
NCHRP SYNTHESIS 322

Safety Management Systems

A Synthesis of Highway Practice

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SUBJECT AREAS

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FOREWORD

*By Staff
Transportation
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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*.

The 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 report of the Transportation Research Board will be of interest to local, regional, state, and federal officials, as well as to other transportation professionals that work with them in dealing with safety management systems (SMSs). This report provides an overview of current transportation agency practices, recent literature findings, and in-depth reviews of two model state SMS initiatives. Overall, findings continue to support that the key benefits derived from the SMS process are increased coordination, cooperation, and communication among state agencies and improvement to data analysis and collection procedures, as well as collaborative strategic plans.

This synthesis report contains information culled from survey responses from state transportation agencies. This information is combined with that from interviews with selected respondents and reviews of applicable literature, as well as previously collected, but not published, summaries of state reports on program and system elements.

A panel of experts in the subject area guided the work of organizing and evaluating the collected data and reviewed the final synthesis report. A consultant was engaged to collect and synthesize the information and to write this report. Both the consultant and the members of the oversight panel are acknowledged on the title 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.

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Crawford F. Jencks, Manager, National Cooperative Highway Research Program, assisted the NCHRP 20-5 Committee and the Synthesis staff.

Information on current practice was provided by many highway and transportation agencies. Their cooperation and assistance are appreciated.

SAFETY MANAGEMENT SYSTEMS

SUMMARY

Improving highway safety is a complex task. Each state has a variety of government agencies, public and private organizations, and various industries expending time, money, and other resources to combat the crash problems on our nations roadways. Given the complexities of the transportation system, the management of improving highway safety should be comprehensive. Thus, it should address the driver, road environment, and vehicle with broad-based prevention and mitigation strategies in the engineering, enforcement, education, and emergency services areas.

A highway Safety Management System (SMS) is a systematic process designed to assist decision makers in selecting effective strategies to improve the efficiency and safety of the transportation system. Its foundation is based on the context that the responsibility for improving the system is a shared responsibility among the highway safety community. The efficient use of resources and coordinated goal setting and planning are enhanced through the implementation of a highway SMS process.

The purpose of this synthesis is to report on the state of the practice of highway SMSs. It is based on a literature review, survey responses from 20 states, and an in-depth review of two safety management system models; one targeting the state level and the other the local level.

Key findings from the literature review and a survey that was distributed in 2002 to 26 states with functioning SMSs as of the fall of 2001 include the following key elements.

- States that continue to embrace the SMS process reported success, which was defined as enhancing coordination and communication between agencies; improving data analysis and collection procedures; developing formal methodologies for implementing crash reduction programs; integrating the engineering, enforcement, education, and emergency services strategies to address the crash problem; and improving awareness of highway safety issues.
- Several actions and situations would improve the effectiveness of the SMS process, including improvements to the data analysis process and increased support from upper management. Other such actions include a designated funding source, improved data collection, access to databases, and increased cooperation between agencies.
- Quantitative analysis, an important element in the SMS process, provides the most important measure used to classify and prioritize the state's safety projects and investment. All responding states reported that improvements were made to their data collection and analysis process to assist the operation of the SMS.
- States indicated having multiple categories of investment for safety, with a variety of decision makers on the safety investment level. Nine states reported a separate category of investment for safety beyond the Federal Hazard Elimination Safety Program. A collective decision by upper-level agency administration or a chief engineer was the most likely decision maker on the level of safety investment.

- States generally track safety investment but do not evaluate safety investment on a regular basis. The main purposes for the assessment of dollar value of benefit are cost-benefit analysis, program and project planning, and evaluation of prior investment. The most common methods to evaluate safety investment are state or federal research studies or those conducted by universities or consultants.
- Multidisciplinary committees are essential as well in enhancing the operation of the SMS process. Their key functions are to strengthen coordination and communication between agencies, develop strategic highway safety plans, and facilitate statewide safety conferences.
- It was seen however that the opportunity to put the SMS process into practice is being lost in the United States. By 1994, all states had developed a work plan for implementation of an SMS. As of 2001, 26 states reported having an active SMS process with a multidisciplinary coordinating committee. Of the remaining states, four indicated having no active SMS process that coordinates highway safety initiatives.

Overall, the research revealed that states implementing SMSs use foundational elements such as multidisciplinary committees in a variety of ways. States choosing to sustain the development and implementation of an SMS report continuing benefits, including increased coordination, cooperation, and communication among agencies; improved data analysis and collection procedures; and the development of collaborative strategic plans.

INTRODUCTION

BACKGROUND

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) stipulated a change in the way in which each department of transportation was to approach business. Specifically, this legislation directed each state transportation agency to develop and implement comprehensive management systems. This comprehensive systems approach was a key strategy in a renewed focus on the improved management, operations, and safety of the nation's highway transportation system.

Section 1034 of the ISTEA required states to have a highway Safety Management System (SMS). Each state was charged with developing a systematic process with a goal of reducing the number and severity of traffic crashes. The process would help ensure that all opportunities to improve highway safety were identified, considered, implemented as appropriate, and evaluated in all phases of highway planning, design, construction, maintenance, and operation. Initial elements of the highway SMS included the following:

- Developing, establishing, and implementing, on a continuing basis, an SMS for all public roads;
- Incorporating the roadway, human, and vehicle safety elements;
- Establishing formalized and interactive communication, coordination, and cooperation among organizations responsible for major highway safety elements;
- Considering and including, where appropriate, projects and programs identified by use of the SMS in its Highway Safety Plan and Motor Carrier Safety Assistance Program State Enforcement Plan;
- Assigning a focal point for coordination of the development, establishment, and implementation of the SMS among the agencies responsible for the roadway, human, and vehicle safety elements.

The first major legislation to recognize the need for better safety management procedures was the Highway Safety Act of 1966. As a result of this enacted legislation, comprehensive highway safety requirements were established for the states to address the safety issues associated with the vehicle, roadway, and operator. Responsibility for program rested with the governor of each state. Essentially, this act served as a foundation for the SMS process concept.

The concept of a highway SMS was an outgrowth of a 1981 symposium entitled, “Enhancing Highway Safety Through Engineering Management in an Age of Limited Resources,” sponsored by TRB. This symposium, in combination with a survey of the states, led AASHTO to publish *A Guide for Enhancement of Highway Safety Directed to Agencies, Programs, and Standards (1)*. One objective of that report was to help administrators identify management techniques that would help ensure that the safety aspects of highway decisions were properly evaluated and considered. It further emphasized that if safety were to receive sufficient consideration within an agency, it should be established as a goal, emphasized by agency leadership, and viewed as a complementary element to system preservation and level-of-service improvements.

Section 1034 of the ISTEA mandated states to develop and implement SMSs. By the end of 1994, all states had developed a work plan for the development of such systems. However, progress toward implementation of the work plans was hampered by the passage of the National Highway System Designation Act of 1995, which made implementation of these systems optional.

In 1994, the FHWA conducted a study tour pertaining to highway safety management practices in Japan, Australia, and New Zealand. The final report of that study noted, “The major transferable safety management finding of this trip is that the management philosophy observed in all three countries is that of networking and building of consensus among stakeholders—government, industry, and citizen groups—working together in a search for solutions to traffic safety problems” (2).

Shortly after that study tour and before the publication of the ISTEA Final Rule, Section 205 (Relief from Mandates) of the National Highway System Designation Act of 1995 made the implementation of safety management and other selected management systems optional. Once the development and implementation of safety management systems became optional, its progress was no longer driven by regulation, but by the notion that the process had merit and would produce enhanced performance outcomes.

According to *Transportation Research Circular 452: Safety Management System: A National Status (3)*, by October 1994, essentially all states had submitted a work plan

describing a blueprint for the development and implementation of their SMSs. After the SMS became optional, the momentum to further develop the SMS process slowed, with only 26 states reporting the existence of an SMS and supporting interdisciplinary committee as of October 2001 (4).

SYNTHESIS OBJECTIVES

This synthesis reports on the state of the SMS in practice. The objectives of the synthesis included the following:

- Examining the SMS organizational structures, including various committees, programs, staffing, and focal points;
- Investigating how states develop multidisciplinary strategic safety plans, including goal statements;
- Identifying how states prioritize, select, and fund safety projects;
- Providing case studies of successful projects and programs;
- Identifying the roles and expectations of the federal level; and
- Identifying how states monitor and measure the success of their projects.

DEFINITIONS AND KEY COMPONENTS

The highway SMS is a systematic process that has the goal of reducing the number and severity of traffic crashes. It does so by ensuring that all opportunities to improve highway safety are identified, considered, implemented as appropriate, and evaluated in all phases of highway planning, design, construction, maintenance, and operation, and by providing information for selecting and implementing effective highway safety strategies and projects. This process is designed to assist decision makers in selecting effective strategies in improving the efficiency and safety of the nation's transportation system.

Key components in the development, implementation, and continuation of an effective SMS include the following. These components are based on a review of research studies, guidance documents, and various reports.

- Recognition that an SMS is not a program, but a process requiring communication, coordination, and cooperation among diverse stakeholders.
- Identification of a lead agency within the state, which is charged with the coordination of the SMS process.
- Organization of an interdisciplinary committee or

coalition consisting of key stakeholders who have responsibility for highway safety.

- Establishment of a mission statement directing the group toward substantially influencing the reduction in frequency and severity of highway crashes.
- Assessment of existing highway safety data, procedures, resources, and activities identifying processes or activities that are working well. Assessment of obvious gaps, weaknesses, missing functions, and overlapping responsibilities (e.g., location and analysis of available data to help clarify crash problem and data weaknesses or voids, identification of institutional barriers that hinder cooperative safety activities, a review of existing laws, and available resources).
- Development of a strategic plan endorsed by the interdisciplinary committee to guide the coalition's strategies, goals, actions, and accomplishments.
- Action to implement, monitor, revise, and evaluate the strategic plan.
- Maintaining the momentum of a state's safety coordinating committee and/or SMS initiative through commitment and buy-in from agency leadership, regular meetings, and development of a strategic plan, as well as a mission statement and committee successes. Examples of committee successes include the passage of seatbelt, graduated license, and alcohol legislation; development of memorandums of understanding between key state agencies; cost-benefit-based prioritization of safety projects; increased focus on data use and ways to improve both accuracy and timeliness; determination of strategic approaches toward approval of safety projects and proposals; development of a new crash location process; and improved crash forms (4).

ORGANIZATION OF REPORT

The synthesis is divided into five chapters. Chapter one presents a brief historical overview of the SMS process, including definitions and working components, as well as the synthesis purpose and objectives. Chapter two provides an overview of relevant literature and reports. It discusses national studies and reports, as well as state and local guides. Key findings of the Safety Management Systems in Practice Survey are presented in chapter three. The discussion includes an overview of the study scope, methodology, and findings. Model SMS processes are the focus of chapter four. A summary of one state's experience with a successful statewide SMS and of another state's successful local SMS process is given in this chapter. Chapter five presents the conclusions. It also discusses further research and operational actions.

LITERATURE REVIEW

NATIONAL STUDIES

Four national studies are addressed in this section. They are *Safety Management System: A National Status* (3), *Safety Management System Update Survey* (4), *Transportation Infrastructure: States' Implementation of Transportation Management Systems* (5), and a survey conducted as part of NCHRP Project 17-18(05), *Integrated Management Process to Reduce Highway Injuries and Fatalities Statewide* (6).

A Look at the National Status

The *Safety Management System: A National Status* (3) was conducted in cooperation with TRB Committee A3B01, Transportation Safety Management. The purpose of the survey was to gain a national perspective on progress toward the development and implementation of each state's SMS. Fifty-one surveys, including one from the District of Columbia, were returned between June and August 1995. The following conclusions were drawn from the survey:

- All states plus the District of Columbia had identified a focal point for the SMS, with 85% found in a DOT or equivalent department.
- Most states were using an administrative structure composed of a coordinating or executive committee and subcommittees representing a broad-based group of individuals from a variety of agencies and organizations.
- More than 80% of the states had developed a mission statement, goals, or major objectives to guide the SMS implementation process.
- Sustained commitment to the SMS was seen as struggling in some states, whereas others were using memorandums of agreement or understanding to help sustain support from the various safety partners.
- States were using a variety of methods to share information about the SMS initiative, including computer-based electronic mail, the Internet, workshops, safety program resource books, brochures, and newsletters.
- To help deal with the staffing shortage created by the extra work involved in the SMS, 32 states elected to hire consultants. These consultants were asked primarily to help with the development of the work plan, resource book, surveys, and workshops.
- The primary funding source for the SMS development was a combination of federal and state money.
- Positive outcomes from the SMS process were reported by 49 (96%) of the state officials who developed and implemented their systems.

- Major barriers to the development and implementation of the SMS were funding, adequate staff, jurisdictional battles, data issues (availability, accuracy, timeliness, jurisdiction, and technical problems between agencies that control data collection and analysis), and sustained commitment to the initiative.

