NCHRP

SYNTHESIS 369

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

State DOT Crash Reconstruction Practices

A Synthesis of Highway Practice

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

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State DOT Crash Reconstruction Practices

A Synthesis of Highway Practice

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SUBJECT AREAS
Operations and Safety

Research Sponsored by the American Association of State Highway and Transportation Officials
in Cooperation with the Federal Highway Administration

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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

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FOREWORD

By Staff
Transportation
Research Board

Highway administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to highway administrators and engineers. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire highway community, the American Association of State Highway and Transportation Officials—through the mechanism of the National Cooperative Highway Research Program—authorized the Transportation Research Board to undertake a continuing study. This study, NCHRP Project 20-5, "Synthesis of Information Related to Highway Problems," searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an NCHRP report series, *Synthesis of Highway Practice.*

This synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

This synthesis will be of interest to state department of transportation (DOT) personnel, as well as to others who work with them in the area of crash reconstruction activities. The report documents the extent of crash reconstruction undertaken by state DOTs and the level of expertise available to perform the tasks. Additionally, the scope of work includes to what extent crash reconstructions are used by state DOTs to improve highway safety. The scope was limited, specifically, by the topic panel to focus on crash reconstruction conducted by DOTs (and not by law enforcement personnel, which is much more common), feedback provided, and mitigation actions taken to determine the use of DOT personnel or contractors when doing routine crash reconstructions, because this information is unknown. The scope also does not include the broad topic of procedures used to conduct detailed crash reconstruction.

This TRB synthesis contains information gathered from 43 states, supplemented by material collected as part of a literature review process. Although a substantial amount of literature addresses the general area of crash reconstruction and tort liability, and the management of risk related to transportation systems and facilities, little appears to address the uses and benefits of crash reconstruction by state DOTs. The level of involvement in crash reconstruction of state DOTs, as noted in the 43 responses to the synthesis survey, was determined to be relatively minor.

Jerry G. Pigman and Kenneth R. Agent, Kentucky Transportation Center, University of Kentucky, Lexington, collected and synthesized the information and wrote the report. The members of the topic panel are acknowledged on the preceding page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

CONTENTS

1 SUMMARY

3 CHAPTER ONE INTRODUCTION
- Background, 3
- Synthesis Objectives, 3
- Synthesis Scope, 4
- Report Organization, 4

5 CHAPTER TWO LITERATURE REVIEW

7 CHAPTER THREE SURVEY RESULTS
- Survey Procedures, 7
- Survey Responses, 7
- State Departments of Transportation Level of Involvement in Crash Reconstruction, 7
- Certification Required and Sources for Training in Crash Reconstruction, 9
- Equipment, Procedures, and Processes Used by State Departments of Transportation, 10
- Crash Reconstruction Justification and Criteria and Use of Data by State Departments of Transportation, 12
- Tort Liability and Sovereign Immunity, 13
- E-Mail Inquiry Through Local Technical Assistance Programs, 13
- State Department of Transportation Website Searches, 14

15 CHAPTER FOUR CONCLUSIONS

17 REFERENCES

18 APPENDIX A SURVEY QUESTIONNAIRE

22 APPENDIX B SUMMARY OF SURVEY RESPONSES FROM STATES INDICATING A UNIT OR ASSIGNED PERSONNEL PERFORMS ACCIDENT RECONSTRUCTION

28 APPENDIX C CALIFORNIA JOINT OPERATIONAL POLICY STATEMENT

STATE DOT CRASH RECONSTRUCTION PRACTICES

SUMMARY

Crash reconstructions are routinely performed by law enforcement agencies, typically for determination of liability or fault by drivers and possible criminal actions, but only occasionally by state departments of transportation (DOTs). State DOTs use crash data for assessing the safety of roadway sections and spots and may conduct crash reconstructions to assist with this assessment. A state DOT may also do a crash reconstruction as part of the defense of a claim against the agency. The extent of crash reconstruction by state DOTs and the level of expertise available to perform these tasks has not been documented. In addition, it is not known to what extent crash reconstructions are used by state DOTs to improve highway safety. This synthesis of the state of the practice in crash reconstruction as it involves state DOTs is intended to address these issues. The scope of this report was limited to determining the specific use by DOTs of their personnel or contractors to conduct routine crash reconstructions. The synthesis topic does *not* include the very broad issue of the procedures used to conduct a detailed crash reconstruction.

The primary objectives of this synthesis were crash reconstruction activities conducted by state DOTs, feedback provided from these reconstruction actions, and mitigation actions taken as a result. An attempt was made to determine the level of intra- and interagency communication, as well as education and training opportunities. This synthesis also addressed knowledge gaps and future research needs to assist state DOTs when performing crash reconstruction. It is anticipated that this report will provide useful information for all agencies involved in crash site investigations or reconstruction practices.

For the purposes of this synthesis and the survey distributed to state DOTs, crash reconstruction is defined as a process using specialized skills beyond typical police crash reporting to document and analyze the events leading to a collision and/or the cause of a collision. Law enforcement agencies use reconstruction data to support criminal investigations; however, it is assumed that the primary uses by DOTs are to identify highway safety problems and initiate countermeasures or improvements, or in defense in instances of litigation against the DOT.

The literature search determined that, although a large amount of research has been undertaken and accomplished to address the general area of crash reconstruction and tort liability and management of risk related to transportation systems and facilities, there has been little attempt to assess the use and benefits of crash reconstruction by state DOTs. Crash reconstruction practices that have been adopted and used by state highway agencies are typically related to managing risk associated with highway crashes involving transportation facilities. It is generally agreed that the goal of highway risk management should be to achieve effective and efficient transportation while minimizing risk of human injury and loss. A comprehensive risk management program was identified as a key element for allocating resources to achieve effective and efficient transportation while minimizing that risk. Reconstruction of highway crashes has been cited as one of the tools that can be used by state DOTs to manage that risk. It was noted that even though law enforcement personnel typically investigate highway crashes, there are circumstances where it would be advantageous for highway agencies to conduct their own investigations.

There were 26 responses to the state survey, with 11 additional responses obtained from a follow-up e-mail inquiry sent out through the network of Local Technical Assistance Program centers, and 7 states (Nevada was counted twice with e-mail and website information) where information was obtained from state transportation websites. This resulted in information being obtained from 43 states.

It was determined from the survey that the level of involvement in crash reconstruction by state DOTs was relatively minor. Of the 26 states returning the survey, only 6 (California, Delaware, Kansas, Kentucky, Oklahoma, and West Virginia) indicated that they had a unit or assigned personnel (including contractors) that performed crash reconstruction on a routine basis. Other states indicated that they hired consultants as needed to prepare crash reconstructions as part of specific litigation. The number of personnel involved ranged from one in West Virginia and Oklahoma to eight in California and Delaware (with two in Kentucky and five in Kansas).

A wide range of requirements were noted for the six states responding to the survey that indicated DOT personnel or consultants performed crash reconstruction. Basic measuring tools were frequently cited, along with reconstruction software and engineering design software that could also be used for crash reconstruction.

It was generally indicated that crash reconstruction was performed by the state police and information from that investigation was then used by the state DOT. The lack of crash reconstruction conducted by DOTs shows the need for communication and cooperation between DOTs and law enforcement agencies.

The primary justification for crash reconstruction was liability concerns. Similarly, criteria used to decide whether to reconstruct a crash typically included a potential claim or suit against the DOT, with severity of the crash and involvement of a government employee or property as secondary factors. Data from the reconstructions were typically used to improve traffic safety through system-wide improvements, specific site improvements, traffic engineering applications, and to complement a risk management program. Responses from the six states that submitted detailed responses indicated that only California had no limits for tort actions and that Delaware was one of only six states remaining with full sovereign immunity. Liability limits for each individual occurrence ranged from $350,000 in Kentucky and $500,000 in Kansas to $1,000,000 in both Oklahoma and West Virginia. Employees' discretionary acts are covered to some degree by sovereign immunity in all six states.

In summary, very few state DOTs conduct crash reconstructions on a routine basis. The lack of DOT crash reconstructions and their reliance on data from law enforcement shows the need for effective communication between the DOT and law enforcement and the need for training to ensure that law enforcement personnel properly recognize highway related issues. The procedures used in California and Delaware demonstrate that a team approach between the DOT and law enforcement can be achieved and illustrates the opportunity lost by other state DOTs that do not use this approach.

CHAPTER ONE

INTRODUCTION

BACKGROUND

Law enforcement agencies routinely undertake crash reconstructions, typically for the determination of liability or fault by drivers and for possible criminal actions. State departments of transportation (DOTs) use crash data for assessing the safety of roadway sections and more specific locations and may perform crash reconstructions to assist with this assessment. A state DOT may also conduct a crash reconstruction as part of the defense of a claim against the agency. The extent of crash reconstruction by state DOTs and the level of expertise available to perform these tasks has not previously been documented. In addition, it is not known to what extent crash reconstructions are used by state DOTs to improve highway safety. This synthesis is intended as a state-of-the-practice report in crash reconstruction as it involves state DOTs.

