to estimate the likely value of each system alternative to themselves and other traffic safety interests. The committee members were also asked what time period for counting prior driver collisions and citations would best meet their needs.

Investigation of Additional Data Sources

The project originally proposed to integrate data from the DL, VR, SWITRS and FARS systems. Based on the advice of committee members in the first survey, it was decided to explore several additional systems as possible data sources. Representatives of these systems were contacted, documentation was collected, data extracts were requested if the data were readily available, and any captured data were explored to find possible linkages between the systems. These systems are listed below.

- California Department of Transportation Traffic Accident Surveillance and Analysis System (TASAS) was considered for roadway segment data related to crash events.

- RL Polk VIN decoding information was investigated as part of the project in an effort to understand vehicle data.
- Office of Statewide Health Planning and Development Hospital Discharge Database was explored for inpatient care data related to traffic crash injuries.
- Office of Statewide Health Planning and Development Emergency Care Database was explored for emergency treatment data related to traffic crash injuries.
- Department of Health Services Emergency Medical Services Authority was contacted for information regarding emergency care delivered at the collision scene and emergency transportation to medical care providers.
- Department of Justice Monthly Arrest and Citation Register was considered for citation and arrest data relating to motor vehicle operation.

Investigation of Model Data Systems

Three data systems were considered as possible models for the ITSPID project: FARS, the Federal Highway Administration's Highway Safety Information System (HSIS), and CODES. (CODES is not really an information system per se but was explored anyway because it uses probabilistic matching methods for combining data across source systems, which has possible application to ITSPID.) These model systems were investigated to learn about their methods of data collection, transfer, storage, documentation, extraction, and delivery and the possible use of these in the ITSPID system.

RESULTS

First Survey

Part I - Data usefulness. The advisory committee members were asked to assess the potential usefulness of data elements from SWITRS, FARS, DL, and VR automated systems. All 15 responded, and most said that the majority of data elements would be useful for traffic safety research and policy evaluation, each emphasizing their particular research interests. Some respondents questioned the accuracy and reporting consistency of certain data items, and others said they wanted data in greater detail than offered by SWITRS and in some cases even by FARS.

Part II - Organization of collision data. Two respondents suggested structuring ITSPID like FARS, using separate data tables with linkage identifiers. Two others recommended organizing data in ITSPID along the same dimensions used in injury-collision epidemiology as represented by the Haddon Matrix, which in some ways is similar to how data are organized in FARS and SWITRS. An example application of the Haddon Matrix for organizing data related to a crash event is shown in Table 1.

Table 1

Example Haddon Matrix for a Crash Event

Referent	Human factors	Vehicle or agent	Physical environment	Socio-cultural environment
Pre-event	Alcohol	Speed	Visibility	Attitudes
Event	Inattention	Mass	Roadway	Laws
Post-event	Recovery	Salvage	EMS time	Driver controls

None of the respondents recommended particular system architectures or processing platforms beyond making general reference to methods used in FARS or HSIS, which contains a standardized set of eight yearly statewide combined roadway and collision datasets. Both HSIS and FARS were found to use combinations of flat-

files, SAS files, and relational databases during different stages of each system. (A flat-file is defined here as a standard ASCII, EBCDIC, or similarly formatted electronic file containing raw data accessible by common computer language input formats.) In the CODES project, participating states were found to use whatever resources were available, which included these three storage methods. In addition, the HSIS, FARS, and CODES systems were found to use several other application packages and programming languages including structured query language (SQL) for data retrieval and file transfer protocol (FTP) for transmission of data files.

Part III - Other data items and systems. Most of the committee members recommended that ITSPID include information from systems other than the SWITRS, FARS, DL, and VR databases. These included the roadway design, emergency response, emergency treatment, and hospital treatment data systems listed above. Some members recommended the use of existing VIN-decoding tables to capture relevant vehicle information. Several respondents also identified systems and standards that might be used as models for the development and implementation of ITSPID. Their suggestions included HSIS, CODES, and the crash data standards Model Minimum Uniform Crash Criteria (MMUCC) created during the development of CODES. All of these systems were subsequently investigated and the results are presented below.

Part IV - Utility and value. All but one respondent commented on the broad potential applications of ITSPID. Policy studies, program evaluation, and problem identification were all mentioned, and repeated references were made to human factors study in roadway, injury recovery, and injury cost research. Committee members also expressed concern regarding authority to collect and release data, ensuring appropriate use of the information, system cost, and human resource requirements. These concerns were addressed as each system was investigated and are discussed below in the section for each system.

Part V - Comments. Committee members shared insights regarding their particular research interests and the data systems of use in their research. Roadway, emergency response, and medical treatment data were discussed and suggested for inclusion in ITSPID.

Review of Source Data Systems

Driver License System. The DL system collects licensing information on over 20 million drivers and stores it in an on-line mainframe database at the Stephen P. Teale Data Center in Sacramento. Traffic violation and collision data are stored in subrecords that are indexed to the case record by use of the driver license number. The driving history information is retained for a minimum of 39 months, and may be kept longer depending on the type of collision or violation and the current retention policy.

The DL system contains information on individual driver characteristics, 3-year prior collision involvements and traffic law violations, licensing and control actions, and other information. Elements of primary interest include license renewal date, license class, age, sex, residence address, citations, driver-reported collisions, police-reported (SWITRS) collisions, a unique collision event identifier, vehicle plate number of the vehicle driven by the licensee, collision date and time, counts of injuries and fatalities, license probations, suspensions, and revocations, driving restrictions, negligent-operator point count, and physical and mental condition type indicators. A full list of the data elements available in the DL system is presented in Appendix B.

The collision data in the DL system come from SWITRS and/or collision reports submitted by crash-involved drivers. SWITRS crash data are merged into the DL database on a regular basis. Crash data reported by drivers themselves—as required by California law for all collisions involving a fatality, a personal injury, or over \$500 in property damage—are submitted on an SR-1 form to the Financial Responsibility (FR) unit at DMV headquarters. Data from SWITRS and FR collision reports pertaining to the same collision are combined in the DL system, but these crash cases (reported from both sources) account for only about 20% of the known collision universe. Of the unmatched collision reports (crashes reported from only one source), half are from SWITRS and half are from the FR system.

Drivers who do not report a collision of the type required by law on an SR1 form face license suspension. To identify non-reporters, DMV cross-references SR1 reports with the driving records of all parties identified on the form, but does not use the SWITRS system data for this purpose. Thus, if none of the drivers in a

SWITRS crash report submit an SR1 form, the noncompliance with the FR reporting requirement would go undetected by the department.

In summary, a large proportion of FR collisions are not reported through SWITRS and conversely a large proportion of SWITRS collisions are not self-reported in the FR system. Thus both systems contain incomplete crash data and are subject to reporting bias. By combining reports from the two systems, a much more complete picture of the total crash universe can be achieved.

Vehicle Registration System. The VR system collects information on over 27 million private and commercial vehicles and trailers from DMV field offices and by mail or electronically. In year 2000, DMV is expected to begin vehicle registration transactions on the Internet, which will enable the mainframe system to be updated more quickly. VR data are stored as subrecords that are indexed to the case by the vehicle license plate number. The vehicle identification number (VIN), as well as the registered owner name and legal owner name, are also used to identify vehicle records in the VR system. The VR system can be accessed on a case-by-case basis directly through either mainframe and network software look-up and data-entry applications or through batch file extracts.

While the VR system does not store collision data other than salvage information, it does contain other important information that is not available in the DL, SWITRS, and FARS systems. For example it contains the VIN, which can be used to obtain several descriptive elements for each vehicle. (VIN-decoding software developed by RL Polk can be used to determine body type, model, and other vehicle characteristics from the VIN.) The odometer reading and purchase price at time of most recent sale is also stored. Other elements of interest include vehicle registration date, payment status, registered and legal owners and addresses, vehicle plate number, model year, model make, and body type. For commercial vehicles the elements include cylinders, fuel type, number of axles, and unladen weight. A full list of the standard elements extracted from the VR system is in Appendix C.

SWITRS. This system contains data from police reports on crashes in California that involve death, injury, major property damage, or blocking of roadways, or that are considered hazardous or important for some other reason. CHP and local-allied policing agencies report collisions on a standardized Traffic Collision 555 report, and

also on supplemental reports for commercial vehicles. The 555 report contains information on the collision, involved parties, and the victims. CHP collects selected data elements from the report, CalTrans adds roadway information including the sequence of collision events, and portions of the information are then input to SWITRS and subsequently merged to TASAS and the DL system.

SWITRS contains four levels of information: collision, party, victim, and roadway. The collision-level record contains date, time, location, road surface and conditions, direction of travel, intersection and ramp description, number of lanes, presence of road dividers, light and weather conditions, signal control devices, violation category, first collision object, collision type, pedestrian action, and a hit-and-run indicator.

The party-level record contains vehicle plate number, age, sex, fault, injury severity, sobriety, other impairments, violation category, type of vehicle movement prior to collision, contributing factors, vehicle direction of travel, vehicle make, vehicle year, towed vehicle information for vehicles with trailers, number killed, number injured, and indicators for hazardous materials, tire failure, and car fire.

The victim-level record contains seating position/pedestrian indicator, sex, age, injury, ejection, and safety equipment.

The roadway-level record contains data added by CalTrans: party, movement preceding, direction of travel, collision objects, and road areas. Many of the SWITRS roadway data elements provided by CalTrans are contained only in specially created SWITRS system files, and are not available on the SWITRS files that are normally distributed. A list of data elements contained in the standard distributed SWITRS dataset is presented in Appendix D.

FARS. This systems contains highly detailed information on fatal collisions occurring in California and other states. FARS collects information similar to that available in SWITRS, although it is more detailed and thoroughly investigated. The collision-level record reports data on the roadway and the nature of the collision. The vehicle record contains vehicle information including enhanced vehicle type data, speed at impact, and extent of vehicle body deformation. The driver record has historical information including licensing, collisions, and

convictions spanning 3 years before the crash. Unlike SWITRS, FARS has person-level data for all involved vehicle occupants. FARS also has more detailed data on safety equipment, injury, and seating position than does SWITRS.

Another difference is that FARS has data for all occupants involved in the crash, while SWITRS frequently does not have victim segments for non-injured occupants. Because both systems carry minimal victim characteristics, victims cannot be uniquely identified between the two systems. This problem is heightened in certain collision profiles, such as fatal collisions involving teenage drivers where occupants often are the same age and gender.

The collision-level elements in FARS include crash location, date, time, roadway type, special jurisdiction (military base, Indian reservation, etc.), first harmful event, manner of collision, junction area, road area, lanes, road division, speed limit, road alignment (curvature), road profile (grade, hillcrest, etc.), road surface and condition, hit-and-run, light and weather conditions, construction zone information, a school bus-related indicator, and a rail-crossing indicator.

The vehicle-level elements include number of occupants, vehicle make, vehicle model, body type, model year, VIN, registration state, registered owner, rollover, jackknife, speed, hazardous cargo, heavy vehicle configuration, axles, cargo body type, special vehicle, emergency vehicle, initial impact point, vehicle body deformation, role of vehicle in collision, manner in which vehicle left scene, occurrence of fire, vehicle-related factors (defective equipment, etc.), prior vehicle maneuver, crash avoidance maneuver, and most harmful event.

The driver-level data elements include license state, non-CDL license status, commercial vehicle license status, compliance with license endorsements, compliance with license type, compliance with license restrictions, violations charged, driver-level counters (prior citations, collisions, etc.), dates of first and last collisions, whether license privileges are suspended, driver ZIP Code, physical/mental conditions, and miscellaneous factors.

Person-level data are collected for all occupants, drivers, and non-motorists involved in the crash. The elements include vehicle striking non-motorist victim, age, sex, person type, seating position, use of restraint, air-bag availability/function,

ejection, ejection path, extrication, non-motorist location, police-reported alcohol involvement, method of alcohol determination (by police), alcohol test result, police-reported other drug involvement, method of other drug determination by police, drug test type, drug test results, injury severity, whether taken to hospital or treatment facility, death date, death time, death certificate number, and indicator of fatal injury while at work. A full list of the FARS standard file elements is presented in Appendix E.

Review of Secondary Data Systems

Several additional data systems were explored during the project. The California Department of Transportation Traffic Accident Surveillance and Analysis System (TASAS) was considered for roadway segment data related to crash events. Information on the composition of the VIN was collected from DMV staff and from RL Polk Inc. The information carried within a VIN was found to be used by both the VR system and FARS. The Office of Statewide Health Planning and Development Hospital Discharge Database (OSHPD HDD) was explored for inpatient care data related to traffic crash injuries. The planned OSHPD Emergency Care Database (ECD) was explored for emergency treatment data on crash injuries. The Department of Health Services Emergency Medical Services Authority (DHS EMSA) was contacted for information regarding emergency care delivered at the collision scene and emergency transportation to medical care providers. Department of Justice Criminal Justice Information System (CJIS) and Monthly Arrest and Citation Register (MACR) were considered for citation and arrest data relating to motor vehicle operation. What was learned in the review of each of these systems is described below.

Department of Transportation TASAS. This system combines roadway information describing state route segments indexed by post-mile location and a historical count of police-reported collisions for each corresponding segment. Currently, there are approximately 4,200 route segments dividing 15,000 miles of roadway. About 35% of collisions in SWITRS are on state routes, and 79% of these are reported by CHP. CalTrans assigns a risk level to each roadway segment based on the historical number of collisions occurring on a segment, the traffic volume, and the segment's roadway characteristics. (CHP creates a related report for local agencies that summarizes collision frequencies by surface-street intersection.) Roadways are

added to this database as they are created or realigned. TASAS maintains a 10-year, 1.6-million record history of collisions and roadways information.

TASAS contains detailed roadway segment data including average traffic flow, number of lanes, design speed, grade type, terrain, and crash rates for all state route highways and intersections. These data are combined with collision data in the TASAS system. The federal HSIS captures and disseminates the TASAS information and similar data from seven other states.

VIN tables. The VIN identifies vehicle characteristics such as weight, original value, wheel base, engine size, and other collision-relevant information. The DMV VR system automatically decodes the VIN using annually updated lookup tables and stores the decoded information on the VR system. FARS analysts use VIN lookup software (PC VINA, RL Polk VIN identifier, and Code Assist) to complete the vehicle-level sections of FARS reports.

OSHPD Hospital Discharge Database (HDD). The HDD system records the reason for each inpatient stay as an event code (E-code). This code indicates which inpatient injuries were caused by a vehicle collision. HDD data elements include patient date of birth, sex, race, ZIP Code, SSN, pre-hospital care and resuscitation, admission date, source of admission, type of admission, discharge date, principal diagnosis, other diagnoses, external cause of injury, principal procedure, other procedures, total charges, disposition of patient, and expected source of payment.

This hospital treatment information could provide some injury and recovery information for ITSPID, although only on the small proportion of collision injuries that result in inpatient treatment. While matching to this database would be hindered by the limited victim-identification information (gender, age, and injury severity) on SWITRS and FARS, the system might still provide useful data for policy decisions in health and emergency resource allocation. The goal of the CODES project, described elsewhere, is to merge such treatment recovery and cost data with crash data using either direct linkage or probabilistic matching. This application of probabilistic matching was investigated during this project. Although at this stage of the project it is planned that ITSPID will require direct linkages, probabilistic matching will be kept under consideration for possible future application in a final ITSPID system. Another obstacle to capturing HDD data is that

obtaining the person-level identifiers is controlled by strict confidentiality laws that require yearly oversight through two independent processes.

OSHPD Emergency Care Database (ECD). The Office of Statewide Health Planning has been mandated by the state legislature to develop a system similar to the HDD that will collect emergency room treatment information for injuries not resulting in inpatient treatment. Emergency treatment probably represents the bulk of collision injury treatments and would be useful for policy studies and resource allocation. This database is scheduled to be implemented in 2002 and will require confidentiality oversight.

DHS Emergency Medical Services Authority (EMSA). The response time of emergency vehicles to crash scenes and the additional transit time to hospitals have been shown to be predictors of the probability and cost of recovery in severe injury collisions. The FARS system collects these data in states where they are available. In California, emergency response is funded at the local level and there is no centralized statewide emergency response information available. The EMSA oversees the statewide functioning of emergency response agencies but does not collect transit times or response times into any centralized database.

DOJ Criminal Justice Information System (CJIS) and Monthly Arrest and Citation Register (MACR). While DMV already collects some information on convictions for vehicle code law violations, a more complete record of arrests and convictions for collision-involved drivers could find application in certain traffic safety studies. For example, the California Department of Insurance has a fraud investigation unit that uses SWITRS data to identify possible staged collisions. Also, there are over 240,000 incarcerated adults (160,000 in prison and 80,000 in jail) who exit and re-enter the driver population, and having data on these drivers may be of some use in traffic safety studies where there is need to control for or examine this driver sector.

CJIS contains arrest and conviction information on all persons booked for a crime in California, and is tied to national and international databases. MACR is a periodic extract from CJIS used for criminal justice research. Neither of these files contained information of sufficient interest to this project to warrant in-depth study at this time.