Appendix A features a summary of the state reports on SMS program elements.

A Look at Implementation

In 1997, the U.S. General Accounting Office released a Report to Congressional Committees entitled the *Transportation Infrastructure: States' Implementation of Transportation Management Systems* (5). The report identified

- The status of the states' development and implementation of the six systems for managing highway pavement, bridges, highway safety, traffic congestion, public transportation facilities and equipment, and intermodal transportation facilities and systems;
- How the states expect to use the systems; and
- The factors that have facilitated or hindered the development and implementation of the systems.

General information about the development and implementation of the systems was collected in the 50 states, the District of Columbia, and Puerto Rico. More detailed information was collected from seven states (Maryland, Michigan, Montana, New York, North Carolina, Oregon, and Texas) selected for case studies because of their experiences in developing, implementing, and using the systems. Additional but less comprehensive information was collected from Colorado, Florida, and Missouri. General findings are as follows:

- As of September 1996, approximately one-half of the states were moving forward with all six transportation management systems, even though they were no longer mandatory. The remaining states were developing or implementing at least three of the systems.
- All states were implementing the pavement management system, and nearly all states were implementing the bridge, safety, and congestion management systems.
- Nationwide, more than half of the states plan to integrate the management systems. States recognize that

to obtain the optimum use from the systems, they need to be integrated.

- Mandating of the systems had several outcomes, including providing a catalyst to develop and implement the new systems and to obtain high-level support and top-priority status.
- Removal of the mandate has had various results. Several states are continuing their efforts because they view the systems as beneficial to the decision-making process, whereas others have lessened support for further developing certain systems.
- Some states reported that the failure to issue a clear and timely rule on management systems following the 1991 mandate had caused difficulties in implementing the public transportation, congestion, and intermodal management systems.

The following points summarize the General Accounting Office report conclusions specific to the status of SMS development and implementation:

- As of September 1996, 48 states, the District of Columbia, and Puerto Rico were developing SMSs.
- South Carolina and Ohio reported that they were not currently implementing their systems.
- At least 30 states included all public roads or all state-maintained roads in their systems. Two states were including only National Highway System roads.
- The composition of an SMS takes many forms—from an administrative structure composed of a coordinating or executive committee and subcommittees representing many agencies to a large database that merges safety information from a number of sources.

A Look at Updates

In 2000, a second national study, *Safety Management System Update Survey (4)*, was undertaken in conjunction with the TRB A3B01 Transportation Safety Management Committee. The purpose of this study was to collect information to update the status of each state's highway SMS. Because Section 205 of the National Highway System Designation Act of 1995 made SMSs optional, implementation status was of interest.

Survey data were collected in late 2000, with follow-up contacts made in November 2001 to confirm the status of responses. Forty-nine states and the District of Columbia submitted surveys. The study was not published, but the results are worthy of review. The following points summarize these results:

- Twenty-six states indicated having both an interdisciplinary committee and an SMS. States indicating that they had *only* an SMS or an interdisciplinary com-

mittee numbered six and eight, respectively. Ten states reported having no SMS or interdisciplinary committee.

- SMSs were found to be active at both the state and local levels in 15 states.
- Of the 34 states having coordinating committees, 25 were established as a result of the ISTEA mandate, and 30 meet at least three times each year.
- Seventy-four percent of the coordinating committees had mission statements, 70% had major goals, and 68% had strategies or objectives. Eighteen states used a subcommittee structure.
- Law enforcement, engineers, state highway safety office representatives, health professionals, and state agencies were represented on 75% of the coordinating committees. Community volunteers and construction industry representatives were least likely to participate on these committees.
- Major activities undertaken by the coordinating committees included development of a strategic plan, review of state safety data, formulation of safety legislation, and planning of state safety conferences.
- Improved communication and coordination between safety agencies and organizations, as well as joint legislative efforts, were the most frequent positive outcomes noted by the respondents.
- Resources, jurisdictional issues, coordination, political factors, time, and leadership barriers have impeded the effectiveness of the states' SMS and coordinating committees.
- Key elements identified as maintaining the momentum of a coordinating committee and/or SMS were commitment and buy-in from key agency leadership, regular meetings, development of a strategic action plan, a mission statement, and activities that committees would cite as victories.
- Of those states not having an SMS or coordinating committee, 80% reported that the regulation's change from required to optional was the major reason that these efforts were abandoned.

Appendix B features a summary of selected responses from this survey.

A Look at Integrated Management

A third national study, NCHRP Project 17-18(05), *Integrated Management Process to Reduce Highway Injuries and Fatalities Statewide*, was undertaken by iTRANS in 2001 (6). The study questionnaire collected information in the categories that make up an integrated management system, including the mission statement, safety management, safety champions, funding, safety initiatives, resource allocation decision making, legislation, analysis, and databases. With 40 responses, a picture was developed that

shows the importance of these elements in the various state management processes.

The existence of a safety champion (an individual and not a group) was recognized as “very important.” Following the implementation of the process, states cited improvements observed, which included attaining greater cooperation between agencies; serving as a focal point for safety advocates; enhancing communication among enforcement, engineering, education, and emergency services; stimulating safety concerns across multiple agencies; and serving as a catalyst for devising new safety initiatives.

When asked about the importance of factors that trigger new safety initiatives, states identified federal and state funding and legislation as the main factors. A high-profile event, collision, or crash (e.g., high fatality school bus crash), a program being promoted by a high-profile individual, and successful implementation of the initiative in other states, were also considered of importance.

Quantitative analysis received the highest rating in deciding which safety countermeasures to apply. Internal expert opinion was rated more important than the opinion of external experts. Internal safety management processes fell slightly below “important” in the rating.

The iTRANS questionnaire asked the additional question, “Once issues have been identified, could you describe briefly the decision making process as to how funding is allocated to engineering, enforcement, education, or emergency medical services with regard to safety initiatives?” Iowa and Louisiana had an SMS component in their responses, whereas Maine, Indiana, Michigan, Nebraska, New York, and Washington mentioned a coalition, partnership, team, or collaboration among various groups in their decision-making process. The responses are presented in Appendix C.

On average, the benefit of a software package that accepts standardized input for safety analysis was not perceived to be much different than documentation of analytical methods for safety analysis, in regard to the question about the benefit of various resources to safety analysis. Overall, the respondents rated the completeness of their databases as “good.”

The main components of the Integrated Safety Management System (ISMSSystem) developed in conjunction with NCHRP 17-18(05) are leadership, mission and vision, organizational structure, integrated safety management process, resources, and tools and related documentation. Figure 1 depicts the relationship between the different components and conveys the order of development involved in building an ISMSSystem. The ISMSSystem works within and depends on an external environment that in-



FIGURE 1 Components of the Integrated Safety Management System (ISMSSystem). [Source: iTRANS, NCHRP Report 501: Integrating Management Process to Reduce Highway Injuries and Fatalities Statewide (6).]

cludes legislation and funding. Fundamental to the ISMSSystem is an interdisciplinary organizational structure, formed through a coalition of highway safety agencies, that allocates different responsibilities to specific groups of people who must work together to maximize safety.

Other personnel resources include an operations manager (for day-to-day management), task teams that develop strategies and action plans for implementation, and the risk analysis and evaluation group to undertake analyses of highway data to support the decision-making process.

The tools necessary to implement the system include the methodologies for identifying crash concerns and evaluating strategies, impact and process performance evaluation methods, optimization approaches, best practice suggestions for maintaining databases, and recommendations for improving interagency coordination and communication (6).

NATIONAL REPORTS

Several national reports addressing SMSs are available. They include workshop proceedings, good practice reviews, and study tour summaries. This section summarizes several of these key reports.

Management Approach to Highway Safety: A Compilation of Good Practices

The FHWA developed the initial guidance document in January 1991, with a subsequent revision in April 1991,

and a final document completed in December 1991 (7). The purpose was to provide general guidance for developing and implementing a management approach to highway safety. It outlined eight key elements in the management approach to highway safety to ensure that processes and programs are effectively coordinated and carried out.

- Goals—Long- and short-term highway safety goals establish a means for resource allocation.
- Accountability—This is an essential management tool for tracking implementation of highway plans and comparing progress with established goals.
- Training—Personnel with the knowledge, skills, and abilities to carry out identified responsibilities are essential.
- Monitoring and evaluation—The design, operation, maintenance, and process reviews determine whether or not the safety processes and improvements are having the desired effects.
- Integrated database—An analysis of timely and accurate data is necessary to identify safety problems and to select and implement effective accident countermeasures.
- Safety analysis—These analyses include accident and operational investigations.
- Coordination—Intraagency and interagency coordination will enhance the implementation and management of a comprehensive highway plan.
- Technology and information exchange—Proactive research and technology and information exchange provide many opportunities for addressing changes and improving safety.

Safety Management System Workshop Proceedings: Managing Mobility Safely

From September 17 to 19, 1991, a Safety Management System Workshop was held in Williamsburg, Virginia. The purpose of the workshop was to enable participants to provide guidance for the development and implementation requirements of an SMS. The workshop also focused on the experiences of Oregon, Pennsylvania, and Washington in working with the draft *Management Approach to Highway Safety* in the development of their respective SMSs. The resulting report, *Safety Management System Workshop Proceedings: Managing Mobility Safely* (8), outlined several key points resulting from this effort.

- The *Management Approach to Highway Safety—Good Practices Guide* (with minor changes) is a good foundation on which to build an SMS.
- Safety management is a workable and useful concept, but it should be implemented not as a new stand-alone system, but as one that integrates safety deci-

sions into a state's overall highway management process.

- SMS requirements must be flexible enough to conform to various organizational structures of the states; they must also be prescriptive and specific enough to ensure safety objectives are achieved.
- Coordination must be strongly advocated and practiced within the highway agency and with other agencies and groups having the common goal to improve highway safety. Highway agencies need to ensure this coordination is carried out.

Safety Management System: Implementation Workshop Proceedings

The FHWA and the National Highway Traffic Safety Administration hosted a national Safety Management System Workshop on January 20 and 21, 1994. The workshop addressed the issue of what can be done within the limits of the law and the regulations to effectively implement an SMS. Those persons designated as the state's SMS focal points were invited to attend the workshop. Representatives from select metropolitan planning organizations, counties, cities, other federal agencies, highway-user advocacy groups, police, emergency medical groups, and motor vehicle administrators also participated. A total of 258 individuals attended the workshop.

The goal of the workshop was to have all jurisdictions start in the same direction. Therefore, it addressed what can be done within the limits of the law and the regulations to effectively implement an SMS.

There seemed to be a general consensus on the following items (9):

- The SMS was a process for managing highway safety activities, not a plan itself.
- The SMS process would not be easy, but it would be worthwhile.
- Limited resources are a big problem.
- Each SMS would be state-specific, responding to the resources available and the needs in each state.
- Proposed guidelines should remain just that and not become mandates.
- A uniform system of data records and electronic formatting was seen as necessary and was proposed.
- Data within a state and between states should be handled uniformly.
- The SMS is a safety effort and not a data collection—only a program.

A copy of the draft of *Safety Management Systems: Good Practices for Development and Implementation* (10) was distributed and reviewed.

FHWA Study Tour for Highway Safety Management Practices in Japan, Australia, and New Zealand

A U.S. study team examined safety management practices in Japan, Australia, and New Zealand. The visit, conducted from June 10 to June 26, 1994, had as its purpose “. . . to assess Safety Management Systems (SMS) in the three countries, their programs or components and technologies of SMS activities including people, vehicles, and roads; compile the information; and identify effective strategies for implementation in the United States of America” (2).

Japan was investing in information technology to achieve quantum gains in highway safety, whereas Australia and New Zealand used a networking method to include relevant safety stakeholders in the process of decision making to develop and implement highway safety programs, as well as a safety audit process.

The report concluded that the major transferable safety management finding of the tour was the management philosophy observed in all three countries, namely that of networking and building consensus among stakeholders in the search for solutions to traffic safety problems (2).

Safety Management Systems: Good Practices for Development and Implementation

This document evolved from a draft document entitled *Safety Management Systems: Good Practices for Development and Implementation (10)* produced by the FHWA in November 1993. A subsequent revision was done in August of 1994, with this expanded document released in May 1996.

The purpose of the document was to provide general guidance to managers and safety specialists on the formulation of an SMS. The guidance is flexible, recognizing that the development and implementation of an SMS is an evolving process.

The document emphasized that because each state is unique, there is no one correct way to develop and implement an SMS. However, the following five major areas should be considered:

1. Coordinating and integrating broad-based highway safety programs;
2. Developing processes and procedures to ensure that the major safety problems are identified and addressed;
3. Ensuring early consideration of safety in all highway transportation programs and projects;

4. Identifying safety needs of special user groups; and
5. Routinely maintaining and upgrading safety hardware, highway elements, and operational features.