The scope of this report was limited specifically to the use by DOTs of their personnel or contractors to conduct routine crash reconstructions. It does not include the very broad topic of the procedures necessary to conduct a detailed crash reconstruction. The synthesis considers the use of crash reconstruction as a proactive method of analyzing traffic crashes to enable system-wide or site-specific improvements and to aid in decision making in highway design, maintenance, and construction. It does not deal with the typical reactive high crash procedure in which locations with high numbers or rates of crashes are analyzed to determine any crash patterns, with countermeasures then recommended.

A 26-question survey was distributed to state TRB representatives. Questions included were related to the certification of those performing crash reconstruction, as well as sources for education and training; to equipment and software used in crash reconstruction, as well as reference materials and the overall process for performing the reconstruction; addressed justification for crash reconstruction, criteria used when deciding whether to reconstruct a crash, and the use of data from crash reconstruction to improve traffic safety; and also addressed the states' liability limits for tort actions, applicable category of negligence within the state, and whether discretionary acts are covered by sovereign immunity. In addition, an e-mail inquiry was sent through Local Technical Assistance Program (LTAP) centers and state websites searched for additional information. A literature search was also undertaken.

SYNTHESIS OBJECTIVES

This synthesis focused on crash reconstruction activities conducted by state DOTs, feedback provided from reconstruction activities, and mitigation actions taken as a result. An attempt was made to determine the level of intra- and interagency communication, as well as education and training opportunities. This synthesis also addressed knowledge gaps and presents areas of future research needs to assist state DOTs when performing crash reconstructions.

The following specific areas of interest were addressed in the survey as they relate to crash investigations and reconstructions performed and used by state DOTs. The extent of the information obtained for a specific question was limited by the responses obtained.

- What is the motivation for the reconstruction—safety, criminal, civil liability?
- What are the criteria used in deciding whether to reconstruct a crash?
- What is the level of depth in the reconstruction effort?
- Are there tort liability limits, as well as immunities and exceptions to immunities?
- How many crashes are typically reconstructed each year?
- Are event data recorder (EDR) data used in the reconstruction activities?
- Does the agency rely on police-collected data or do the DOT and/or a separate agency collect additional information?
- Who does crash reconstruction—law enforcement, DOT, consultant, or specialized team? If a consultant is used, how are they located and what qualifications are required?
- Who is on the reconstruction team? What are their education, training, and certification?
- Does the agency use multidisciplinary crash reconstruction teams? If so, what disciplines are represented? What are the criteria of team members?
- How are the reconstruction findings used to improve roadway safety?

- What happens to the reconstruction data? Is it maintained/stored in a database/file at the state or local level and for what length of time?
- Does the DOT provide training opportunities for staff to expose them to reconstruction practices and techniques?
- Is there interagency training or support relating to crash reconstruction?

SYNTHESIS SCOPE

Traffic crash reconstructions are routinely conducted by law enforcement agencies and only occasionally by state DOTs. For the purposes of this synthesis, crash reconstruction is defined as a process using specialized skills beyond typical police crash reporting to document and analyze the events leading to a collision and/or cause of a collision. Although police agencies use reconstruction data to support criminal investigations, it is assumed that DOTs primarily use crash reconstruction data to identify highway safety problems and subsequently initiate countermeasures or improvements, or to defend against litigation.

This NCHRP synthesis project documents the current practice in crash reconstruction activities as conducted by state DOTs. It provides useful information for all agencies involved in crash site investigations or reconstruction practices. The scope of the synthesis is limited to information relating to the extent of crash reconstruction activities conducted by state DOTs and was not concerned with the very general area of crash reconstruction.

REPORT ORGANIZATION

The first chapter of this synthesis report contains introductory information, including background, objectives, and scope. Chapter two is a review of the literature, which was conducted to determine if relevant information was available that addressed crash reconstruction activities performed by state DOTs, as well as the use of information collected through those activities. Chapter three documents the survey process and results obtained. In addition to results from the survey questionnaire, a summary of information is also provided for the responses obtained from an e-mail inquiry sent out through the network of university transportation centers (LTAPs) and from website searches (for those states not responding to the survey). Chapter four summarizes the synthesis findings and conclusions, including future research work that may be considered to understand the extent and usefulness of crash reconstruction activities performed by state DOTs.

CHAPTER TWO

LITERATURE REVIEW

The literature review dealt with the specific topic of crash reconstruction practices of state DOTs; that is, the use of DOT personnel or contractors to conduct routine crash reconstructions. The review was not directed to the very general area of crash reconstruction, where thousands of publications can be found.

Crash reconstruction practices adopted and used by state highway agencies are typically related to managing risk associated with highway crashes involving transportation facilities. Risk management and tort liability were previously addressed as part of *NCHRP Synthesis of Highway Practice 206* (*1*). It was noted that the goal of highway risk management should be to achieve effective and efficient transportation while minimizing risk of human injury or loss. A comprehensive risk management program was identified as a key element for allocating resources to achieve effective and efficient transportation while minimizing risk. Reconstruction of highway crashes was cited as one of the tools that can be used by state DOTs to manage risk. It was noted that although law enforcement personnel typically investigate highway crashes, it would be advantageous for transportation agencies to conduct their own investigations. Reasons cited for supplementing standard police reports included the following:

- Police reports may not provide information typically needed by highway agencies.
- Highway investigations can result in rapid corrective or remedial actions.
- Engineering evaluations of specific situations may be required.
- Additional information may be needed in anticipation of a claim against the agency.
- Corrective actions may be required before the police report is filed, such as in work zones.
- A crash may establish notice of a potential problem or defect.
- Crash investigations enable highway personnel to testify firsthand as to findings.

Although a large amount of research has been undertaken and accomplished to address tort liability and the management of risk related to transportation systems and facilities, there has been very little attempt to assess the uses and benefits of crash reconstruction by state DOTs. A peripheral report by the New York State DOT addressed the development of a tort liability database system as a means of categorizing highway tort claims and classifying the elements involved in specific claims (*2*). A similar effort aimed at risk management for the Virginia DOT was reported in 1996 by Blydenburgh and Stoke (*3*). This analysis showed that claims involving road or roadside defects were the most common type, accounting for 30% of the claims reviewed. Another report summarized a national survey of risk management procedures and objectives as they apply to state DOTs (*4*). Key elements of risk management programs were identified, including criteria for measuring the effectiveness of a program, identification of hazardous situations, and documentation of actions taken. Agent and Pigman reviewed tort claims made against the Kentucky Transportation Cabinet including location, reason for the claim, amount sought for the claim, and the resolution of the claim (*5*). Based on the analysis, recommendations were made in the Kentucky report for the establishment of an effective risk management program.

NHTSA has provided uniform guidelines for 21 state highway safety programs and one of those programs is described in *Highway Safety Guideline Number 18, Accident Investigation and Reporting* (*6*). The scope of this guideline establishes the requirement that each state should have a highway safety program for accident investigation and reporting. Furthermore, the guidelines include recommendations for "adequate numbers of personnel, properly trained and qualified, to conduct accident investigations and process resulting information." It appears that the guideline is clarified to allow "the use of personnel other then police officers, in carrying out the requirements of this guideline in accordance with laws and policies established by state and/or local governments."

This federal program guideline even more directly recommends the use of investigative teams by noting that these teams "should be established, representing different interest areas, such as police, traffic, highway and automotive engineering, medical, behavioral, and social sciences." Investigative teams are commonly used to analyze high-crash locations, determine trends, and recommend countermeasures. However, this investigative process does not typically involve detailed crash reconstruction. The common type of crash analysis used in this procedure is preparing collision diagrams as opposed to detailed reconstruction of specific crashes.

Another safety tool that has been used on a limited basis in the United States is the roadway safety audit (RSA), which is defined as a formal and independent safety performance review of a road transportation project by an experienced team of safety specialists, addressing the safety of all road users. A previous synthesis was prepared describing the current use of RSAs (*7*). The use of RSAs is emerging as a proactive safety tool in U.S. practice. Similar to crash reconstruction, RSAs have been used by a limited number of states. Implementation of RSAs on a large scale involves some of the same problems as encountered for crash reconstruction.

CHAPTER THREE

SURVEY RESULTS

SURVEY PROCEDURES

After development and review the survey questionnaire was transmitted to the state TRB representatives in late January 2006. The questionnaire included 26 questions and is included in this report as Appendix A. In addition to the survey questionnaire, an e-mail inquiry was sent out through the network of LTAPs, and state websites were searched for additional information. After the initial deadline, a second contact was made with any state that had not responded to the first contact. In addition, subsequent telephone contact was made with several states in an effort to obtain a survey response.

The various contacts and other searches for information resulted in 26 responses to the state survey, with 11 additional responses obtained as a result of the e-mail inquiry through LTAP centers, and 7 states (Nevada was counted twice with e-mail and website information) where information was obtained from state websites (*8–14*). This resulted in information being obtained from one of the three sources (survey, LTAP, and website) for 43 states.

SURVEY RESPONSES

In addition to the results derived from the responses to the survey questionnaire, a summary of information is also provided for the responses obtained from an e-mail inquiry distributed through the network of LTAP centers and from website searches (for states not responding to the survey). Responses to the mail survey sent out through the TRB state representatives were received from 26 states. The respondent's titles varied; however, they were typically indicated as being an engineer (although the division where they worked varied widely). The most common areas of work were traffic, safety management, planning, and research. There were three responses to the survey from DOT attorneys.