Review of Model Data Systems

HSIS, FARS, and CODES are each legislatively mandated cooperative federal and state systems, with staff and system hardware and software funded through federal and state budget line items. What was learned about each of these model systems is discussed below.

Highway Safety Information System (HSIS). HSIS is the product of a collaborative effort between the Federal Highway Administration, the University of North Carolina, and several states. The system collects, warehouses, and provides collision, roadway, and traffic information from the selected states, including California, on a yearly basis. The HSIS staff work directly with each state and serve as a primary information resource to the Federal government and both public and private agencies conducting roadway crash-related studies and as input to program and policy decisions. The HSIS is used to analyze a large number of safety problems ranging from the more basic "problem identification" issues to modeling efforts that attempt to predict future collisions from roadway characteristics and traffic factors. This system is probably the best model of data collection methodology, storage, and delivery for the conceptual design of ITSPID.

HSIS stores state roadway and collision data in formats that are standardized across eight states. The system provides documentation of each source state but refers users to the individual states for additional data from the source files. Each of the eight selected states provide the FHWA with crash files, roadway inventory files, and traffic files, such as SWITRS and TASAS. HSIS starts with roadway data and then adds collision data. For California, HSIS can only collect data on state route collisions.

HSIS is administered and maintained by two computer scientists, two analysts, and a research administrator. Data are stored in HSIS using the database software Sybase. Data extractions, loading, and processing are accomplished with SAS Access. DBMS/Copy software is used to create output datasets in most of the common extract formats. Once extracted, HSIS transports the data via many common methods including Internet FTP, CD-ROM, and 8mm tape. HSIS staff recommended using SAS for all ITSPID data processing, computation, and ad hoc work, and Sybase or a similar database product such as Oracle for storage and

security. HSIS stores approximately one gigabyte of data per year. This is accomplished on a SUN Ultra Sparc II computer with a large data storage capacity. The SUN system is attached to a Microsoft NT network that is used as a front-end to access the database using SAS for Windows.

A mandatory data request form is used to request information from HSIS. Data requests must be approved by HSIS staff. Each request is evaluated and the precise information needs assessed. The data are extracted and delivered to the requestor with documentation. An innovative method of maintaining the quality of research conducted using HSIS information is that all data users agree to publish their research results in a peer-reviewed journal, if possible. These research products are listed in the annual publication HSIS Summary Reports.

The administration at HSIS has offered their roadway information for use as an adjunct database to ITSPID, and recommended that at the very least users of ITSPID be told of the availability of HSIS data.

Fatality Analysis Reporting System (FARS). FARS contains data on crashes that result in a fatality within 30 days of the crash. The final FARS file for a given year is normally completed and available for use by Memorial Day of the following year. To protect individual privacy, no personal information, including name, address, or specific crash location, is entered into the system. Data are available for every year since FARS was established in 1975. Congress budgets several million dollars annually to maintain FARS, which is staffed by over 100 state and federal employees nationwide.

FARS collects preexisting state fatal crash data and enhances it through manual lookups and investigations. Although FARS relies more heavily on source data collection than would ITSPID, its use of linked SAS tables and Internet-based SQL queries makes it a good model of a modern data-delivery system. FARS data collection spans the US, with staff in every state and six regional offices.

Users can obtain FARS data in several ways. The on-line FARS Query System guides users through a series of choices and produces the requested subset of data in table or file format. It enables users to perform their own custom queries, such as generating case listings and cross tabulations of selected subsets of data, and access to

a library of frequently requested tables. FARS data, reports, and documentation are also available for download via the Internet (FTP). FARS data are available on a CD-ROM directly from the Bureau of Transportation Statistics. The files on CD-ROM and computer tape are available in several formats including both the source flat-files and SAS datasets.

Crash Outcome Data Evaluation System (CODES). CODES is an ongoing series of projects and cooperating agencies whose aim is to foster the linkage and use of motor vehicle crash data (police reports) and health data (EMS, hospital, claims, vital statistics, etc.) to support motor vehicle safety research and public policy. As of 1999, over 100 CODES facts sheets, studies, and management reports had been produced related to injury prevention, traffic safety, highway safety, and crash data quality.

As previously indicated, CODES is a good example of applied probabilistic data matching, joining normally separate data systems (crash data and medical treatment data) to support policy involving both traffic safety and injury treatment. In conjunction with the CODES project, NHTSA helped sponsor the development of Model Minimum Uniform Crash Criteria (MMUCC). MMUCC is a model of crash data elements with standardized definitions proposed as a national standard for collision reporting. It was developed in 1997 by selected private and public safety, engineering, transportation, and research experts at the local, state, and federal levels.

Second Survey

The second survey had three parts: Part I - Summary of First Survey, Part II - Proposed Initial System Design, and Part III - Survey Questions. Part I summarized responses gathered in the first survey. Part II described two proposed system prototype designs including the data sources and contents under consideration, the time period to be used for counting prior driver record entries, planned system linkages, the organization of data in the two prototype designs, and the intended system documentation. The information provided to the survey committee in Parts I and II is discussed more fully in the *Proposed Prototype ITSPID System* section of this report.

Following are the six questions posed in Part III and the responses.

Question 1: We do not plan to incorporate roadway data systems, emergency response, emergency treatment, or hospital treatment systems in the prototype ITSPID system. Given this, in your opinion, would the ITSPID prototype provide enough added value to previously existing systems to justify its development?

Each of the eleven committee members who responded to the second survey thought that the ITSPID prototype would provide enough added value to previously existing systems to justify its development, despite the decision not to include the additional data suggested by respondents in the first survey. One respondent suggested that we promote the use of the HSIS system as an adjunct to ITSPID. Several respondents emphasized that we should be sure to provide as many linkage elements as possible so users could attempt to match ITSPID data to date files they already have. Roadway information and medical treatment information were the most frequently recommended additions to the proposed data system.

Question 2: We plan to leave the existing flat-file structures of SWITRS and FARS unmodified, although we may interleave the existing files by collision event. Given the choice between a set of separate files linked by an identifier record and a single ITSPID file containing interleaved data sets from the source systems, which of the two options would best meet the needs of your traffic safety research studies?

Six respondents preferred linked but separate files, four preferred the interleaved file option, and one did not state a preference. Three of the respondents said they preferred the separate files because of the inherent flexibility of using only parts of the system. One respondent expressed a preference for a relational database that could be queried with SQL, even though this choice was not offered to the committee as an option.

Question 3: If the ITSPID configuration was not your preferred choice in the question above, would your organization be technically unable to use the data to meet the needs of your traffic safety research studies?

All but one committee member (who did not answer this question) said that they could use ITSPID based on either design.

Question 4: Would your organization be likely to request accident data from an ITSPID system as conceptualized for the prototype? Please describe briefly the nature and frequency of the requests you might make.

Although one respondent felt that his organization might potentially use ITSPID data several times each year, most committee members replied that they would expect to use the system no more than once or twice per year. Two respondents said they would not be able to use the data because it was not local to their state, and three others stated that they would not use the data but knew colleagues who would. One respondent did not answer this question.

Question 5: The DL component of ITSPID will contain citation and collision counts for a fixed prior time period. Given the low frequency of repeated citations and collisions each year (approximately 5% of involved drivers having two or more collisions), what time period(s) might best meet your research needs?

The shortest specific length of time chosen was 2 years and the longest was 10 years. Several respondents said their choice was similar to the time length used in their existing datasets. One suggested that we should use several fixed time periods, such as each year prior to the accident going back several years. One researcher expressed concern that the use of too long of a time span (e.g., 5 years) would result in the same collisions being reported on several separate ITSPID files across adjacent years, creating redundancies when counts are added across multiple years. Another respondent recommended that citation counts be categorized by citation type (alcohol-related violations, driving while suspended, etc.).

Question 6: Please make additional comments as desired. Attach separate sheets if necessary.

Two respondents emphasized the need for additional detail in citation and collision categories, one respondent repeated his belief that a relational database would serve as a better resource, and two others made additional comments in support of the project.

PROPOSED PROTOTYPE ITSPID SYSTEM

Data Contents and File Structure

The department has decided to develop and test a prototype ITSPID system that will combine data only from the DL, VR, SWITRS, and FARS systems. A fifth data file containing linkage records will be created and used to accomplish the data integration. The linkage record will contain the specific identifiers used to match records for each collision event across the other four files, and will also include summary collision, driver, and vehicle information selected to meet basic traffic safety research needs. The DL and VR data to be included in the ITSPID prototype will be customized to provide a maximum amount of meaningful traffic-safety research information. Individual SWITRS and FARS collision case records will be kept in their original content and format.

Two possible versions of a prototype ITSPID system will be created and evaluated. The first one will keep the five files separate but linked. The other one will consist of a single file, in which data from the source files will be interleaved within each collision event.

For purposes of developing an ITSPID prototype, we have chosen to leave the SWITRS and FARS files in their original flat-file format for two main reasons. First, although R&D wants to collect and index the traffic collision information for our research purposes and as a resource to other agencies, it does not have authority nor the requisite manpower to assume responsibility for the content of these two files beyond distributing file documentation supplied by the source agencies. It is believed that if the department modified, reformatted, or subsetted the SWITRS or FARS data, it would then become responsible for providing technical support beyond what is normally available from the source agencies. Second, there is no state or federal mandate for DMV to collect this information, and it is unlikely that external funding can be secured to support the long-term maintenance of an ITSPID system by the department. Therefore, it has been decided to develop the database primarily as a California DMV resource and secondarily as a resource for external agencies.

The primary value of the conceptualized ITSPID system will be that it will contain comprehensive information on all reported California collisions and the necessary collision-linkage identifiers that will enable data from the different source systems to be tied together. In addition, the system will produce summary information and periodic reports that will have direct application to traffic safety research and policy development.

The other systems recommended by survey respondents, including California roadway, emergency medical response and treatment, and hospital treatment systems have been explored. Although the initial ITSPID prototypes will not include data from these systems, the source agencies have been contacted, available information and extract processes have been documented, and they will remain under consideration for inclusion in the database when (and if) an operational ITSPID system is finally implemented.

Proposed Organization of Data in ITSPID

Separate files. Under this option the custom DL and VR extracts, the standard SWITRS and FARS data sets, and the collision linkage identifier records will be kept in separate files. The linkage identifiers will provide the means by which users can select and match data from each of the four source files. Figure 1 illustrates the file linkages for the proposed "separate file" ITSPID design.

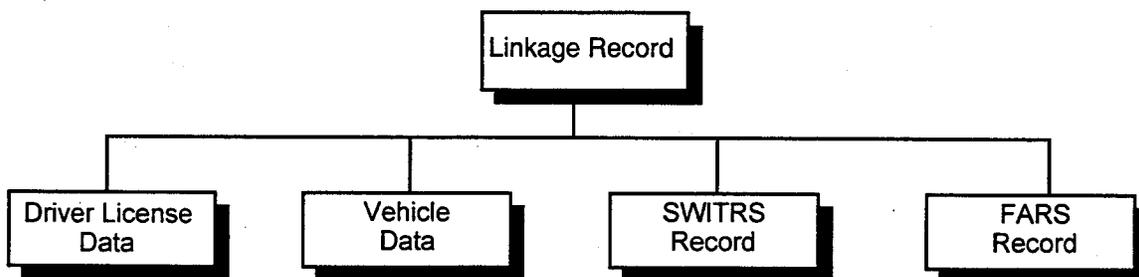


Figure 1. Proposed structure of ITSPID prototype using linked but separate files.

Combined files. Under this option, the data from the source files would be collated by collision event (case) to form a single merged file. Figure 2 illustrates the linkage of the proposed merged-file ITSPID design. This pattern would be repeated within the file for each crash case.

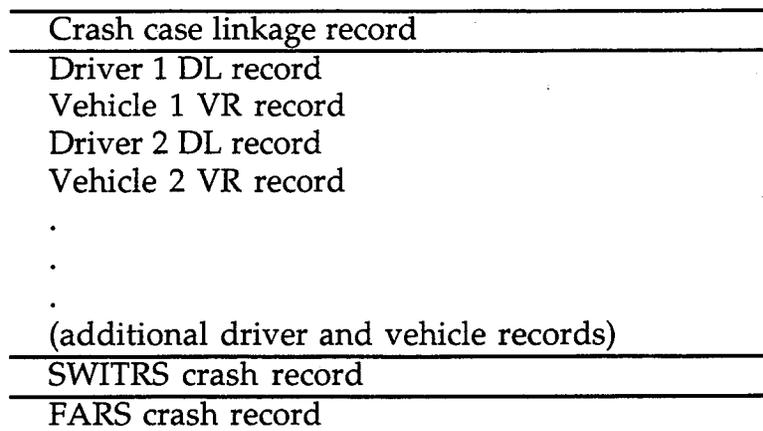


Figure 2. ITSPID prototype merged-file example.

It is envisioned that the ITSPID files will eventually be available to users as yearly archives.

Later in the development of ITSPID the department will evaluate the feasibility of creating an auxiliary ITSPID file that would store selected extracts from each of the source files as tables in a relational database. This would enable the use of SQL, which might help meet information needs more efficiently and improve user access to the data.

SWITRS data structure. SWITRS is organized horizontally with all information for one collision on a single variable-length line up to 1,500 bytes long. Each case consists of a header section containing collision and roadway data followed by segments containing party information and then segments containing victim information. Variables in the header and party segments give the number of party and victim segments within the case. Party segments are used for non-motorists.

Figure 3 represents the horizontal configuration of a collision record in SWITRS. Data for an involved non-motorist in SWITRS are stored within a party segment and the victim segments generally do not include uninjured passengers. Not shown are additional CalTrans roadway segments that describe the sequence of impacts between involved vehicles with roadway objects. These CalTrans data are not available on the ordinarily distributed SWITRS files and are created only for state-route (not surface-street) crashes.

Collision Header	Party Segments			Victim Segments		
Crash Event Data	Party 1	Party 2	...	Victim 1	Victim 2	...

Figure 3. SWITRS case record horizontal data structure.

FARS data structure. The organization of data in FARS is different than it is in SWITRS. The FARS case record has a vertical data structure, stacking a collision data subrecord first followed by separate vehicle, driver, and occupant data subrecords grouped by vehicle. Figure 4 shows the organization of a FARS flat-file record for an example crash case involving one pedestrian (non-motorist) and two vehicles. Each row in the figure represents one line of data in the FARS file. There is a unique collision event identifier (the state case number) linking all lines of data related to a single crash event. The count of subsequent sub-records is available in preceding high-level records and the sequence of record types is fixed, so conditional input routines to select particular data regarding specific collision types are not difficult to create. While a typical collision is represented by seven lines of information in FARS, a very large crash (involving several parties) might have 150 lines of data each 120 bytes long.

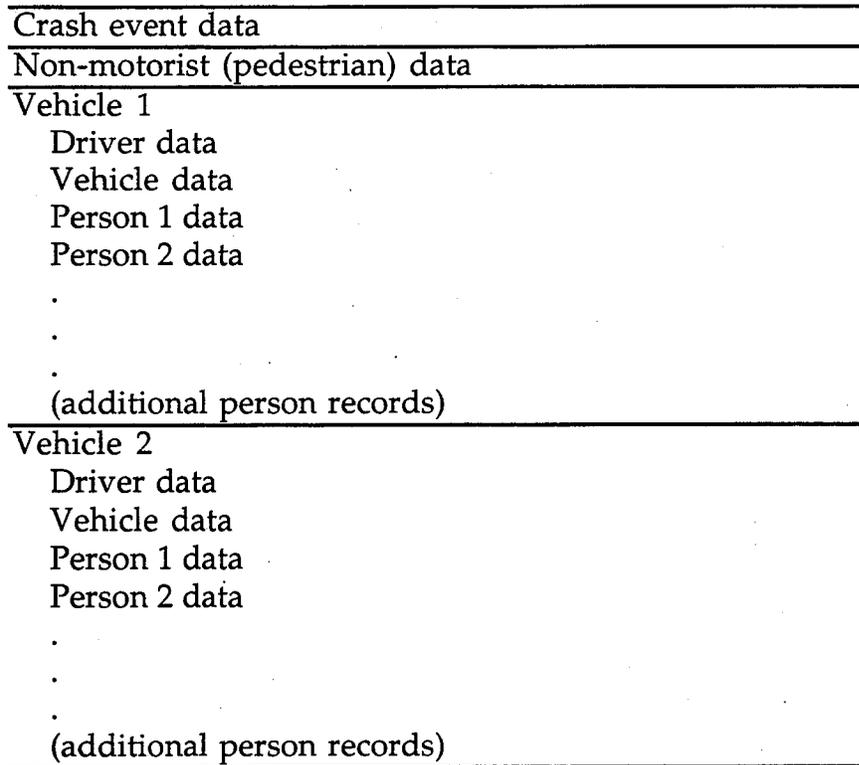


Figure 4. Structure of FARS "vertical" flat-file case record for an example fatal crash involving one pedestrian and two vehicles.