It was further suggested that within each of these five major areas, eight elements should be incorporated, as appropriate.

1. Establishment of short- and long-term highway safety goals to address both existing and anticipated safety problems.
2. Establishment of accountability by identifying and defining the safety responsibilities of units and positions.
3. Recognition of institutional and organizational initiatives through identification of disciplines involved in highway safety at the state and local levels; assessment of multiagency responsibilities and accountability; and establishment of coordination, cooperation, and communication mechanisms.
4. Collection, maintenance, and dissemination of data necessary for identifying problems and determining improvement needs.
5. Analysis of available data, multidisciplinary and operational investigations, and evaluations of existing conditions and current standards to assess highway safety needs, select countermeasures, and set priorities.
6. Evaluation of the effectiveness of activities that relate to highway safety performance, to guide future decisions.
7. Development and implementation of public information and education activities to educate and inform the public about safety needs, programs, and countermeasures that affect safety on the nation's highways.
8. Identification of skills, resources, and current and future training needs to implement the state's activities and programs affecting highway safety; development of a program to carry out necessary training; and development of methods for monitoring and disseminating new technology and incorporating effective results (10).

Continuous improvement in reducing the number and severity of crashes, as well as the medical and financial consequences is the primary goal of the SMS. The agencies should have an internal quality control system, or a self-assessment process, that ensures continuous improvement and compliance with the goals of the SMS. The self-assessment should not only measure the level of effort, but what is actually being accomplished as a result of that effort (10).

STATE AND LOCAL GUIDES

Two publications are discussed in this section: *Local Agency Safety Management System (11)*, developed for local agencies by the Washington State DOT and *Toolbox of Highway Safety Strategies (12)*, sponsored by the Iowa Highway Safety Management System Coordinating Committee.

Local Agency Safety Management System

The purpose of this document is to provide Washington's local agencies with a resource for implementing the Washington State SMS (11). The document is divided into three sections: Overview—Your Safety Management System; The SMS Process: How an SMS Works; and Tools to Get Your SMS Started.

The primary goal of the local agency SMS is to prevent and reduce the number and severity of roadway collisions, transportation-related injuries, and property damage (11) (Figure 2). The local agency SMS does the following:

- Provides a process for obtaining objective information that helps agencies identify and prioritize safety needs and choose cost-effective strategies to improve the safety of their transportation systems;
- Involves the roadway, human, and vehicle elements;
- Identifies methods for addressing safety issues in the engineering, education, enforcement, and emergency service areas; and

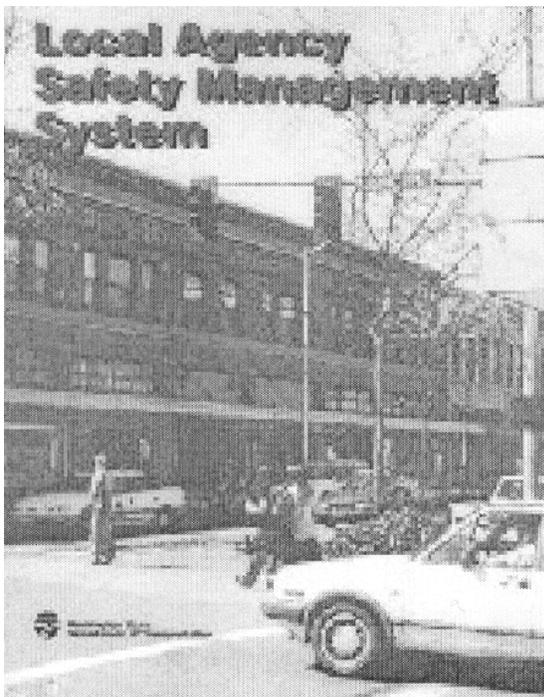


FIGURE 2 *Local Agency Safety Management System (11)*. (Source: Washington State DOT, 1998.)

- Builds on two basic parts—a collaborative process represented by a standing local agency SMS committee and an eight-element decision-making process.

The eight elements of a local agency SMS are outlined in Table 1.

TABLE 1
SUMMARY OF EIGHT ELEMENTS OF SAFETY
MANAGEMENT SYSTEMS

Element	Description
Local policy Data collection	Establishes policy and responsibilities. Provides information to support decisions and monitors their results.
Data analysis	Converts field data into usable information to assist decision makers.
System output	Presents the analyzed and processed data in a format that is usable to decision makers.
Project prioritizing and program development	Includes final prioritizing of transportation safety needs, selecting cost-effective solutions, and adopting safety policies, standards, procedures, and programs.
Program implementation	Carries out funded projects resulting in safety enhancements and educational, enforcement, and emergency services programs.
Performance monitoring	Measures and analyzes results of transportation decisions, countermeasures, and programs for future work program development.
Annual safety reporting	Annual report of safety system work efforts, expenditures, and system performance.

Toolbox of Highway Safety Strategies

The Iowa initiative is not a “how-to” manual for developing an SMS, but a highway safety resource product of the Iowa SMS Coordinating Committee members and friends. Adopting most of the content areas modeled in the AASHTO Strategic Highway Safety Plan, the *Toolbox of Highway Safety Strategies* was developed as Iowa's own compilation of problem definitions, data, and potential solutions. The purpose of the toolbox is to assist and inspire Iowa's highway safety professionals, policymakers, and citizens in implementing ways to improve highway safety, thereby reducing death, injury, and economic loss on Iowa's roadway system (12) (Figure 3).

The toolbox contains the following materials:

- Toolbox notebook contents—The Iowa SMS *Toolbox of Highway Safety Strategies* (300+ pages in a 3-hole-punched format);

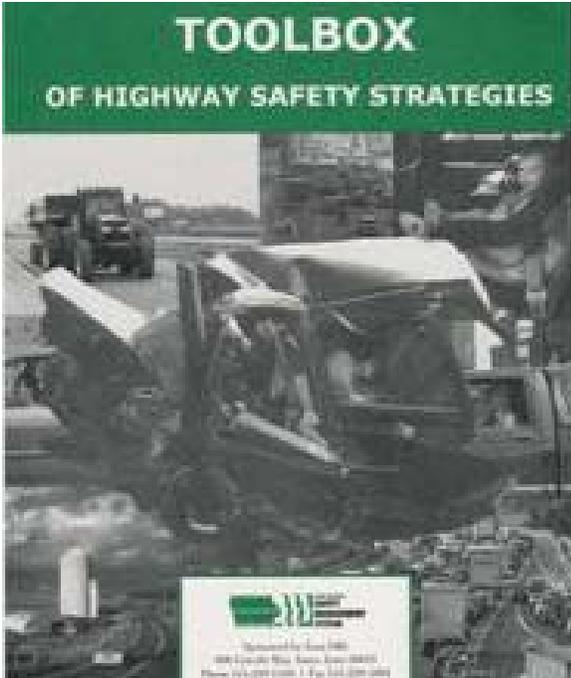


FIGURE 3 *Toolbox of Highway Safety Strategies* (12).
(Source: Iowa Highway Safety Management System, Iowa DOT 2002.)

- Summary booklet—“Highway Safety Strategies for Iowa—Executive Summary of the Iowa SMS Toolbox” (20 pages);
- Endorsement—Statement of Iowa’s Commitment to Highway Safety;
- CD-ROM—Electronic versions of the Iowa SMS *Toolbox of Highway Safety Strategies* and “Highway Safety Strategies for Iowa—Executive Summary of the Iowa SMS Toolbox”; and
- SMS “tool” with interchangeable screwdriver heads.

The Iowa SMS toolbox reinforces the safety goals, policies, and actions of highway safety agencies and practitioners by identifying many alternative actions that could be considered for implementation over the next 10 to 20 years. It also identifies some specific implementation steps that could be completed sooner (12). The document offers a range of potential solutions, including the following:

- Law, policy, and enforcement changes;
- Education and public awareness to influence driver behavior;
- Roadway design changes systemwide or in high-crash-incident locations/segments;
- Technology applied to assist drivers or enhance roadways;
- Availability and delivery of emergency and medical services;
- Data collection and analysis; and
- Planning and management.

The document is organized into three parts:

- Potential strategies for highway safety improvement, organized into chapters on drivers, other users, highways, emergency response, and planning and management;
- Resources, including primary contributors and key organizations; and
- Appendixes providing graphs and trends of Iowa crash data and summary findings of the Iowa SMS Public Opinion Survey.

In addition to the printed and CD-ROM versions, the Iowa SMS *Toolbox of Highway Safety Strategies* and “Highway Safety Strategies for Iowa—Executive Summary of the Iowa SMS Toolbox” are located on the SMS website at www.IowaSMS.org.

SUMMARY OF THE LITERATURE REVIEW

As was discussed, the principles of an SMS process have their foundation in both guides and guidelines focusing on the enhancement and management of highway safety, as well as federal legislation. National studies revealed that the SMS process has brought about many positive outcomes, particularly the enhancement of coordination, cooperation, and communication among key highway safety stakeholders. Successful SMS state initiatives continue to thrive in the absence of a legislative mandate.

SURVEY RESULTS

SCOPE AND METHODOLOGY

The purpose of this synthesis is to summarize the current practice of the highway SMS process. On the basis of earlier research findings, different approaches are used to implement these processes, with varying levels of personnel and agency involvement, resource disposition, data management, strategic planning, and activity assessment.

This chapter summarizes the state of the practice among states with active SMS processes. As of fall 2001, 26 states reported having an SMS process and multidisciplinary committee that coordinated highway safety initiatives (5): Alabama, Arizona, California, Connecticut, Florida, Indiana, Iowa, Louisiana, Maine, Massachusetts, Michigan, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Pennsylvania, Rhode Island, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

In 2002, a questionnaire was developed and distributed to these focus states as well as to Nebraska and Tennessee, for a total of 28 surveys distributed (Appendix D). Questionnaire content was formulated from Project Panel input, the literature review, and discussions with state and federal transportation personnel.

The questionnaire is divided into five parts: Part I—Process Management, Part II—Resource Allocation, Part III—Data/Database Enhancements, Part IV—Tracking and Evaluating Safety Investment, and Part V—Multidisciplinary Committee. It should be noted, that in addition to the completed questionnaire, some states provided other documents relevant to the SMS process.

Twenty states returned usable surveys or sent e-mail responses. In the 2001 survey, Nebraska and Tennessee were not in the focus 26 states that reported having an active SMS and a multidisciplinary committee.

Of these 20 returns, 15 indicated the presence of an active SMS and a multidisciplinary committee that coordinates highway safety initiatives: Arizona, Iowa, Louisiana, Maine, Michigan, Nevada, New Jersey, New York, North Carolina, Rhode Island, Tennessee, Vermont, Washington, West Virginia, and Wisconsin. California, Montana, Nebraska, and New Mexico indicated that they currently do not have an active SMS process that coordinates highway safety initiatives. Florida reported by e-mail that the SMS

group was in flux and is in the middle of making critical decisions about the continuation of its SMS. As a result, the state declined to complete the survey. See Appendix E for the list of respondents.

KEY FINDINGS

Fifteen states reported the presence of an active SMS and a multidisciplinary committee. Findings discussed in this section are based on their responses to the questionnaire. The questionnaire was divided into five parts [Parts I–V (Questions 2–22)] and five summary questions (Questions 23–27), for a total of 27 questions.

Part I—SMS Process Management

This section of the survey (Questions 1–8) asked states about their agencies' management of the SMS process. Table 2 shows the importance level of measures used in classifying projects as safety projects. A rating of 5 means Extremely Important. The importance rating was established by taking each state's rating by level of importance and multiplying it by the appropriate assigned numerical equivalent (5 = Extremely Important, 4 = Very Important, 3 = Important, 2 = Not Very Important, 1 = Not Important at All). The total number was then divided by the number of states (N), the result of which established a rating of importance.

TABLE 2
MEASURE USED IN CLASSIFYING SAFETY PROJECTS

Classification Measure	Importance Rating
Quantitative analysis	4.4
Designated federal funding	4.0
Safety management process	3.7
Administrative decision	3.6
Pressure from high profile individual	2.9
External expert opinion	2.3

Notes: Number of states reporting, 15.

Nine states indicated having a separate category of investment for safety beyond the Federal Hazard Elimination Safety Program (FHESP): Arizona, Iowa, Louisiana, Maine, New Jersey, North Carolina, Tennessee, Washington, and Wisconsin. Comments on these separate categories are presented in Table 3.