E-mail responses through the LTAP centers were received from 11 states that did not respond to the mail survey. In addition, information concerning the level of crash reconstruction activities by the state DOT was obtained from websites of seven states who did not respond to the survey. Figure 1 is a map that shows the 43 responding states by how the responses were received. The following summary includes only that information obtained from the survey questionnaire. Results from the e-mail responses and website searches are summarized under separate headings.

STATE DEPARTMENTS OF TRANSPORTATION LEVEL OF INVOLVEMENT IN CRASH RECONSTRUCTION

From the survey, the level of involvement in crash reconstruction by state DOTs was determined to be relatively minor. Of the 26 states returning the survey, only 6 (California, Delaware, Kansas, Kentucky, Oklahoma, and West Virginia) indicated that they had a unit or assigned personnel (including contractors) that performed crash reconstruction on a routine basis. Other states indicated that they hired consultants as needed for specific litigation to conduct a crash reconstruction. Answers to the survey from the six states that indicated having personnel assigned for crash reconstruction is summarized in Appendix B.

The number of personnel involved was one in West Virginia and Oklahoma, two in Kentucky, five in Kansas, and eight in California and Delaware. It was noted that the personnel assigned to crash reconstruction were DOT employees in California, Delaware, and West Virginia.

In Kansas, Kentucky, and Oklahoma, the crash reconstructionists were hired by the general counsel office. To supplement state DOT employees and offer expertise in specific areas, consultants are hired as expert witnesses for selected cases in California, Kentucky, and West Virginia. The frequency of state DOT involvement in crash reconstruction ranged from fewer than 25 per year in Kansas, Kentucky, Oklahoma, and West Virginia to more than 50 per year in California and Delaware. It should be noted that this represents the crash reconstructions conducted by the assigned personnel. A substantial number of additional reconstructions are conducted in response to specific issues, such as in the defense of a lawsuit.

States that indicated crash reconstruction was not conducted by or for the DOT (on a routine basis) were requested to provide an explanation. The following were provided to explain why crash reconstruction is not performed by the state DOT.

Arizona

The Arizona DOT does not have a unit or assigned personnel that perform crash reconstruction.

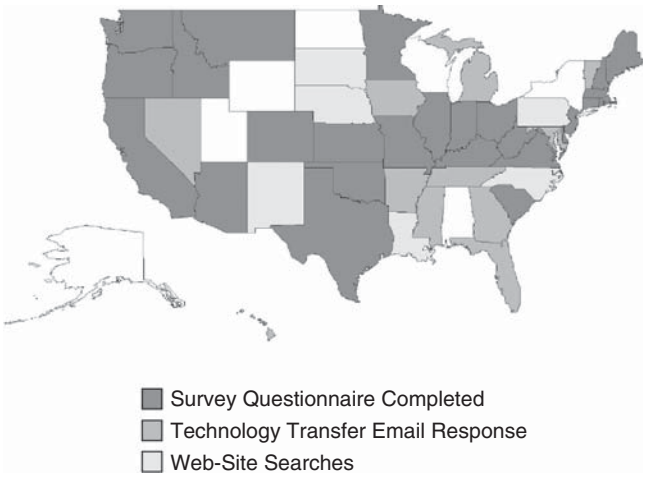

FIGURE 1 U.S. map showing states responding to survey, states responding by e-mail, and states responding by website searches.

Colorado

All reconstructions for the Colorado DOT are done by the Colorado State Patrol. The Colorado DOT and the State Patrol have an agreement to share data.

Connecticut

The Connecticut DOT receives the information provided on the uniform police officer's accident report. The DOT does support the State Police in their accident reconstruction efforts through grants allowing them to purchase specialized equipment needed to conduct these investigations. In September 2005, the State Police formed a Crash Analysis Reconstruction Team. On request, this team will investigate any crash for both local police and their own forces.

The crash report data (collected and maintained by the Bureau of Planning) is used by the DOT to analyze accident history and trends.

Idaho

Transportation department involvement in crash reconstruction would require a substantial commitment of manpower and resources and staff would continually be required to appear in court.

Law enforcement officers complete a crash report form that is sent to the Idaho DOT for every crash where there is damage of more than $1,500. Crash reconstruction in Idaho is done by law enforcement officers. It is usually undertaken only if the crash is severe enough that the officer thinks it will go to court. This usually involves either fatal crashes or crashes with a severe nonfatal injury.

Law enforcement provides the Idaho DOT with a copy of the reconstruction if they believe it is necessary. However, in a vast majority of cases, transportation engineers can obtain enough information from the crash report to establish crash patterns.

Illinois

Law enforcement completes most reconstructions. The Illinois Law Enforcement Standards Board adopted a formal certification program for reconstructionists in 1986. The Illinois Association of Technical Accident Investigators, which is mainly comprised of law enforcement personnel but does include some private investigators, was created to provide professional standards for accident investigation, promote traffic safety, and share information and experience.

The Illinois DOT has one person on staff whose duties include site visits to some of the serious crashes and inspection of some of the vehicles involved to verify safety belt use and other details not captured on the law enforcement crash form.

Indiana

In Indiana, the State Police have this responsibility.

Maine

Reconstruction is done by the Maine Office of Public Safety (State Police). The Maine DOT can request reconstruction data from the State Police as needed.

Massachusetts

The Massachusetts Highway Department relies on crash reconstruction data collected by the Massachusetts State Police Collision Analysis Reconstruction Section. The Highway Department does not perform its own accident/crash reconstruction work.

Minnesota

Reconstruction is done by the State Patrol, Department of Public Safety. The Attorney General's office decides if reconstruction is needed for the defense of a DOT lawsuit. They typically use the Minnesota State Patrol, unless there is a conflict of interest in which case where they would then hire another source.

Missouri

Accident reconstructionists are retained on the basis of need to defend specific lawsuits.

Montana

The Montana DOT has used consultants to prepare crash reconstruction in lawsuits. Select staff attends a Northwestern University course titled "Accident Reconstruction for Engineers."

New Jersey

The New Jersey DOT does not reconstruct crashes, but does map crashes and uses data from the police report. Police departments normally reconstruct crashes.

New Hampshire

Crash reconstruction is the responsibility of the New Hampshire State Police for crashes that occur on the state maintained system.

Ohio

The Ohio State Highway Patrol has officers trained in traffic crash reconstruction. There is no specific arrangement in place to guarantee interaction between the Highway Patrol and Ohio DOT. If the reconstruction determines that there is an issue that would be of concern and/or of importance to the Ohio DOT, then Highway Patrol officials make certain it is passed along to the transportation agency.

The Ohio State Highway Patrol has developed a regulation to establish policy, criteria, and guidelines for collision analysis and reconstruction personnel. It is noted that professional reconstruction is essential to promote traffic safety, with one objective of a reconstruction to identify methods of preventing crashes under similar circumstances. The policy is to reconstruct any vehicle crash resulting in one or more fatalities, serious bodily injury, extensive property damage, and where the possibility of prosecution has not been eliminated.

Oregon

In Oregon, crash reconstructions are done by state and local law enforcement agencies only. Some information from reconstructions is input into the Fatality Analysis Reporting System database, and also into the state crash database, which is maintained by the Oregon DOT. Individual DOT employees in the field charged with identifying safety improvements may contact law enforcement agencies to obtain reconstruction reports as part of the data collection that goes into characterizing the crash history of a location. However, there is no specific policy relating to the use of crash reconstructions and no mandate to use them.

Rhode Island

Rhode Island State Police do reconstructions. At the present time, there is no arrangement for the Rhode Island DOT to interact with the reconstructionists. However, reconstruction reports are provided to the DOT on request.

South Carolina

Crash reconstruction is done by the South Carolina Highway Patrol (Department of Public Safety). On request from the Highway Patrol, the DOT may assist with the investigation. The DOT is made aware of the findings.

Texas

The investigating police agency does crash reconstruction. However, many of the Texas DOT's district employees either visit the scene of a crash and/or receive copies of reports on all fatal crashes. Through observations, photographs, interviews, and crash analysis the determination of engineering improvements is made.

Virginia

The Virginia DOT does not have a unit or assigned personnel (or contractor) that does accident reconstruction.

There is a joint venture between the Virginia Highway Safety Division and Virginia Commonwealth University (Transportation Safety Training Center) that includes a unit that conducts crash investigations. The mission of the crash investigation team is to provide in-depth analysis of motor vehicle crashes to produce insights to help steer future crash reduction through highway design, policy development, programming and legislation.

Washington

The Washington State DOT has software for conducting accident reconstruction, but has not had dedicated staff available to develop and maintain a reasonable level of proficiency. Another work group within the DOT has agreed to attempt to develop and maintain proficiency with the reconstruction software.

CERTIFICATION REQUIRED AND SOURCES FOR TRAINING IN CRASH RECONSTRUCTION

Questions were included in the survey related to the certification of those performing crash reconstruction, as well as sources for education and training. The following is a summary of responses from the six states that indicated there were DOT personnel or consultants conducting crash reconstruction.