Linkage of Source Systems. A collision summary and index file containing identifiers for each collision event will be created for use in linking the information relating to the specific collision contained in the four primary data sources. This file will identify all collision cases in SWITRS or reported to DMV by collision-involved drivers.

Each linkage record will also include selected basic information summarizing key characteristics of collision events and the involved drivers, passengers, and vehicles. The information contained in the linkage record should be sufficient to generally meet the needs of most research applications, in which case further access of the source systems would not be necessary.

Table 2 shows the existing linkage identifiers between the source data systems proposed for inclusion in the ITSPID prototype system. Note that many of the

SWITRS party and vehicle identifiers (those marked with an asterisk in the table) are only contained on specially extracted SWITRS data files and are not available in the data files ordinarily distributed by the system.

Table 2
ITSPID Prototype Source Data Systems
Existing Linkage Identifiers

Category identifier	Identifier	DL	VR	SWITRS	FARS
Collision	Jurisdiction	✓		✓	
	Officer badge #	✓		✓	
	Date	✓		✓	✓
	Time	✓		✓	✓
Location	County			✓	✓
	Route			✓	✓
	Postmile			✓	✓
	Roadway			✓	✓
Party	Driver license #	✓	✓	✓*	
	Social security #	✓			
	Name	✓	✓	✓*	
	Date of birth	✓		✓*	
	Age	✓		✓	
	Sex	✓		✓	
	Address	✓	✓	✓*	
	Criminal identifier				
Vehicle	License Plate	✓	✓	✓*	
	VIN		✓		✓
	Year/make/model		✓	✓	✓
Victim	Social security #				
	Date of birth				
	Age			✓	✓
	Sex			✓	✓
	ZIP Code of residence				
Occupant	Age				✓
	Sex				✓

✓ Available identifier.

* Elements not available in standard SWITRS files.

Table 3 shows the existing linkage identifiers between the other data systems proposed as possible sources for an operational ITSPID system, (but which will not be included in the prototype system).

Table 3
Additional Available Source Data Systems
Existing Linkage Identifiers

Category identifier	Identifier	TASAS (roadway)	HDD (hospital discharge)	ECD (emergency treatment)	CJIS (criminal justice)	MACR (criminal justice sample)
Collision	Jurisdiction	✓				
	Officer badge #	✓				
	Date	✓	✓	✓		
	Time	✓				
Location	County	✓				
	Route	✓				
	Postmile	✓				
	Roadway	✓				
Party	Driver license #				✓	
	Social security #				✓	
	Name				✓	✓
	Date of birth				✓	✓
	Age				✓	✓
	Sex				✓	✓
	Address				✓	
	Criminal identifier				✓	
Vehicle	License Plate					
	VIN					
	Year/make/model					
Victim	Social security #		✓	✓		
	Date of birth		✓	✓		
	Age		✓	✓		
	Sex		✓	✓		
	ZIP Code of residence		✓	✓		
Occupant	Age					
	Sex					

✓ Available identifier.

Proposed ITSPID Data Elements

The prototype ITSPID system to be developed and tested in the Stage II project will contain a collision summary and linkage identifier file, full copies of the standard yearly SWITRS and FARS files, and customized extracts of data from the DL and VR systems. The specific data elements to be included are listed below for each type of record file.

Collision linkage record file.

1. Collision date and time
2. County
3. SWITRS record identification number
4. FARS record identification number
5. Financial responsibility report collision case number
6. Number of drivers/vehicles
7. Number of non-motorists (pedestrians, bicyclists, etc.)
8. Number of passengers
9. Number of injured parties
10. Violation category
11. Collision severity (greatest injury)
12. Collision type of impact
13. At-fault driver indicator
14. Date of birth of oldest driver
15. Date of birth of youngest driver
16. Number of case DL records
17. Number of case VR records

DL (involved-driver) file.

1. Last driver license renewal date
2. Last in-person renewal date
3. License class
4. Date of birth
5. Sex
6. Number of citations during a fixed prior time period
7. Number of self-reported collisions during a fixed prior time period
8. Number of police-reported collisions during a fixed prior time period
9. Number of police-reported injury collisions during a fixed prior time period

10. Number of police-reported fatal collisions during a fixed prior time period
11. License probation status at time of collision
12. evocation status at time of collision
13. License driving restriction status at time of collision
14. Physical/mental status

VR (involved-vehicle) file.

1. Vehicle registration date
2. Vehicle plate number
3. Vehicle identification number (VIN)
4. Model year
5. Make
6. Body type
7. Vehicle weight (unladen)
8. Odometer reading
9. Odometer reading date

SWITRS and FARS files. The contents of the SWITRS and FARS files are listed in Appendices E and F, respectively.

System Documentation

Documentation of the structure and contents of the linkage data file and the DL and VR extracts would need to be created. SWITRS and FARS documentation would be compiled from available CHP and CalTrans materials. The department would also need to create additional documentation that would describe the ITSPID contents and data structure, discuss known problems with any of the data elements, describe the crash universe and the underreporting of crashes, and recommend how to best access and process the data files.

Implementation Schedule

OTS funding (2000 OTS project TR0007) is being requested for the next stage (Stage II) of the ITSPID development effort. This will involve creation of a prototype ITSPID system with the design features described above. Stage II is scheduled to begin in April 2000 and will involve collecting actual data selected from the various source databases, linking the data, and producing trial information and statistical reports as a demonstration and validation of the system. Issues such as data uniformity and

quality, linkage methodology, matching rates, storage design, and usefulness of reports will be evaluated. Input for this evaluation will be solicited from traffic safety professionals and department management. If the outcome is successful, the department would consider pursuing development of a final ITSPID system in a subsequent Stage III funded by OTS.

The goal and objectives for the Stage II effort are presented below.

Stage II goal: To develop and assess the usefulness of a prototype risk management information system and statistical database for improved problem identification, countermeasure development, and resource allocation.

Stage II objectives:

1. Collect data from each source system pursuant to recommendations made in this report.
2. Link the data sources together by unique identifiers or probabilistic methods.
3. Produce and distribute example statistical reports that would be of value to department management, R&D, traffic safety researchers outside the department, and other targeted users.
4. Evaluate the usefulness and acceptability of ITSPID data and statistical reports to users and modify the system as needed.
5. Submit the final project work product to departmental management and OTS.

The work to be completed following Stage II (i.e., in Stage III) will include specification of software and hardware requirements, data storage and processing needs, programming to produce output reports, and cost estimates for a fully operational ITSPID system.

SUMMARIZED ACCOMPLISHMENT OF PROJECT GOAL AND OBJECTIVES

The completed tasks and results that evidence accomplishment of the project goal and objectives are presented below.

Project Goal

The goal of this project was to develop a conceptual model of a risk management information system and statistical database for improved problem driver identification, countermeasure development, and resource allocation.

Two conceptual models have been selected and will be used in the next phase of the ITSPID project.

Project Objectives

Project objectives are defined as steps taken to meet the project goal. The objectives and the project activities supporting each one of them are listed below.

1. *Identify the major potential end users of the system.*

Major potential users of ITSPID were identified. Fifteen key users representing a wide array of interest groups were invited to be on the advisory committee and provided input in two surveys that helped guide the project.

2. *Determine the data needs of potential end users.*

The first survey determined the data needs of the potential end users and the second survey determined acceptability of the proposed system design and data structures.

3. *Identify available data sources and evaluate the suitability of the data and the feasibility of obtaining and using data from each source.*

Nine existing data systems were investigated as possible sources of information to include in ITSPID.

4. *Determine the data elements to be contained in the system.*

Data items were selected to make up the main linkage identifier file and the customized DL and VR data files. It was also decided to use the complete SWITRS and FARS files in their original formats.

5. *Determine the general system configuration (data and reporting structures, indexing methods, etc.).*

Three model systems were investigated to help guide the design of ITSPID. The systems were investigated for collection, storage, retrieval, and delivery methods and also staffing, hardware, and software requirements.

6. *Determine the general data processing requirements for data linkages, data structuring, and other system functions.*

Data files from the source data systems were collected whenever possible. The files were investigated, including analyzing the data elements, identifying and testing various identifier combinations for matching between systems, and calculation of yearly file record counts.

7. *Evaluate end-user acceptability of the proposed data elements and system design.*

The second survey evaluated the end-user acceptability of the proposed data elements and system designs.

8. *Identify the task-flow schedule and resource requirements necessary to implement a prototype of the conceptualized system.*

A broad outline of the task sequence that will make up the next stage of ITSPID development was specified. The resources to put the prototype system into operation will be determined as part of that follow-up project.

9. *Prepare a report documenting the work products completed pursuant to project objectives and recommending whether to further develop and implement a prototype of the conceptualized system.*

This report accomplishes this objective.

10. *Fax to OTS, at least 2 weeks in advance, a short description of any new traffic safety event or program relevant to the project; addressing the FAX to the OTS public information officer and OTS program coordinator.*

New events or programs requiring OTS notification did not occur.

11. *Perform all activities outlined in the "Method of Procedure" in accordance with the project agreement.*

All activities outlined in the "Method of Procedure" were performed in accordance with the project agreement.

12. *Ensure the project is cost effective.*

The project was completed within the funding allotment.

APPENDIX

Appendix A

Text of Advisory Committee Surveys (space for responses removed)

INTEGRATED TRAFFIC SAFETY PROBLEM IDENTIFICATION DATABASE First Survey

Part I - Determining Data Usefulness

Listed in the boxes below are the specific major data elements available from each data source being considered as input to the ITSPID database. Please respond to the two questions below for each set of data items. Feel free to mark on the questionnaire, circle or strike through elements, and write comments on the front and back.

- 1) What elements would you consider unimportant to traffic safety work or might be of little possible research value or information reporting interest to you?
- 2) Are there elements collected at the wrong level of detail in your experience? How would you collapse or expand them?

California Driver License File

Driver license date, class, age, sex, residence, citations, self-reported and police-reported accidents, accident date and time, counts and highest severity of injuries and fatalities, probation, revocations, driving restrictions, negligent-operator point counts, physical and mental conditions.

California Vehicle Registration File

Vehicle registration date, payment status, registered and legal owners and addresses, vehicle plate number, vehicle identification number (VIN), model year, make and body type.

Commercial vehicles only: cylinders, fuel type, number of axles, and unladen weight.

California Statewide Integrated Traffic Reporting System

Accident Record (one per accident): Date, time, location, road surface and conditions, direction of travel, intersection and ramp description, number of lanes, presence of road dividers, light and weather conditions, signal control devices, violation category, first collision object, collision type, pedestrian action, hit and run.

Party Record (one per vehicle or pedestrian): Age, sex, fault, injury, sobriety, drugs or impaired, violation category, movement of vehicle prior to accident, contributing factors, vehicle direction, vehicle make, vehicle year, towing and towed vehicle types, number killed and number injured in party, hazardous materials, tire failure, car fire.

Victim Record (one per vehicle occupant): Seating position/pedestrian, sex, age, injury, ejection, safety equipment.

DOT Record (up to nine involved vehicles with four collisions possible per vehicle): Party, movement preceding, direction, collision object(s), road area(s).

NHTSA Fatality Analysis Reporting System

Accident Level (one per accident): Location, date, time, roadway type, special jurisdiction (military base, Indian reservation, etc.), first harmful event, manner of collision, junction area, road area, lanes, road division, speed limit, road alignment (curvature), road profile (grade, hillcrest, etc.), road surface and condition, hit and run, light, weather, construction zone, school bus related, rail crossing identifier.

Vehicle Level (one per vehicle): Number of occupants, vehicle make, vehicle model, body type, model year, VIN, registration state, registered owner, rollover, jackknife, speed, hazardous cargo, heavy vehicle configuration, axles, cargo body type, special vehicle, emergency vehicle, initial impact point, deformation extent, vehicle role in accident, manner vehicle left scene, fire, related factors (defective equipment, etc.), prior vehicle maneuver, crash avoidance maneuver, most harmful event.

Driver Level (one per vehicle): Driver presence, license state, non-CDL license status, commercial vehicle license status, compliance with license endorsements, driver license type compliance, compliance with license restrictions, violations charged, driver level counters (prior citations, accidents, etc.), date of first and last accident, suspension, conviction, driver ZIP Code, related factors-driver level.

Person Level (one per vehicle occupant or pedestrian): Striking vehicle (of non-motorist victim), age, sex, person type, seating position, restraint system use, air bag availability - function, ejection, ejection path, extrication, non-motorist location, police-reported alcohol involvement, method of alcohol determination (by police), alcohol test result, police reported other drug involvement, method of other drug determination by police, drug test type, drug test results, injury severity, taken to hospital or treatment facility, death date, death time, related factors-person level, death certificate number, fatal injury at work.

Part II - Organization of Accident Data

Below is a proposed categorization of the data elements that might be used to organize the ITSPID database and possibly aid in the use of the data. In your opinion, is this a useful conceptual model for organizing the information? Would you collapse, expand, divide, or add any categories? Would you structure the information differently? Please explain.

ITSPID Data Categories

Event: prior movement, speed, collision type, collision objects, pedestrian position/movement, violation category, etc.

Location: time, roadway, county, state, etc.

Environment: weather, lighting, road surface, area of roadway, road properties (hill, curve, etc.), traffic controls, speed limit, etc.

Participants: driver ages, genders, prior records, passenger data, other victims, alcohol, drugs, other attention factors, physical or mental disabilities, etc.

Injuries: safety equipment and use, injury severity, ejection, EMS response, recovery time, recovery cost, etc.

Vehicles: make, year, model, VIN, commercial type, trailers, emergency, etc.

Part III - Other Data Items and Systems

One goal of this project is to create a system that enhances the value of information in existing systems. Below are some elements that might be of value, but as far as we know are not readily available at this stage of the project. Do any of the following have potential to add valuable information to the proposed traffic safety research database? Are there other items that you would suggest? Please circle, strike-through or otherwise mark the form as you see fit.

Traffic density, distractions such as tobacco smoking, cellular telephone use, or eating, vehicle size/mass, vehicle headlight height, vehicle color, vehicle modifications, driver vision, reaction time, passenger relationships (family, friends, co-workers), trip purpose (work, commute to work, personal business, recreation), psychological data (stressors, attitudinal, etc.), EMS time of notification, EMS time of arrival and EMS time at hospital, injury recovery (hospital length of stay, permanent disabilities incurred), insurance coverage (paid claims, denied claims, total damages).

Do you know of any currently available sources of such data?

Are you familiar with any other existing data resources that might add significant research value to this system? Please name them and describe their utility.

Part IV - Utility and Value

Would the proposed integrated database of linked systems be of substantially greater value than individual existing systems? Please comment on the increased utility and value regarding each of the following applications:

Basic research studies:

Accident studies:

Problem identification:

Resource allocation:

Reporting for management or traffic safety agencies:

Summaries, tables and displays:

Part V - Comments

Please share any additional insights or opinions you may have.

INTEGRATED TRAFFIC SAFETY PROBLEM IDENTIFICATION DATABASE Second Survey

Part I - Summary of First Survey

Determining data usefulness. Respondents were asked to assess an itemized list of items from the California Highway Patrol Statewide Integrated Traffic Records System (SWITRS), the NHTSA Fatality Analysis Reporting System (FARS), and the DMV Driver License (DL) and Vehicle Registration (VR) automated systems. Most responded that the majority of data elements would be useful to their research, although committee members emphasized different areas of research interest. Each system was believed by one or more respondents to contain items of research and policy evaluation interest. The integrity of certain data items was questioned, including the accuracy, the objectivity, and the consistency with which they are reported. Many respondents wanted greater detail than offered by SWITRS and in some cases by FARS.

Organization of collision data. The potential structure of ITSPID was compared to FARS by two respondents, both of whom recommended the use of data tables with linkage identifiers. Two researchers recommended organizing ITSPID along the same dimensions used in injury accident epidemiology as represented by the Haddon Matrix, which is similar to the conceptual organization of FARS and SWITRS. None of the respondents recommended particular architecture or processing platforms other than making general reference to methods used in FARS or the Federal Highway Administration's Highway Safety Information System (HSIS), which is a standardized set of eight yearly statewide combined roadway and collision datasets.

Other data items and systems. The majority of the committee recommended that information from systems other than SWITRS, FARS, DL and VR databases be included in ITSPID. These included roadway design, emergency response, emergency treatment, and hospital treatment data systems, and also VIN decoding tables. Several respondents also discussed related systems and standards that might be models for the development and implementation of ITSPID. Their suggestions included the HSIS, the NHTSA Crash Outcome Data Evaluation System (CODES), and the related crash data standards Model Minimum Uniform Crash Criteria (MMUCC) developed by the National Association of Governors' Highway Safety Representatives.

Utility and value. All but one respondent commented on the broad potential applications of this system. Policy studies, program evaluation, and problem identification were each mentioned. Responses repeatedly referred to human factors combined with roadway, injury recovery, and injury cost research. Committee members also expressed concern regarding several common issues: authority to collect and release the information, insuring the appropriate use of the information, system cost, and manpower needed.