Based on survey responses, the key decision maker on the safety investment level was a joint decision by upper-

TABLE 3
INVESTMENT BEYOND FEDERAL HAZARD ELIMINATION SAFETY PROGRAM

State	Investment Beyond FHESP
Arizona	Maricopa Association of Governments Safety Management System, \$350,000 set aside for FY 2005 to develop a regional SMS.
Iowa	Of the state road-use tax, 0.5% is designated for highway safety improvements and research. The Iowa DOT Management Systems Advisory Committee continues to fund the SMS with \$50,000–\$100,000 annually.
Louisiana	The department’s program is partitioned into four categories, with one being safety. This means that safety projects compete only against safety projects.
Maine	TEA-21 Safety Incentive Funds used for transportation safety education, municipal assistance, and pilot transportation safety initiatives.
New Jersey	Highway Safety Improvement Program (HSIP; of which the HES is a subprogram) Crash Records Systems.
North Carolina	State funded “Spot Safety” program, \$9.1 million/year. Contingency and Senate Bill 1005. Programs, Median Barrier Freeway Safety Initiatives (TIP) \$120 million over 5 years.
Tennessee	Optional Safety Program—Excess federal funds from 10% STP set aside above minimum HES required level.
Washington	Within the 2001–2003 WSDOT budget, the Safety Improvements subprogram funds capital projects in two categories: collision reduction (\$80 million) and collision prevention (\$62 million); the Roadway Preservation (paving) subprogram funds “spot safety” improvements using a maximum of 12% of subprogram funds (\$32 million). The ongoing state SMS initiative, Target Zero, enables additional statewide safety investments using federal safety incentive funds (\$3 million). The Traffic Operations program funds a “low cost enhancements” element to address immediate safety concerns (\$5 million).
Wisconsin	Wisconsin DOT is an umbrella organization in that it includes the Division of Motor Vehicles, the Division of State Patrol, and the Governor’s Highway Safety Representatives (DTIM/Bureau of Transportation Safety). The Bureau of Transportation Safety compiles the department’s annual Highway Safety Performance Plan, for submittal to the U.S.DOT. This document details the program funding allocation plan for the upcoming fiscal year for the state’s federal Section 402, 403, 410, 411, 157, 164 transfer, 2003b, OJJDP, and MCSAP funds. It also includes program funding allocations for state-funded Wisconsin DOT safety initiatives in areas such as motorcycles, pedestrians, bicycles, school buses, and corridor/community safety. The department also has a state-funded program-specific safety initiative in the area of alcohol-impaired driving (e.g., subsidies for local safe-ride programs and pretrial intensive supervision for repeat offenders).

Notes: Number of states reporting, 9. FHESP = Federal Hazard Elimination Safety Program; HES = Hazard Safety Elimination; TIP = Transportation Improvement Program; STP = Surface Transportation Program; DTIM = Division of Transportation Investment Management; OJJDP = Office of Juvenile Justice Delinquency Prevention; MCSAP = Motor Carrier Safety Assistance Program.

level agency management. Table 4 summarizes the likelihood of individuals or groups as key decision makers on the level of safety investment. A value of 5 equals extremely likely.

TABLE 4
DECISION MAKERS ON THE LEVEL OF SAFETY INVESTMENT

Decision Maker	Likelihood Rating
Joint decision by upper-level agency administration	4.2
Chief engineer	3.7
Safety engineer	3.5
District engineer	3.3
Safety management system committee	3.2

Notes: Number of states reporting, 15.

Quantitative analysis was the most important element in prioritizing the state’s safety investment. The cost-benefit approach and agency (internal) expert opinion were also rated very important. Table 5 depicts these results. A rating of 5 means extremely important.

All 15 states reported that improvements to the data collection and analysis process have been initiated to assist

TABLE 5
IMPORTANCE IN PRIORITIZING STATE’S SAFETY INVESTMENT

Element	Importance Rating
Quantitative analysis	4.6
Benefit-cost approach	4.1
Agency (internal) expert opinion	4.1
Safety management process	3.9
Review of research	3.2
Public opinion	3.0
Political influence	2.9
External expert opinion	2.7

Notes: Number of states reporting, 15.

the operation of the SMS. Fourteen states (93%) indicated that they have identified a lead agency to organize meetings and monitor progress, whereas 13 states (86%) developed a mission statement to assist the operation of the SMS. Memorandums of agreement between key local agencies or between key state and local agencies were not obtained by any state in the operation of their SMSs. Appendix F features a complete listing of actions taken by states to assist in the operation of their SMSs.

Table 6 shows what actions would improve the effectiveness of the SMS process. The table reveals that im-

TABLE 6
ACTIONS LIKELY TO IMPROVE THE EFFECTIVENESS OF
THE SAFETY MANAGEMENT SYSTEM PROCESS

Actions	Improvement Rating
Improve data analysis process	4.1
Increase support from upper management	3.9
Designate funding source to support SMS process	3.8
Improve data collection process	3.8
Improve access to database	3.7
Increase cooperation between agencies	3.7
Link databases	3.5
Use financial incentives for meeting safety goals	3.1
Revise current strategic plan	3.0
Improve attendance at SMS meetings	3.0
Develop a strategic plan	2.7
Designate staff to oversee the SMS process	2.6

Notes: Number of states reporting, 15.

provement in the data analysis process is very likely to improve the effectiveness. Other actions also likely to improve SMS effectiveness were increased support from upper management, a designated funding source to support the SMS process, improvements to the data collection process, and improved access to databases.

Part II—SMS Resource Allocation

Part II of the survey (Questions 9 and 10) asked states about their resource investment in the SMS process. Nine of the 15 states reported designating funds to assist in the operation of the SMS process. Four states listed an approximate expenditure amount: Maine, \$225,000; New Jersey, \$5,000,000; Washington, \$500,000–\$1,000,000; and Iowa, \$50,000–\$100,000.

States with full-time staff assigned to coordinate the SMS process include Iowa, Maine, New Jersey, and New York. Part-time staff similarly assigned is located in Louisiana, Rhode Island, and Tennessee. States that assign the coordination of the SMS process as collateral duty are Arizona, Nevada, North Carolina, Rhode Island, Vermont, Washington, and West Virginia. Wisconsin reported no such designated staff.

Part III—Data/Database Enhancements

Part III of the survey (Questions 11–13) asked states how the SMS process has affected their data collection, availability, analysis, and linkage. Based on their responses, the SMS process has exerted a positive impact on the data information systems. Improvements were made in data analysis, data collection procedures, and data availability. Table 7 reflects how the SMS process has affected data information systems. A rating of 5 equals extensive improvement.

TABLE 7
HOW THE SAFETY MANAGEMENT SYSTEM PROCESS
AFFECTS DATA INFORMATION SYSTEMS

Action	Improvement Rating
Data analysis	3.8
Data collection procedures	3.7
Data availability	3.6
Improved staff expertise	3.3
Number of data elements captured	3.2
Linking data	3.1

Notes: Number of states reporting, 15.

General appreciation of safety data, support for system improvements, and pedestrian collision data were also listed as ways the SMS process has affected data information systems.

When asked whether the state was using the Model Minimum Uniform Crash Criteria, 10 states, Iowa, Louisiana, Maine, Michigan, Nevada, North Carolina, Vermont, Washington, West Virginia, and Wisconsin replied yes. The quality of the crash, vehicle, person, and roadway data elements is shown in Table 8. A rating of 5 indicates excellent quality.

TABLE 8
QUALITY OF DATA ELEMENT CATEGORIES

Data Element Category	Rating
Crash	3.6
Vehicle	3.3
Person	3.3
Roadway	2.7

Notes: Number of states using the Model Minimum Uniform Crash Criteria, 10.

Part IV—Tracking and Evaluating Safety Investment

Part IV of the survey (Questions 14–20) asked states how their SMS monitors and measures the success of safety initiatives. Seventy-three percent of the states' SMS processes have procedures to track the state's safety investments. Four states (27%) evaluate the dollar value of benefits associated with the safety investments or projects on a regular basis, whereas six states (40%) occasionally evaluate the dollar value of benefits. The purposes for which dollar value of benefits are assessed are shown in Table 9. The reasons that some states did not evaluate the dollar value of benefits were because the assessment was not required or not needed for decisions, there were no applicable projects, doing an assessment was too expensive and/or too hard to do, and data were poor.

None of the 15 states reported evaluating the safety investment on a regular basis, although 11 states indicated evaluating it on occasion. Three states reported not evaluating safety investments at all. The methods used to evaluate safety investments are shown in Table 10.

TABLE 9
PURPOSES FOR THE ASSESSMENT OF DOLLAR VALUE OF BENEFITS

Purpose	States Indicating Yes
Benefit-cost analysis (9 states)	Arizona Louisiana Maine Nevada New Jersey North Carolina Tennessee Washington West Virginia
Program project planning (8 states)	Louisiana Maine New Jersey North Carolina Tennessee Washington West Virginia
Evaluate prior investment (8 states)	Louisiana Maine New Jersey North Carolina Tennessee Washington West Virginia Wisconsin
Prioritize and rank alternatives (7 states)	Louisiana Maine New Jersey North Carolina Tennessee Washington West Virginia Wisconsin
Public information or discussion (4 states)	Louisiana Maine Washington Wisconsin
To support or oppose proposed safety legislation (3 states)	Louisiana Washington Wisconsin

Notes: Number of states reporting, 15.

Two states indicated they did not evaluate the safety investment because they did not have the expertise to do the evaluations. One state reported each of the following responses: doing an evaluation was too difficult and/or too expensive, there were no applicable projects, or it was not required or needed for decisions.

Part V—Multidisciplinary Committee

Part V of the survey (Questions 21 and 22) asked states about the role and function of their SMS multidisciplinary committees. All 15 states reported having a multidisciplinary committee. The functions of such a committee are rated by importance in Table 11. A rating of 5 indicates extremely important.

In the nine states where the SMS multidisciplinary committee selects safety projects (Iowa, Louisiana, Michigan,

TABLE 10
METHODS USED TO EVALUATE SAFETY INVESTMENT

Methods	States Indicating Yes
Use state and federally conducted studies (7 states)	Arizona Louisiana North Carolina Tennessee Washington West Virginia Wisconsin
Use other research studies (university, etc.) (7 states)	Maine Michigan North Carolina Tennessee Washington West Virginia Wisconsin
Use findings of federally funded studies (5 states)	Arizona Louisiana North Carolina Washington West Virginia
Pool funded studies (4 states)	Arizona Louisiana Tennessee Washington
Other: Benefit-cost Annual evaluation of individual project location crash statistics State-, international-, university-based research	Nevada New Jersey North Carolina Maine West Virginia
Synthesis, public polling, survey	North Carolina

Notes: Number of states reporting, 15.

TABLE 11
FUNCTIONS OF MULTIDISCIPLINARY COMMITTEE

Function	Importance Rating
Enhance coordination between agencies	4.3
Enhance communication between agencies	4.3
Develop strategic plan	3.6
Host statewide safety conference	3.6
Formulate safety legislation	3.4
Evaluate safety initiatives	3.3
Lobby for safety legislation	3.1
Produce statewide newsletter	2.7

Notes: Number of states reporting, 15.

New Jersey, New York, North Carolina, Vermont, Washington, and West Virginia), seven (77%) use data analysis as the selection criterion. The use of available funding and by majority vote was six (66%) and three (33%), respectively. Funding partnerships and political influence were also mentioned as selection options.

Success of SMS Process

When asked about the overall success rate of the state SMS process (Questions 23–27), 8 of the 15 states rated it either

TABLE 12
SUCCESS RATE OF STATE SAFETY MANAGEMENT SYSTEM PROCESS

State	Extremely Successful	Very Successful	Successful	Not Very Successful
Arizona		X		
Iowa		X		
Louisiana		X		
Maine		X		
Michigan			X	
Nevada				X
New Jersey			X	
New York	X			
North Carolina		X		
Rhode Island			X	
Tennessee		X		
Vermont			X	
Washington		X		
Wisconsin			X	
Wyoming			X	
Total	1	7	6	1

Notes: Number of states reporting, 15.

TABLE 13
SUCCESS OF LOCAL SAFETY MANAGEMENT SYSTEM INITIATIVES

State	Extremely Successful	Very Successful	Successful	Not Very Successful	Not Successful At All	No Local Initiatives
Arizona		X				
Iowa			X			
Louisiana			X			
Maine			X			
Michigan						X
Nevada					X	
New Jersey				X		
New York			X			
North Carolina		X				
Rhode Island			X			
Tennessee		X				
Vermont						X
Washington				X		
West Virginia					X	
Wisconsin			X			
Total	0	3	6	2	2	2

Notes: Number of states reporting, 15.

extremely successful or very successful. Only one state indicated that the process was not very successful. Table 12 reflects these findings.

In regard to local SMS initiatives, no state reported them as being extremely successful, with only three states rating them as very successful. Two states have no local initiatives, and four states rated them as either not very successful or not successful at all. Table 13 presents these responses.

The states were asked to identify one key success achieved by their SMS processes. Table 14 reflects these responses.