California

Engineers must be a "Registered Civil Engineer" with the California Board for Professional Engineers and Surveyors. California Highway Patrol (CHP) members of the Multidisciplinary Accident Investigation Team (MAIT) must pass the Traffic Accident Reconstructionist Specialist Certification.

Sources for the education and training of those involved in crash reconstruction included: (1) in-house use of agency staff, (2) state police academy or equivalent, (3) independent specialized classes for software and accident reconstruction techniques, and (4) a one-year mentorship for new investigators.

Delaware

Engineers conducting crash reconstruction are expected to attend the "Accident Reconstruction for Engineers" course presented by Northwestern University's Traffic Institute.

Sources for education and training included: (1) in-house use of agency staff, (2) LTAP center, (3) the Northwestern Center for Public Safety (formerly the Traffic Institute), and (4) NTSB.

Kansas

Certification or licensing is not required; however, reconstructionists must have knowledge and experience sufficient to testify in court.

With the use of reconstructionists being independent consultants hired on an as-needed basis, there are no applicable agency sources of training.

Kentucky

Certification or licensing as a reconstructionist is not required; however, personnel under contract to do reconstructions must have experience in reconstruction and court testimony, as well as a professional engineering license.

Reconstructionists are consultants hired on an as-needed basis through the University of Kentucky and there are no applicable agency sources of training.

Oklahoma

Certification or licensing is not required; however, personnel under contract to conduct reconstructions must have a Ph.D. in traffic engineering and 20 years of experience.

Reconstructionists are independent consultants hired on an as-needed basis and there are no applicable agency sources of training.

West Virginia

Reconstructionists must be licensed professional engineers or have specialized reconstruction training.

Sources for education and training included the LTAP center and other educational institutions. At the current level of DOT involvement, the existing reconstruction training sources appear to be meeting the instructional needs.

EQUIPMENT, PROCEDURES, AND PROCESSES USED BY STATE DEPARTMENTS OF TRANSPORTATION

Questions were included in the survey related to equipment and software used in crash reconstruction, as well as reference materials and the overall process for performing the reconstruction. The following is a summary of responses from the six states with DOT personnel or consultants performing crash reconstructions. The survey did not attempt to obtain a detailed procedure for crash reconstruction. Owing to the many variables involved in a traffic crash, there is no standardized data collection procedure used in crash reconstruction. The most detail reviewed dealing with investigative procedures was a chapter from the California operations manual used by their MAIT.

California

Reconstructionists use traditional tape measuring devices and total station equipment for collecting data at crash sites. A wide range of computer software packages is also used including AutoCad, Photomodeler, iWitness, MS Office, 3D Studio, Crash Zone, Autostats, MathCad, and Human Vehicle Environment. Reference materials routinely used include the Northwestern University course "Traffic Accident Reconstruction" and various SAE papers, along with stiffness coefficients from Neptune Engineering.

In-depth data collection is used when conducting a crash reconstruction. It was reported that both paper files and electronic files are used to maintain data from crash reconstructions. EDRs are used to provide more detailed data as part of the crash reconstructions, including change in velocity, seatbelt use, and braking. Reconstructions are conducted both at the scene and immediately following the crash. Vehicle inspections are done by enforcement officers (police and motor carrier) and by certified mechanics. Reconstructionists for the DOT also rely on police-reported data, in addition to the data independently collected.

A MAIT is used with the following member representation:

- Team leader—CHP sergeant
- Team engineer—California DOT (Caltrans) roadway environment specialist

- Dynamics specialist—CHP officer
- Human factors specialist—CHP officer
- Motor carrier specialist—CHP auto technician.

Delaware

Equipment used by reconstructionists at crash sites includes traditional measuring tape, total station survey equipment, and distance measuring instruments. Typical references used as part of the reconstruction process include AASHTO manuals, the *Manual on Uniform Traffic Control Devices*, and Center for Public Safety (formerly Northwestern Traffic Institute) documents.

It was reported that both paper files and electronic files are used to maintain data from crash reconstructions. The level of data collection at crash sites was characterized as basic measurements. EDRs are not yet being used.

Reconstructions are conducted both at the scene and immediately following the crash. Vehicle inspections are done by enforcement officers (police or motor carrier). Reconstructionists for the DOT also rely on police-reported data, in addition to the data independently collected.

A multidisciplinary team is used with the following member representation:

- Law enforcement
- DOT (traffic, design, pavement management)
- FHWA.

Kansas

Equipment used by reconstructionists at crash sites includes traditional measuring tape, total station survey equipment, and photogrammetry. Computer software and reference documents are left to the discretion of the reconstructionist.

It was reported that both paper files and electronic files are used to maintain data from crash reconstructions. The level of data collection at crash sites was characterized as in-depth data collection. EDRs are not yet used; however, it is anticipated that they will become part of the crash reconstruction process in the future.

Reconstructions are typically performed months or years after the crash occurrence. Vehicle inspections are performed by enforcement officers (police or motor carrier) and the reconstructionist if the vehicle is available. Reconstructionists hired by the Kansas DOT also rely on police-reported data, in addition to the data independently collected.

A multidisciplinary team is used depending on the circumstances of the crash. Specific team representation was not provided.

Kentucky

Equipment used by reconstructionists at crash sites includes traditional measuring tape, SmartLevel, and Ballbank Indicator. Computer software and reference documents are left to the discretion of the reconstructionist, with specific application made of the Northwestern University AICALC software.

Paper files are typically used to maintain data from crash reconstructions. The level of data collection at crash sites was characterized as in-depth data collection. EDRs are not yet used as part of a typical reconstruction.

Reconstructions are typically conducted months or years after the crash occurrence. Vehicle inspections are occasionally performed; however, information from the standard police report and vehicle enforcement officers is routinely used. Reconstructionists hired by the DOT also rely on police-reported data, in addition to the data independently collected.

A multidisciplinary team is not used as part of the reconstruction process.

Oklahoma

As noted previously, contractors are hired as needed and undertake the reconstruction at their own discretion in terms of equipment, procedures, and processes. Electronic files are used to maintain data from reconstructions and in-depth data collection would best characterize the investigation. EDRs are not used as part of the reconstruction.

Investigations are usually conducted months or years after the crash occurrence and vehicle inspections are done as needed specific to the case. It was also reported that the contractor for the DOT does not rely on police-reported data as part of the crash reconstruction.

A multidisciplinary team is not used as part of the reconstruction process.

West Virginia

Equipment used by a DOT reconstructionist varies with the case condition or situation. No use of specific computer software was reported. Reference materials used were AASHTO publications and various reconstruction manuals. Paper files were reported as the means of maintaining data from the crash reconstructions. The level of investigation varies with the case-specific issues or questions to be answered. EDRs are not used as part of the reconstruction.

Reconstructions may be performed immediately following the crash or months or years after the crash occurrence. Vehicle inspections are conducted by the reconstructionist or by

enforcement officers (police or motor carrier). Reconstructionists hired by the DOT also rely on police-reported data.

A multidisciplinary team is used on an infrequent basis dependent on the issues to be addressed. Specific team representation was not provided.

CRASH RECONSTRUCTION JUSTIFICATION AND CRITERIA AND USE OF DATA BY STATE DEPARTMENTS OF TRANSPORTATION

Questions in the survey addressed justification for crash reconstruction, criteria used when deciding whether to reconstruct a crash, and the use of data from crash reconstruction to improve traffic safety. Responses from the six states with DOT personnel or consultants performing crash reconstruction are summarized here.

California

The primary justifications for crash reconstruction included:

- Safety improvements,
- Liability concerns,
- Potential criminal concerns, and
- High-profile cases such as "big-rig crashes" involving multiple fatalities.

Criteria used when deciding whether to reconstruct a crash included the following:

- Severity of crashes (fatal crashes involving automobiles or commercial vehicles),
- Roadway issues (any roadway issues that may have contributed to the collision),
- Vehicle type,
- Involvement of DOT or state employee or property (any on-duty Caltrans or CHP employee—this means a "shall" respond to perform a reconstruction), and
- Restraint failures.

Data from crash reconstructions are used to improve traffic safety through the following applications:

- System-wide improvements;
- Specific site improvements;
- Decision making in design, construction, and maintenance; and
- Traffic engineering.

Delaware

The primary justifications for crash reconstruction included:

- Safety improvements,
- Liability concerns, and
- A more proactive approach to highway safety.

Criteria used when deciding whether to reconstruct a crash included the following:

- Severity of crashes (DOT only participates in fatal crashes),
- Roadway issue involved a crash,
- Involvement of DOT employee or property, and
- DOT litigation.

Data from crash reconstructions are used to improve traffic safety through the following applications:

- Specific site improvements,
- Decision making in design,
- Risk management, and
- Traffic engineering.

Kansas

The primary justification for crash reconstruction was liability concerns.

Criteria used when deciding whether to reconstruct a crash included the following:

- Severity of crashes,
- Roadway issue involved a crash,
- Road type, and
- DOT litigation.

It was also reported that crash reconstruction data are not routinely used to improve traffic safety.

Kentucky

The primary justifications for crash reconstruction included liability concerns and the response to a claim against the DOT.