Part II - Proposed Initial System Design

Data sources. The initial ITSPID system will capture SWITRS, FARS, DL, and VR system data. The FARS and SWITRS data files will remain in their original formats, but may be integrated into a single database instead of being left as separate files. We will create custom extracts of data from both the DL and VR systems. From the DL system we plan to collect citation and accident counts for a fixed time period (e.g., 2 years) before the crash. Decoded VIN and other vehicle-specific information will be captured from the VR system.

The other systems recommended by survey respondents, including California roadway, emergency medical response and treatment (EMS), and hospital treatment systems have been explored as part of this stage of the project. Although the initial ITSPID system will not include data drawn from these additional data sources, the source agencies have been contacted, available information and extract processes have been documented, and they will all remain in consideration for inclusion in the database in future stages of this project.

Time period. The system will be organized by accident event into yearly file sets based on calendar year. Because SWITRS is the primary information source for the system, ITSPID will be organized using the same yearly time periods as used for SWITRS.

Accident linkage records. We will create an index file containing identifiers for each accident event that will be used for linking the information relating to the specific accident contained in the four primary data sources. This file will identify all accident cases that are recorded in SWITRS or reported to DMV by the drivers involved in the accidents. About 40% of all known accidents are reported only by individual drivers through the DMV's financial responsibility (FR) reporting system, and these are generally property-damage-only (PDO) accidents. Such accidents will have identifiers linking only to the DL and VR summary files. About 10% of SWITRS-reported accidents do not link to driver license records, although some proportion will have VR information. Such records will have SWITRS, FARS, and vehicle record identifiers but no DL-based driver information. Fatal accidents contained in FARS should also be contained in SWITRS, so all records with a FARS link will also have a SWITRS link, in addition to any DL and VR links.

Each linkage record will also include selected basic information regarding the accident event and the involved drivers, passengers, vehicles, and possibly other summary data. The linkage record will contain enough information to identify which records to extract from the source systems to satisfy most research needs. The more basic research questions will be answerable directly from the linkage record without further accessing of the source systems.

Proposed ITSPID contents. ITSPID will contain full copies of the standard yearly SWITRS and FARS files and customized extracts of data from the DL and VR systems.

The accident linkage records might contain the following items:

1. Accident date and time
2. County
3. SWITRS record identification number
4. FARS record identification number
5. DMV FR collision case number
6. Number of vehicles/drivers
7. Number of non-motorists (pedestrians, bicyclists, etc.)
8. Number of reported passengers
9. Number injured
10. Violation category
11. Collision severity (highest injury)
12. Collision type of impact
13. At-fault driver indicated
14. Date of birth of oldest driver
15. Date of birth of youngest driver
16. Number of DL records available
17. Number of VR records available

The involved-driver records created from data extracted from the DL system might include:

1. Last driver license renewal date
2. Last in-person renewal date
3. License class
4. Date of birth
5. Gender
6. Number of citations during a fixed prior time period
7. Number of self-reported collisions during a fixed prior time period
8. Number of police-reported collisions during a fixed prior time period
9. Number of police-reported injury collisions during a fixed prior time period
10. Number of police-reported fatal collisions during a fixed prior time period
11. Probation status at time of collision
12. Revocation status at time of collision
13. Driving restriction status at time of collision
14. Physical/mental status

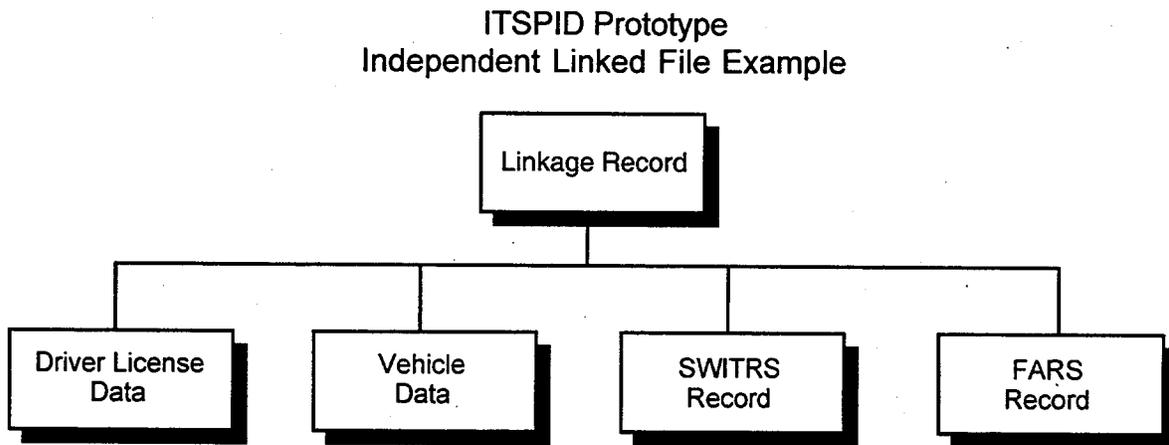
Involved driven vehicle variables that might be included in the VR records in ITSPID include the following:

1. Vehicle registration date
2. Vehicle plate number
3. Vehicle identification number (VIN)
4. Model year
5. Make
6. Body type

7. Vehicle weight (unladen)
8. Odometer reading
9. Odometer reading date

Organization. The organization of data in the initial prototype system has not yet been decided. We are considering the following two possibilities:

1. Five separate files: the custom DL and VR extracts, the standard SWITRS file, the FARS file, and the collision linkage identifier file.



2. Similar to #1, except that the data from the source files would be nested within collision event, creating a single merged file.

**ITSPID Prototype
Merged File Example**

Accident 1
Linkage Record
Driver 1a Record
Vehicle 1a Record
Driver 1b Record
Vehicle 1b Record
...
SWITRS Record (segments nested horizontally)
FARS Record (segments stacked vertically)
Accident 2
Linkage Record
Driver 2a Record
Vehicle 2a Record
Driver 2b Record
Vehicle 2b Record
...
SWITRS Record (segments nested horizontally)
FARS Record (segments stacked vertically)
More Accidents

It is envisioned that the ITSPID dataset(s) will be available to users as yearly archives.

Later in the development of ITSPID we will consider developing an auxiliary ITSPID file that would store selected extracts from each of the source files as tables in a relational database, making possible the use of standardized queries to more efficiently meet the majority of information needs. This approach would allow users to have more direct and perhaps easier access to the data.

For purposes of developing an ITSPID prototype, we have chosen to leave the source SWITRS and FARS files in original flat-file format for two main reasons. First, although we want to collect and index the traffic accident information for our research purposes and as a resource to other agencies, we do not have authority or requisite manpower to assume responsibility for the content of these two files beyond distributing file documentation supplied by the source agencies. We believe that if we modified, reformatted, or subsetted the SWITRS or FARS data, we would then be responsible to provide technical support beyond what is available from the source agencies. Second, there is no state or federal mandate for DMV to collect this information, and there is no pre-existing funding source that would support the long-term maintenance of an ITSPID system. We prefer, therefore, to develop the database primarily as a California DMV resource and secondarily as a resource for external agencies.

The primary value of the ITSPID system will be that it will contain comprehensive information on all reported California collisions and the necessary accident-linkage identifiers that will enable data from the different source systems to be tied together. In addition, the system will produce summary-level information and periodic reports that will have direct application to traffic safety research and policy development.

Documentation. We will need to develop documentation for the DL and VR systems on a yearly basis. Documentation for SWITRS and FARS (and other systems if added) would be collected as they become available from the source providers.

Part III - Survey Questions

In the boxes below are questions asking your opinion regarding the content and structure of the proposed ITSPID prototype system. Feel free to mark on the questionnaire, circle or strike through elements, and write comments on the front and back.

<p>We do not plan to incorporate roadway data systems, emergency response, emergency treatment, or hospital treatment systems in the prototype ITSPID system. Given this, in your opinion, would the ITSPID prototype provide enough added value to previously existing systems to justify its development?</p>

We plan to leave the existing flat-file structures of SWITRS and FARS unmodified, although we may interleave the existing files by collision event. Given the choice between a set of separate files linked by an identifier record and a single ITSPID file containing interleaved data sets from the source systems, which of the two options would best meet the needs of your traffic safety research studies?

If the ITSPID configuration was not your preferred choice in the question above, would your organization be technically unable from using the data to meet the needs of your traffic safety research studies?

Would your organization be likely to request accident data from an ITSPID system as conceptualized for the prototype? Please describe briefly the nature and frequency of the requests you might make.

The DL component of ITSPID will contain citation and collision counts for a fixed prior time period. Given the low frequency of repeated citations and collisions each year (approximately 5% of involved drivers having two or more collisions), what time period(s) might best meet your research needs?

Please make additional comments as desired. Attach separate sheets if necessary.

Appendix B

Driver License System Standard Record

```
*****
* BASIC RECORD SECTION 001
*****
DRIVERS LICENSE
CLASS OF LICENSE
DATE OF BIRTH
SOCIAL SECURITY #
COLOR OF EYES
COLOR OF HAIR
HEIGHT
WEIGHT
SEX
MARITAL STATUS
MAILING ADDRESS DATE
OFFICE OF APPLICATION
LICENSE ISSUED DATE
APPLICATION DATE
DRIVING TEST RESULT
COUNTY OF RESIDENCE
ZIP CODE
TERM OF LICENSE
EXPIRATION DATE OR REV/CANC/REF
PHOTO MAIL DATE
DRIVER'S NAME
*****
* BASIC RECORD SECTION 002
*****
MAIL ADDRESS, HOUSE/STREET
MAIL ADDRESS CITY
OUT OF STATE CITY CODE
PROOF REQUIRED CODE
ATTACHMENT CODES
FIELD FILE NUMBER
LEGAL FILE INDICATOR
MICROGRAPHICS BATES #
DL FILMED IND. M
DL FILMED IND. D
DL FILMED IND. P
LATEST ADDRESS DATE
FEE DUE DATE
STATE LAST LICENSED
REPLY IND, STATE LAST LICD
GUARANTOR CODE
OLD CLASS
OLD CLASS FOUR ENDORSEMENT
OLD EXPIRATION DATE (YY)
LAST TERM DATE/PROOF
*****
* BASIC RECORD SECTION 003
*****
OUT OF STATE REPLY
APPLICATION HELD PENDING CODE
```

LICENSE EXTENSION CODE
 DECEASED CODE
 LICENSE LOCATION CODE & REASON
 IN-HOUSE ROUTE CODE
 IN-HOUSE ROUTE CODE DATE MMDD
 PROOF ELIGIBILITY DATE
 P & M CODE
 PHOTO REMAIL DATE
 MISSING RECORD CODE
 VISION TEST RESULT
 ORAL TEST RESULT
 MINOR ABSTRACT HISTORY
 LATEST YEAR MINOR ABSTRACT
 EARLIEST YEAR MINOR ABSTRACT
 ENDORSEMENT & CERTS CODE
 ENDORSEMENT & CERTS DATE
 ISSUANCE TYPE
 ISSUANCE DATE
 ISSUANCE OFFICE

 * BASIC RECORD SECTION 004

 ISSUANCE TYPE # 6
 ISSUANCE DATE # 6
 ISSUANCE OFFICE # 6
 LATEST OTHER ADDR STREET
 LATEST OTHER ADDR CITY
 LATEST OUT OF STATE CITY CODE
 RESIDENCE ADDR STREET
 RESIDENCE ADDR CITY
 RESIDENCE OUT OF STATE CITY CODE

 * BASIC RECORD SECTION 005

 USER DATA
 EXTRACT DATE
 REFERENCE DATE
 DL# ON DL MASTER
 DL# ORIGINAL INPUT

 * CDL SUB-RECORD, DOCUMENT CODE = CD1

 CDL RECORD

 * CDLIS NOTIFIED INFORMATION

 DATE CDLIS NOTIFIED
 TYPE OF NOTIFICATION

 * TRANSFER INFORMATION

 TYPE OF TRANSFER
 ALPHA STATE CODE
 O/S DL #

 * COMMERCIAL ENDORSEMENTS

 1ST COMM ENDORSEMENT

Integrated Traffic Safety Problem Identification Database

2ND COMM ENDORSEMENT
3RD COMM ENDORSEMENT
4TH COMM ENDORSEMENT
PRIOR SSN #

* PRIOR O/S DL # 'S

1ST PRIOR O/S CODE
1ST PRIOR O/S DL #
2ND PRIOR O/S CODE
2ND PRIOR O/S DL #
3RD PRIOR O/S CODE
3RD PRIOR O/S DL #

* ADDITIONAL FIELDS FOR FUTURE EXPANSION

MEDICAL INDICATOR
HD MESSAGE STATUS
H3 MESSAGE STATUS
H4 MESSAGE STATUS
H5 MESSAGE STATUS
PROCESSING COMPLETED

* PENDING CDL SUB-RECORD

APPLICATION DATE
COMMERCIAL INDICATOR
SOCIAL SECURITY #
SSN # VERIFIED INDICATOR
MEDICAL EXAM EXPIRATION DT
1ST GENERAL LAW TEST RESULTS
2ND GENERAL LAW TEST RESULTS
3RD GENERAL LAW TEST RESULTS

* AIR BRAKE LAW TEST RESULTS (AB)

1ST AB LAW TEST RESULTS
2ND AB LAW TEST RESULTS
3RD AB LAW TEST RESULTS

* CLASS A LAW TEST RESULTS

1ST CLASS A LAW TEST RESULTS
2ND CLASS A LAW TEST RESULTS
3RD CLASS A LAW TEST RESULTS

* PRE-TRIP INSPECTION INFORMATION

LAST PRE-TRIP INSPECTION DT
1ST PRE-TRIP RESULTS
1ST PRE-TRIP EXAMINER ID
2ND PRE-TRIP RESULTS
2ND PRE-TRIP EXAMINER ID
3RD PRE-TRIP RESULTS
3RD PRE-TRIP EXAMINER ID

* DRIVE TEST INFORMATION

LAST DRIVE TEST DT
1ST DRIVE TEST CLASS
1ST DRIVE RESULTS
1ST DRIVE EXAMINER ID
2ND DRIVE TEST CLASS
2ND DRIVE RESULTS
2ND DRIVE EXAMINER ID
3RD DRIVE TEST CLASS
3RD DRIVE RESULTS
3RD DRIVE EXAMINER ID

* COMMERCIAL ENDORSEMENTS

1ST COMMERCIAL ENDORSEMENT
2ND COMMERCIAL ENDORSEMENT
3RD COMMERCIAL ENDORSEMENT
4TH COMMERCIAL ENDORSEMENT

* PASSENGER VEHICLE LAW TEST RESULTS (PV)

1ST PV LAW TEST RESULTS
2ND PV LAW TEST RESULTS
3RD PV LAW TEST RESULTS

* DOUBLES/TRIPLE LAW TEST RESULTS (DT)

1ST DT LAW TEST RESULTS
2ND DT LAW TEST RESULTS
3RD DT LAW TEST RESULTS

* TANKER VEHICLE LAW TEST RESULTS (TV)

1ST TV LAW TEST RESULTS
2ND TV LAW TEST RESULTS
3RD TV LAW TEST RESULTS

* HAZARDOUS MATERIAL LAW TEST RESULTS (HM)

1ST HM LAW TEST RESULTS
2ND HM LAW TEST RESULTS
3RD HM LAW TEST RESULTS

* PRE-TRIP INSPECTION RESULTS

PRE-TRIP INSPECTION CLASS 1
PRE-TRIP INSPECTION CLASS 2
PRE-TRIP INSPECTION CLASS 3

* NON-COMMERCIAL LAW TEST RESULTS

NON-COMMERCIAL LAW TEST 1
NON-COMMERCIAL LAW TEST 2
NON-COMMERCIAL LAW TEST 3

* FIREFIGHTER LAW TEST RESULTS

FIREFIGHTER LAW TEST 1
FIREFIGHTER LAW TEST 2

FIREFIGHTER LAW TEST 3

```
*****
*           FIREFIGHTER CL A TEST RESULTS
*****
FIREFIGHTER CL A TEST 1
FIREFIGHTER CL A TEST 2
FIREFIGHTER CL A TEST 3
*****
*   AKA SUB-RECORD
*****
AKA NAME
UNUSED
*****
*   PULL NOTICE SUB-RECORD
*****
PULL CONDITIONS
INFORMATION NEEDED
REASON
PURGE DATE MMY
PURGE CODE
NAME IN-HOUSE 1 DIGIT CODE X
DA CASE #
ADDRESS STREET
ADDRESS CITY
*****
*   SUSPENSE SUB-RECORD
*****
SUSPENSE DUE DATE
SUSPENSE REASON CODE
SUSPENSE DETINATION (ROUTE CD)
UNUSED
*****
*   HISTORY SUB-RECORD
*****
TYPE ACTION
TYPE HEARING
ORIGINAL HEARING DATE
MODIFIED HEARING DATE
SCHEDULED RESULTS CODE
REASON CODE
EFFECTIVE DATE/ORDER
THROUGH DATE/TERM
ORDER # OR S/A MAIL DATE
MAIL DATE
SERVICE OF ORDER DATE
BRIEFING DATE
REINSTATEMENT DATE
TERM DT OR S/A EFF DATE
FR CASE # IR T/A 45 DL #
STATE TAKING ACTION
ADDITIONAL INFO CODE
COUNTY OF WITHDRAWAL ACTION
CORRECTED ORDER CODE
CITY OF HEARING
SERVICE OF ORDER
SERVICE OF BRIEF
```