The states suggested the following actions that could be taken on the national level to further support the SMS process:

- Develop case studies of success stories;
- Share successful programs with DOT chief executive officers at the AASHTO annual meeting;
- Provide incentives, such as funding, to encourage greater participation and reward meeting measurable achievements;
- Conduct statewide multiagency training sessions in transportation safety and highlight successful undertakings by other states;
- Require DOTs to define their safety programs and to set measurable safety goals;
- Refocus the Hazard Elimination Program on national goals to reduce the number of collisions with fatalities/injuries or on national goals for collision reduction; and
- Simplify and streamline the Individual Project Funding Reimbursement process.

TABLE 14
SAFETY MANAGEMENT SYSTEM PROCESS SUCCESSES

State	Success Achieved
Arizona	Accident reductions.
Iowa	The Safe Mobility for Older Drivers Forum held in June 2002—accomplished public awareness and added stakeholder involvement through inviting Iowa seniors and celebrity Art Linkletter to speak along with state and national safety experts. Institutions took note and the resulting public awareness efforts, with new partners and stakeholders, continue to develop.
Louisiana	An improvement in data collection and analysis and better communication among agencies.
Maine	Increased communication and cooperation with other transportation safety-related agencies.
Michigan	Creation of awareness of traffic safety issues through an Annual Traffic Safety Summit. Passage of major legislation, such as repeat offender, graduated driver licensing, primary enforcement, etc.
Nevada	Initiated data improvements.
New Jersey	Developed formal methodologies for overall and individual crash reduction program implementation, including a flow chart for the SMS/HSIP process.
New York	<ol style="list-style-type: none"> 1. Gained agency approval of a safety goal, which calls for the reduction, each year, of an additional 1,500 crashes, a reduction resulting from engineering improvements to our highways. We have met the goal each year. 2. Gained agency support and funding for an engineering position at our Local Technology Assistance Program Center (Cornell Local Roads) to train local highway officials in highway safety practices and technologies. 3. We have reached out to our metropolitan planning organizations to encourage them to consider safety in their planning process. Their Unified Planning Work Programs now reflect a heightened consciousness of safety planning. 4. Gained agency approval and support of our Skid Accident Reduction Program, which identifies high wet road crash locations on our system, conducts friction tests on those locations, and treats those locations with any friction test results below FN (40) of 32. 5. Gained agency approval and support of our Safety Appurtenance Program (SAFETAP), a safety audit initiative, which ensures that roadside safety needs are addressed on all agency simple resurfacing projects. 6. Reductions in the role of alcohol in crashes. 7. Increased seatbelt usage, encouraged through special enforcement effort. 8. Joint DOT/state police targeted enforcement in corridors experiencing high levels of aggressive driving crashes. 9. Initiation of two studies (one state, Rensselaer Polytechnic Institute, and one Federal, NCHRP) evaluating the impacts of roundabouts of various designs on conventional intersections of various designs, for improving our understanding of the role of roundabouts in reducing intersection crashes. 10. We are in the midst of a systematic, across-the-board, upgrading of our safety information systems, including the development of an electronic crash reporting process (national model); the capability to receive, download, and distribute data electronically; and the use of geocoding to locate and group crash data for analysis purposes. We are also in the midst of a number of improvements affecting our ability to analyze crash data and to make system capabilities available over the Internet to local highway officials.
North Carolina	Better involvement/participation of 4 Es (engineering, enforcement, education, emergency response) and dispelled the misconception that safety only applied to Occupational Safety and Health Administration and work zones.
Rhode Island	More accurate data received on a timelier basis.
Tennessee	Optional Safety Program produces local agency safety improvement projects.
Vermont	Forced us to think about safety.
Washington	<ol style="list-style-type: none"> 1. Incorporated our federally approved SMS decision-making process and “worst first” safety investment strategy into Washington State DOT budget building process. As part of our 1995 Stewardship Agreement with the FHWA, this enables full federal participation on all Preservation (paving) projects, while allowing preapproved design exceptions on FHWA’s 12 safety elements. 2. Washington State DOT can now easily describe, quantify, and measure the level of specific “safety” investment (planned versus actual) enabling future evaluative and trade-off discussions concerning benefits of safety investments compared with such worthy competitors as mobility, maintenance/operations, economic development, environmental retrofit, and preservation. 3. Applied a focused SMS process within our Corridor Safety Program using local collaboration groups, looking at their sections of the state highway, to define problems and solutions. Demonstrated collision-reduction benefits and vital multijurisdictional teamwork. Won the Governor’s Award for Public Benefit for 2002. 4. Applying the SMS decision-making process led directly to our adoption of statewide design standards and implementation of shoulder rumble strips on all rural freeways.
West Virginia	Joint projects combining engineering, education, and enforcement.
Wisconsin	Strategic Plan for Highway Safety.

Notes: Number of states reporting, 15. HSIP = Highway Safety Improvement Program.

SUMMARY OF THE STATE OF THE PRACTICE

This chapter reviewed the responses to the Safety Management System in Practice questionnaire. The questionnaire, which was sent to 26 states, received 20 responses. Fifteen states indicated having active SMS processes. The key findings are as follows:

- Most states view their overall statewide SMS process as successful.
- Local SMS initiatives have been less successful than statewide processes.
- Quantitative analysis provides an important measure in classifying projects as safety projects, as well as prioritizing the state's safety investments.
- Nine states have a separate category of investment for safety beyond the FHESP.
- Upper-level agency administration is the key decision maker on the level of safety investment.
- Most states have taken the following actions to assist the operation of the SMS: identified a lead agency to organize and monitor the SMS process, developed a mission statement, invested money and designated staff to support the process, and initiated improvements to the data collection and analysis process.
- Improving the data analysis process and increasing support from upper-level management are key actions that would improve the effectiveness of state's SMS process.
- The SMS process has improved the data information systems within the states, particularly in the data analysis and collection procedures.
- The quality of the roadway data elements collected in the states is fair, as compared with very good or good for crash, vehicle, and person data elements.
- Few states have evaluated, on a regular basis, the dollar value of benefits associated with safety investments.
- Multidisciplinary committees were deemed very important in enhancing coordination and communication among agencies.

MODEL SAFETY MANAGEMENT SYSTEM INITIATIVES

STATE SAFETY MANAGEMENT SYSTEM

Iowa

One of the most mature and successful SMSs in the nation is located in Iowa. The Iowa SMS has been strong since its inception under the federal ISTEA of 1991. The Iowa SMS Coordination Committee was formed and began regular meetings in February 1995. Since its early beginnings, the Iowa DOT's Office of Transportation Safety and the Iowa Department of Public Safety's Governor's Traffic Safety Bureau (GTSB) have partnered to develop and sustain the Iowa SMS.

Iowa's SMS is multidisciplinary and multijurisdictional, representing both public and private perspectives. The "4 Es + 1" of highway safety—engineering, enforcement, education, and emergency response, plus "everyone else"—are represented in the Iowa SMS membership (11).

Through the years, the SMS Coordination Committee has established communication and cooperation among its interdisciplinary members; identified new safety problems and areas in need of improvement; and established task forces, conducted surveys, and developed products to address problems.

Keys to the success of the Iowa SMS are the following:

- A multidisciplinary network of knowledge and resources whereby the SMS serves more as a catalyst than a control. The SMS focuses on filling gaps and creating beneficial connections between existing highway safety programs. Each member entity retains autonomy while contributing to and benefiting from the greater highway safety gain resulting from shared efforts.
- A multidiscipline goal, dedicated to reducing the human suffering and economic losses resulting from crashes on Iowa's roadways.
- An SMS program-designated chairperson (in the Iowa DOT) and a support staff person assigned to SMS as a primary duty (three-fourths time).
- An active partnership of the Iowa DOT, Office of Traffic Safety, and the Iowa Department of Public Safety—GTSB. These key offices manage most of the state's designated highway safety program funds.
- Thirty to 40 highway safety champions and entities that join SMS efforts as members and friends. The Coordination Committee meets regularly, currently four to six times per year. Its members are aware of the positive impact their efforts may have on other members and they routinely consider how they can encourage and support others. These champions help ensure that when worthy highway safety strategies cannot be implemented in a single agency, SMS or multiagency collaboration can fill the gap.
- Broad institutional support for the SMS, including the SMS *Toolbox of Highway Safety Strategies* and *Iowa's Commitment to Highway Safety* "charter" signed by Iowa's governor and many other officials. As a living document compiled by SMS members, with potential rather than prescribed strategies, the toolbox contains safety-focused data and ideas for discussion and problem solving in 28 topics of concern.
- Changing SMS activities that involve stakeholders in various shared efforts promote the multidiscipline synergy and buy-in needed to sustain and grow the Iowa SMS. These activities can span all "5 Es" of Iowa's SMS disciplines and all topics in the 28 SMS toolbox chapters.
- Each year, \$50,000–\$100,000 in dedicated SMS funds is allocated from the Iowa DOT Management Systems program. The SMS multiagency and multidiscipline membership then has authority to commit these funds to specific projects that further implement the Iowa SMS *Toolbox of Highway Safety Strategies*. Other funds are made available through project grant applications and partnerships with SMS members and friends—among which are the DOT, FHWA, GTSB, and other public- and private-sector sources.
- Safety program enhancements in member agencies are triggered or supported beyond the confines of the SMS organization and its authority or funding.
- Extensive strategic planning efforts resulting in the 1999 Iowa Strategic Highway Safety Plan and the 2002 *Toolbox of Highway Safety Strategies*.
- Effective standing committees, task forces, and ongoing efforts, including the following:
 - The Statewide Traffic Records Committee operates as an SMS standing committee that involves key agencies and multiple jurisdictions in an ongoing collaboration to collect, integrate, and analyze all statewide crash-related data.
 - The Speed Limit Report Committee produces a nationally recognized annual report of data in-

- cluding speed limit and crash records for Iowa and surrounding states. The intended audience for the report is policymakers and lawmakers who review Iowa's speed limits nearly every year.
- SMS local multidiscipline groups are offered special project funding through a small oversight committee.
- The Older Driver Task Force has led efforts to identify and implement effective strategies to reduce the crash risk of Iowa's aging drivers.
- Other task forces have addressed rail crossings, access management, deer–vehicle crashes, bicycle safety, and a number of emergency response issues, including response patterns, training, and resources.
- Sponsoring several events aimed at increasing highway safety awareness, knowledge, and resources including the 2000 Multi-State Highway Safety Peer Exchange (Figure 4), the 2001 Iowa Local Safety Group Peer Exchange, and the 2002 Older Driver Forum.



FIGURE 4 2000 Multistate Highway Safety Peer Exchange.

- Partnering with the Iowa's Traffic Control Safety Association, the Iowa Safety Education Association, Iowa American Association of Retired Persons 55 ALIVE training, and the Heartland intelligent transportation systems in support of its annual education events, and offering the National Highway Safety Institute incident management training to local multidiscipline teams and their agencies.
- Conducting two pilot projects—the SMS Bicycle Safety physical education class curriculum, which in 2003 will become part of a statewide program; and the school bus video camera project, which helped the Iowa Department of Education demonstrate widespread illegal passing of school buses.
- Sharing and effectively using data among several agencies to help set priorities and identify problems.
- Providing process and decision tools for local and state use through research projects (Deer/Vehicle Crash Study, Iowa Highway Safety Public Opinion

Survey, spatial analysis of older driver crashes, and Communicating Highway Safety—What Works; reports (access of management handbook and multimedia resources for local use); and tools (older driver data report and Emergency Response Information System).

- Supporting public information and education projects including driver videos, upgrades to the State Patrol Road Condition toll-free phone access and website, and enhanced driver education for both young and older drivers.
- Infusing SMS members' existing programs with additional safety emphasis where possible with data, expertise, technical support, or encouragement offered by SMS members.

Iowa is a genuine success story that has stayed on course and reaped numerous benefits of the SMS process. All of these efforts were accomplished despite the loss of a regulatory mandate from federal legislation.

Iowa's 1994 *Safety Management System Strategic Work Plan* stated, "Several years from now, when someone asks what is the SMS, it is quite possible that the answer will be not very different than when the committee structure of this Work Plan is put into operation, early in 1995. It will be groups of people working systematically to apply all pertinent management practices toward the improvement of highway safety in Iowa. With time, it (SMS) will surely become a whole that is far more effective than the sum of its parts" (13). Iowa's SMS efforts have truly fulfilled this prophecy and become a "whole that is far more effective than the sum of its parts."

Washington

Washington State achieved federal agency approval of its SMS in 1994 as an "existing" system in compliance with the original 1991 ISTEA mandate. This was accomplished through the partnership of the Washington Traffic Safety Commission (WTSC; directed by the Governor's Highway Safety Representative) and the Washington DOT (WSDOT). This partnership embodies the four "Es" of highway safety—engineering, enforcement, education, and emergency services in the public and private sectors. All highway safety stakeholders were and are encouraged to participate.

Simply described, Washington's SMS has three components: the defined safety program, the stakeholder partnership, and a five-step decision-making model (safety needs identification, solution/resources development, safety investment prioritization/programming, safety investment tracking, and safety investment evaluation).