Criteria used when deciding whether to reconstruct a crash included a lawsuit against the DOT.

Data from crash reconstructions may be used to improve traffic safety through system-wide improvements and decision making in maintenance.

Oklahoma

The primary justification for crash reconstruction was liability concerns; data from the reconstructions are not used to improve traffic safety.

Criteria used when deciding whether to reconstruct a crash included the following:

- Severity of crash,
- DOT liability, and
- Type of crash.

West Virginia

The primary justifications for crash reconstruction were liability concerns and documentation of safety hardware performance.

Criteria used when deciding whether to reconstruct a crash included the following:

- Severity of crash,
- Involvement of DOT employee or property, and
- DOT litigation.

Data from crash reconstructions are used to improve traffic safety through the following applications:

- System-wide improvements,
- Specific site improvements,
- Risk management, and
- Traffic engineering.

TORT LIABILITY AND SOVEREIGN IMMUNITY

Questions in the survey also addressed state liability limits for tort actions, applicable category of negligence within the state, and discretionary acts covered by sovereign immunity. Responses from the six states with DOT personnel or consultants performing crash reconstruction are summarized here. It should be noted that a state can have either comparative or contributory negligence with "joint and several liability," a separate issue.

California

- There are no limits for tort actions or claims related to traffic crashes.
- The category of negligence law is joint and several liability.
- State employees' discretionary acts have limited coverage, dependent on whether the employee knowingly violates a standard or policy, which moves beyond discretionary and into the area of willful negligence.

Delaware

- It was noted that Delaware is one of only six states remaining with sovereign immunity.
- The category of negligence law is contributory negligence.
- Employees' discretionary acts are covered by sovereign immunity.

Kansas

- The state's liability limit for tort actions or claims is $500,000 per occurrence.
- The category of negligence law is comparative negligence.
- Employees' discretionary acts are covered by sovereign immunity.

Kentucky

- The state's liability limits for tort actions or claims are $200,000 per person and $350,000 per crash or occurrence.
- The category of negligence law is comparative negligence.
- Employees' discretionary acts are covered by sovereign immunity.

Oklahoma

- The state's liability limits for tort actions or claims are $25,000 for property damage, $175,000 per person, and $1,000,000 per occurrence.
- The category of negligence law is comparative negligence.
- Employees' discretionary acts are covered by sovereign immunity; however, very little is considered to be discretionary.

West Virginia

- The state's liability limits for tort actions or claims are $1,000,000 per occurrence in state courts and no limit in the Court of Claims.
- The category of negligence law is comparative negligence, as well as modified joint and several liability.
- Employees' discretionary acts are covered by sovereign immunity.

E-MAIL INQUIRY THROUGH LOCAL TECHNICAL ASSISTANCE PROGRAMS

To supplement the survey questionnaire and obtain information from other sources for state DOTs that may be involved in crash reconstruction, an e-mail inquiry was sent out through the network of LTAPs. Only one of the 11 states responding to the e-mail inquiry (Nevada) (that did not respond to the survey) indicated that it had a unit or personnel performing crash reconstruction.

STATE DEPARTMENT OF TRANSPORTATION WEBSITE SEARCHES

Websites of state DOTs (who did not return a survey) were searched to determine the level of involvement in crash reconstruction activities and information was obtained for seven states (*8–14*). It was determined that five of the seven states had some level of crash reconstruction activity being done within the state DOT (Louisiana, New Mexico, Nevada, North Carolina, and Pennsylvania). Within the Nebraska Department of Roads, there is a Risk Management Section that has responsibility for analysis of crash data; however, there is no reference to reconstruction of specific crashes. For South Dakota it was determined that there was a centralized risk management office for all state agencies, and not a dedicated unit within the state DOT. Following is a summary of information obtained from the websites that relates to the subjects addressed in the survey questionnaire.

Louisiana

Within the Louisiana Department of Transportation and Development (LADOTD) there is a Road Hazards Unit with an Accident Reconstruction Program. The program is a coordinated effort between the Office of Risk Management, the Louisiana State Police, and the LADOTD. It was reported that during the 2001–2002 fiscal year there were 247 highway crashes investigated, resulting in the correction of numerous roadway deficiencies around the state. Results from lawsuits against the LADOTD involving cases investigated through the Accident Reconstruction Program had not yet been determined. Equipment has been purchased to enhance the capabilities of the reconstruction unit, including computer hardware and software to download information from EDRs. In addition, global positioning system units have been purchased for state police officers to more accurately locate crash scenes during the investigative process.

New Mexico

There is a Safety Section within the Risk Management Bureau of the New Mexico DOT that performs vehicle accident investigations and tort claims investigations.

Nevada

It was determined from an e-mail response that the Nevada DOT has a Safety and Training Officer in each district who does crash reconstruction. From the Nevada DOT website, information was found indicating that the Nevada DOT Legal Division uses accident reconstructionists in anticipation of or for specific litigation involving DOT actions. It was noted that proper education, training, experience, and certification in reconstruction was required. Experience testifying in court as an expert was also required. Similarly, the website included information related to the use of expert witnesses for general engineering and traffic engineering. Qualifications for these experts were also cited, including a registered professional engineering license and experience testifying in court.

North Carolina

The North Carolina DOT has developed Fatal Accident Investigation Guidelines to assist Area Accident Investigation Engineers when making fatal crash investigations. It was noted that the guidelines were intended to establish a uniform method and report for this type of investigation. Following are the 10 guidelines for the investigation of a fatal crash:

1. Receive notice of a fatal crash,
2. Log the date the fatal notice was received,
3. Input fatal crash into database,
4. Review fatal notice to determine need for field investigation,
5. Obtain crash report and other helpful information,
6. Make field investigation,
7. Record global positioning system location,
8. Conduct office investigation,
9. Make recommendations and contact proper personnel, and
10. Update database with final action and file.

Pennsylvania

The Pennsylvania DOT has a Risk Management and Administrative Services Division that is responsible for risk management functions. There is a Risk Management Engineer who is responsible for planning, directing, and coordinating a program to identify DOT areas (activities, policies, procedures, etc.) that have either resulted in tort liability claims or demonstrated a strong potential and for organizing and administering the DOTs' efforts to modify or eliminate these high-risk areas through the application of effective risk management principles. The Division is also responsible for technical training services in the areas of traffic engineering and highway safety.

CHAPTER FOUR

CONCLUSIONS

It was determined from the survey of state departments of transportation (DOTs) that traffic crash reconstructions are routinely conducted by law enforcement agencies, and only occasionally by state DOTs. For the purposes of this synthesis and the survey distributed to state DOTs, crash reconstruction was defined as a process using specialized skills beyond typical police crash reporting to document and analyze the events leading to a collision and/or cause of a collision. Police agencies use reconstruction data to support criminal investigations; however, the primary uses by state DOTs are more typically in defense of claims or lawsuits against the DOT or to identify highway safety problems and initiate countermeasures or improvements. The lack of crash reconstruction conducted by DOTs shows the need for communication and cooperation between DOTs and law enforcement agencies. The opportunity for crash reconstruction information is lost if the DOT does not have an effective method of communicating with the various law enforcement agencies in their state.

The literature review dealt with the specific topic of crash reconstruction practices of state DOTs; that is, the use of DOT personnel or contractors to conduct routine crash reconstructions. The literature review was not directed to the very general area of crash reconstruction where thousands of publications can be found. The search determined that, although a large amount of research has been undertaken and accomplished to address the general area of tort liability and management of risk related to transportation systems and facilities, there have been only very limited attempts to assess the use and benefits of crash reconstruction by state DOTs. Crash reconstruction practices that have been adopted and used in state highway agencies are typically related to managing risk associated with highway crashes involving transportation facilities. It is generally agreed that the goal of highway risk management should be to achieve effective and efficient transportation while minimizing risk of human loss. A comprehensive risk management program was identified as a key element for allocating resources to achieve effective and efficient transportation while minimizing such risk. Reconstruction of highway crashes has been cited as one of the tools that can be used by state DOTs to manage risk. It was noted that, although law enforcement personnel typically investigate highway crashes, there are circumstances where it would be advantageous for highway agencies to conduct their own investigations.

It was determined from the survey that the level of involvement in crash reconstruction by state DOTs was relatively minor. Of the 26 states returning the survey, only 6 (California, Delaware, Kansas, Kentucky, Oklahoma, and West Virginia) indicated that they had a unit or assigned personnel (including contractors) to conduct crash reconstruction on a routine basis. Other states indicated that they hired consultants as needed for specific crashes to prepare reconstructions for lawsuits. Of the 17 states (not responding to the survey) where information was obtained from the Local Technical Assistance Program inquiry or website search, it was determined that five (Louisiana, New Mexico, Nevada, North Carolina, and Pennsylvania) have some level of crash reconstruction activity being undertaken within the state DOT.

The survey responses indicated a range in the number of personnel involved; with one each in West Virginia and Oklahoma, two in Kentucky, five in Kansas, and eight each in California and Delaware. It was noted in the responses that the personnel assigned to crash reconstruction in California, Delaware, and West Virginia were DOT employees. In Kansas, Kentucky, and Oklahoma, the crash reconstructionists were hired by the general counsel office. To supplement state DOT employees and offer expertise in specific areas, consultants are hired as expert witnesses for selected cases in California, Kentucky, and West Virginia.