REINSTATEMENT AUTHORITY SECTION
REMINATION AUTHORITY
AUTHORITY SECTION 1
AUTHORITY SECTION 2
AUTHORITY SECTION 3

* HISTORY SUB-RECORD, ID-CARD

TYPE ACTION 50 OR 70
APPLICATION DATE
EXPIRATION DATE
MAIL ISSUE DATE
SERVICE MISC DATE
ADDITIONAL ISSUE DATE
OFFICE OF APPLICATION
SERVICE CODE MISC
ADDITIONAL ISSUE
AUTHORITY SECTION

* HISTORY SUB-RECORD, REISSUE FEE

TYPE ACTION 52
FEE USED DATE
FEE DUE DATE
FEE REFUNDED DATE
ADDITIONAL FEE PAID DATE
FEE PAID DATE
BAD CHECK DATE
ADDITIONAL FEE PAID
FEE DUE AMOUNT
FEE PAID AMOUNT
FEE USED AMOUNT
FEE REFUNDED AMOUNT

* PROOF SUB-RECORD

TYPE OF PROOF
REQUESTER CODE
PROOF RECEIVED DATE
DATE OF UPDATE
INSURANCE CO
ALPHA KEY
POLICY DATE
CANCELLATION REC DT
CANCELLATION EFF DT
POLICY NUMBER
UNUSED

* CA ABSTRACT SUB-RECORD

ADULT ABSTRACT
DOCKET OR CITATION #
DISPOSITION CODE O (ALPHA)
DISPOSITION CODE Q
OPEN
CONVICTION DATE
COURT CODE
VIOLATION DATE

Integrated Traffic Safety Problem Identification Database

VEHICLE LICENSE #
COURT SUSPENSION OR REST-TERM
COURT SUSPENSION OR REST DATE
JAIL
FINE
DISMISSAL OR CORRECTION IND
DISMISSAL OR CORRECTION IND DATE
FTA DESTROYED IND
FTP INDICATOR
CAN'T HANDLE IND (WEEKS UPDATED)

* OUT-OF-STATE ABSTRACT SUB-RECORD

DISPOSITION CODES
SECTIONS VIOLATED
CONVICTION DATE
VIOLATION DATE
STATE OF ORIGIN
CAN'T HANDLE IND (WEEKS UPDATED)

* FAILURE TO APPEAR SUB-RECORD

DOCKET OR CITATION #
SECTIONS VIOLATED
COURT CODE
VIOLATION DATE
VEHICLE LICENSE #
2ND FLD DOCKET OR CIT
2ND FTA LIC NOTICE
FTA SUPPORT ACT IND
CAN'T HANDLE IND (MORE 8 SECT VIOL)
CAN'T HANDLE IND (2ND FTA W/HELD)
CAN'T HANDLE IND (WEEKS UPDATED)

* DDL ACCIDENT SUB-RECORD

REPORT NUMBER
LOCATION
TYPE OF ACCIDENT
ACCIDENT DATE
ACCIDENT TIME
INJURIES
FATALITIES
SOBRIETY
PHYSICAL CONDITION
CITED
FR CASE #
VEHICLE LICENSE #

* FR ACCIDENT SUB-RECORD

LOCATION
REPORTING CODE
ACCIDENT DATE
ACCIDENT TIME
FR CASE #
VEHICLE LICENSE #

* OUT-OF-STATE ACCIDENT SUB-RECORD

VEHICLE LICENSE #
STATE OF ORIGIN
DATE
TIME

* COMMENT SUBRECORD

COMMENT NUMBER
PURGE DATE MMY
COMMENTS

* RESEARCH & STATISTICS SPERAW SUB-RECORD

SPERAW DATE
SPERAW CODE 1
SPERAW CODE 1 DATE
SPERAW CODE 2
SPERAW CODE 2 DATE
PRIOR RECORD STATUS CODE
PRIOR RECORD STATUS CODE DATE
ELIGIBLE FOR 3RD EXT
VISION RESTRICTION
EXPOSURE RESTRICTION
ATTACHMENT CODE IND.
RESEARCH & STAT STUDY CODE

* PENDING DL APP SUB-REC (PAR 1 OF 4)

PENDING DL APP DOC CD
PENDING DL APP REASON CD
OFFICE ID
WORK DATE (MMDDYY)
CASHIER ID
SEQUENCE NUMBER
TYPE TRANSACTION CODE
APPLICATION DATE (MMDDYY)
UPDATE EMP ID (MOST RECENT)
NO FEE PAID REASON CD
ORIG/NON-ORIG INDICATOR
MINOR CODE
CORR/UNVER B/D INFO
CORR/UNVER B/D (MMDDYY)
CORR/UNVER B/D INDICATOR
PHOTO LIC MICROGRAPHIC INFO
PHOTO LICENSE MG # (BATES)
PHOTO OFFICE
PHOTO DATE (MMDDYY)
CLASS INFO
CLASS OF APPLICATION
MOTORCYCLE ENDORSEMENT
DRIVE TEST INDICATOR
CDL APP FEE PAID INDICATOR
FIREFIGHTER APP FEE PD IND
PAID BY CREDIT CARD IND.
CDL DRIVE TEST FEE USED IND
DRIVER ED/TRNG INFO

Integrated Traffic Safety Problem Identification Database

DRIVER EDUCATION CODE
DRIVER TRAINING CODE

* PENDING DL APP SUB-REC (PART 2 OF 4)

OUT OF STATE NAME ABBREV
OUT OF STATE LICENSE INFO
O/S LICENSE NUMBER
O/S LOCATION CODE
O/S TYPE
VISION TEST RESULTS
ORAL TEST INDICATOR
FOREIGN LANGUAGE
SIGN TEST 1 RESULTS
SIGN TEST 2 RESULTS
SIGN TEST 3 RESULTS
WORDS/PHRASES TST 1 RSLTS
WORDS/PHRASES TST 2 RSLTS
WORDS/PHRASES TST 3 RSLTS
LAW TEST RESULTS CL1
LAW TST 1 CL1 RSLTS
LAW TST 2 CL1 RSLTS
LAW TST 3 CL1 RSLTS
LAW TEST RESULTS CL2
LAW TST 1 CL2 RSLTS
LAW TST 2 CL2 RSLTS
LAW TST 3 CL2 RSLTS
LAW TEST RESULTS CL3
LAW TST 1 CL3 RSLTS
LAW TST 2 CL3 RSLTS
LAW TST 3 CL3 RSLTS
LAW TEST RESULTS CL4
LAW TST 1 CL4 RSLTS
LAW TST 2 CL4 RSLTS
LAW TST 3 CL4 RSLTS
LAST LAW TST FAILURE (MMDD)

* PENDING DL APP SUB-REC (PART 3 OF 4)

E1-PENDING PART 2
MOTORCYCLE SKILL TEST 1 INF
M/C SKILL TEST 1 RESULTS
M/C SKL TST 1 FAIL DT-MMDD
M/C SKL TST 1 EXAMINER ID
MOTORCYCLE SKILL TEST 2 INF
M/C SKILL TEST 2 RESULTS
M/C SKL TST 2 FAIL DT-MMDD
M/C SKL TST 2 EXAMINER ID
MOTORCYCLE SKILL TEST 3 INF
M/C SKILL TEST 3 RESULTS
M/C SKL TST 3 FAIL DT-MMDD
M/C SKL TST 3 EXAMINER ID
DRIVE TEST 1 INFO
DRIVE TST 1 APP CLASS
DRIVE TEST 1 RESULTS
DRIVE TEST 1 FAIL DT-MMDD
DRIVE TEST 1 EXAMINER ID

DRIVE TEST 2 INFO
DRIVE TST 2 APP CLASS
DRIVE TEST 2 RESULTS
DRIVE TEST 2 FAIL DT-MMDD
DRIVE TEST 2 EXAMINER ID
DRIVE TEST 3 INFO
DRIVE TST 3 APP CLASS
DRIVE TEST 3 RESULTS
DRIVE TEST 3 FAIL DT-MMDD
DRIVE TEST 3 EXAMINER ID

* PENDING DL APP SUB-REC (PART 4 OF 4)

RESTRICTIONS 1-5
RESTRICTION 1 OF 5
RESTRICTION 2 OF 5
RESTRICTION 3 OF 5
RESTRICTION 4 OF 5
RESTRICTION 5 OF 5
ATTACHMENT CODES 1-5
ATTACHMENT CODE 1 OF 5
ATTACHMENT CODE 2 OF 5
ATTACHMENT CODE 3 OF 5
ATTACHMENT CODE 4 OF 5
ATTACHMENT CODE 5 OF 5
LIMITED TERM INFO
LIMITED TERM FEE DUE DT (YY
TERM (YEARS)
INSTRUCTION PERMIT 1 INFO
INSTR PERMIT 1 DT (MMDD)
INSTR PERMIT 1 CLASS
TEMPORARY LICENSE 1 INFO
TEMP LIC 1 DT (MMDD)
TEMP LIC 1 CLASS
PREV PEND APP RSN CODE
NOT ELIG FOR DT WAVE
MILITARY EXTENSION CODE
ORTHORATER TEST RESULTS
SOCIAL SECURITY # DATA
LAST PROCESSING DATE
M/C TRAINING

* PENDING ID APP

PENDING ID APP DOC CD
PENDING ID APP REASON CD
OFFICE ID
WORK DATE (MMDDYY)
CASHIER ID
SEQUENCE NUMBER
TYPE TRANSACTION CODE
APPLICATION DATE (MMDDYY)
UPDATE EMP ID (MOST RECENT)
NO FEE PAID REASON CD
ORIG/NON-ORIG INDICATOR
MINOR CODE
CORR/UNVER B/D INFO
CORR/UNVER B/D (MMDDYY)

CORR/UNVER B/D INDICATOR
PHOTO LIC MICROGRAPHIC INFO
PHOTO LICENSE MG # (BATES)
PHOTO OFFICE
PHOTO DATE (MMDDYY)
PREV APP INCOMP REA CODE
LAST PROCESSING DT (MMDDYY)

* ARREST RECORD SUB-RECORD DESCRIPTION

ARREST DATE (MMDDYY)
BAC TEST TYPE
BAC LEVEL
CASE NUMBER
ARREST AGENCY NAME
COURT CODE
FIELD OFFICE
CLOSURE CODE

Appendix C

Vehicle Registration System Standard Record

OFFICE ID
WORK DATE (MMDDYY)
TECHNICIAN ID
TECHNICIAN SEQUENCE NUMBER
RECORD DESCRIPTION CODE
TRANSACTION CODE = C10
CORRECTED BY (TECH ID)
KEYED BY (TECH ID)
CURRENT LICENSE
TYPE LICENSE
TYPE TRANSACTION CODE
EXPIRATION DATE (MMDDYY)
BODY/HULL TYPE CODE
TYPE VEHICLE OR VESSEL CODE
LAST 3 POSITIONS VIN/HIN
FIRST 3 POSITIONS OF R/O NAME FIELD
VLF CLASS
DATE 1ST SOLD/VSL DATE OF PURCHASE (MMDDYY)
YEAR MODEL
REG ISSUE DATE (MMDDYY)
PAPER ISSUE CODE (L/O CODE)
GENERATED VALUE
WAIVED VALUE
NET VALUE THIS TRANSACTION
VIN/HIN
BODY TYPE MODEL
MAKE/BUILDER
FEE DATA (OCCURS 0 - 99 TIMES)
CREDIT CARD NUMBER
CREDIT CARD EXPIRATION MONTH/YEAR
CREDIT CARD APPROVAL NUMBER
CREDIT CARD REFUND INDICATOR (= 0 OR 1)
KEYED ADMIN SERVICE FEE 1 INDICATOR
KEYED ADMIN SERVICE FEE 2 INDICATOR
DATE FEES DUE/1ST OPERATED/LAST TRANSFERRED
DATE FEES RECEIVED
ORIGINAL DATE FEES RECEIVED
ORIGINAL RDF DATE
REPORT OF SALE NUMBER
PNO INDICATOR
MOTIVE POWER/VESSEL FUEL CODE
AXLES
UNLADEN WEIGHT
WEIGHT CODE
VLF EXEMPTION CODE
DISABLED VET PERCENT OF OWNERSHIP (00 - 99)
INVENTORY CODE (PLATE)
REFLECTORIZED PLATE INDICATOR = Y
INVENTORY CODE (STICKER)
STICKER NUMBER ISSUED
DATA ENTRY RECEIPT NUMBER ISSUED
TOTAL CASH

Integrated Traffic Safety Problem Identification Database

TOTAL VALUE - CHECKS/MONEY ORDERS (FR/DL/OL
TOTAL NUMBER OF CHECKS/MONEY ORDERS
TOTAL MANUAL/PH I RECEIPTS VALUE
TOTAL PHASE II RECEIPTS VALUE
TOTAL CREDIT CARD VALUE
ADJUSTED PAYMENT DATA
PHASE II RECEIPT DATA (OCCURS 0 - 5 TIMES)
CASH AMOUNT OF CHANGE DUE
HQ AMOUNT OF CHANGE DUE
ASTERISK YEAR OR VESSEL YEAR BUILT
CYLINDERS
CERTS MAILED FROM HQ
PARTIAL YEAR CODE = 2 POSITION MONTH
PRIOR TYPE LICENSE
PRIOR LICENSE
HULL MATERIAL
PROPULSION
VESSEL LENGTH (FEET)
VESSEL LENGTH (INCHES)
REG OWNER ALLOCATED OR SITUS COUNTY CODE
REG OWNER TOO LONG INDICATOR
LEGAL OWNER TOO LONG INDICATOR
VIN/HIN TOO LONG INDICATOR
ENGINE TOO LONG INDICATOR
DATA TO BYPASS STOPS
PRORATE OPERATOR/LESSOR NUMBER
MULTIPLE TRANSFER INDICATOR (# OF TRANSFERS
LAST TRANSFER DATE OR
PURCHASE PRICE (INCLUDES CENTS)
VEHICLE VALUE
PRIOR HISTORY CODE/DATE
USE TAX PAID TO OTHER STATE
BUNDLE ID OR MULTIPLE INDICATOR
DEALER NUMBER
DUAL REGISTRATION CODE
PWO STATUS
REFUND DUE NAME (IF NOT= REG OWNER)
REFUND DUE NAME/ADDRESS (IF NOT= REG OWNER)
REFUND DUE NAME/ADDRESS (IF NOT= REG OWNER)
REFUND DUE NAME/ADDRESS (IF NOT= REG OWNER)
REFUND DUE ADDRESS (IF NOT= REG OWNER)
REFUND DUE CITY (IF NOT= REG OWNER)
REFUND DUE TO STATE (IF NOT= REG OWNER)
REFUND DUE TO ZIP (IF NOT= REG OWNER)
ENGINE NUMBER
REG OWNER FIRST LINE NAME
REG OWNER SECOND LINE CODE
REG OWNER SECOND LINE NAME OR ADDRESS
REG OWNER THIRD LINE CODE
REG OWNER THIRD LINE NAME OR ADDRESS
REG OWNER FOURTH LINE CODE
REG OWNER FOURTH LINE NAME OR ADDRESS
REG OWNER FIFTH LINE ADDRESS
REG OWNER CITY OR STATE, IF OUT OF STATE
REG OWNER COUNTY CODE
REG OWNER ZIP CODE
LEG OWNER FIRST LINE NAME
LEG OWNER SECOND LINE CODE