From 1993 to 1995, the WSDOT was redefining its capital investment programming structure at the direction

of the state legislature. Simultaneously, the SMS was being developed in close coordination with the FHWA owing to the ISTEA mandate and to efforts to agree on a new stewardship agreement. These related influences on SMS development facilitated an agreement with the FHWA on a newly defined safety investment program. The WSDOT guaranteed that minimum levels of safety investment would be made at the “worst first” safety problem locations, in exchange for FHWA preapproved “safety design standard exceptions” on all preservation (paving) projects.

Incorporating the SMS five-step decision-making process into a biennial budget building process has returned huge, yet-to-be quantified benefits in at least two areas:

1. The safety investment has doubled since the agreement in 1995 to invest at “equal to or greater than the ‘95 safety investment level”—and now safety investments are made at the “worst safety locations first,” rather than allowing the highway preservation (paving) schedule to drive safety investment; and
2. Countless hours of project-by-project deviation discussions, negotiations, and documentations, on hundreds of paving projects—where safety design standards are certainly still the goal, but at many paver locations, the standards are not as cost-effectively applied, compared with situations at high-priority safety locations.

For Washington, the need to clearly define the safety program in 1993 and 1994 proved to be a task that sounded difficult, yet it enabled the SMS to flourish even after the mandate was lifted in 1995. The local agency SMS was developed from 1996 to 1998. This important resource to local agencies can provide benefits realized through increased collaboration and definition of their road environment safety projects and programs.

During 1998 and 1999, WSDOT and WTSC continued to demonstrate the effective multijurisdictional partnership by developing and launching the governor’s strategic highway safety program—Target Zero (Figure 5). Target Zero is a statewide traffic safety plan with three objectives:

- Recognize and build on existing safety programs,
- Bring traffic safety partners together, and
- Coordinate a statewide safety vision and goals.

The Target Zero Steering Committee, in cooperation with many state, local, and private agencies, focuses on further reducing traffic-related fatalities and disabling injuries in Washington State. Target Zero supports the committee’s 30-year vision, to achieve a “transportation system with no deaths or disabling injuries” (14).

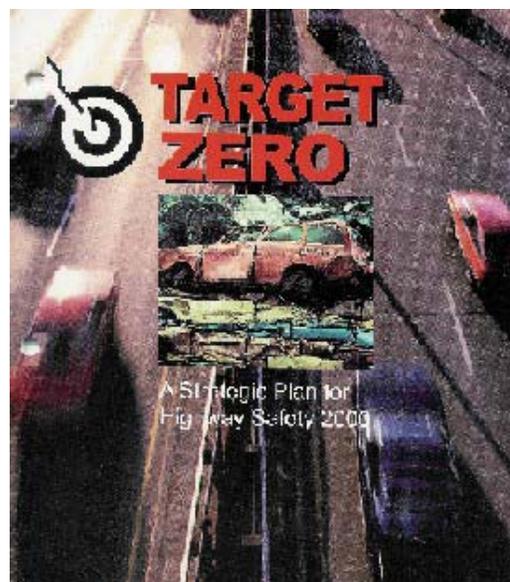


FIGURE 5 *Target Zero: A Strategic Plan for Highway Safety 2000*. Washington State (14). (Source: Washington Traffic Safety Commission, 2000.)

This program identifies the state’s top 10 safety goals, provides solution strategies for each goal, and funds projects specifically targeting the strategies. Federal Safety Incentive funds are used to fund the Target Zero projects, all of which are selected by the Target Zero (SMS) committee.

LOCAL SAFETY MANAGEMENT SYSTEM

Washington State

The state of Washington’s commitment to local SMSs began in 1996 and culminated in 1998 when the first Local Agency Safety Management System document was published (11). The purpose of that document is to provide Washington’s local agencies with a resource for implementing the Washington State SMS. Local agency experts from jurisdictions across the state developed the SMS model. It incorporates all aspects of transportation including law enforcement, emergency services, and education, as well as engineering.

Furthermore, the guide seeks to assist local agencies in reducing the number and severity of collisions on their streets and roads. The complete context of safety management, as it applies to local streets and roads, includes three safety elements of highway safety: the vehicle, the human, and the roadway.

The guide recognizes that emergency services, law enforcement, and education are equal partners with engineering in providing comprehensive and efficient management of local agency safety resources. An SMS strengthens these

efforts by integrating the engineering component of safety management with the other three components. Through a collaborative process that emphasizes routine communication and information sharing, safety needs can be identified and the resources necessary to address them can be coordinated (10).

In Washington State, one community, Vancouver, has begun the process of implementing a local SMS using this SMS model. Staff from the Washington State Technology Transfer Center is assisting with the process. Initially, the center's staff met with individuals from the city of Vancouver to discuss the process. Progress to date includes identifying a lead agency and organizing a multidisciplinary committee. To attain buy-in from upper administration, the center's staff advised the lead agency staff to include a member of the City Council on the multidisciplinary committee.

Resources and Tools

The role of the Technology Transfer Center in the development of these local initiatives is to serve as a technical resource during key junctures of the development and implementation phases of the local SMS. Plans are under way to provide local agencies with valuable tools in addition to the *Local Agency Safety Management System* document to support their SMS processes. The center's staff is working

on two companion tools: a collision analysis tool and a prediction model tool.

To stimulate additional communities to organize SMS processes, beginning in 2004, a funding bonus of up to a 10% will be given to communities receiving Hazard Elimination Safety monies if basic elements of an SMS process are in place. A copy of the draft document of Criteria for Hazard Elimination Safety Bonus Points, Self-Certification document is found in Appendix G.

In addition, the Technology Transfer Center staff plans to conduct several regional training sessions using the *Local Agency Safety Management System* document and supporting collision analysis tools to assist communities in understanding the SMS process and to promote the incentive program.

The document and companion tools are vital to the success of this local SMS initiative. So is the commitment of the WSDOT, which assigned a program manager to focus on local SMS development.

A local community initiative assisted by state support and resources is the primary motivator in Washington State to move the local SMS process forward. The foundational guide, support tools, technical assistance personnel, incentive, and technology transfer plan, all working together, will expand the local SMS opportunities for this state.

CONCLUSIONS

The Safety Management System (SMS) is a process whereby members of the highway safety community collectively improve safety on the roadway system. It is an effective avenue for stimulating cooperation, coordination, and increased communication among highway safety stakeholders, as well as improving strategic planning and data sharing.

By 1994, every state had developed a work plan outlining strategies to implement an SMS as required by the Intermodal Transportation Efficiency Act of 1991. Following the passage of the National Highway System Designation Act of 1995, further development and implementation of SMS by states became optional. By 2001, only 26 states indicated that they had an active multidisciplinary committee and SMS. Further deterioration of SMS initiatives is evidenced in the Safety Management System in Practice survey results. Four of those 26 states are now reporting no SMS activity.

Because the SMS process is ongoing, key organizational components assist its operation, sustainability, products, tools, and initiatives. Based on survey responses, these components are

- Buy-in from top management;
- Identification of a lead agency to help organize the process;
- Formation of a multidisciplinary coalition or committee encompassing at a minimum representatives from engineering, enforcement, education, and emergency medical services;
- Designation of staff to support the initiative;
- Development of a mission statement;
- Improvements to the data collection and analysis process;
- Development of a strategic plan to help guide the ongoing effort; and
- Funding to assist the SMS operation.

According to survey respondents, qualitative analysis and designated federal funding were the most important measures in classifying projects as safety projects. Nine states indicated having separate categories of investment for safety beyond the Federal Hazard Elimination Safety Program, with a joint decision by upper-level agency administration deemed most likely to determine the level of safety investment.

The most important element in prioritizing the state's safety investment was quantitative analysis. Cost-benefit

analysis and agency (internal) expert opinion were also seen as very important.

Actions taken by states to assist the SMS operation included improvements to the data collection and analysis process, identification of a lead agency to assist the effort, and development of a mission statement.

When asked about how to improve the effectiveness of the SMS process, states identified improvements to the data analysis process, increased support from upper-level management, a designated funding source to support the process, and improvements to the data collection process as the most important. Fourteen of the 15 states reported allocating staff time to the SMS process effort in a full-time, part-time, or collateral duty capacity.

Data information system improvements seem to be a positive outcome of the SMS process; so are improvements in data collection procedures and availability. Ten of the 15 states indicated using the Model Minimum Uniform Crash Criteria. The quality of roadway data elements were rated only "fair" as compared with "good" for crash, vehicle, and person data elements.

As far as tracking and evaluating safety investment, 11 states have procedures in place. Benefit-cost analysis was identified as the most common purpose for the assessment of dollar value of benefits. The reasons given for not evaluating the dollar value were that evaluations were not required or needed for decision making, the activity was too expensive or too hard, and the data were poor.

The most common methods used to evaluate safety investment were state or federal research studies or those conducted by universities or other groups. The lack of expertise hampered some states attempting to conduct evaluations.

All reporting states have multidisciplinary committees, and in nine states these committees assist in the selection of safety projects. The most common criteria for selecting safety projects by these committees were data analysis, available funding, and majority vote.

Only two states reported that their state SMS processes were extremely successful, whereas six states rated it very successful. Local SMS initiatives are limited; only three states indicated very successful results.

The SMS process continues to reap rewards for states that invest effort in their development and implementation. Multidisciplinary committees and other elements appear to strengthen and sustain the SMS process. States reported success with varying levels of implementation.

Overall, the research continues to support the position that the key benefits derived from the SMS process are increased coordination, cooperation, and communication among agencies. In addition, the SMS process has resulted in improvement to data analysis and collection procedures, as well as collaborative strategic plans.

Nevertheless, the overall implementation of the SMS process seems to be losing ground. As reported earlier, in 2001, 26 states indicated having active SMSs and multidisciplinary committees. Results from the 2002 survey found that four of these states now report having no SMS and one state is evaluating the continuation of its effort.

The Integrated Safety Management System initiative has the potential to revitalize the interest and development

of this valuable management strategy. That initiative was developed in conjunction with NCHRP Project 17-18(05).

To monitor and further the practice of the integrated safety management approach, several actions should be considered.

- Additional research studies to monitor the status of the states SMS efforts;
- A strong technology transfer initiative to promote the implementation of products and findings derived from NCHRP Project 17-18(05)—specifically the Integrated Safety Management System Process guide;
- SMS success stories shared at conferences, workshops, and peer exchanges;
- A national SMS peer exchange to be held every 3 years;
- A generic local agency SMS manual to be developed and widely disseminated;
- Another synthesis focusing on data collection; and
- Development of a national roadway data dictionary.

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APPENDIX A

1995 Summary of State Reports on Program Elements

(Y = yes, N = no, I = in progress)

State	Mission Statement			Goals			Executive Committee			Sub-committee			Formal Agreement			Internet			Resource Document			Workshop			Newsletter			Consultants		
	Y	N	I	Y	N	I	Y	N	I	Y	N	I	Y	N	I	Y	N	I	Y	N	I	Y	N	I	Y	N	I	Y	N	I
AL	X			X			X			X				X			X			X	X				X		X			
AK	X					X	X			X				X			X			X	X				X		X			
AZ	X			X			X			X				X			X			X	X			X			X			
AR	X			X			X			X				X			X			X			X			X			X	
CA		X		X			X			X				X			X			X			X			X			X	
CO	X			X			X			X				X			X			X	X				X		X			
CT	X			X				X			X			X			X			X			X			X			X	
DE	X			X			X			X				X			X			X	X			X			X			
DC	X			X					X		X			X			X			X			X			X			X	
FL		X		X			X			X				X			X			X	X				X		X			
GA	X			X			X			X				X			X			X			X			X			X	
HI		X		X				X			X			X			X			X				X			X		X	
ID		X		X				X			X			X			X			X	X				X		X			
IL		X		X			X			X				X			X			X	X				X			X		
IN		X		X			X			X				X			X			X	X				X		X			
IA	X			X			X			X				X			X			X	X				X		X			
KS	X			X			X			X				X			X			X			X			X		X		
KT		X				X	X			X				X			X			X	X			X			X		X	
LA		X		X			X			X				X			X			X			X			X			X	
ME	X			X			X			X				X			X			X	X				X		X			
MD	X			X			X			X				X			X			X	X				X			X		
MA	X			X			X			X				X			X			X			X			X		X		
MI	X			X			X			X				X			X			X	X				X		X			
MN		X		X			X			X				X			X			X	X					X		X		
MO	X			X			X			X				X			X			X	X				X		X			
MS	X			X			X				X			X			X			X			X			X			X	
MT	X			X			X			X				X			X			X	X				X			X		
NE	X			X			X			X				X			X			X			X	X				X		
NV	X			X			X			X				X			X			X			X			X			X	
NH		X		X			X			X				X			X			X					X		X			

(Y = yes, N = no, I = in progress)

State	Mission Statement		Goals		Executive Committee		Sub-committee		Formal Agreement		Internet		Resource Document		Workshop		Newsletter		Consultants											
NJ	X		X		X		X		X		X		X		X		X		X											
NM	X			X	X			X		X		X		X	X		X		X											
NY	X		X		X		X		X		X		X	X			X		X											
NC	X		X		X		X		X		X	X		X			X		X											
ND		X		X	X			X		X		X		X	X		X		X											
OH	X		X		X		X		X		X		X	X			X		X											
OK	X		X		X		X		X		X		X		X		X		X											
OR		X		X		X		X		X		X		X		X		X		X										
PA	X		X		X		X		X		X	X			X		X		X											
RI	X			X	X			X		X			X	X			X		X											
SC	X		X		X			X		X	X		X		X		X		X											
SD		X		X		X		X		X	X		X			X		X		X										
TN	X		X		X		X		X		X		X	X			X		X											
TX	X		X			X		X		X	X	X			X		X		X											
UT	X		X		X		X		X		X				X		X		X											
VT	X		X		X			X		X			X	X			X		X											
VA	X		X		X		X		X		X	X		X			X		X											
WA		X		X		X		X		X	X		X		X		X		X											
WV	X		X		X		X		X		X	X			X		X		X											
WI	X		X		X		X		X		X	X			X		X		X											
WY	X		X		X		X		X		X		X	X		X		X		X										
Total	37	13	1	43	4	4	45	4	2	37	10	4	8	29	14	4	37	10	20	12	19	29	18	4	5	45	1	31	20	0

Source: Transportation Research Circular 452: Safety Management Systems: A National Status (3).

(Y = yes, N = no, Blank = no response)															
State	Multi-disciplinary Committee		Highway Safety Mgmt. System		Committee Established Section 1034		Mission Statement		Major Goals		Strategies/Objectives		Subcomm./Task Forces		
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	
*NM	X		X			X		X		X		X		X	
*NY	X		X		X		X		X		X		X		
*NC	X		X		X										
ND		X		X											
OH	X			X	X			X		X		X		X	
OK		X		X											
OR		X	X					X							
*PA	X		X		X		X		X		X			X	
*RI	X		X		X		X		X		X			X	
SC															
SD	X			X	X			X		X		X		X	
TN	X			X		X	X		X		X			X	
TX		X		X											
UT		X		X											
*VT	X		X			X	X		X		X			X	
*VA	X		X			X	X		X		X		X		
*WA	X		X			X	X		X		X		X		
*WV	X		X		X		X			X	X		X		
*WI	X		X		X						X				
*WY	X		X		X		X		X		X			X	
Total	34	16	32	17	24	13	23	8	20	9	22	8	18	11	

* Indicates states having both a coordinating committee and a Highway Safety Management System.

Source: *Transportation Infrastructure: States; Implementation of Transportation Management Systems (5)*.

APPENDIX C

The Decision-Making Process for Funding Allocation with Regard to Safety Initiatives

Responses from the iTRANS Questionnaire

Alabama	Through a priority basis according to statistical analysis.
Alaska	DOT and Project Funding for safety consists of Section 402 funding—mostly for education and enforcement, and HSIP funding for engineering fixes. Projects are ranked two ways under the HSIP—benefit–cost (accident cost reduction/cost of construction and maintenance) is computed for locations with a high number of accidents; other projects without many accidents but with a high potential for severe accidents may be submitted without benefit–costs.
California	Assessment of needs and identification of most efficient ways to meet these needs within policy and operational constraints.
California	Funding for engineering concerns is allocated out of the hazard elimination and other programs to locations where collision concentrations are occurring at higher than expected rates for a particular roadway type.
Colorado	The Colorado DOT is designated as receiving all federal funds (Section 402 monies) for transportation safety initiatives and typically allocates money to various agencies through a grant process or through special state sponsored safety programs such as Hot Friday Nights DUI campaign, etc. Many local law enforcement groups, as well as the Colorado State Patrol (CSP) participate and receive funding to pay officers to do enforcement under these programs. Colorado DOT has sole authority to decide where funds are to be allocated. Typically, little input is sought from the CSP.
Connecticut	If funding may be available, an operations plan (grant) is written identifying the issue/problem, countermeasures (education, engineering, and enforcement areas are addressed) and a budget that identifies what is needed, and who will supply what. Monthly or quarterly reports documenting results are submitted.
Delaware	With respect to federal Section 402 highway safety funding, a grant review committee, composed of state and local interests rates prospective grantees based on problem identification, goals and objectives, problem solution plans, milestones, and time frames.
Florida	My agency handles the engineering (roadway safety improvement) projects, as well as the Section 402 grant projects. Allocation of funds for highway safety improvement projects is provided to our Florida DOT district offices by formula, and projects are funded based on engineering analysis and crash data (identification of high crash locations and benefit-cost, etc.) Grant funds are allocated for concepts that merit consideration in the various program areas, with crash data and behavioral data being considered in the process. Specific emergency medical services (EMS), enforcement, or educational funding is not a part of my agency's role, although several grants administered through the Section 402 program are given to local agencies to improve or enhance their efforts in the behavioral side of traffic safety. These grants often are for educational initiatives, enforcement programs, or to enhance EMS activities.
Georgia	Funding is handled separately with the different agencies that are responsible for 4 Es of safety management.
Idaho	Educational and enforcement safety programs funded by federal grant dollars from Sections 402, 410, 157, 163, 411, and 2003b.
Indiana	Agreement is reached with Governor's Council, the DOT, and the governor's office.
Indiana	The funding decision is based on consensus of decision makers.
Indiana	Funding is negotiated among state agencies through agreements.

Iowa	<p>The SMS Coordinating Committee controls a very small budget (\$50,000–100,000) from the Iowa DOT Management Systems Policy Committee and typically funds projects not covered in Iowa’s institutional highway safety programs.</p> <p>SMS members participate in their own agency safety funding allocation decisions as follows:</p> <ul style="list-style-type: none"> • NHTSA grants (402, 410, 157, 163, 411, 2003b) follow program rules within the Governors Traffic Safety Bureau in the Department of Public Safety. • Iowa’s unique 0.5% program projects (safety earmarked road-use tax) go through a competitive DOT application and committee review process including benefit–cost analysis. These grants are available to entities outside the DOT. • HES projects are funded in DOT by safety ranking. • Some safety funds are allocated by DOT management and some safety funds are allocated in the Office of Traffic and Safety. • Department of Public Safety and DOT management negotiate annually on splitting 157 and 411 funds between agency program needs to meet shared goals. • Iowa FHWA and NHTSA Region VII participate and influence their respective programs.
Louisiana	<p>With regard to engineering, projects are identified, prioritized, and funded based on output from many sources. These sources include the SMS, elected officials, DOT districts, the statewide long-range plan, metropolitan planning organization plans, and federal and state agencies.</p>
Maine	<p>The Maine Transportation Safety Coalition has been formed to minimize turf issues. It is a nonprofit entity composed of transportation safety-related state agencies, FHWA and NHTSA regional representatives, and other transportation safety advocates. This group is working on multiple fronts including the “four Es,” but funding is an issue. The Maine DOT and the Maine Department of Public Safety split TEA-21 Safety Incentive Funds. The Maine DOT is funding multiple pilot safety projects, safety public awareness projects, and other safety initiatives.</p>
Maine	<p>The Bureau of Highway Safety (BHS) director and his staff make the distribution of funds administered by the BHS.</p>
Maryland	<p>Based on performance measures, agency goals and objectives, identification of problems, benefit–cost analysis, cost-effectiveness, partnering, peer review, and total funding available—all of above are based on safety data and analysis.</p>
Michigan	<p>The process begins with analysis of available data and information. Input from all safety partners is then solicited to react to proposed goals and objectives. A plan is developed internally and then shared with all partners.</p>
Minnesota	<p>Funding is allocated in numerous ways—sometimes there is a solicitation of need or interest; sometimes there is a project identification process using a quantitative analysis.</p>
Nebraska	<p>Assessment of potential impact both short- and long-term with demographic and geographic considerations; potential evaluation and cost–benefit considerations are included...team uses grading tool in rating the proposed project for ranking.</p>
New Jersey	<p>Following issue identification, most programs or countermeasures begin with existing budgetary funding. Additional funding is solicited from federal monies channeled through our Highway Traffic Safety Office in the form of NHTSA funding or Department of Transportation with FMCSA funding if the safety issue can be tied to their allocation guidelines. In very limited cases, funding may be legislated to supplement the activity deemed critical to highway traffic safety in the state.</p>
New York State	<p>In NYDOT we avoid tying our safety initiatives to safety funds. We develop strong technical evidence based on evaluation data of the value of a particular course of actions and work (with all functional areas managers) to gain agency endorsement. When we tie safety programs or initiatives to particular funding sources, actions tend to be limited to the availability of those dollars.</p>
North Carolina	<p>Decisions impacting the programmatic distribution of funds across the 4 Es are typically made in advance of identification of specific safety needs and priorities. Funding for many enforcement and emergency response activities are via separate programs and sources. The majority of behavioral programs continue to be funded through the Governor’s Highway Safety Program office, and traditional engineering countermeasures are funded through the transportation improvement, hazard elimination, and spot safety processes.</p>

North Dakota	Most funding goes to increasing safety belt use and reducing impaired driving. These are the two most serious problems based on data analysis and survey data.
Oregon	I don't believe that there currently is a process per se for allocating resources across (as opposed to within) these different areas. These efforts are carried out largely by different state agencies that have little or no history of explicit cooperation, and in some cases histories are best characterized by rivalry and antagonism. We most often see cooperation when the legislature or the governor intercedes to mandate it. The Governor's Traffic Safety Representative in Oregon is as effective as can be reasonably expected and has had some limited success encouraging cooperation; however, the situation could be much better than it is.
Oregon	It depends on the statutory authority. Some processes are mandated with funding allocated, others are not.
Oregon	State safety funds for engineering divided between five regions based on need. Region/local decided on programming.
Pennsylvania	Three factors: (1) FHWA and NHTSA "rules" on use of federal funds; (2) balanced, comprehensive approach; (3) best use of funds to save lives based on strategies available, scope of the targeted problem, and best estimate of effectiveness.
Tennessee	Tennessee DOT is the primary decision maker on how federal funds are utilized for safety programs.
Texas	Allocation is determined by safety need, greatest impact, and the type of available funding. With the engineering area, once funds are allocated, projects are selected by a cost-benefit ratio analysis and prioritized. Enforcement, education, and emergency medical services are funded with NHTSA Section 402 funds. Projects are selected based on their compatibility with set safety goals and initiatives.
Vermont	No clear process.
Virginia	Based on problem identification, resources available, and political permission; also by funding stream.
Washington State	In 1999, Washington State developed a statewide traffic safety strategic plan called Target Zero. The plan's development process involved more than 11 local, state, and private agencies. Safety representatives examined traffic safety data and determined the main emphasis areas for traffic safety grant funding. This past May, our traffic safety representatives went through a combined grant funding effort that included the direction and criteria developed through the Target Zero process. All grant monies awarded represent the emphasis and focus of the major agencies involved. This process ensures equitable distribution of grant funds. The process also places an emphasis on statewide areas identified in the plan. Discussions among affected agencies at sub-cabinet level.

Notes: HSIP = Highway Safety Improvement Program; NHTSA = National Highway Traffic Safety Administration; HES = Hazard Elimination Safety; FMSCA = Federal Motor Carrier Safety Administration.

Source: *Safety Management System Update Survey*, 2001 (4).

APPENDIX D

Survey Questionnaire

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Project 20-5, Topic 33-07

Safety Management Systems in Practice

Questionnaire Sent to Twenty-Six Focus States

The Safety Management System (SMS) process and other similar integrated management initiatives have gone through an evolutionary process over the past several years. Since Section 1034 of the Intermodal Surface Transportation Efficiency Act of 1991 required states to have an SMS and the subsequent National Highway System Designation Act of 1995 provided relief from that mandate, there is wide variation in states' continuation, acceptance, and implementation of the SMS process.

This questionnaire seeks to collect additional information on the state of the practice of highway safety management systems. Specifically, it requests input on implementation status, management procedures, resource allocation, data/databases and tracking, and evaluating safety investments.

To accomplish this task, we need your help in supplying some information about the current status of SMS in your state. The questionnaire should be completed by persons familiar with your state's SMS activities.

Please return the completed survey by mail or fax (660-543-4482) no later than July 15, 2002, to Leanna Depue, Missouri Safety Center, Humphreys 201, Central Missouri State University, Warrensburg, MO 64093. A return address label is enclosed for your convenience.

If you have any questions, contact Leanna Depue at 660-543-4830 or depue@cmsu1.cmsu.edu.

Thank you for your participation.

1. Agency Contact

Name: _____

Title: _____

Agency: _____

Address: _____

Telephone: _____ Fax: _____

E-mail: _____

PART I—PROCESS MANAGEMENT

This section asks about your agency’s management of the SMS process.

2. Does your state currently have an active safety management system and multidisciplinary committee that coordinates highway safety initiatives?
 _____ Yes _____ No

If “Yes,” continue. **If “No,”** thank you for your participation. Please fax or mail the questionnaire to the address above.

3. How important are the following measures in classifying projects as “safety projects” within your state?

	Extremely Important	Very Important	Important	Not Very Important	Not Important at All
Quantitative analysis	<input type="checkbox"/>				
Safety management process	<input type="checkbox"/>				
Designated federal funding	<input type="checkbox"/>				
Administrative decision	<input type="checkbox"/>				
Pressure from high-profile individual (legislator)	<input type="checkbox"/>				
External expert opinion	<input type="checkbox"/>				
Other: _____					
Other: _____					

4. Does your state have a separate category of investment for safety beyond the Federal Hazard Elimination Safety Program?
 _____ Yes _____ No

If “Yes,” provide a brief description/explanation.

5. Who are the key decision makers on the safety investment level?

	Extremely Likely	Very Likely	Likely	Not Very Likely	Not Likely at All
Chief engineer	<input type="checkbox"/>				
Joint decision by upper agency administration	<input type="checkbox"/>				
Safety engineer	<input type="checkbox"/>				
Safety management system committee	<input type="checkbox"/>				
District engineer	<input type="checkbox"/>				
Other: _____					

6. Please rate how important the following are in prioritizing your state’s safety investments.

	Extremely Important	Very Important	Important	Not Very Important	Not Important
Quantitative analysis	<input type="checkbox"/>				
Review of research results	<input type="checkbox"/>				
Political influence	<input type="checkbox"/>				
Public opinion	<input type="checkbox"/>				
Agency (internal) expert opinion	<input type="checkbox"/>				
External expert opinion	<input type="checkbox"/>				
Safety management process	<input type="checkbox"/>				
Benefit-cost approach	<input type="checkbox"/>				
Other: _____					
Other: _____					

7. What actions have been taken by your state to assist the operation of the safety management system?

Check (√) all that apply.

_____ Identified a lead agency to organize meetings, monitor progress, etc.

Name of agency _____

- _____ Invested money to support the management of the process
- _____ Designated staff (full- or part-time) to support the process
- _____ Obtained signed memorandum of agreements between key state agencies
- _____ Obtained signed memorandum of agreements between key local agencies
- _____ Obtained signed memorandum of agreement between key state and local agencies
- _____ Developed a mission statement
- _____ Identified a statewide injury/fatality reduction goal
- _____ Collectively developed a strategic plan to help guide statewide safety initiatives
- _____ Collectively developed a strategic plan to help guide local safety initiatives
- _____ Initiated improvements to the data collection and analysis processes
- _____ Other: _____
- _____ Other: _____

8. What is the likelihood that the following actions would improve the effectiveness of your state’s safety management system process?

	Extremely Likely	Very Likely	Likely	Not Very Likely	Not Likely at All
Increase cooperation between agencies	<input type="checkbox"/>				
Designate staff to oversee SMS process	<input type="checkbox"/>				
Improve attendance at SMS meetings	<input type="checkbox"/>				
Develop a strategic plan	<input type="checkbox"/>				
Revise current strategic plan	<input type="checkbox"/>				
Improve data collection process	<input type="checkbox"/>				
Improve data analysis process	<input type="checkbox"/>				
Improve access to databases	<input type="checkbox"/>				
Link databases	<input type="checkbox"/>				
Designate funding source to support SMS process	<input type="checkbox"/>				
Increase support from upper management	<input type="checkbox"/>				
Financial incentives for meeting safety goals	<input type="checkbox"/>				
Other: _____					
Other: _____					

PART II—RESOURCE ALLOCATION

This section asks about your state’s resource investment in the SMS process.

9. Does your state designate funds to assist in the operation of the safety management system process?
 _____ Yes _____ No

If “Yes,” approximately how much money is invested per year to continue the safety management system process?
 _____ I don’t know
 _____ Approximately \$ _____

10. Has your state designated staff to coordinate the SMS process?
 _____ Yes _____ No

If “Yes,” how is the staff assigned?
 _____ full-time _____ part-time _____ collateral duty

Identify the agency association, title, and supervisor’s title of the designated person.

Agency: _____

Title: _____

Supervisor’s title: _____

PART III—DATA/DATABASE ENHANCEMENTS

This section asks how data collection, availability, analysis, and linkage have changed.

11. Please rank how the SMS process has affected data information systems within your state.

	Extensive Improvement	Good Improvement	Improvement	Little Improvement	No Improvement
Data collection procedures	<input type="checkbox"/>				
Data availability	<input type="checkbox"/>				
Data analysis	<input type="checkbox"/>				
Linking data	<input type="checkbox"/>				
Improved staff expertise	<input type="checkbox"/>				
Number of data elements captured	<input type="checkbox"/>				
Safety management process	<input type="checkbox"/>				
Benefit-cost approach	<input type="checkbox"/>				

Other: _____

Other: _____

12. Is your state using the Model Minimum Uniform Crash Criteria (MMUCC)?

_____ Don’t know
 _____ Yes
 _____ No

13. If “Yes,” rate the quality of the MMUCC data elements in each of the four major categories.

	Excellent	Very Good	Good	Fair	Poor	Don't Know
Crash data elements	<input type="checkbox"/>					
Vehicle data elements	<input type="checkbox"/>					
Person data elements	<input type="checkbox"/>					
Roadway data elements	<input type="checkbox"/>					

PART IV—TRACKING AND EVALUATING SAFETY INVESTMENT

This section asks how the SMS monitors and measures the success of safety initiatives.

14. Does your SMS have a process in place to track the state’s safety investments?
 _____ Yes _____ No

If “Yes,” briefly describe the process.

15. Has your SMS process evaluated the dollar value of benefits associated with proposed or completed safety investments or projects?
 _____ Yes, we do it on a regular basis.
 _____ Yes, we have done it on occasion.
 _____ No, we have not done it.

16. If “Yes,” for what purpose was the dollar value of benefits assessed? Check (√) all that apply.

- _____ Program project planning
- _____ Prioritize and rank alternatives
- _____ Benefit–cost analysis
- _____ Evaluate prior investment
- _____ Public information or discussion
- _____ To support or oppose proposed safety legislation
- _____ Other: _____
- _____ Other: _____

17. If “No,” why was there no evaluation of the benefits done? Check (√) all that apply.

- _____ Not required or needed for decision
- _____ No demand for it
- _____ No applicable projects
- _____ Too hard to do
- _____ Too expensive to do
- _____ Don't have the expertise and/or training to do it
- _____ Other: _____
- _____ Other: _____

18. Has your SMS used other strategies to evaluate safety investment?

- _____ Yes, we evaluate safety investment on a regular basis.
- _____ Yes, we evaluate safety investment on occasion.
- _____ No, we do not evaluate safety investment.

19. **If “Yes,”** what methods are used to evaluate safety investment? Check (√) all that apply.

- State conducted and funded studies
- Utilize findings of federally funded studies
- Pool funded studies
- Other (state, international, university-based) research studies
- Other: _____
- Other: _____

20. **If “No,”** why is there no evaluation of safety investment done? Check (√) all that apply.

- Not required or needed for decision
- No applicable projects
- Too hard to do
- Too expensive to do
- Other: _____
- Other: _____

PART V—MULTIDISCIPLINARY COMMITTEE

This section asks about the role and function of your SMS’s multidisciplinary committee.

21. Rate the importance of each function to your multidisciplinary committee.

	Extremely Important	Very Important	Important	Not Very Important	Not Important
Develop strategic plan	<input type="checkbox"/>				
Formulate safety legislation	<input type="checkbox"/>				
Lobby for safety initiatives	<input type="checkbox"/>				
Host statewide safety conference	<input type="checkbox"/>				
Produce statewide newsletter	<input type="checkbox"/>				
Enhance coordination between agencies	<input type="checkbox"/>				
Enhance communication between agencies	<input type="checkbox"/>				
Other: _____					
Other: _____					

22. How does your multidisciplinary committee select safety projects?

- Committee does not select projects
- Majority vote
- Data analysis
- Available funding
- Other: _____
- Other: _____

23. How would you rate the overall statewide Safety Management System process in your state?

Extremely Successful	Very Successful	Successful	Not Very Successful	Not Successful at All
<input type="checkbox"/>				

24. How would you rate the overall local safety management system initiative in your state?

- | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Extremely
Successful | Very
Successful | Successful | Not Very
Successful | Not Successful
at All | No Local
Alternatives |
| <input type="checkbox"/> |

25. Identify one key success that your SMS process has achieved.

26. What additional action can the Federal Highway Administration take to support the practice of safety management systems?

27. Additional comments: _____

Thank you very much.

Please return the completed survey by mail or fax by **July 15, 2002** to:

Dr. Leanna Depue
Missouri Safety Center
Humphreys Suite 201
Central Missouri State University
Warrensburg, MO 64093

Phone: 660-543-4830
Fax: 660-543-4482
E-mail: depue@cmsu1.cmsu.edu

APPENDIX E

List of Survey Respondents

*Arizona Department of Transportation
California—Caltrans

**Florida Department of Transportation

*Iowa Department of Transportation

*Louisiana Department of Transportation and
Development

*Maine Department of Transportation

*Michigan Office of Highway Safety Planning

Montana Department of Transportation

Nebraska Department of Roads

*Nevada Department of Transportation

*New Jersey Department of Transportation,
Bureau of Safety Programs

**New Mexico Highway and Transportation
Department

*New York State Department of Transportation

*North Carolina Department of Transportation

*Rhode Island Department of Transportation

*Tennessee Department of Transportation

*Vermont Agency of Transportation

*Washington State Department of Transportation

*West Virginia Division of Highways

*Wisconsin Department of Transportation

*States with both safety management systems and multidisciplinary committee.

** E-mail responses.

APPENDIX F

Summary of Responses to Question 7 of the State of the Practice Questionnaire

Actions Taken by States to Assist and Support the Operation of the Safety Management System Process

State	Identified Lead Agency	Invested Money	Designated Staff	Obtained MOA Between State Agencies	Obtained MOA Between Local Agencies	Obtained MOA Between State and Local Agencies	Developed Mission Statement	Identified Statewide Injury/Fatality Reduction Goal	Developed Strategic Plan to Guide Statewide Safety Initiatives	Developed Strategic Plan to Guide Local Safety Initiatives	Initiated Improvements to Data Collection and Analysis Process	*Other Actions
AZ	X	X	X				X	X			X	
IA	X	X	X	X			X		X		X	X
LA	X	X	X	X			X	X	X		X	
ME	X	X	X				X				X	X
MI	X	X	X	X			X				X	X
NV	X						X				X	
NJ	X	X	X				X	X	X		X	
NY	X		X				X		X	X	X	
NC	X						X	X			X	
RI	X	X	X				X				X	
TN	X	X	X				X	X	X	X	X	
VT	X		X				X	X	X		X	
WA	X	X	X	X				X	X	X	X	X
WV	X	X	X				X		X		X	
WI		X	X					X	X		X	
Totals	14	11	13	4	0	0	13	8	9	3	15	4

IA, developed the *Toolbox of Highway Safety Strategies*; MOA, Memorandum of Agreement; ME, established the Maine Transportation Safety Coalition; MI, local agency representation, executed order from governor to create commission that supports SMS; WA, formation of highway safety issues group.

APPENDIX G

Draft Criteria for Hazard Elimination Safety Bonus Points Self Certification

1. Local Policy

- Elected Officials adopt ordinance or policy supporting deployment of a Safety Management System referencing ordinance number on self-certification form to H&LP Safety Management System Program Manager.
- Local project development policy to identify a revenue distribution system, road standards, and right-of-way use.
- Organize a Safety Management Committee including the 4 “E’s.”
- SMS Committee meets at least twice a year.

2. Data Collection

- Agency certifies process is in place for collision records system, claims records, and citizen complaint process utilizing a safety action request form.

3. Data Analysis

- Agency must have an identified data analysis process in place or identify consultant who is a Registered Professional Engineer.

4. System Outputs

- Must have process in place to prioritize projects.
- Provide budget and program recommendations.
- Utilize a benefit-cost analysis process.

Agency Name: _____

Local Agency Ordinance # _____

LOCAL AGENCY certifies that: _____

All criteria herein have been met.

Signed:

Public Works Director or Authorized Agency Designee

Date

Abbreviations used without definition in TRB Publications:

AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
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
ITE	Institute of Transportation Engineers
NCHRP	National Cooperative Highway Research Program
NCTRP	National Cooperative Transit Research and Development Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
SAE	Society of Automotive Engineers
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
U.S.DOT	United States Department of Transportation