The frequency of state DOT involvement in crash reconstruction ranged from fewer than 25 per year in Kansas, Kentucky, Oklahoma, and West Virginia to more than 50 per year in California and Delaware. The time of the reconstruction varied from at the scene to months or years later. The reconstructions conducted a significant time after the crash were usually related to court cases.

A summary of explanations was included for states responding to the survey and indicating accident reconstruction was not conducted by or for the DOT. It was generally indicated that crash reconstruction was performed by the state police and information from these investigations was used by the state DOT.

In addition, responses to the survey questionnaire determined the following:

- A wide range of requirements (certification, education, training) was noted for the six states responding to the

survey and that indicated DOT personnel or consultants performed crash reconstruction.

- For questions pertaining to equipment and software used in crash reconstruction, basic measuring tools were frequently cited, along with reconstruction software and engineering design software that could also be used for crash reconstruction.
- The primary justification for crash reconstruction was liability concerns. Similarly, criteria used to decide whether to reconstruct a crash typically included a potential claim or lawsuit against the DOT, with severity of the crash and involvement of a government employee or public property as secondary factors. Data from the reconstructions were typically used to improve traffic safety through system-wide improvements, specific site improvements, traffic engineering applications, and to complement a risk management program.
- Responses from the six states indicated that only California had no limits for tort actions and Delaware's response was that they were one of only six states remaining with full sovereign immunity. Liability limits per occurrence ranged from $350,000 in Kentucky to $1,000,000 in both Oklahoma and West Virginia. Employees' discretionary acts are covered to some degree by sovereign immunity in all six states.

Several topics are suggested for further study. Additional insight into the use of crash reconstruction processes and data as components of a state DOT risk management program would be beneficial. For example, in those states relying on law enforcement for reconstruction, it was not clear how much training or background the police have with respect to roadway factors and issues. Information from this synthesis could be used to initiate development of a model risk management program that incorporates crash reconstruction along with other proactive procedures to identify and implement safety improvements or appropriate countermeasures. The risk management program could include funding within the DOT designated for the reconstruction of specific types of crashes.

The lack of crash reconstruction conducted by DOTs illustrates the need for developing a procedure to ensure communication and coordination between DOTs and law enforcement. Any crash reconstruction report completed by a law enforcement agency should be available to the DOT. The procedures used in California and Delaware can be viewed as methods to obtain this communication. Specifically, the Multidisciplinary Accident Investigation Team format used in California can be viewed as a model to consider for ensuring communication and coordination between the DOT and law enforcement. Included in Appendix C is the Joint Operational Policy Statement between the California Department of Transportation and California Highway Patrol used in this procedure.

The opportunities that are lost by not having DOT crash reconstructions should be identified. Crash reconstructions that detail issues with roadway design, maintenance, and construction could allow a proactive approach to safety improvements. This would complement the typical reactive approach of identifying high crash locations and analyzing crash patterns to determine the need for specific countermeasures. The potential benefit of including crash reconstruction in a risk management program should be documented.

REFERENCES

1. Lewis, R.M., *NCHRP Synthesis of Highway Practice 206*: *Managing Highway Tort Liability*, Transportation Research Board, National Research Council, Washington, D.C., 1994, 40 pp.
2. Disbro, J.E. and J.E. Bryden, *Development of a Preliminary Tort Liability Database System*, Report FHWA/NY/SR-92/105, Engineering Research and Development Bureau, New York State Department of Transportation, Albany, N.Y., 1992, 47 pp.
3. Blydenburgh, C.A. and C.B. Stoke, *Review and Update of Claims and Lawsuits Filed Against VDOT: July 1, 1988–March 31, 1994*, Report VTRC 97-TAR1, Virginia Transportation Research Council, Virginia Department of Transportation, Charlottesville, 1996, 58 pp.
4. Demetsky, M.J. and K. Yu, "Assessment of Risk Management Procedures and Objectives in State Departments of Transportation," *Transportation Research Record 1401*, Transportation Research Board, National Research Council, Washington, D.C., 1993, pp. 1–8.
5. Agent, K.R. and J.G. Pigman, *Tort Liability Related to Highways in Kentucky*, Final Report, KTC-90-8, Kentucky Transportation Center, University of Kentucky, Lexington, 1990, 117 pp.
6. *Uniform Guidelines for State Highway Safety Programs*, *Highway Safety Program Guideline Number 18: Accident Investigation and Reporting*, National Highway Traffic Safety Administration, Washington, D.C., 1999.
7. Wilson, E.M. and M.E. Lipinski, *NCHRP Synthesis of Highway Practice 336*: *Road Safety Audits*, Transportation Research Board, National Research Council, Washington, D.C., 2004, 127 pp.
8. Louisiana Office of Risk Management, Baton Rouge, 2005 [Online]. Available: http://doa.louisiana.gov/orm/orm.htm.
9. Nebraska Department of Roads, Risk Management Section, Lincoln, 2006 [Online]. Available: http://www.dor.state.ne.us/highway-safety/#risk.
10. New Mexico Department of Transportation, Risk Management Bureau, Safety, Santa Fe, 2005 [Online]. Available: http://www.nmshtd.state.nm.us/main.asp?secid=11066.
11. Nevada Department of Transportation, Legal Division, Carson City, 2005 [Online]. Available: http://www.nevadadot.com/contact/.
12. North Carolina Department of Transportation, Division of Highways, Traffic Engineering and Safety Systems Branch, Raleigh, 2006 [Online]. Available: http://www.ncdot.org/doh/preconstruct/traffic/safety/.
13. Pennsylvania Department of Transportation, Risk Management and Administrative Services Division, Harrisburg, 2006 [Online]. Available: http://www.dot.state.pa.us/.
14. South Dakota Office of Risk Management, Pierre, 2005 [Online]. Available: http://www.state.sd.us/boa/rm/.

APPENDIX A

Survey Questionnaire

NCHRP Project 20-5

Synthesis Topic 37-08

Crash Reconstruction Practices

Traffic crash reconstructions are routinely conducted by law enforcement agencies and occasionally by state departments of transportation (DOTs). Crash reconstruction for this survey is defined as a process using specialized skills beyond typical police crash reporting to document and analyze the events leading to a collision and/or cause of a collision. Police agencies use reconstruction data to support criminal investigations; however, it is assumed that the primary uses by DOTs are to identify highway safety problems and initiate countermeasures or improvements, or to defend lawsuits against the DOT.

This NCHRP synthesis project is intended to document the current practice in crash reconstruction activities conducted by state DOTs. It is anticipated that this synthesis will provide useful information for all agencies involved in crash site investigations or reconstruction practices.

The following questionnaire seeks to collect information relating to crash reconstruction activities conducted by state DOTs. To accomplish this task, we need your assistance by providing information about your agency's level of involvement and status of activities related to crash reconstruction.

Your participation is appreciated. Please return the completed questionnaire by mail or fax no later than February 20, 2005, to:

Jerry G. Pigman
Fax Number: 859-257-1815
Kentucky Transportation Center
140 Raymond Building
University of Kentucky
Lexington, KY 40506-0281

If you have questions, you may contact Jerry Pigman (jpigman@engr.uky.edu) or Ken Agent (kagent@engr.uky.edu) at 859-257-4513.

1. Agency contact:
Name:_____
Title: _____
Agency: _____
Address: _____
Telephone: _____Fax: _____
E-mail:_____

2. Does your state DOT currently have a unit or assigned personnel (or contractor) that performs accident reconstruction (either on a routine basis for specific types of crashes or in defense of lawsuits)?
   _____Yes
   _____No
   If **yes**, please continue with the questionnaire (Question No. 3).
   If **no**, please provide any information that you believe would explain why accident reconstruction is not performed within your DOT. For example, if reconstruction is performed by the state police agency, is there an arrangement to interact with the police and use their data for DOT purposes? _____
   _____

3. What is approximate number of DOT personnel (or contractors) specifically assigned to conduct reconstruction of traffic crashes?
   _____
   If no DOT personnel are assigned directly to perform crash reconstruction, how are individuals selected to perform these activities?
   _____
   Are contractors or consultants used for crash reconstruction?
   _____ Yes
   _____ No
   If yes, how they selected? _____
   Within what part of the organizational structure is the reconstruction conducted? _____
   _____
   Is certification or licensing required for individuals performing crash reconstruction?
   _____ Yes
   _____ No
   If yes, please identify the requirements. _____
   _____
   What training or background is required for personnel performing crash reconstruction?
   _____
   Does the crash reconstruction involve the use of a multidisciplinary team?
   _____ Yes
   _____ No
   _____ Other comments: _____
   If yes, describe the representation of the team? _____
   _____

4. How many traffic crash reconstructions are typically performed by or for your DOT unit on an annual basis?
   _____ Less than 25
   _____ 25–50
   _____ More than 50

5. What is the primary justification for reconstructing a crash (check as many as apply)?
   _____ Safety improvements
   _____ Liability concerns
   _____ Potential criminal concerns
   _____ Other (describe): _____

6. What are your state's liability limits for tort actions or claims related to traffic crashes?
   _____
   _____

Which of the following categories best describe negligence law in your state?