LEG OWNER SECOND LINE NAME OR ADDRESS
 LEG OWNER THIRD LINE CODE
 LEG OWNER THIRD LINE NAME OR ADDRESS
 LEG OWNER FOURTH LINE ADDRESS
 LEG OWNER CITY, OR STATE IF OUT OF STATE
 LEG OWNER ZIP CODE
 LEG OWNER OUT OF STATE INDICATOR
 REG OWNER SITUS ADDRESS
 REG OWNER SITUS CITY
 EQUIPMENT NUMBER
 PEACE OFFICER EMPLOYING AGENCY
 PREVIOUS REG OWNER NAME
 PREVIOUS REG OWNER NAME/ADDRESS
 PREVIOUS REG OWNER NAME/ADDRESS
 PREVIOUS REG OWNER NAME/ADDRESS
 PREVIOUS REG OWNER ADDRESS
 PREVIOUS REG OWNER CITY OR STATE (IF O/S)
 PREVIOUS REG OWNER ZIP
 STATE CODE
 TITLE NUMBER
 YEAR OUT OF STATE REGISTRATION
 OUT OF STATE LICENSE NUMBER
 OUT OF STATE TITLE SURRENDERED (Y/N)
 CALIFORNIA TITLE ISSUED (Y/N)
 OWNERSHIP ISSUED DATE (MMDDYY)
 SMOG DATE OR DISMT FEES PAID DATE (MMDDYY)
 MISC INDICATOR
 COMPUTER DATE WHEN INVENTORY ISSD (MMDDYY)
 HEAVY VEHICLE USE TAX CODE & DATE
 CITATION HQ CODE INDICATOR (00 - 07)
 LESSEE NAME
 LESSEE 2ND LINE CODE
 LESSEE 2ND LINE NAME OR ADDRESS
 LESSEE 3RD LINE CODE
 LESSEE 3RD LINE NAME OR ADDRESS
 LESSEE 4TH LINE ADDRESS
 LESSEE CITY
 LESSEE COUNTY CODE
 LESSEE ZIP CODE
 LESSEE STATE CODE (IF O/S)
 LESSEE DATE (MMDDYY)
 E68 DELETION CODE
 REG STATUS EFFECTIVE YEAR (YY OR SPACE)
 VLF REFUND VALUE
 VLF REFUND ADMIN. SERVICE FEE VALUE
 VLF REFUND DATE (MMDDYY)
 VLF RECLASS DATE (MMDDYY)
 E73 NRESMOG REASON CODE
 E74 PURGE INDICATOR
 REG VALID FROM DATE
 C STOP INDICATOR (Y, N OR SPACE)
 1ST LINE DL/ID R/O NAME POSITION INDICATOR
 1ST DL/ID CARD NUMBER
 1ST LINE NAME CODE (P, C, F OR N)
 2ND DL/ID R/O NAME POSITION INDICATOR
 2ND DL/ID CARD NUMBER
 3RD DL/ID R/O NAME POSITION INDICATOR
 3RD DL/ID CARD NUMBER

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FILLER
NON-REPAIRABLE OR WRECK DATE (MMDDYY)
E77 INDICATOR
BILLING NOTICE INDICATOR (Y, N, OR SPACE)
CITY CODE
REFLECTORIZED PLATE CODE
COLLEGIATE CODE (001 = UCLA)
ODOMETER READING
CURRENT ODOMETER DATE (MMDDCCYY)
PRIOR ODOMETER DATE (MMDDCCYY)
MILES OR KILOMETER INDICATOR
BRAND CODE (A, E OR N)
SMOG REASON CODE
ORGANIZATION CODE
THIRD VEHICLE TYPE LICENSE
THIRD VEHICLE LICENSE #
THIRD VEHICLE 1ST 3 POSITIONS R/O NAME
SPECIAL PLATE DATE FEES RECEIVED
DELINQUENT REG OR FRANCHISE TAX INDICATOR
SUB E, RCC26 DELINQUENT REG YRS AND AMOUNTS
FTB RECORD BUILT INDICATOR (= Y OR SPACE)
NON-REPAIRABLE REASON CODE
SMOG INSPECTION CERTIFICATE NUMBER
SMOG TYPE CODE OR E79 OR E80 DELETE CODE
LIVERY BILLING INDICATOR
USE TAX EXEMPTION CODE
VIN INSPECTION INDICATOR (C=CHP, D=DMV)
PNO TYPE (01 = CLOSED, 02 = OPEN ENDED)
REVENUE LOSS
FILLER
ERROR CODES (2-BYTES, OCCURS 0-5 TIMES)

Appendix D

SWITRS Standard Record

STATEWIDE INTEGRATED TRAFFIC RECORDS SYSTEM (SWITRS)

EACH RECORD IS COMPOSED OF SEGMENTS IN SEQUENCE:

NAME	COUNT	LENGTH IN BYTES
COLLISION	1	162
PARTY	PT	37
VICTIM	VC	10

UNUSED PARTY SEGMENTS TRAIL THOSE USED AND ARE BLANK; TOTAL COUNT IS THE MAXIMUM OBSERVED IN THE FILE AS SELECTED TO MEET REQUIREMENTS OF THE REQUEST. UNUSED VICTIM SEGMENTS TRAIL THOSE USED AND ARE BLANK; TOTAL COUNT IS THE MAXIMUM OBSERVED IN THE SELECTED FILE.

COLLISION SEGMENT:

PROCESS DATE (BYTE 1, LENGTH 6)
 (YYMMDD) TWO DIGITS YEAR, TWO DIGITS MONTH, TWO DIGITS DAY. DATE OF ENTRY OF COLLISION REPORT OR SUPPLEMENTAL REPORT INTO SWITRS.

JURISDICTION (BYTE 7, LENGTH 4)
 (REPORTING) TWO DIGITS COUNTY, TWO DIGITS CITY; OR
 (NCIC NUMBER) TWO DIGITS COUNTY, "00", SHERIFF CONTRACT; OR "9" AND THREE DIGITS CHP AREA.

COLLISION DATE (BYTE 11, LENGTH 6)
 (YYMMDD) TWO DIGITS YEAR, TWO DIGITS MONTH, TWO DIGITS DAY.

COLLISION TIME (BYTE 17, LENGTH 4)
 (HHMM) 0000 TO 2359 - TWO DIGITS HOUR, TWO DIGITS MINUTE.
 2500 - UNKNOWN.

BADGE (BYTE 21, LENGTH 5)
 LAST FIVE DIGITS OF BADGE NUMBER OF INVESTIGATING OFFICER.
 99999 - OFFICER ID NUMBER NOT STATED OR ILLEGIBLE OR ALPHA.

JURISDICTION TYPE (BYTE 26, LENGTH 1)
 1 - CHP JURISDICTION
 2 - OTHER

DISTRICT WITHIN (BYTE 27, LENGTH 4)
 JURISDICTION FOUR DIGITS OR
 (LOCAL OPTION) 0000 - NOT STATED

Integrated Traffic Safety Problem Identification Database

LOCAL REPORT (BYTE 31, LENGTH 15)
(LOCAL OPTION) COLLISION CASE NUMBER ASSIGNED BY
REPORTING JURISDICTION.

COLLISION DAY OF WEEK (BYTE 46, LENGTH 1)
1 - MONDAY
2 - TUESDAY
3 - WEDNESDAY
4 - THURSDAY
5 - FRIDAY
6 - SATURDAY
7 - SUNDAY

COLLISION SHIFT (BYTE 47, LENGTH 1)
1 - 0600 THRU 1359
2 - 1400 THRU 2159
3 - 2200 THRU 0559
4 - CHP NOT STATED
5 - NOT CHP

POPULATION (BYTE 48, LENGTH 1)
(CITY/RURAL GROUP)
1 - INCORPORATED (LESS 2500)
2 - INCORPORATED (2500 TO 10000)
3 - INCORPORATED (10000 TO 25000)
4 - INCORPORATED (25000 TO 50000)
5 - INCORPORATED (50000 TO 100000)
6 - INCORPORATED (100000 TO 250000)
7 - INCORPORATED (GREATER 250000)
9 - UNINCORPORATED (RURAL)
0 - UNIVERSITY (PRIVATE PROPERTY)

COLLISION LOCATION (BYTE 49, LENGTH 4)
(CII) TWO DIGITS COUNTY, TWO DIGITS CITY; OR
TWO DIGITS COUNTY, "00", UNINCORPORATED.

SPECIAL CONDITION (BYTE 53, LENGTH 1)
1 - SCHOOLBUS ON PUBLIC ROADWAY (CHP BEAT
OR CHP ADM BEAT 901)
2 - STATE UNIVERSITY (ALSO SFIA)
3 - SCHOOLBUS NOT ON PUBLIC ROADWAY
(CHP ADM BEAT 903)
4 - OFF ROAD (UNIMPROVED) (CHP ADM BEAT 906, 907)
5 - VISTA POINT OR REST AREA (CHP ADM BEAT 903)
OR SCALES OR INSPECTION FACILITY (CHP
COMMERCIAL BEAT 860-898)
6 - OTHER PUBLIC ACCESS (IMPROVED)
(CHP ADM BEAT 903)
0 - NOT ABOVE
(SPECIAL CONDITION GREATER THAN 1
TREATED AS PRIVATE PROPERTY.)

BEAT TYPE (BYTE 54, LENGTH 1)
1 - CHP STATE HIGHWAY
2 - CHP COUNTY ROAD LINE

- 3 - CHP COUNTY ROAD AREA
 - 4 - SCHOOLBUS ON CITY ROADWAY (CHP ADM BEAT 901)
 - 5 - SCHOOLBUS NOT ON PUBLIC ROADWAY
(CHP ADM BEAT 903)
 - 6 - OFF ROAD (UNIMPROVED) (CHP ADM BEAT 906, 907)
 - 7 - VISTA POINT OR REST AREA (CHP ADM BEAT 903)
OR SCALES OR INSPECTION FACILITY
(CHP COM BEAT 860-898)
 - 8 - OTHER PUBLIC ACCESS (IMPROVED)
(CHP ADM BEAT 903)
 - 0 - NOT CHP
- (BEAT TYPE GREATER 3 EXCLUDED FROM CHP STATISTICS.)

CHP BEAT TYPE (BYTE 55, LENGTH 1)

1 - INTERSTATE	CONTRACT CITY:
2 - US HIGHWAY	6 - US HIGHWAY
3 - STATE ROUTE	7 - STATE ROUTE
4 - COUNTY ROAD LINE	8 - COUNTY ROAD LINE
5 - COUNTY ROAD AREA	9 - COUNTY ROAD AREA
A - ALL ADMINISTRATIVE ("SPECIFIED")	
0 - NOT CHP	

COUNTY GROUP (BYTE 56, LENGTH 1)

- 1 - NORTH (NOT BAY)
- 2 - BAY
- 3 - CENTRAL
- 4 - SOUTH (NOT LOS ANGELES)
- 5 - LOS ANGELES (ONLY)

CITY DIVISION (BYTE 57, LENGTH 1)
(LAPD) ALPHABETIC

CHP BEAT CLASS (BYTE 58, LENGTH 1)

- 1 - CHP PRIMARY
- 2 - CHP OTHER
- 0 - NOT CHP

BEAT (BYTE 59, LENGTH 3)
THREE DIGITS, CHP OR LOCAL

CHP ROAD CLASS (BYTE 62, LENGTH 1)

- 1 - STATE HIGHWAY
- 2 - OTHER NOT CITY OR PRIVATE PROPERTY
- 3 - OTHER IN CITY
- 4 - OTHER ON PRIVATE PROPERTY
- 0 - NOT CHP

PRIMARY ROAD (BYTE 63, LENGTH 18)
ROAD, STREET, OR HIGHWAY ON WHICH
COLLISION OCCURRED.

SECONDARY ROAD (BYTE 81, LENGTH 18)
ROAD, STREET, OR HIGHWAY INTERSECTING
PRIMARY ROAD AND NEAR WHICH COLLISION

OCCURRED.

ROAD SWITCH (BYTE 99, LENGTH 1)
 * - PRIMARY AND SECONDARY ROAD NAMES
 HAVE BEEN INTERCHANGED.

DISTANCE (BYTE 100, LENGTH 5)
 FIVE DIGITS DISTANCE IN FEET FROM (THE
 CENTER OF) INTERSECTION OF PRIMARY AND
 SECONDARY ROADS TO POINT OF COLLISION.

DIRECTION (BYTE 105, LENGTH 1)
 DIRECTION FROM INTERSECTION OF PRIMARY
 AND SECONDARY ROADS TO POINT OF COLLISION.
 N - NORTH
 E - EAST
 S - SOUTH
 W - WEST
 - - NOT STATED, IN INTERSECTION

INTERSECTION (BYTE 106, LENGTH 1)
 1 - INTERSECTION
 2 - NOT INTERSECTION

WEATHER-2 (BYTE 107, LENGTH 1)
 SEE WEATHER-1, BYTE 160.

STATE HIGHWAY INDICATOR (BYTE 108, LENGTH 1)
 1 - ON STATE HIGHWAY
 2 - ASSOCIATED WITH STATE HIGHWAY
 0 - NOT ABOVE

COUNTY (BYTE 109, LENGTH 3)
 (CALTRANS) THREE ALPHA ABBREVIATION

CALTRANS DISTRICT (BYTE 112, LENGTH 2)
 01 TO 12 - CALTRANS DISTRICT
 00 - NOT STATE HIGHWAY

STATE ROUTE (BYTE 114, LENGTH 3)
 (INCLUDES FEDERAL) 001 TO 999 - STATE ROUTE
 000 - NOT STATE HIGHWAY

ROUTE SUFFIX (BYTE 117, LENGTH 1)
 B - NOT NEEDED (BLANK FROM NOT STATED)
 P - PRIOR (OBSOLETE)
 S - SUPPLEMENTAL ALIGNMENT, PARTIAL OPENED
 FOR USE BEFORE ALIGNMENT IS COMPLETE
 AS A THROUGH ROUTE
 U - UNRELINQUISHED, SUPERSEDED BY REALIGN-
 MENT, BUT NOT YET ACCEPTED FOR NON-
 STATE-HIGHWAY MAINTENANCE

POSTMILE PREFIX (BYTE 118, LENGTH 1)

- B - NOT NEEDED (BLANK FROM NOT STATED)
- C - ALIGNMENT RESERVED FOR COMMERCIAL VEHICLES
- D - POSTMILE DUPLICATED WITHIN COUNTY DUE TO MEANDERING COUNTY LINE
- H - REALIGNMENT OF "D"
- L - DUPLICATE POSTMILE DUE TO AN EQUATION
- M - REALIGNMENT OF REALIGNMENT
- N - REALIGNMENT OF REALIGNMENT OF REALIGNMENT
- R - REALIGNMENT
- S - LOCAL ROAD ADOPTED BY HIGHWAY COMMISSION TO CONNECT TWO STATE HIGHWAYS
- T - ROADWAY USED TEMPORARILY FOR THROUGH TRAFFIC DURING CONSTRUCTION

POSTMILE (BYTE 119, LENGTH 6)
SIX DIGITS (THREE WHOLE, THREE DECIMAL)

LOCATION TYPE (BYTE 125, LENGTH 1)
H - HIGHWAY
I - INTERSECTION
R - RAMP (OR COLLECTOR)
- - NOT STATE HIGHWAY

RAMP/INTERSECTION (BYTE 126, LENGTH 1)
1 - RAMP EXIT, LAST 50 FEET
2 - MID-RAMP
3 - RAMP ENTRY, FIRST 50 FEET
4 - NOT STATE HIGHWAY, RAMP-RELATED, WITHIN 100 FEET
5 - INTERSECTION
6 - NOT STATE HIGHWAY, INTERSECTION-RELATED, WITHIN 250 FEET
7 - HIGHWAY
8 - NOT STATE HIGHWAY

SIDE OF HIGHWAY (BYTE 127, LENGTH 1)
N - NORTHBOUND
S - SOUTHBOUND
E - EASTBOUND
W - WESTBOUND

APPLIES TO DIVIDED HIGHWAY, BASED ON NOMINAL DIRECTION OF ROUTE, FOR SINGLE VEHICLE IS SAME AS NOMINAL DIRECTION OF TRAVEL, OVERRULED BY IMPACT WITH SECOND VEHICLE AFTER CROSSING MEDIAN

INJURY, FATAL, OR TOW-AWAY (BYTE 128, LENGTH 1)
1 - YES
2 - NO

COLLISION SEVERITY (BYTE 129, LENGTH 1)
HIGHEST DEGREE OF INJURY IN COLLISION

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1 - FATAL
2 - SEVERE INJURY
3 - OTHER VISIBLE INJURY
4 - COMPLAINT OF PAIN
0 - PROPERTY DAMAGE ONLY (PDO)

VICTIMS KILLED (BYTE 130, LENGTH 2)
TWO DIGITS (00 TO 70)

VICTIMS INJURED (BYTE 132, LENGTH 2)
TWO DIGITS (00 TO 70)

VICTIMS (BYTE 134, LENGTH 2)
TWO DIGITS (00 TO 70)

PARTIES (BYTE 136, LENGTH 2)
TWO DIGITS (01 TO 15)

PARTY AT FAULT (BYTE 138, LENGTH 2)
TWO DIGITS (01 TO 15)
00 - NOT STATED

PRIMARY COLLISION FACTOR:

ALPHA (BYTE 140, LENGTH 1)
A - (VEHICLE) CODE VIOLATION
B - OTHER IMPROPER DRIVING
C - OTHER THAN DRIVER
D - UNKNOWN

CODE OF VIOLATION (BYTE 141, LENGTH 1)
B - BUSINESS AND PROFESSIONS
C - VEHICLE
H - CITY HEALTH AND SAFETY
I - CITY ORDINANCE
O - COUNTY ORDINANCE
P - PENAL
S - STREETS AND HIGHWAYS
W - WELFARE AND INSTITUTIONS

VIOLATION (BYTE 142, LENGTH 5)
FIVE DIGITS

VIOLATION SUBSECTION (BYTE 147, LENGTH 1)
ALPHABETIC OR NUMERIC

VIOLATION CATEGORY (BYTE 148, LENGTH 2)
01 - DRIVING OR BICYCLING UNDER INFLUENCE
OF ALCOHOL OR DRUG
02 - IMPEDING TRAFFIC
03 - UNSAFE SPEED
04 - FOLLOWING TOO CLOSELY
05 - WRONG SIDE OF ROAD
06 - IMPROPER PASSING

- 07 - UNSAFE LANE CHANGE
- 08 - IMPROPER TURNING
- 09 - AUTOMOBILE RIGHT-OF-WAY (NOT 11)
- 10 - PEDESTRIAN RIGHT-OF-WAY
- 11 - PEDESTRIAN VIOLATION
- 12 - TRAFFIC SIGNALS AND SIGNS
- 13 - HAZARDOUS PARKING
- 14 - LIGHTS
- 15 - BRAKES
- 16 - OTHER EQUIPMENT
- 17 - OTHER HAZARDOUS VIOLATION (NOT 22)
- 18 - OTHER THAN DRIVER (OR PEDESTRIAN)
- 19 -
- 20 -
- 21 - UNSAFE STARTING OR BACKING
- 22 - OTHER IMPROPER DRIVING
- 23 - PEDESTRIAN OR "OTHER" UNDER
INFLUENCE OF ALCOHOL OR DRUG
- 24 - FELL ASLEEP (MID 1987 ON)
- 00 - UNKNOWN

HIT AND RUN

- (BYTE 150, LENGTH 1)
- 1 - HIT AND RUN FELONY
 - 2 - HIT AND RUN MISDEMEANOR
 - 0 - NOT ABOVE

COLLISION TYPE

- (BYTE 151, LENGTH 2)
- 01 - HEAD-ON
 - 02 - SIDESWIPE
 - 03 - REAR-END
 - 04 - BROADSIDE
 - 05 - HIT OBJECT
 - 06 - OVERTURNED
 - 07 - AUTO/PEDESTRIAN
 - 08 - OTHER
 - 00 - NOT STATED

MOTOR VEHICLE
(OF FIRST CONTACT)
INVOLVED WITH
(MVIW)

- (BYTE 153, LENGTH 2)
- 01 - NON-COLLISION (E.G., OVERTURNED WITHOUT
COLLISION OR OCCUPANT JUMPED OUT)
 - 02 - PEDESTRIAN
 - 03 - OTHER MOTOR VEHICLE
 - 04 - MOTOR VEHICLE ON OTHER ROADWAY
 - 05 - PARKED MOTOR VEHICLE
 - 06 - TRAIN
 - 07 - BICYCLE
 - 08 - ANIMAL (NOT 10)
 - 09 - FIXED OBJECT (TREE, UTILITY POLE, LIGHT
STANDARD, GUARD RAIL, BOULDER, OR CONSTRUCTION
MACHINERY IN CONSTRUCTION AREA NOT IN MOTION)
 - 10 - OTHER OBJECT (ANIMAL-DRAWN CONVEYANCE, RIDDEN
ANIMAL, STREETCAR, FALLEN TREE OR STONE, CON-
STRUCTION MACHINERY IN MOTION IN CONSTRUCTION
AREA, OR OBJECT DROPPED FROM MOTOR VEHICLE BUT

NOT STILL IN MOTION (IF STILL IN MOTION, TYPE COLLISION = MVIW = 3))

- 11 - OTHER (OBSOLETE, COMBINED WITH NOT STATED)
- 00 - NOT STATED

PEDESTRIAN ACTION

- (BYTE 155, LENGTH 1)
- 1 - NO PEDESTRIAN INVOLVED
 - 2 - CROSSING IN CROSSWALK AT INTERSECTION
 - 3 - CROSSING IN CROSSWALK NOT AT INTERSECTION
 - 4 - CROSSING NOT IN CROSSWALK
 - 5 - IN ROAD, INCLUDING SHOULDER
 - 6 - NOT IN ROAD
 - 7 - APPROACHING/LEAVING SCHOOLBUS
 - 0 - NOT STATED

ROAD SURFACE

- (BYTE 156, LENGTH 1)
- 1 - DRY
 - 2 - WET
 - 3 - SNOWY OR ICY
 - 4 - SLIPPERY (MUDDY, OILY, ETC.)
 - 0 - NOT STATED

ROAD CONDITION 1,2,3

- (BYTE 157, 158, OR 159, LENGTH 1)
- 1 - HOLES, DEEP RUTS
 - 2 - LOOSE MATERIAL ON ROADWAY
 - 3 - OBSTRUCTION ON ROADWAY
 - 4 - CONSTRUCTION OR REPAIR ZONE
 - 5 - REDUCED ROADWAY WIDTH
 - 6 - FLOODED
 - 7 - OTHER
 - 8 - NO UNUSUAL CONDITION
 - 0 - NOT STATED

WEATHER-1

- (BYTE 160, LENGTH 1)
- 1 - CLEAR SEE WEATHER-2, BYTE 107
 - 2 - CLOUDY CROSS EDITED AS FOLLOWS:
 - 3 - RAINING WEATHER-1 WEATHER-2
 - 4 - SNOWING 0 0
 - 5 - FOG >0 0 OR > WEATHER-1
 - 6 - OTHER 1 >5
 - 7 - WIND 3 >4
 - 0 - NOT STATED

LIGHTING

- (BYTE 161, LENGTH 1)
- 1 - DAYLIGHT
 - 2 - DUSK - DAWN
 - 3 - DARK - STREET LIGHTS
 - 4 - DARK - NO STREET LIGHTS
 - 5 - DARK - STREET LIGHTS NOT FUNCTIONING
 - 0 - NOT STATED

RIGHT-OF-WAY CONTROLS

- (BYTE 162, LENGTH 1)
- 1 - FUNCTIONING
 - 2 - NOT FUNCTIONING

- 3 - OBSCURED
- 4 - NONE
- 0 - NOT STATED

PARTY SEGMENT:

PARTY TYPE (BYTE 1, LENGTH 1)

- 1 - DRIVER (INCLUDING HIT AND RUN)
- 2 - PEDESTRIAN
- 3 - PARKED VEHICLE
- 4 - BICYCLIST
- 5 - OTHER (MOTOR VEHICLE WITHOUT A DRIVER, OR NON-MOTOR VEHICLE, E.G., RIDDEN ANIMAL, TRAIN, OR BUILDING, ON/IN WHICH THERE IS A VICTIM)

PARTY SEX (BYTE 2, LENGTH 1)

- 1 - MALE
- 2 - FEMALE
- 0 - NOT STATED

PARTY AGE (BYTE 3, LENGTH 2)

- 01 TO 99 - COMPUTED FROM PARTY BIRTHDATE
- 00 - NOT STATED

PARTY EXTENT OF INJURY (BYTE 5, LENGTH 1)

- 1 - KILLED (DIED NO LATER THAN 30 DAYS AFTER COLLISION)
- 2 - SEVERE INJURY
- 3 - OTHER VISIBLE INJURY
- 4 - COMPLAINT OF PAIN
- 0 - NO INJURY

PARTY SOBRIETY (SDP-1) (BYTE 6, LENGTH 1)

- 1 - HNBD - HAD NOT BEEN DRINKING
- 2 - HBD - HAD BEEN DRINKING, UNDER INFLUENCE
- 3 - HBD - HAD BEEN DRINKING, NOT UNDER INFLUENCE
- 4 - HBD - HAD BEEN DRINKING, IMPAIRMENT UNKNOWN
- 7 - IMPAIRMENT UNKNOWN (HIT AND RUN)
- 0 - NOT STATED/NOT APPLICABLE

PARTY DRUG-PHYSICAL (BYTE 7, LENGTH 1)

- 5 - UNDER DRUG INFLUENCE
- 6 - OTHER PHYSICAL IMPAIRMENT
- 8 - SLEEPY, FATIGUED
- 0 - NOT STATED/NOT APPLICABLE

DIRECTION OF TRAVEL (BYTE 8, LENGTH 1)

- N - NORTH
- E - EAST
- S - SOUTH
- W - WEST
- - NOT STATED

SPECIAL INFORMATION (BYTE 9, LENGTH 1)

- 1 - HAZARDOUS MATERIALS
- 2 - FIRE INVOLVED
- 3 - TIRE DEFECT/FAILURE
- 0 - NOT STATED

OTHER ASSOCIATED FACTOR:

CODE OF VIOLATION (BYTE 10, LENGTH 1)
B - BUSINESS AND PROFESSIONS
C - VEHICLE
H - CITY HEALTH AND SAFETY
I - CITY ORDINANCE
O - COUNTY ORDINANCE
P - PENAL
S - STREETS AND HIGHWAYS
W - WELFARE AND INSTITUTIONS

VIOLATION (BYTE 11, LENGTH 5)
FIVE DIGITS

VIOLATION SUBSECTION (BYTE 16, LENGTH 1)
ALPHABETIC OR NUMERIC

VIOLATION CATEGORY (BYTE 17, LENGTH 2)

- 01 - UNDER INFLUENCE IN PUBLIC (647F)
- 02 - COUNTY ORDINANCE
- 03 - CITY ORDINANCE
- 05 - BUSINESS/PROFESSIONS CODE
- 06 - FELONY PENAL CODE (NOT 15)
- 08 - CONTROLLED SUBSTANCES (FELONY HEALTH & SFTY)
- 09 - HEALTH/SAFETY CODE (MISDMR)
- 10 - PENAL CODE (MISDMR-NOT 647F & 647FF)
- 11 - STREETS/HIGHWAYS CODE LESS 27176
- 13 - WELFARE/INSTITUTIONS CODE
- 15 - MANSLAUGHTER
- 16 - NON-VEHICLE CODE NOT SPECIFIED ABOVE
- 17 - FISH & GAME CODE
- 18 - AGRICULTURE CODE
- 19 - HIT AND RUN
- 20 - DRIVING OR BICYCLING UNDER INFLUENCE
OF ALCOHOL OR DRUG
- 21 - IMPROPER LANE
- 22 - IMPEDING TRAFFIC
- 23 - FAILURE TO HEED STOP SIGNAL
- 24 - FAILURE TO HEED STOP SIGN
- 25 - UNSAFE SPEED
- 26 - RECKLESS DRIVING
- 27 - WRONG SIDE OF ROAD
- 28 - UNSAFE LANE CHANGE
- 29 - IMPROPER PASSING
- 30 - FOLLOWING TOO CLOSELY
- 31 - IMPROPER TURNING
- 33 - AUTOMOBILE RIGHT-OF-WAY
- 34 - PEDESTRIAN RIGHT-OF-WAY

- 35 - PEDESTRIAN VIOLATION
- 37 -
- 38 - HAZARDOUS PARKING
- 39 - LIGHTS
- 40 - BRAKES
- 43 - OTHER EQUIPMENT
- 44 - OTHER HAZARDOUS MOVEMENT
- 46 - IMPROPER REGISTRATION
- 47 - OTHER NON-MOVING VIOLATION
- 48 - EXCESSIVE SMOKE
- 49 - EXCESSIVE NOISE
- 50 - OVERWEIGHT
- 51 - OVERSIZE
- 52 - OVER MAXIMUM SPEED
- 53 - UNSAFE STARTING OR BACKING
- 60 - OFF-HIGHWAY VEHICLE VIOLATION
- 61 - CHILD RESTRAINT (1988 ON)
- 62 - SEAT BELT (1988 ON)
- 63 - SEAT BELT (EQUIPMENT) (1988 ON)
- 00 - NOT STATED

OTHER ASSOCIATED
FACTOR 1,2,3

- (BYTE 19, 20, OR 21, LENGTH 1)
- A - VIOLATION (B, C, D HAVE BEEN COLLAPSED TO A)
 - E - VISION OBSCUREMENTS
 - F - INATTENTION
 - G - STOP AND GO TRAFFIC
 - H - ENTERING/LEAVING RAMP
 - I - PREVIOUS COLLISION
 - J - UNFAMILIAR WITH ROAD
 - K - DEFECTIVE VEHICLE EQUIPMENT
 - L - UNINVOLVED VEHICLE
 - M - OTHER
 - N - NONE APPARENT
 - O - RUNAWAY VEHICLE (1982 ON)
 - Z - NOT STATED

VICTIMS KILLED IN
OR ON THIS PARTY

- (BYTE 22, LENGTH 2)
- 00 TO 70 - KILLED VICTIMS RELATED TO THIS PARTY

VICTIMS INJURED IN
OR ON THIS PARTY

- (BYTE 24, LENGTH 2)
- 00 TO 70 - INJURED VICTIMS RELATED TO THIS PARTY

MOVEMENT PRECEDING
COLLISION

- (BYTE 26, LENGTH 2)
- 01 - STOPPED IN ROADWAY
 - 02 - PROCEEDING STRAIGHT
 - 03 - RAN OFF ROAD
 - 04 - MAKING (OR WAITING TO MAKE) RIGHT TURN
(NOT LANE CHANGE)
 - 05 - MAKING (OR WAITING TO MAKE) LEFT TURN
(NOT LANE CHANGE)
 - 06 - MAKING (OR WAITING TO MAKE) U TURN
 - 07 - BACKING (NOT IN PARKING AREA)
 - 08 - SLOWING/STOPPING
 - 09 - PASSING OTHER VEHICLE (IN OPPOSING LANE,

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- NOT OVERTAKING IN MULTI-LANE)
- 10 - CHANGING LANES
- 11 - PARKING MANEUVER (NOT 12)
- 12 - ENTERING TRAFFIC FROM SHOULDER, MEDIAN,
PARKING STRIP, OR PRIVATE DRIVE (INCLUDES
BACKING FROM PARKED POSITION OR DRIVEWAY)
- 13 - OTHER UNSAFE TURNING
- 14 - CROSSED INTO OPPOSING LANE (UNPLANNED)
- 15 - PARKED (LEGALLY OR ILLEGALLY), NOT IN ROADWAY
- 16 - MERGING
- 17 - TRAVELING WRONG WAY
- 18 - OTHER
- 99 - NOT APPLICABLE (PEDESTRIAN)
- 00 - NOT STATED

VEHICLE MODEL YEAR (BYTE 28, LENGTH 2)
01 TO NN - 1901 TO 19NN (CLSN YR + 1)
99 - PEDESTRIAN, BICYCLE, NOT STATED

VEHICLE MAKE (BYTE 30, LENGTH 2)

- 01 - AMERICAN MOTORS
- 02 - BUICK
- 03 - CADILLAC
- 04 - CHEVROLET
- 05 - CHRYSLER
- 06 - DODGE
- 08 - FORD
- 09 - GMC (LATE 1995 ON)
- 11 - LINCOLN
- 12 - MERCURY
- 14 - OLDSMOBILE
- 16 - PLYMOUTH
- 17 - PONTIAC
- 18 -
- 30 - OTHER DOMESTIC
- 51 - DATSUN/NISSAN
- 52 - FIAT
- 53 - MERCEDES-BENZ
- 54 - LEXUS (LATE 1995 ON)
- 55 - ACCURA (LATE 1995 ON)
- 56 - MITSUBISHI (LATE 1995 ON)
- 57 - HYUNDAI (LATE 1995 ON)
- 58 - TOYOTA
- 59 - VOLKSWAGON
- 60 - VOLVO
- 61 - HONDA
- 62 - MAZDA
- 63 - AUDI
- 64 - BMW
- 65 - PORSCHE
- 66 - SUBARU
- 70 - OTHER FOREIGN
- 98 - PEDESTRIAN, BICYCLE, NOT STATED, OR WITH PARTY
TYPE "OTHER" BUT NOT COVERED BY 99 BELOW

99 - TRUCK OTHER THAN PICKUP, BUS, MOTORCYCLE,
MOTOR-DRIVEN CYCLE, GOLF CART, GO CART, OR
MOTOR HOME
(PICKUP TRUCK IS INCLUDED UNDER MAKE.)