_____ Comparative negligence
_____ Contributory negligence
_____ Joint and several liability

7. Are state employees' discretionary acts covered by sovereign immunity?

_____ Yes
_____ No
_____ Limited (explain): _____

8. What criteria are used when deciding whether to reconstruct a crash (check as many as apply)? Where appropriate, identify the specific criteria.

_____ Severity of crash_____
_____ Roadway issue involved in crash_____
_____ Road type_____
_____ Vehicle type_____
_____ Involvement of DOT employee or property_____
_____ Lawsuit against the DOT _____
_____ Other (describe): _____

9. What equipment is typically used to collect or take measurements at the crash site?

_____ Tape
_____ Total stations (survey equipment)
_____ Photogrammetry
_____ Laser
_____ Other (describe): _____

10. List any software packages routinely used in reconstruction activities. _____
_____

11. List major reference materials routinely used in the analysis portions of the reconstruction process. _____
_____

12. Is there a standardized procedure for collecting and compiling the data?

_____ Yes
_____ No

If yes, describe: _____

13. How are the data from crash reconstructions maintained?

_____ Electronic files
_____ Paper files
_____ Other (describe): _____

14. When performing a crash reconstruction, what would best characterize the investigative level of depth?

_____ Basic measurements
_____ In-depth data collection
_____ Other (describe): _____

15. Is information from event data recorders (black boxes) used in crash reconstruction?

_____ Yes
_____ No

If yes, how are the devices used? _____
If yes, what are the primary capabilities and limitations of the devices? _____
_____

16. When are the reconstruction activities typically undertaken?

_____ At the crash scene
_____ Immediately following the crash
_____ Months/years later

17. How are vehicle inspections typically handled?
    _____ None beyond standard police crash reports
    _____ DOT employee (specify):_____
    _____ Enforcement (police or motor carrier)
    _____ Certified mechanic
    _____ Other (specify): _____

18. Does the DOT rely on police-reported data when performing a crash reconstruction?
    _____ Yes
    _____ No

19. Are data from crash reconstructions used to improve traffic safety?
    _____ Yes
    _____ No
    If yes, note which of the following apply?
    _____ System-wide improvements
    _____ Specific site improvements
    _____ Decision making in design
    _____ Decision making in maintenance
    _____ Risk management
    _____ Traffic engineering

20. Does your agency have a documented procedure describing the process for using crash reconstruction data to improve safety?
    _____ Yes
    _____ No
    If yes, is the documentation available and how can it be obtained? _____
    _____

21. Has any form of documentation been prepared to evaluate or document the DOT crash reconstruction process in your state?
    _____ Yes
    _____ No
    If yes, is it available and how can it be obtained? _____
    _____

22. Is there a risk management unit within the DOT that handles crash reconstruction responsibilities?
    _____ Yes
    _____ No
    If yes, describe: _____

23. What is the typical range of cost and/or time for a crash reconstruction? _____
    _____

24. What limitations are there concerning the use of data collected during a DOT reconstruction?
    Specifically, can the data be obtained for use in civil actions not involving the DOT? _____
    _____

25. Is there a formal mechanism within and between agencies regarding sharing information obtained from reconstruction?
    _____ Yes
    _____ No
    If yes, describe:_____

26. What sources does your agency rely on to meet education/training needs relative to accident reconstruction (check all that apply)?
    _____ In-house (agency staff)
    _____ State police academy (or equivalent)
    _____ LTAP center
    _____ Private organization (please identify): _____
    _____ Other (identify): _____

APPENDIX B

Summary of Survey Responses from States Indicating a Unit or Assigned Personnel Performs Accident Reconstruction

Question	California	Delaware	Kansas	Kentucky	Oklahoma	West Virginia
Title of Responder	Multidisciplinary Accident Investigation Team Engineer	Safety Programs Engineer	Staff Attorney	Traffic Research Engineer	General Counsel	Traffic Research Engineer
3) Number of personnel?	8	8	5	2	1	1
3A) Contractors used for crash reconstruction?	Yes	No	Yes	Yes	Yes	Yes
3B) If yes, how selected?	Legal Division hires consultants		Hired by KDOT's Chief Counsel	Based on previous experience in accident reconstruction	Recommendation	Used for litigation by in-house or contract attorneys
3C) Where is reconstruction conducted?	Traffic Operations/Safety	Traffic	Office of Chief Counsel	General Counsel	General Counsel's Office	Claims Section of Legal Division
3D) Is certification required?	Yes	No	No	No	No	Yes
3E) If yes, identify requirements	Registered civil engineer					Sufficient training and experience
3F) Training/background required for crash reconstruction?	CHP accident reconstruction courses	Accident reconstruction for engineers from Northwestern University Traffic Institute	Enough knowledge to be able to testify about reconstructions in court	P.E.; experience in reconstruction and court testimony	Ph.D. in traffic engineering, 20 years experience	Civil engineering or specialized reconstruction training
3G) Crash reconstruction involves multidisciplinary team?	Yes	Yes	Other comments	No	No	Other comments

Question	California	Delaware	Kansas	Kentucky	Oklahoma	West Virginia
3H) If yes, describe representation of team	Team leader—CHP sergeant, Team engineer—Caltrans engineer, Dynamics specialist—CHP officer, Human factors specialist—CHP officer, Motor carrier specialist—CHP auto technician	Law enforcement and DOT	Depends on the circumstances of accident			Infrequent, but depends on questions to be answered
4) Number of crash reconstructions annually?	More than 50	More than 50	Less than 25	Less than 25	Less than 25	Less than 25
5) Justification for reconstructing crashes?	Safety improvements, liability concerns, criminal concerns, high profile cases	Safety improvements, liability concerns, more proactive in highway safety	Liability concerns	Liability concerns, response to claim	Liability concerns	Liability concerns, document performance of safety hardware
6) States liability limits?	None	Sovereign immunity	$500,000 per accident	$200,000/single $350,000/accident	$175,000 individual, $25,000 property, $1,000,000 per occurrence	$1,000,000 per occurrence
6A) Describe negligence law?	Joint and several liability	Contributory negligence	Comparative negligence	Comparative negligence	Comparative negligence	Comparative negligence, joint and several liability

Question	California	Delaware	Kansas	Kentucky	Oklahoma	West Virginia
7) State employees' discretionary acts covered by sovereign immunity?	Limited—If employee knowingly violates policy it moves beyond discretionary act	Yes	Yes	Yes	Yes. Limited—Very little considered discretionary	Yes
8) Criteria used in deciding whether to reconstruct crash?	Severity of crash, roadway involved, vehicle type, involvement of DOT employee, restraint failures	Severity of crash, roadway involved, involvement of DOT employee, lawsuit against DOT	Severity of crash, roadway involved, road type, lawsuit against DOT	Lawsuit against the DOT	Severity of crash, lawsuit against DOT, type of accident	Severity of crash, roadway involved, involvement of DOT employee, lawsuit against DOT
9) Equipment used for measurements?	Tape, total stations	Tape, photogrammetry, distance measuring instrument	Tape, total stations, photogrammetry	Tape, Smartlevel, Ballbank indicator	Contractor uses what is needed	Varies with situation
10) Software used?	AutoCAD, Photmodeler, iWitness, etc.		Left to discretion of reconstructionist	Northwestern	Contractor uses what is needed	
11) Major reference materials used?	"Traffic Accident Reconstruction," SAE papers, Neptune Engineering	AASHTO manuals, *Manual on Uniform Traffic Control Devices*, Northwestern traffic material	Left to discretion of reconstructionist	Northwestern publications, SAE publications	Left to discretion of reconstructionist	AASHTO publications, various reconstruction manuals
12) Standardized procedure for collecting data?	No	No	No	No	No	No
13) How are data maintained?	Electronic and paper files	Electronic and paper files	Electronic and paper files	Paper files	Electronic files	Paper files
14) Investigative level depth?	In-depth data collection	Basic measurements	In-depth data collection	In-depth data collection	In-depth data collection	Varies with situation
15) Event data recorders used?	Yes	No	No	No	No	No

Question	California	Delaware	Kansas	Kentucky	Oklahoma	West Virginia
15A) If used, how?	Data in conjunction with physical evidence		It is anticipated that EDRs will be used in future			
15B) If used, capabilities and limitations?	Cannot be used as "stand alone" data	Few used, confirms actual operating speed and activation of breaking system				
16) When are reconstruction activities undertaken?	At crash scene, immediately following crash	At crash scene, immediately following crash	Months/years later	Months/years later	Months/years later	Immediately following crash, months/years later
17) How are vehicle inspections handled?	Enforcement, certified mechanic	Enforcement	Enforcement, reconstructionist	None beyond standard police crash reports	Depends on circumstances	Reconstructionist, enforcement
18) DOT relies on police reports?	Yes	Yes	Yes	Yes	No	Yes
19) Data from reconstruction used to improve traffic safety?	Yes	Yes	No	Yes	No	Yes
19A) If yes, how?	System-wide improvements, specific site improvements, decision making in design, decision making in maintenance, traffic engineering	Specific site improvements, decision making in design, risk management, traffic engineering		System-wide improvements, decision making in design, decision making in maintenance, risk management		System-wide improvements, specific site improvements, risk management, traffic engineering
20) Documented procedure to improve safety?	No	No	No	No	No	No