STATEWIDE VEHICLE TYPE (BYTE 32, LENGTH 2)

- 01 - (NON-EMERGENCY) PASSENGER CAR, STATION WAGON,
OR JEEP
- 02 - (NON-EMERGENCY) PASSENGER CAR, STATION WAGON,
OR JEEP WITH TRAILER(S)
- 03 - (NON-EMERGENCY) MOTORCYCLE, MOTOR-DRIVEN
CYCLE, OR MOTORSCOOTER
- 04 - PICKUP OR PANEL TRUCK
- 05 - PICKUP OR PANEL TRUCK WITH TRAILER(S)
- 06 - TRUCK OR TRUCK TRACTOR
- 07 - TRUCK OR TRUCK TRACTOR WITH TRAILER(S)
- 08 - SCHOOLBUS, AS DEFINED BY V.C. 545, 546, 680.
- 09 - OTHER BUS, AS DEFINED BY V.C. 233
- 10 - EMERGENCY VEHICLE, AS DEFINED BY V.C. 165,
WHETHER OR NOT IN EMERGENCY SERVICE (CHP,
POLICE, SHERIFF, FIRE, AMBULANCE, OR RESCUE)
- 11 - HIGHWAY CONSTRUCTION EQUIPMENT, AS DEFINED BY
V.C. 565 (ONLY WHILE NOT IN CONSTRUCTION AREA,
BECOMES AN OBJECT IN AREA--SEE MVIW)
- 12 - BICYCLE
- 13 - OTHER (MOTOR HOME, FORK LIFT, MOBILE EQUIP-
MENT, IMPLEMENT OF HUSBANDRY, GOLF CART,
AIRPORT LIMOUSINE, OR, IF CARRYING A VICTIM,
A NON-MOTOR VEHICLE (SEE VICTIM TYPE "OTHER"))
(FOR 1979 ON INCLUDES FARM LABOR VEHICLE)
- 14 - PEDESTRIAN
- 15 - MOTORIZED BICYCLE (1977 ON)
- 00 - NOT STATED (ALSO NOT CHP)

(THE TERM TRAILER(S) FOR STATEWIDE VEHICLE TYPE
MEANS ANY TOW--A TRAILER, A VEHICLE, OR EVEN A
HOUSE. SPECIFIED VEHICLE TYPE IS INDEPENDENT OF
MODE OF REGISTRATION.)

CHP VEHICLE TYPE (BYTE 34, LENGTH 4)

(MMNN):

FOUR DIGITS, SEE BELOW FOR MM AND NN, DESCRIPTION
OF MM INCLUDES CORRESPONDING STATEWIDE VEHICLE TYPE

MM, NO-TOW OR TOWING	01 - (NON-EMERGENCY) PASSENGER CAR, STATION WAGON, OR JEEP	01/02
	02 - (NON-EMERGENCY) MOTORCYCLE	03
	03 - (NON-EMERGENCY) MOTOR-DRIVEN CYCLE (<15 HP)	03
	04 - BICYCLE	12
	05 - MOTORIZED BICYCLE	15
	06 - ALL TERRAIN VEHICLE (ATV)	03
	09 - PARATRANSIT BUS	09
	10 - TOUR BUS	09
	11 - OTHER COMMERCIAL BUS	09
	12 - NON-COMMERCIAL BUS	09
	13 - SCHOOLBUS WITHOUT PUPIL PASSENGERS	08

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14 - SCHOOLBUS PUBLIC I	08
15 - SCHOOLBUS PUBLIC II	08
16 - SCHOOLBUS PRIVATE I	08
17 - SCHOOLBUS PRIVATE II	08
18 - SCHOOLBUS CONTRACTUAL I	08
19 - SCHOOLBUS CONTRACTUAL II	08
20 - PUBLIC TRANSIT AUTHORITY	09
21 - TWO AXLE TANK TRUCK	06/07
22 - PICKUP OR PANEL TRUCK	04/05
23 - PICKUP TRUCK WITH CAMPER	04/05
24 - THREE AXLE TANK TRUCK	06/07
25 - TRUCK TRACTOR	06/07
26 - TWO-AXLE TRUCK	06/07
27 - THREE-AXLE TRUCK	06/07
41 - AMBULANCE	10
42 - DUNE BUGGY	01/02
43 - FIRE TRUCK (NOT RESCUE)	10
44 - FORKLIFT	13
45 - HIGHWAY CONSTRUCTION EQUIPMENT (ONLY WHILE NOT IN CONSTRUCTION AREA, BECOMES AN OBJECT IN AREA--SEE MVIW)	11
46 - IMPLEMENT OF HUSBANDRY	13
47 - MOTOR HOME	13
48 - CHP, POLICE, OR SHERIFF CAR, EMERGENCY SERVICE OR NOT	10
49 - CHP, POLICE, OR SHERIFF MOTORCYCLE, EMERGENCY SERVICE OR NOT	10
50 - MOBILE EQUIPMENT	13
51 - FARM LABOR VEHICLE	13
55 - TWO AXLE TOW TRUCK	06/07
56 - THREE AXLE TOW TRUCK	06/07
60 - PEDESTRIAN (INCLUDES MOTORIZED WHEELCHAIR)	14
61 - SCHOOL PUPIL ACTIVITY BUS I	08
62 - SCHOOL PUPIL ACTIVITY BUS II	08
63 - "YOUTH" BUS	08
71 - PASS. CAR-HAZARDOUS MATERIALS ONLY	01/02
72 - PICKUPS & PANELS-HAZ. MATERIALS ONLY	04/05
73 - PICKUPS & CAMPERS-HAZ MATERIALS ONLY	04/05
75 - TRUCK TRACTOR-HAZARDOUS MATERIALS ONLY	06/07
76 - TWO AXLE TRUCK-HAZARDOUS MATERIALS ONLY	06/07
77 - THREE OR MORE AXLE TRUCK-HAZ MAT. ONLY	06/07
78 - TWO AXLE TANK TRUCK-HAZ MATERIALS ONLY	06/07
79 - THREE AXLE TANK TRK-HAZ MATERIALS ONLY	06/07
81 - PASS. CAR-HAZ WASTE OR WASTE/MAT. COMBO	01/02
82 - PICKUPS & PANELS-HAZ WASTE OR COMBO	04/05
83 - PICKUPS & CAMPERS-HAZ WASTE OR COMBO	04/05
85 - TRUCK TRACTOR-HAZ WASTE OR COMBO	06/07
86 - TWO AXLE TRUCK-HAZ WASTE OR COMBO	06/07
87 - THREE OR MORE AXLE TRUCK-HAZ WASTE/COMBO	06/07
88 - TWO AXLE TANK TRUCK-HAZ WASTE OR COMBO	06/07
89 - THREE AXLE TANK TRK-HAZ WASTE OR COMBO	06/07
95 - MISCELLANEOUS NON-MOTORIZED VEHICLE (RIDDEN ANIMAL, ANIMAL-DRAWN CONVEYANCE, TRAIN, OR BUILDING) WITH VICTIM	13

96 - MISCELLANEOUS MOTORIZED VEHICLE (GOLF CART) 13
 99 - NOT STATED OR UNKNOWN (HIT AND RUN) 13
 00 - NOT CHP
 CHP VEHICLE TYPE (NO-TOW OR TOWING) GIVES RISE TO
 STATEWIDE VEHICLE TYPE AS INDICATED. CHP VEHICLE
 TYPE IS NOT PROVIDED FOR ANY NON-CHP REPORT.

NN, TOWED VEHICLE

- 01 - (NON-EMERGENCY) PASSENGER CAR,
STATION WAGON, OR JEEP
- 02 - (NON-EMERGENCY) MOTORCYCLE
- 03 - (NON-EMERGENCY) MOTOR-DRIVEN CYCLE
- 04 - BICYCLE
- 05 - MOTORIZED BICYCLE
- 06 - ALL TERRAIN VEHICLE (ATV)
- 09 - PARATRANSIT BUS
- 10 - TOUR BUS
- 11 - OTHER COMMERCIAL BUS
- 12 - NON-COMMERCIAL BUS
- 13 - SCHOOLBUS WITHOUT PUPIL PASSENGERS
- 14 - SCHOOLBUS PUBLIC I
- 15 - SCHOOLBUS PUBLIC II
- 16 - SCHOOLBUS PRIVATE I
- 17 - SCHOOLBUS PRIVATE II
- 18 - SCHOOLBUS CONTRACTUAL I
- 19 - SCHOOLBUS CONTRACTUAL II
- 20 - PUBLIC TRANSIT AUTHORITY
- 21 - TWO AXLE TANK TRUCK
- 22 - PICKUP OR PANEL TRUCK
- 23 - PICKUP TRUCK WITH CAMPER
- 24 - THREE AXLE TANK TRUCK
- 25 - TRUCK TRACTOR
- 26 - TWO-AXLE TRUCK
- 27 - THREE-AXLE TRUCK
- 28 - SEMI-TANK TRAILER
- 29 - PULL-TANK TRAILER
- 30 - TWO TANK TRAILER
- 31 - SEMI-TRAILER
- 32 - PULL TRAILER (INCLUDES DOLLY)
- 33 - TWO TRAILERS (OR 31 + 32)
- 34 - BOAT TRAILER
- 35 - UTILITY TRAILER
- 36 - TRAILER COACH
- 37 - EXTRALEGAL PERMIT LOAD
- 38 - POLE, PIPE, OR LOGGING DOLLY
- 39 - THREE TRAILERS (OR 31 + 33)
- 40 - FEDERALLY LEGAL SEMI TRAILER
- 41 - AMBULANCE
- 42 - DUNE BUGGY
- 43 - FIRE TRUCK (NOT RESCUE)
- 44 - FORKLIFT
- 45 - HIGHWAY CONSTRUCTION EQUIPMENT
- 46 - IMPLEMENT OF HUSBANDRY
- 47 - MOTOR HOME
- 48 - CHP, POLICE, OR SHERIFF CAR

- 49 - CHP, POLICE, OR SHERIFF MOTORCYCLE
- 50 - MOBILE EQUIPMENT
- 51 - FARM LABOR VEHICLE
- 52 - FEDERALLY LEGAL DBL CARGO COMBO (OVER 75')
- 53 - FIFTH WHEEL TRAILER (1991 ON)
- 54 - CONTAINER CHASSIS
- 55 - TWO AXLE TOW TRUCK
- 56 - THREE AXLE TOW TRUCK
- 61 - SCHOOL PUPIL ACTIVITY BUS I
- 62 - SCHOOL PUPIL ACTIVITY BUS II
- 63 - "YOUTH" BUS
- 71 - PASS. CAR-HAZARDOUS MATERIALS ONLY
- 72 - PICKUPS & PANELS-HAZ. MATERIALS ONLY
- 73 - PICKUPS & CAMPERS-HAZ MATERIALS ONLY
- 75 - TRUCK TRACTOR-HAZARDOUS MATERIALS ONLY
- 76 - TWO AXLE TRUCK-HAZARDOUS MATERIALS ONLY
- 77 - THREE OR MORE AXLE TRUCK-HAZ MAT. ONLY
- 78 - TWO AXLE TANK TRUCK-HAZ MATERIALS ONLY
- 79 - THREE AXLE TANK TRK-HAZ MATERIALS ONLY
- 81 - PASS. CAR-HAZ WASTE OR WASTE/MAT. COMBO
- 82 - PICKUPS & PANELS-HAZ WASTE OR COMBO
- 83 - PICKUPS & CAMPERS-HAZ WASTE OR COMBO
- 85 - TRUCK TRACTOR-HAZ WASTE OR COMBO
- 86 - TWO AXLE TRUCK-HAZ WASTE OR COMBO
- 87 - THREE OR MORE AXLE TRUCK-HAZ WASTE/COMBO
- 88 - TWO AXLE TANK TRUCK-HAZ WASTE OR COMBO
- 89 - THREE AXLE TANK TRK-HAZ WASTE OR COMBO
- 95 - MISCELLANEOUS NON-MOTORIZED VEHICLE (RIDDEN ANIMAL, ANIMAL-DRAWN CONVEYANCE, TRAIN, OR BUILDING) WITH VICTIM
- 96 - MISCELLANEOUS MOTORIZED VEHICLE (GOLF CART)
- 98 - ANY VEHICLE TYPE IN EMERGENCY USE
- 99 - OTHER TOW (SUPERSEDED 1974 BY 95, 96)
- 00 - CHP NO-TOW OR NOT CHP

VICTIM SEGMENT:

VICTIM TYPE

(BYTE 1, LENGTH 1)

- 1 - DRIVER
- 2 - PASSENGER (INCLUDES NON-OPERATOR ON BICYCLE OR ANY VICTIM ON/IN PARKED VEHICLE, OR MULTIPLE VICTIMS ON/IN NON-MOTOR VEHICLE)
- 3 - PEDESTRIAN
- 4 - BICYCLIST
- 5 - OTHER (SINGLE VICTIM ON/IN NON-MOTOR VEHICLE, E.G., RIDDEN ANIMAL, HORSE-DRAWN CARRIAGE, TRAIN, OR BUILDING)
- 6 - NON-INJURED PARTY

VICTIM SEX

(BYTE 2, LENGTH 1)

- 1 - MALE
- 2 - FEMALE
- 0 - NOT STATED

VICTIM AGE (BYTE 3, LENGTH 2)
 01 TO 99 - COMPUTED FROM PARTY BIRTHDATE IF
 APPROPRIATE; OTHERWISE, AS RECORDED
 (99 INCLUDES FETUS AND AGE 99)
 00 - NOT STATED

VICTIM EXTENT OF INJURY (BYTE 5, LENGTH 1)
 1 - KILLED (DIED NO LATER THAN 30 DAYS
 AFTER COLLISION)
 2 - SEVERE INJURY
 3 - OTHER VISIBLE INJURY
 4 - COMPLAINT OF PAIN
 0 - NON-INJURY

VICTIM IN PARTY (BYTE 6, LENGTH 2)
 01 TO 15 - ASSOCIATED PARTY

VICTIM SEATING POSITION (BYTE 8, LENGTH 1)
 1 - DRIVER
 2 TO 6 PASSENGERS
 7 - STATION WAGON REAR
 8 - REAR OCC TRR OR VAN
 9 - POSITION UNKNOWN
 0 - OTHER OCCUPANTS

VICTIM SAFETY EQUIPMENT (BYTE 9, LENGTH 1)
 OCCUPANT RESTRAINT

-
- A - NONE IN VEHICLE
 - B - UNKNOWN
 - C - LAP BELT USED
 - D - LAP BELT NOT USED
 - E - SHOULDER HARNESS USED
 - F - SHOULDER HARNESS NOT USED
 - G - LAP/SHOULDER HARNESS USED
 - H - LAP/SHOULDER HARNESS NOT USED
 - J - PASSIVE RESTRAINT USED
 - K - PASSIVE RESTRAINT NOT USED
 - L - AIR BAG DEPLOYED
 - M - AIR BAG NOT DEPLOYED
 - N - OTHER
 - P - NOT REQUIRED

CHILD RESTRAINT

-
- Q - IN VEHICLE USED
 - R - IN VEHICLE NOT USED
 - S - IN VEHICLE USE UNKNOWN
 - T - IN VEHICLE IMPROPER USED
 - U - NONE IN VEHICLE

M/C HELMET

-
- DRIVER
 - V - NO
 - W - YES

PASSENGER

X - NO
Y - YES

VICTIM EJECTED
FROM VEHICLE

(BYTE 10, LENGTH 1)
0 - NOT EJECTED
1 - FULLY EJECTED
2 - PARTIALLY EJECTED
3 - UNKNOWN

Appendix E

FARS Standard Record

Case Number - State Number
Consecutive Number
Transaction Code
Card Number
City / County
Accident Date
Time
Number of Vehicle Forms Submitted
Number of Person Forms Submitted
Number of Non-Motorist Forms Submitted
Federal-Aid System
Roadway Function Class
Route Signing
Trafficway Identifier
Milepoint
Special Jurisdiction
First Harmful Event
Manner of Collision
Relation To Junction
Relation To Roadway
Trafficway Flow
Number of Travel Lanes
Speed Limit
Roadway Alignment
Roadway Profile
Roadway Surface Type
Roadway Surface Condition
Traffic Control Device
Traffic Control Device Functioning
Hit-and-Run
Light Condition
Atmospheric Condition
Construction/Maintenance Zone
Notification Time EMS
School Bus Related
Related Factors-Accident Level
Rail Grade Crossing Identifier
Additional State Information
Vehicle Number
Number of Occupants

Vehicle Make, Vehicle Model
Body Type
Vehicle Model Year
Vehicle Identification Number
Registration State
Registered Vehicle Owner
Rollover
Jackknife
Travel Speed
Hazardous Cargo
Vehicle Trailing
Vehicle Configuration
Number of Axles
Cargo Body Type
Special Use
Emergency Use
Impact Point-Initial
Impact Point-Principal
Extent of Deformation
Vehicle Role
Manner of Leaving Scene
Fire Occurrence
Related Factors-Vehicle Level
Vehicle Maneuver
Crash Avoidance Maneuver
Most Harmful Event
Driver Presence
License State
Non-CDL License Status
Motor Vehicle License Status
Compliance with License Endorsements
Driver License Type Compliance
Compliance with License Restrictions
Violations Charged
Driver Level Counters
Date of First and Last Accident, Suspension, Conviction
Driver Zip Code
Related Factors-Driver Level
Vehicle Number Person Level
Person Number
Non-Motorist Striking Vehicle Number
Age
Sex
Person Type
Seating Position
Restraint System Use

Air Bag Availability - Function
Ejection
Ejection Path
Extrication
Non-Motorist Location
Police-Reported Alcohol Involvement
Method of Alcohol Determination (By Police)
Alcohol Test Result
Police Reported Other Drug Involvement
Method of Other Drug Determination By Police
Drug Test Type
Drug Test Results
Injury Severity
Taken To Hospital or Treatment Facility
Death Date
Death Time
Related Factors-Person Level
Death Certificate Number
Fatal Injury at Work