Question	California	Delaware	Kansas	Kentucky	Oklahoma	West Virginia
21) Documents prepared to evaluate reconstructions?	No	No	No	No	No	No
22) Does risk management unit handle reconstructions?	No	Yes	No	No	No	No
22A) If yes, describe:		Our assigned Deputy District Attorney				
23) Typical cost/time range of reconstructions?	Approximately $2,000 per case	3 h on average for fatal crashes	Depends on accident, and lawsuit	Reconstruction data collection within 3 to 4 h	Depends on circumstances	Varies with situation
24) Can data be used in civil actions not involving DOT?	Yes	For internal use only	Varies	Could be obtained through legal procedure	Yes	Do not know
25) Formal mechanism regarding sharing information?	Yes	Yes	No	No	No	No
25A) If yes, describe?	The engineers act as mechanism in sharing information between two agencies	DOT Accident Records Unit is the repository of all accident records				
26) What sources are used to meet education needs?	In-house, state police academy, independent specialized classes	In-house, LTAP center, Northwestern Traffic Institute, NTSB	N/A	Contract with university	Contractor reconstruction	LTAP center, educational institutions

Notes: N/A = not available; CHP = California Highway Patrol; EDR = event data recorder; LTAP = Local Technical Assistance Program.

APPENDIX C

California Joint Operational Policy Statement

Department of Transportation/California Highway Patrol

and

Annex J (Caltrans Engineers and Multidisciplinary Accident Investigation Team)

CALIFORNIA HIGHWAY PATROL

GENERAL ORDER 100.43.

Revised June 2001

JOINT OPERATIONAL POLICY STATEMENT

DEPARTMENT OF TRANSPORTATION/CALIFORNIA HIGHWAY PATROL

1. PURPOSE

a. This General Order contains the Joint Operational Policy Statement and subsequent mutual agreements entered into by the Director of the California Department of Transportation (Caltrans) and the Commissioner of the California Highway Patrol (CHP). This information should enhance cooperation and understanding between the two departments in matters of mutual concern.

b. It is important to note that the CHP and Caltrans define the terms "Traffic Management" and "Incident Management" differently. For the CHP, "Traffic Management" is defined as the direct enforcement interaction between officers and motorists that provides for safe and orderly traffic movement. For Caltrans, "Traffic Management" means the activities associated with planning and implementing traffic handling strategies including, but not limited to, signing, delineation, traffic signals, ramp metering, transportation management center activities, etc. The CHP use of the term "Incident Management" means the coordination of traffic and emergency services at the scene of an incident. When Caltrans speaks of "Incident Management" they refer to the measures taken by Caltrans to mitigate traffic disruption to the highway system in the regional vicinity of an incident.

2. POLICY

a. Highway traffic management and control functions administered by both departments are to be performed in compliance with the Joint Operational Policy Statement contained in Annex A.

b. Searches for explosive devices by both departments on state highways are to be performed in compliance with the Joint Operational Policy Statement, Bomb Search Agreement contained in Annex B.

c. Communication services provided to Caltrans by the Department are to be performed in compliance with the Joint Operational Policy Statement on Rural Communications contained in Annex C.

d. Hazardous material spill cleanup activities are to be performed in compliance with the Joint Operational Policy Statement contained in Annex D.

e. Providing safety roadside rest area security shall be in accordance with the Joint Operational Policy Statement contained in Annex E.

f. Special events on conventional state highway rights-of-way shall be in accordance with the Joint Operational Statement contained in Annex F. This Statement applies only to highways where the CHP has jurisdiction.

g. Freeway Service Patrols shall be in accordance with the Joint Operational Policy Statement contained in Annex G.

h. Closing or restricting the use of highways because of visibility-related conditions shall be done in accordance with Annex H.

i. Intelligent Transportation Systems development, implementation, and operation shall be in accordance with the Joint Operational Policy Statement contained in Annex I.

j. The use of Caltrans engineers assigned to the CHP's Multidisciplinary Accident Investigation Teams shall be in accordance with Annex J.

k. Providing pedestrian safety programs shall be in accordance with the Joint Operational Policy Statement contained in Annex K.

I. Planned freeway and highway lane closures shall be performed in accordance with Annex L.

3. GENERAL

a. Commanders are requested to solicit the cooperation of Caltrans management in identifying and solving problems of mutual interest. It is incumbent upon the two departments, through joint effort, to promote the maximum benefits available from the existing highway system.

b. Commanders should develop an active and aggressive interest in furthering the mutual goals and objectives of the two departments by meeting regularly with Caltrans traffic operations and maintenance personnel.

c. The Office of the Commissioner shall be advised of any problems or programs which may have statewide application or which may require further coordination at the headquarters level.

OFFICE OF THE COMMISSIONER

ANNEXES A, B, C, D, E, F, G, H, I, J, K, L

OPI: 052

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DEPARTMENT OF TRANSPORTATION

AND

CALIFORNIA HIGHWAY PATROL

Joint Operational Policy Statement

CALTRANS ENGINEERS AND MULTIDISCIPLINARY ACCIDENT INVESTIGATION TEAMS

GENERAL

This joint operational policy statement between the California Department of Transportation (Caltrans) and the California Highway Patrol (CHP) is to promote an understanding regarding the use of Caltrans' engineers while they are assigned to the CHP's Multidisciplinary Accident Investigation Teams (MAIT).

MAIT reports are used to assist in the determination of damages paid out in tort claims, settlements, and judgments. These claims are paid by the state of California, Caltrans, CHP, cities, and counties.

MAIT reports are used to assist in the formulation of safety improvements to prevent collisions or incidents of a similar nature from recurring. This is consistent with the mission statements of the CHP and Caltrans.

It is the intent of the Director of Caltrans and the Commissioner of the CHP that their respective departments work cooperatively to provide service to the public through the use of Caltrans' engineers within the CHP's MAIT Program.

CALTRANS' RESPONSIBILITIES

1. Caltrans will provide full-time engineers to the CHP's MAIT Program.

2. Caltrans will provide engineering and laboratory services.

3. Caltrans will provide engineers assigned to the MAIT Program with equipment necessary to effectively assist the CHP.

CHP RESPONSIBILITIES

1. The CHP will provide Caltrans engineers with the necessary training to become an integral part of the CHP's MAIT Program.

2. The CHP will be responsible for functional field supervision of Caltrans engineers as it relates to the MAIT Program.

3. The CHP will provide Caltrans' Legal Department with a completed MAIT report.

4. The CHP will coordinate media relations activities related to MAIT. Every effort will be made to involve Caltrans in this process.

5. The CHP will notify the Caltrans team member when MAIT responds to a collision. The Caltrans team member will be responsible for the appropriate notifications within the Caltrans command structure.

6. The CHP will notify Caltrans, through the Caltrans team member, when the completion of the MAIT investigation will exceed 30 days and provide an estimated completion date for the investigation.

ENGINEER RESPONSIBILITIES

1. The Caltrans engineer assigned to the Division MAIT will be responsible for conducting in-depth investigations of accidents and incidents. The engineer will provide accident reconstruction support to MAIT members by preparing and reviewing the "Highway" section of the report. The engineer will assist the team with other sections of the report as determined by the MAIT team leader.

2. The engineer will assist in conducting in-depth investigations of severe and complicated traffic accidents and incidents. These investigations will include, but are not limited to, the collection and compilation of roadway and traffic data relevant to accidents or incidents as follows: the overall roadway environment, design speed, horizontal alignment, superelevation, grade, signs, signals, pavement and roadway delineation, coefficient of friction, traffic volume, accident history, damage to state property, damage to the environment, and ambient weather factors.

3. The engineer will present completed report findings and conclusions to interested parties. The engineer will give legal depositions, and testify in court as required. The engineer may be required to provide training to Caltrans, CHP, allied agencies, and Caltrans public contractors. Coordination of these activities, attendance at meetings, and administrative duties will be performed as required.

4. The engineer will accept functional direction from the MAIT sergeant in charge of the team. Personnel and civil service administrative issues are to be addressed by the engineer's first line supervisor at Caltrans.

5. The engineer assigned to the Division MAIT Program will not exercise supervision in the capacity as the Caltrans MAIT Engineer. However, the engineer may provide limited direction at the scene of an accident or incident to CHP officers and Motor Carrier Specialist-I personnel. This direction will relate only to the effective utilization of these personnel during the collection of physical evidence, documentation of the highway conditions, and the proper use of the Total Station Survey System (TSSS) and related surveying techniques.

FUNCTIONAL SUPERVISION

Any dispute between a Caltrans engineer and MAIT team leader that cannot be resolved at the team level will be rectified through the chain of command.

JEFF MORALES, Director Department of Transportation	D. O. HELMICK, Commissioner Department of California Highway Patrol
Date	Date

Abbreviations used without definitions in TRB publications:

AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	Air Transport Association
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation