

Incorporating Safety into the Transportation Planning Process

Best Practices in Data Investments and Coordination Efforts

FINAL REPORT

Requested by:

**American Association of State Highway
and Transportation Officials (AASHTO)**

Standing Committee on Planning

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Disclaimer

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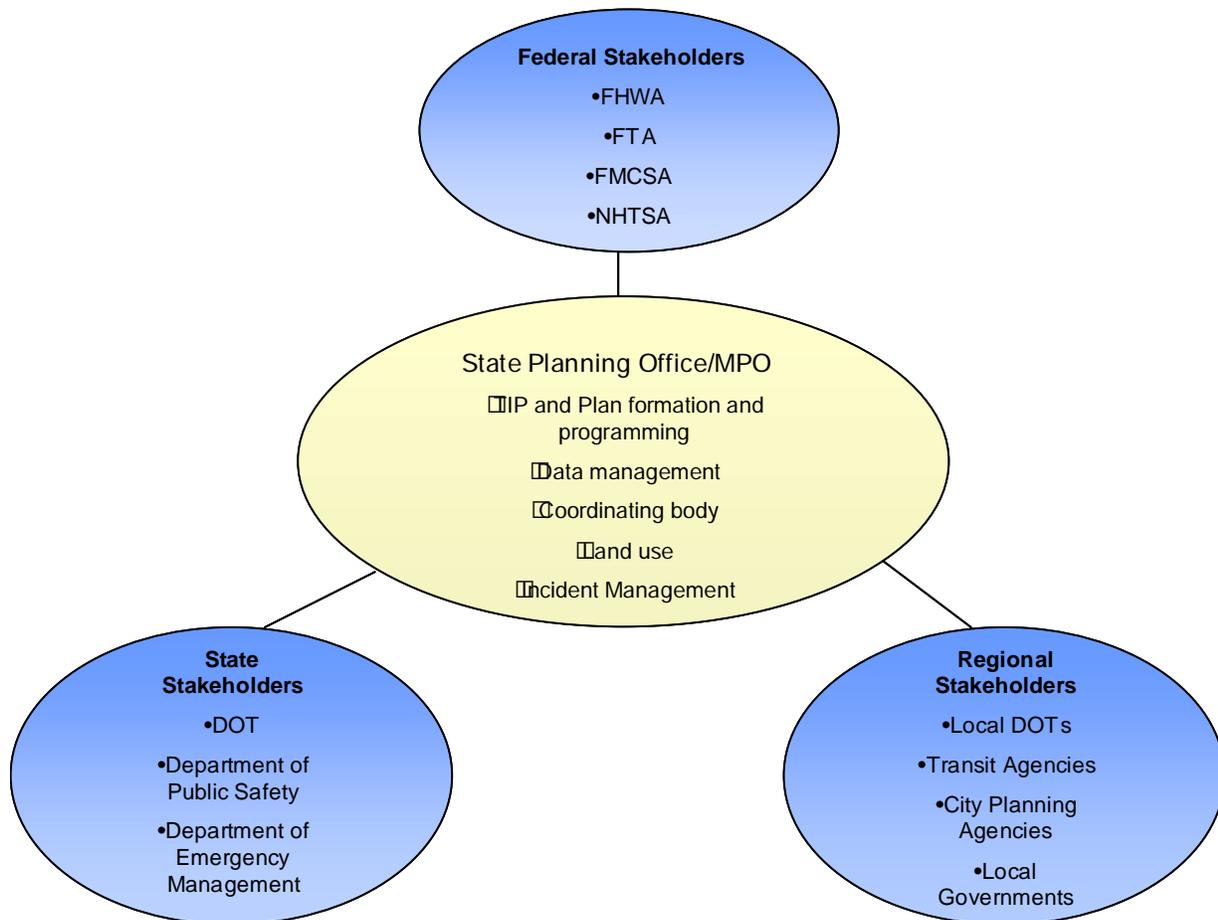
History of Safety Considerations in the Transportation Planning Process

Since 1962, planning has been an integral part of the transportation program and project development process. During these past forty years, the planning process has become more diversified and complex, with multiple issues and stakeholders involved in the transportation planning process. Planning issues have expanded to include environmental, neighborhood preservation, public involvement, social and environmental justice, sustainable development, historic preservation, smart growth, and many other local and regional concerns. The number of stakeholders involved in the transportation planning process has also expanded to include Metropolitan Planning Organizations (MPOs), Councils of Governments, local government agencies, transit operators, economic development agencies, neighborhood groups, environmental advocacy groups, and developer groups. This increased involvement of non-traditional agencies in the planning process has changed the dynamic of the historic planning process.

With the formal inclusion of safety as one of seven planning factors to be considered in the transportation planning process in 1998 with the passage of the Transportation Equity Act of the Twenty-First Century (TEA-21), a larger number of agencies with a safety interest have started to become involved in the transportation planning process (see Exhibit 1 below). These include traditional groups involved in the “3-Es” programs promoting improved public safety through Engineering, Education, and Enforcement; local emergency services departments such as police, fire, and rescue services; intermodal groups such as the Operation Lifesaver railroad grade crossing safety program and hazardous materials response teams; and emerging groups such as those that have arisen in the aftermath of the September 11, 2001 terrorist attacks, such as vulnerability assessment, prevention, and response teams.

The increased number of agencies with a stake in transportation safety has contributed to the dramatic improvement in the relative safety of our transportation modes, most noticeably the automobile. While airline, public transit, and intercity passenger services have enjoyed relatively low fatality, injury, and property damage rates, automobiles and trucks have been associated with much higher accident rates. Our society has paid the price of personal mobility with staggering levels of fatalities, injuries, and property damage, let alone the indirect costs of lost wages, lower productivity, pain, and suffering associated with these incidents. Federal and state agencies have worked on programs such as the imposition of higher drinking ages and graduated driving privileges for young drivers; enforcement of seat belt and child restraint laws; introduction of effective vehicle safety features; expanded enforcement of laws prohibiting speeding, aggressive driving, and use of alcohol or drugs while driving; and increased

Exhibit 1: Surface Transportation Stakeholder Agencies in Transportation Planning



public education and awareness of driver safety matters by such groups as Operation Lifesaver and Mothers Against Drunk Drivers (MADD) and it is these programs that have caused automobile accident statistics to show a significant decline. This corresponds to the many initiatives that have resulted from the increased emphasis placed by Federal, state, and local governments on this number one killer of persons between the ages of 16 and 25.

Since the passage of TEA-21 and the events of September 11, 2001, safety and security have become among the “hottest” topics for those responsible for developing and implementing transportation infrastructure programs and projects. This can be attributed to a continuing emphasis by the U.S. Department of Transportation on safety and the public’s receptiveness to programs that save lives and promote improved quality of life for users of our nation’s transportation systems, whether owned and operated by the private or public sectors. It is likely that we will see a continuing emphasis on safety by

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transportation stakeholders for the foreseeable future, reinforced by the expanding interest in and funding for programs promoting homeland security.

Statistics show that almost 11 percent of our nation's gross economic product is involved in the transportation industry. This represents over \$1 trillion in expenditures per year. With transportation permeating every aspect of the nation's economy, it is critical that programs that aim to influence this industry be carefully planned and executed so that optimum results can be achieved with minimum reduction in personal mobility, individual freedom, and cost / inconvenience to the

What is emerging from more recent research is that optimum improvement in safety results from efforts that are well coordinated and integrated across the stakeholders, modes, and attributes of the transportation system.

traveling public. While the future appears bright for programs that promote the increased safety of the nation's public-use transportation systems, facilities, vehicles, and services, there is increasing recognition that such programs must be better integrated among the myriad of stakeholder groups and modes that make up the transportation industry in this country for these programs to be cost-effective.

In the past, safety programs have focused on specific modes, stakeholder groups, and attributes of the transportation system (such as the vehicle, driver, roadway, traffic control device, and applicable laws and regulations). What is emerging from more recent research is that optimum improvement in safety results from efforts that are well coordinated and integrated across the stakeholders, modes, and attributes of the transportation system. Today, a holistic approach to developing and implementing safety improvement programs and measures is needed to ensure that the investments being made to improve the safety of our public-use transportation systems produce optimum results. This report documents three success stories of such coordinated efforts.

Despite the increasing attention paid to safety and security, in terms of legislative requirement, agency regulations, and funding, results are sometimes less than expected because the stakeholder groups involved in the U.S. transportation industry have competing interests and cultures that discourage cooperation and coordination. In certain instances, efforts to improve the safety of transportation systems and services are impeded by traditional approaches and organizational cultures that perceive the introduction of safety considerations as a diversion from the central mission of the organization. In other cases, safety is considered later in the program / project development life cycle, resulting in more expensive rework and redesign of the project.

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Another major consequence of this approach is the unintentional neglect of many locations that may pose a safety hazard for the public. Safety is considered as an after thought – after a location has been selected for improvement because of a deficiency related to other primary criteria such as capacity and accessibility. The traditional transportation planning process does not consider safety as one of the primary criteria for identifying transportation network deficiencies. Many of the models and tools used by transportation agencies charged with the responsibilities of planning for transportation investments are primarily focused on capacity deficiency analysis. More recently these models are being improved to enhance the capacity of transportation professionals to evaluate and implement projects and programs of interest to various stakeholders.

Since safety affects so many aspects of the U.S. transportation industry, one must understand and be sensitive to the consequences that safety initiatives and considerations are likely to have on stakeholders of this industry, whether economic, financial, safety, operational, engineering, or any other consequence – from the perspective of these various stakeholders.

What is becoming more widely recognized is that the traditional transportation planning process have not adequately dealt with safety issues or concerns. The traditional planning process typically flows in the following fashion: 1) defining system goals and objectives, 2) identifying problems, 3) developing alternatives, 4) evaluating these alternatives, and 5) recommending the best alternatives to the decisions makers. While the exact process may vary region by region, this sequence provides the framework for the general flow. In this process, safety is typically identified as one of the system goals and objectives, but instead of considering it throughout this process, safety is left to the end of the project development life cycle – for the civil engineer to design the facility to be safe, the mechanical engineer to design a safer vehicle, the traffic engineer to regulate traffic operations, the police officer to enforce regulations, and the press and media to educate the public about transportation safety issues and strategies through public service announcements. Incorporating safety into transportation planning means making safety a direct priority for all stakeholders during all parts of this process.

When you begin to think about safety as a process, there is a need to differentiate between different types of safety planning activities. Some activities tend to be reactive in nature and fall at the end of the process. These are activities designed to made a given project safe or fix safety problems that currently exist. Other activities proactively incorporate safety priorities in defining and selecting a solution. In this type of process, safety is a fundamental evaluation criterion when selecting projects, and planners have all the necessary data and tools for quantifying the results of safety related considerations. This is a change

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from a sometimes complacent notion that because a project may follow required standards and guidelines, the project is inherently safe. Clearly, general engineering knowledge about safe construction has improved tremendously over the past forty years, but what planners must realize is that each road segment and intersection has unique safety considerations, and needs to be evaluated accordingly.

In recent years, creative efforts have been made by individuals at all levels of government to raise the consciousness of transportation stakeholders to the need to consider safety earlier in the transportation program and project development process – namely: the transportation planning process. It is this need for integrating the various concerns and perspectives, as well as capabilities, of all key stakeholders in the transportation industry with regards to safety considerations when first developing transportation programs and projects that brings us to this discussion of practices where by this safety inclusion is already taking place.

This report will attempt to identify agencies that have been forward thinking in the new realm of safety conscious planning. Since this is such a new area, it is often difficult to differentiate between safety conscious planning, and the planning of safety activities. As safety conscious planning becomes more common, it will be easier to document processes and results. In the meantime, the authors have attempted to document both cases of safety conscious planning, and exemplary safety planning activities (ie. where planners utilized data and tools or where agencies collaborated.)

Project Background

The purpose of this report is to expand upon the reports and work previously accomplished within the topic of safety conscious transportation planning, and demonstrate through case studies successful methods by which safety can be incorporated into the planning process. This particular report was initiated at a time where there were several concurrent efforts attempting to accomplish similar goals. The Federal Highway Administration (FHWA) developed a “guidebook” document entitled “Considering Safety in the Transportation Planning Process” which discusses how safety can be incorporated in short and long range transportation planning, as well as data, tools, and resources needed to explicitly consider safety in the planning process. The report also discusses Federal, state, local, and national organizations that have a stake in this process, and how agencies can work together to form partnerships. This report is written to expand upon the concepts developed in that document.

Additionally, FHWA, in conjunction with the Transportation Research Board (TRB) have sponsored statewide safety conscious planning forums. These forums pulled together transportation planners, safety

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engineers, law enforcement personnel and staff from MPOs, transit agencies, and various State Department of Transportation offices. To date, six forums were held around the country including Tennessee, Maryland, Oregon, Texas, Florida, and Michigan. Through these forums, FHWA and TRB sought to bring together agencies and personnel who have a stake in both the planning process and the safety of the transportation network with two goals:

1. To learn who does what within a state and meet one another
2. To brainstorm methods by which various agencies could collaborate to maximize the planning process to incorporate safety.

FHWA is planning seven more of these forums around the country. The proceedings of these forums are available at www.fhwa.dot.gov/

In July of 2002, TRB, FHWA, and NCHRP jointly held a safety conscious planning Leadership Conference to evaluate the effectiveness of the forums held to date. This project co-sponsored the conference and provided staff resources for preparing the materials and leading the sessions. In addition, we utilized the opportunity of having all the state leaders in one place to conduct some additional research on two major areas related to safety conscious planning. These include:

1. Investments in data tools and analysis techniques, and
2. Strategies for collaboration.

The Leadership Conference identified the need for best practice documentation, specifically with respect to data and information, and collaboration strategies.

Organization of this Report

This report was written to benefit all agencies involved in the transportation planning process to include State DOTs, MPOs, transit operators, city planning offices and others. Proactive safety conscious planning is a fairly new concept, and planners and researchers are only recently beginning to understand the differences between safety improvement projects, and a coordinated systematic approach to safety conscious transportation planning. This report demonstrates some of the activities of agencies leading the safety conscious planning initiative. Additionally, the report highlights agencies that have undertaken proactive safety planning activities in coordination with other regional agencies.

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This NCHRP Project consisted of four tasks. The first of these tasks was the organization and implementation of the Leadership Conference. The second task identified agencies that had made significant investments in accident information systems and safety performance measures. The third identified transportation agencies that have successfully built relationships with other agencies and have unanimously benefited from the coordination. The fourth task was the compilation of this report.

The first section of this report is a summary of the Leadership Conference. It summarizes the overall discussion and the recommendations related to Safety Conscious Planning. The participants identified a need for straightforward documentation of noteworthy practices in two specific areas: data and tools, and collaboration efforts. These are the topics of the next two sections of this report.

The second section addresses data and tools. The development and availability of data and tools to incorporate safety into the transportation planning process is needed. Many of the tools used by the transportation agencies were developed when the focus of transportation network analysis and evaluation was primarily on expanding the transportation network to handle the rapidly growing urban population. The introduction of data management tools such as Geographic Information Systems (GIS) offer significant opportunities to incorporate safety in early development of transportation planning projects.

The third section documents strategies and stories of successful collaboration efforts. Safety conscious planning requires that regional planning agencies work together to solve safety problems. Without this collaboration it is far more difficult to get multiple agencies with individual priorities to cooperate in the implementation of safety strategies. This report highlights a number of places that have successfully used collaboration techniques to achieve safety objectives.

The report concludes with a discussion of the institutional and organizational barriers to effective integration of safety into the transportation planning process. It identifies differences in perspectives and focus that can frustrate efforts to make safety a more important consideration in transportation plans. It also suggests some ways that these barriers can be overcome and offers a number of recommendations to safety advocates about how they can help.

Safety Conscious Planning Leadership Retreat

Background

The Safety Conscious Planning Leadership Conference held July 30-31, 2002 in Washington, DC was organized to meet the objectives of two concurrent projects related to safety conscious planning. The first was to evaluate the effectiveness of the Safety Conscious Planning forums sponsored by TRB and FHWA that were held the previous year, and to understand what, if anything, was done in the participating states as a result of the forums. The second objective, Task 1 of this project, was to bring together the identified leaders and visionaries with respect to safety planning in order to discuss current best practices, specifically identifying practices used for balancing cost effective investments for safety measures, and examples of collaboration strategies among local jurisdictions, states, MPOs, and transit agencies. The information gathered at this conference provided the framework for the remainder of this study, as the project team was able to understand not only some noteworthy practices of safety conscious planning in the United States, but also some ideas for research and reports which could assist multi-modal transportation planners implement a systematic planning process with a safety priority.

Prior to the Leadership Conference, project staff conducted a detailed electronic survey of forum participants to understand in advance what types of projects and partnerships resulted from the forums. This assisted the team in finalizing the agenda for the conference because it provided an understanding of not only some best practices, but also some ongoing issues in regional safety planning. The survey concluded that most of the participants have at least maintained relationships with other agencies represented at the forum and in some cases it led to an ongoing and systematic partnership to incorporate safety in the planning process. For example, a staff member from the Maryland State Highway and Transportation Department reported that they are working with MPO bicycle and pedestrian planners to ensure their concerns are met in the design of roadway improvements. Staff from Michigan reported organizing three statewide task forces focusing on different safety issues. The survey also concluded that there is still a clear need for documentation and technical assistance in safety planning, and the conference provided the setting to brainstorm some ideas to meet these needs.

The majority of the participants at the leadership conference represented state, local and federal field personnel who provided the leadership for their respective forums. These participants were augmented by an “expert panel” which provided advice and guidance in specific areas including: planning, safety, research, policy, data and information, and marketing and communications. Finally, many members of

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the Safety Conscious Planning Working Group organized and facilitated by TRB, participated in the conference.

The Conference was organized to provide for presentation and panel discussions with the entire group, but also breakout sessions in smaller groups to discuss more specific issues. The part of the conference focused on presentations and panel discussions covering the following three topics:

1. Activities, benefits, and best practices in safety conscious planning since the forum.
2. Next steps in safety conscious planning, and
3. Success factors: What information is still needed and what can the Safety Conscious Planning Working Group do to help?

These panel discussions were followed by breakout group discussions, focusing on the following two topics:

1. Planning needs: research, information, data, tools, and champions needed for safety conscious planning, and
2. Collaboration strategies and marketing safety conscious planning.

After each breakout session, one member of the group provided a summary report of the conclusions. At the conclusion of the conference, the expert panel convened to discuss their thoughts and ideas on the future of safety conscious planning.

The following provides a brief summary of some of the results and needs identified at the forum, as drawn from the Safety Conscious Planning Leadership Conference Summary Report. The full report includes more detailed findings in addition to a summary of individual states efforts, an attendance list, a copy of the agenda, and a copy of the survey and results.

Conference Results and Identified Needs

The conference identified the current practice, and next steps, for safety conscious planning in the seven states where forums were held. Additionally, the following categories were identified which indicate planning needs and ideas for safety planning. Within each category, specific items are listed that will assist in the implementation of a coordinated planning process.

Goals and Performance Measures

- Create guidelines for developing safety goals that can be used by all states and MPOs.
- Communicate national goals using methods that divide up the responsibility by region, state and local planning units.
- Develop sample or proposed performance measures and define success. The MPOs need a yardstick, as they have in other planning areas, by which to measure success.
- Develop performance expectations by type of facility and evaluation of investment programs.
- Establish accountability by linking performance to funding.
- Develop a critical role for safety in the MPO and DOT planning certification processes with the same emphasis as is currently placed on public involvement, congestion mitigation, environmental justice and air quality.

Communication

- Begin the process by establishing educational and communications mechanisms in support of safety planning with internal partners. Workshops should include a discussion of successful methods for increasing communication between safety and planning professionals.
- Conduct surveys to illuminate the safety concerns that the public views as important.
- Identify and document best practices in marketing and communicating safety conscious planning. Include strategies for linkage between safety conscious planning and context sensitive design, smart growth, economic development, transportation for the elderly and handicapped citizens and environmental streamlining.

Collaboration

- Survey and document best practices for state DOTs and MPOs as well as inner agency working relationships. In many instances, the DOT or MPO planning group must gain another division's permission and resources to advance safety planning. It would be useful to document cases where planning divisions have developed a quid pro quo for working within their parent agencies.
- Form interdisciplinary safety advisory committees at all levels and include nontraditional partners like freight, insurance, employers and trade organizations.

Few State DOTs appear to have a collaborative working relationship with the MPOs and regional councils.

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Leadership

- Embolden leadership at all levels by providing information and messages related to safety problems. Meet with key political leaders at the local, state and national level to explain the benefits of safety conscious planning.
- Recruit safety champions at the local level and focus from the beginning on succession planning for when the champions are no longer available. To ensure that such “champions” exist within the state and local planning agencies, identify or create a job description and encourage the DOTs and larger local entities to assign a person to the position.
- Use federal funding to enable collaboration among states and MPOs across geographical boundaries.
- Provide resources and empower the FHWA Divisions and Resource Centers to advocate more effectively for safety conscious planning.

Priorities

- Develop a menu of best practice examples and share the information with the states and MPOs to help them focus on initiatives with high potential for reducing crashes and encourage interdisciplinary approaches in engineering, education, enforcements, emergency services and environmental management. For example, FHWA is focusing safety efforts on four types of crashes based on frequency of occurrence.

| <i>Type of Crash</i> | <i>Percent of Total Fatalities</i> |
|---|------------------------------------|
| <i>Single vehicle, run-off-the-road</i> | <i>38%</i> |
| <i>Speeding too fast for conditions</i> | <i>30%</i> |
| <i>Intersections</i> | <i>21%</i> |
| <i>Pedestrians and bicyclists</i> | <i>13%</i> |

- Expand the reach of construction/maintenance/improvement projects to include education and enforcement components. STP funding supports engineering projects but crash problems are usually attributable to human behavior. The MPOs tend to focus on facilities rather than people.

Resources

Data and Information

- Develop strategies for overcoming the liability issues associated with data sharing: Identify the legal issues and investigate examples of public and media misuse of data. Provide examples of sanitized data for release outside the planning community.
- Conduct a survey of current practices in the collection use and management of safety data.

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- Develop data “warehouses” in all states and provide MPOs with “micro data” that pinpoints and analyzes current and potential crash problems by specific location using GPS equipment within their jurisdictions.
- Encourage states to create traffic records coordinating committees consisting of all agency managers who manage and use data.

Tools

- Identify tools that are available and disseminate the information broadly. Convince planners they already know how to adopt safety conscious planning principles.
- Develop analysis tools similar to other forecasting and modeling tools used by planners.
- Create an assessment tool, such as a matrix that inventories the planning processes, tools and data used and position responsibilities, for state and local planners to assess their own progress.
- Develop a formula(s) for incorporating safety as a factor in project selection.

Expertise

- Create mechanisms for providing staff expertise. Few MPOs have a traffic engineer on staff and, in many cases; law enforcement must fulfill that role without the requisite expertise.
- Ensure the federal officials at all levels are familiar with the “rules of the game” related to funding sources and requirements.

Training

- Develop and deliver an SCP training and awareness workshop for planners and safety practitioners at all levels including definitions to create a common language.
- Create a workshop on the use, analysis and understanding of safety data.
- Develop and provide cross training to MPO and DOT planners.

Funding

- Modify the criteria for HES funding. At present, HES requirements include an identified problem before funds can be spent. The requirement should be modified to allow for prevention measures.
- Provide incentive grants for implementing and evaluating innovative safety planning ideas and strategies.
- Identify and document creative strategies for sharing and leveraging resources devoted to safety-related improvements and programs.

Research

- Conduct research to identify and synthesize current knowledge and noteworthy practices, create analysis and forecasting planning tools and demonstrate effectiveness.
- Develop predictive models of economic and financial impact.
- Analyze accident rates by corridor and facility.
- Identify and document best practices on safety management systems.

Applicability to this Report

Clearly, this conference not only identified current efforts underway, it identified areas and methods by which agencies can work together and include safety in the planning process. Based on the findings and identified needs at the conference, the project team identified case studies that demonstrated excellence in two of these areas: data investment strategies, and coordination. Two strong cases in the use of data and information for safety planning include the Southeast Michigan Council of Governments and the State of Iowa. Case studies that demonstrate success as a result of interagency coordination include the Rhode Island Walkable Communities project, the Rogue Valley Council of Governments, and the Southeast Michigan Council of Governments.

Case Studies of Data Investment Strategies

One of the concerns expressed at the Leadership Conference is that the industry can be data rich and information poor. There is a significant amount of data related to safety issues that is generally available to planners and engineers. Unfortunately, this data is poorly organized and unrelated to other information that is typically used and needed for transportation planning. This makes it difficult to integrate safety data into the transportation planning process so that decision-makers have the information they need to make trade-off and weigh alternatives. The development and availability of data and tools to incorporate safety into the transportation planning process is sorely needed. The introduction of data management tools such as Geographic Information Systems (GIS) offer significant opportunities to incorporate safety in early development of transportation planning projects.

This section highlights the efforts of the Southeast Michigan Council of Governments and the Iowa Department of Transportation to develop tools and data that facilitate safety planning. These efforts have been highly successful in bringing safety to the forefront of the transportation planning process, and have resulted in a wide range of technical and collaborative solutions to safety issues.

The Southeast Michigan Experience

The Southeast Michigan Council of Governments (SEMCOG) is the Metropolitan Planning Organization (MPO) for Southeast Michigan. Its region includes the following counties in Michigan: Wayne, Oakland, Macomb, Washtenaw, Monroe, Livingston, and St. Clair, with Detroit as the central and largest city.

SEMCOG's Traffic and Safety Engineering program began as part of the Transportation System Management (TSM) planning efforts initiated in the 1970s and strengthened with the passage of ISTEA and TEA-21. These two legislations emphasized the need for MPOs and State DOTs to consider safety in the transportation planning processes. In March 1991, SEMCOG published a comprehensive report entitled *Regional Traffic Safety Policies for Southeast Michigan* that articulated a detailed safety action agenda and firmly established traffic safety as a high priority. The regional safety document stated the following concerns:

Few public safety issues reach as wide and diverse a cross section of our population as does traffic safety. All age groups and socio-economic backgrounds, residing in both rural and urban environments, are affected by the unexpected and tragic results of traffic crashes. In Southeast Michigan alone, someone is killed every 14 hours in a traffic crash, at an annual cost estimated to be over \$1.79 billion.

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SEMCOG's well established safety program works toward five goals to:

- Encourage comprehensive and systematic analyses/evaluation of traffic safety needs;
- Provide traffic safety assistance to local governments;
- Provide the umbrella for the coordination of traffic safety activities among various levels of government, the private sector and other specialized traffic safety groups;
- Mainstream traffic safety activities as an integral part of transportation planning; and
- Enhance the knowledge of the local elected officials and the public on traffic safety.

The successful and consistent pursuits of its goals have SEMCOG set apart among its peers. SEMCOG was the first MPO in the country to effectively incorporate traffic safety planning as an integral part of the regional transportation planning process. As a result of the agency's activities at both the local and state levels, several innovative safety partnerships have been established or strengthened. For instance, the Michigan Office of Highway and Safety Planning (the Governor's representative on traffic safety issues) now house one of their staff within SEMCOG to help enhance and further penetrate the community with traffic safety programs. SEMCOG now is increasingly called upon by other agencies outside the state to share lessons learned from several years of incorporating safety into the transportation planning process.

Limited safety data availability and analysis for transportation planning are perennial issues confronting transportation planners. In many cases there are no central databases similar to the traditional data and analysis tools used by transportation planners to evaluate transportation network performance. These traditional tools and data sets were developed as a result of decades of planning geared to address the mobility of the growing urban/suburban population. SEMCOG efforts in traffic safety planning have resulted in the development and availability of macro and micro data sets that are made available to local units of governments to assist in identifying important safety issues and solutions.

The following provides a description of the activities undertaken by SEMCOG to address its goals.

Encourage Comprehensive and Systematic Analysis/Evaluation of Traffic Safety Needs

Geographic Information System (GIS) technology was rapidly introduced into various facets of transportation planning in Southeast Michigan in the early 1990s. In many cases, GIS was implemented to address a specific need, which left agencies with fragmented GIS networks and tools. SEMCOG, in cooperation with state and local agencies, addressed this problem by working together to create a comprehensive transportation GIS network for planning applications in the region. The objective of this

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work was to establish a common base containing essential transportation attributes to be used by agencies for transportation planning purposes.

Examples of transportation planning applications to date are the developing, updating and displaying of the regional travel demand forecast results, traffic safety analyses, and the use of GIS in intelligent transportation systems operations in transit and general planning applications in Southeast Michigan.

The development of the regional transportation GIS network involved the conflating (merging) of four distinct databases and networks that were developed at different times, by different agencies, and for various purposes. Although this task was acknowledged as enormous and costly, it provided the best chance of bringing together databases that include integrated transportation attributes that encompassed essential elements of transportation planning. The files that were merged together were:

- The Topologically Integrated Geographic Encoding and Referencing system (TIGER) developed and maintained by the Census Bureau for managing demographic data. The incorporation of this file opened the avenue to easily include demographic data in transportation network evaluation. However, the file had a major drawback – limited positional accuracy. The local agencies required accurate maps for their planning applications.
- The Michigan Resource Information System (MIRIS) was chosen to improve the positional accuracy of the TIGER files and at the same time make available the environmental data maintained by the Michigan Department of Natural Resources (MDNR). MDNR was responsible for maintaining the state's environmental data such as wetlands, parks, etc.
- To facilitate data referencing and retrieval the Michigan Accident Location Index (MALI), a crash database for all crashes in Michigan, was chosen. This data set was maintained by the Michigan State Police and was initially developed in the mid-1970s.
- Finally the regional transportation planning network maintained by SEMCOG with the assistance of local operating agencies and the Michigan Department of Transportation provided the traffic data needed to evaluate transportation network performance. The regional travel demand forecasting network is also included as part of this project.

The initial completion of the development of a composite transportation network provided a powerful tool for transportation planners in the region. It greatly enhanced the ability of transportation planners to consider more effectively several transportation elements such as socio-economic factors, traffic crashes, roadway conditions, and the environment as part of transportation planning process and the regional transportation development.

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Some communities in the SEMCOG region have taken this project further to meet their individual needs. Notable among them are Wayne and Oakland counties. They have improved on the positional accuracy of the transportation network, completed parcel mapping as part of their GIS system, and further refined the environmental data available within their respective counties. Furthermore, they have spent significant resources incorporating economic development data into the master database. The acceptance of the composite transportation network as the framework for subsequent GIS transportation activities intricately tied safety into all aspects of transportation planning. The framework provided a macroscopic and microscopic database that incorporates safety into the transportation planning process.

As a result of this initial effort by SEMCOG, the State of Michigan adopted the SEMCOG GIS plan statewide. This composite transportation network initially developed by SEMCOG and later enhanced by the state is now the common transportation planning framework in the State of Michigan. Choosing the Michigan Accident Location Index (MALI) database, developed by the State of Michigan for location crash data, as the linear referencing system integrated traffic crashes into the planning process.

As GIS becomes more of an essential tool in the data input, query, display and analysis of transportation planning, it will become even more important for all agencies to be able to easily share information through a common base. This project provided the framework to foster greater coordination and communication among all agencies involved in GIS implementation in Michigan.

Provide Traffic Assistance to Local Governments

SEMCOG recognized that a comprehensive local highway safety program was needed to reduce the large and varied impacts of traffic crashes on Southeast Michigan residents. Collection and effective use of crash data to identify and correct safety deficiencies in the roadway system was identified as a crucial element of such a program.

Unfortunately, SEMCOG discovered that there was a general lack of relevant traffic engineering and safety assistance available to or within communities in the seven-county area of Southeast Michigan. Only seven cities in the seven-county SEMCOG region had full-time traffic engineers at the start of this program.

They observed that while several communities used consultants for special projects, the overall lack of adequate engineering assistance indicated that numerous traffic safety problems were probably being overlooked in many communities. SEMCOG believed that more engineering assistance would translate into an overall improvement in traffic safety. However, with the limited resources available to most

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communities, hiring a traffic engineer was often not viewed as a viable option. Many communities in Southeast Michigan were forced to assign traffic safety as a collateral duty to law enforcement officers and public works personnel. While these people often did a good job of addressing traffic safety issues it was not the primary focus of their jobs. SEMCOG, therefore, created a traffic safety manual in 1997 to assist these personnel (and others) in their analysis of roadway-related traffic safety problems.

SEMCOG developed a Traffic Safety Manual that provides a set of user-friendly tools for checking a location's crash history, identifying possible crash causes and countermeasures, and conducting a preliminary benefit/cost analysis of those countermeasures selected for further consideration. Benefit/cost analysis is an economic tool for assessing and comparing possible countermeasures. For each countermeasure considered, it compares expected benefit to expected cost. One of the agency's objectives in producing the manual was to provide the local traffic safety practitioner with "stretch planning tool" comparable to those used by other staff in other disciplines to formulate preliminary transportation budgets.

Many engineering disciplines have "sketch-planning" tools that allow them to evaluate specific roadway segments or alternatives without conducting an in-depth engineering analysis. For example, a highway engineer can usually estimate how much it will cost to add a lane to an existing roadway simply by using sketch-planning techniques and without doing a complete site evaluation. Similarly, traffic volume-to-capacity ratios are often used in congestion analyses. Such techniques are primarily used to prepare budgets and proposals. They are not considered to be substitutes for the detailed engineering analysis, often needed later in the implementation process.

In the past, traffic safety personnel have not had the means to quickly and efficiently evaluate suspected safety problems and proposed solutions. This manual addressed this need. In addition to limited safety engineering expertise at the local level, many communities have witnessed a growing portion of their limited budgets being consumed by the increasing costs of litigation resulting from crashes within their jurisdictions. The systematic use of this manual to develop traffic safety improvement priorities within available budgets may prove useful in defending against traffic crash litigation.

Purpose of the Traffic Safety Manual

The manual was designed to aid in identifying:

- Information relevant to safety analysis;

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- High-crash locations;
- Significant crash patterns and generally related causes and countermeasures;
- Default values for countermeasure service life, cost and effectiveness; and
- Safety project benefit/cost ratios, for use in planning and budgeting.

In response to the increased use of the SEMCOG Traffic Safety Manual, the agency, with assistance from Michigan Office of Highway Safety Planning, produced computer software to perform the analysis suggested in the manual to assist local governments in crash analysis. It has also conducted several training sessions on the use of the manual and the software. The Michigan Office of Highway Safety Planning is currently reviewing the software for statewide applicability.

SEMCOG also has a small group of safety staff assigned to provide traffic safety and engineering assistance to member organizations within the SEMCOG area. The agency continues to apply innovative approaches to leverage sources to provide safety assistance to local governments including partnering with the private sector such as AAA and the auto industry.

Mainstreaming Traffic Safety Activities as an Integral Part of Transportation Planning

SEMCOG was an early innovator in incorporating traffic safety into transportation planning. SEMCOG used a two pronged approach – educating and involving the local elected officials and the media, and providing a comprehensive database and crash analysis at the local level. As part of the development of the 2015 Long-Range Transportation Plan, completed in 1997, SEMCOG developed a methodology to evaluate regional safety deficiencies, making traffic safety one of the primary criteria for evaluating transportation network deficiencies and allocating corresponding transportation investments to address such needs.

The process used in identifying safety deficiencies throughout the region involved several steps as follows:

1. Traffic and crash information was extracted for each of the segments in SEMCOG's roadway network.
2. A segment crash rate, a segment crash frequency and a segment casualty ratio were computed for each of the segments remaining in the analysis.

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3. Critical crash sites, critical crash frequencies, and critical casualty ratios, based on functional class and area type, were computed for the region.
4. A Crash Probability Index (CPI) was computed for each segment that had at least one segment rate that exceeded its corresponding critical rate.
5. Segments having a CPI greater than zero were grouped into tiers based on the severity of their CPI scores.

Calculation of Segment Deficiency Rates

Segment crash rates, crash frequencies, and casualty ratios are computed for each segment, as stated below:

$$\begin{aligned}\text{Segment Crash Rate} &= \frac{\text{Total Crashes} * 10^6}{\text{ADT} * \text{Length} * 365} \\ \text{Segment Crash Frequency} &= \frac{\text{Total Crashes}}{\text{Length}} \\ \text{Segment Casualty Ratio} &= \frac{\text{Casualty Crashes}}{\text{Total Crashes}}\end{aligned}$$

In general terms, the segment crash rate represents the number of crashes per million vehicle miles traveled (VMT) on a segment. The segment crash frequency represents the number of crashes per mile on a segment, and the segment casualty ratio represents the percent of casualty crashes as compared to total crashes.

Computation of the Crash Probability Index (CPI)

During the deficiency analysis, each segment's crash rate, crash frequency and casualty ratio were compared to the corresponding critical rates for the segment's functional class and area type. For any of the segments that had at least one segment rate that exceeded its corresponding critical rate, a CPI was computed.

The CPI was computed by giving each segment an overall score based upon how it's computed segment rates compared to their corresponding critical rates. The following procedure was used for computing a segment's CPI:

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1. If the segment's crash rate exceeded the critical crash rate for the group, the segment receives a score of five.
2. If the segment's crash frequency exceeded the critical crash frequency for the group, the segment receives a score of five.
3. If the segment's casualty ratio exceeded the critical casualty ratio for the group, the segment receives a score of ten.
4. If more than one of the computed segment rates exceeded their respective critical rates, the designated scores were added together to compute the overall CPI of the segment.

For example, if a segment's crash rate exceeded its critical crash rate and the segment casualty ratio exceeded the critical casualty ratio, the segment would receive an overall CPI score of fifteen. Similarly, if all three of the segment rates exceeded their corresponding critical rates, the segment would have an overall CPI score of twenty.

Ranking of the Segments into Tiers

In the final step of the crash analysis, segments are ranked into tiers based upon their CPI scores. Segments that had CPI scores of zero were removed from the analysis at this point. The process of ranking safety deficient segments of a roadway was accomplished by first sorting the segments in descending order by CPI and county. Next, the segments were designated with a tier ranking according to their CPI values. The tier ranking system used in the safety deficiency analysis was designed to be compatible with the tier ranking system utilized in the congestion deficiency analysis. Tiers are defined according to the magnitude of their CPI values as follows:

If the CPI \geq 15, then the segment was classified as Tier A.

If the CPI = 10, then the segment was classified as Tier B.

If the CPI = 5, then the segment was classified as Tier C.

Once the process of identifying and ranking the segments was complete, lists of the results by county were prepared for use by SEMCOG and local agencies in the decision-making process for the regional long-range transportation plan. Tables 1 through 4 represent samples of crash data generated as part of the long-range transportation plan development.

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| Municipality | Crash Probability Index (CPI) Value | | | | | Total |
|--------------------------|-------------------------------------|-----|-----|----|----|-------|
| | 0 | 5 | 10 | 15 | 20 | |
| Detroit | 426 | 123 | 44 | 14 | 0 | 607 |
| Livingston | 30 | 12 | 9 | 0 | 0 | 51 |
| Macomb | 269 | 40 | 38 | 7 | 0 | 354 |
| Monroe | 58 | 10 | 2 | 3 | 0 | 73 |
| Oakland | 419 | 60 | 25 | 5 | 0 | 509 |
| St. Clair | 66 | 10 | 2 | 3 | 0 | 81 |
| Washtenaw | 146 | 38 | 12 | 4 | 0 | 200 |
| Wayne(excluding Detroit) | 323 | 50 | 19 | 20 | 1 | 413 |
| Region | 1,737 | 343 | 151 | 56 | 1 | 2,288 |

Source: SEMCOG Safety Deficiency Analysis, 1996

| Municipality | Crash Probability Index (CPI) Value | | | | | Total |
|---------------------------|-------------------------------------|-------|-------|------|------|-------|
| | 0 | 5 | 10 | 15 | 20 | |
| Detroit | 70.2% | 20.3% | 7.2% | 2.3% | 0.0% | 100% |
| Livingston | 58.8% | 23.5% | 17.6% | 0.0% | 0.0% | 100% |
| Macomb | 76.0% | 11.3% | 10.7% | 2.0% | 0.0% | 100% |
| Monroe | 79.5% | 13.7% | 2.7% | 4.1% | 0.0% | 100% |
| Oakland | 82.3% | 11.8% | 4.9% | 1.0% | 0.0% | 100% |
| St. Clair | 81.5% | 12.3% | 2.5% | 3.7% | 0.0% | 100% |
| Washtenaw | 73.0% | 19.0% | 6.0% | 2.0% | 0.0% | 100% |
| Wayne (excluding Detroit) | 78.2% | 12.1% | 4.6% | 4.8% | 0.2% | 100% |
| Region | 79.9% | 15.0% | 6.6% | 2.4% | 0.2% | 100% |

Source: SEMCOG Safety Deficiency Analysis, 1996

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| Municipality | Crash Probability Index (CPI) Value | | | | | Total |
|---------------------------|-------------------------------------|-----|-----|----|----|-------|
| | 0 | 5 | 10 | 15 | 20 | |
| Detroit | 468 | 186 | 145 | 3 | 0 | 802 |
| Livingston | 152 | 44 | 15 | 0 | 1 | 212 |
| Macomb | 633 | 102 | 61 | 1 | 0 | 797 |
| Monroe | 174 | 29 | 8 | 1 | 0 | 212 |
| Oakland | 1,129 | 185 | 93 | 0 | 0 | 1,407 |
| St. Clair | 198 | 41 | 20 | 0 | 0 | 259 |
| Washtenaw | 366 | 60 | 31 | 0 | 0 | 457 |
| Wayne (excluding Detroit) | 914 | 121 | 96 | 0 | 0 | 1,131 |
| Region | 4,034 | 768 | 469 | 5 | 1 | 5,277 |

Source: SEMCOG Safety Deficiency Analysis, 1996

| Municipality | Crash Probability Index (CPI) Value | | | | | Total |
|---------------------------|-------------------------------------|-------|-------|------|------|-------|
| | 0 | 5 | 10 | 15 | 20 | |
| Detroit | 58.4% | 23.2% | 18.1% | .4% | 0.0% | 100% |
| Livingston | 71.7% | 20.8% | 7.16% | 0.0% | 0.5% | 100% |
| Macomb | 79.4% | 12.8% | 7.77% | 0.1% | 0.0% | 100% |
| Monroe | 82.1% | 13.7% | 3.8% | 0.5% | 0.0% | 100% |
| Oakland | 80.2% | 13.1% | 6.6% | 0.0% | 0.0% | 100% |
| St. Clair | 76.4% | 15.8% | 7.7% | 0.0% | 0.0% | 100% |
| Washtenaw | 80.1% | 13.1% | 6.8% | 0.0% | 0.0% | 100% |
| Wayne (excluding Detroit) | 80.8% | 10.7% | 8.5% | 0.0% | 0.0% | 100% |
| Region | 76.4% | 14.6% | 8.9% | 0.1% | 0.0% | 100% |

Source: SEMCOG Safety Deficiency Analysis, 1996

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In contrast to other deficiency analysis related to capacity, bridges, transit and pavement, the SEMCOG 2015 Long-Range Transportation Plan did not identify specific locations that exceeded the critical rates on any of the maps made available to the public. The operating agencies expressed concern that any mapping or identification of such locations might draw unwarranted attention that may unduly expose the local agencies to possible lawsuits. However, every operating agency received a list of these locations and a further identification of the type of crashes.

Tables 1 and 2 show that the regional crash analysis performed as part of the long-range transportation plan development covered over 2,000 intersections. Of the more than 2,000 intersections analyzed, 20% of these intersections were found to be potentially safety deficient. Similarly Tables 3 and 4 contain crash information related to roadway segments.

Local operating agencies working in concert with SEMCOG proposed solutions to address these deficiencies along with other deficiencies that have traditionally been the focus of transportation planning and the Long-Range Transportation Plan development.

There were at least two primary benefits that were immediately evident as a result of the inclusion of regional safety analysis in the transportation planning process – the education of the elected officials and the public on safety issues, and the allocation of transportation funds traditionally devoted to other transportation improvements to safety improvements.

The local elected officials in the SEMCOG region have the responsibility to adopt the long-range transportation plan including plan goals and objectives, recommended improvements, and regional transportation funding distributions to address recommended improvements. Improving safety was identified as one of the goals of the plan. The elected officials became more aware of the number and severity of crashes in Southeast Michigan and its impact to their community, in particular. Armed with this information, they were more prepared to make informed decisions that included safety improvements.

Prior to the inclusion of safety as part of the transportation planning process, many local agencies had a difficult time shifting resources away from transportation improvements such as road widening or pavement resurfacing. They had no basis for proposing such expenditure. However, with the incorporation of safety in the planning process, many received the tools necessary to do trade off analysis and to select transportation investment that maximizes the communities' desires.

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For instance, in the City of Detroit, a significant allocation of transportation investment was devoted to traffic safety improvements. Many transportation agencies traditionally devote about 10 percent of their transportation funds to safety improvements, in part to meet federal guidelines. Incorporating safety into long-range transportation plan development improved the outcome of the transportation planning process and allowed for better allocation of transportation resources.

The City of Detroit, taking advantage of the “safety planning nurturing environment“ entered into partnership with AAA of Michigan to analyze and improve selected high crash location in the City. This partnership was an innovative arrangement to address the City’s concerns about high insurance costs for City residents. SEMCOG provided the initial set of high crash locations for review. The City of Detroit and AAA retained Wayne State University to perform detailed analysis of selected intersections in the City of Detroit and recommended improvements. These improvements were implemented with funding from AAA. Wayne State University has gone back and performed before-and-after studies on these locations and observed outstanding results. For many of the improved locations the numbers of crashes were reduced by more than 40 percent.

Based on the favorable results, the State of Michigan, as part of its transportation funding legislation, earmarked a special urban traffic safety improvement fund. Furthermore, the recent Michigan safety agenda identified an intersection improvement program as one of the three emphasis areas. The Michigan Department of Transportation, as part of its review and coordination of the MPOs and TMAS Planning activities, is now requiring the inclusion of safety in transportation planning. Still in its infancy, the program requires that the MPOs/TMAs produce a safety profile for their respective areas.

Iowa Highway Safety Management System

The Iowa Safety Management System (SMS) consists of a diverse partnership of highway safety practitioners in engineering, enforcement, education, and emergency services. This partnership is dedicated to reducing the number and severity of crashes on Iowa’s roadways. Iowa SMS developed a comprehensive toolbox with 28 key emphasis subjects in five areas:

- Drivers;
- Special uses;
- Highways;
- Emergency Response; and

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- Management Systems.

The toolbox for each emphasis area articulates the issues from national and state perspectives, discusses an extensive list of potential strategies, provides examples of successes and strategies implemented, and identifies available resources for additional assistance.

The toolbox is designed to be a living document that provides information, direction, and ideas for highway safety decision makers. The toolbox notes that any strategies selected for implementation will require further development through identifying potential partners, entities impacted, funding sources and detailed steps for implementation and evaluation. The following is a list of the 28 emphasis areas.

Emphasis Areas

Drivers

- Increasing Driver Safety Awareness
- Increasing Safety Belt and Child Restraint Usage
- Preventing Drowsy and Distracted Driving
- Curbing High-Risk Driving Behaviors
- Ensuring Drivers are Fully Licensed, Competent, and Insured
- Education and Licensing for Young Drivers
- Graduated Licensing for Young Drivers
- Sustaining Proficiency in Older Drivers

Special (Other) Users

- Making Walking and Street Crossing Safer
- Ensuring Safer Bicycle Travel
- Making School Bus Travel Safer
- Making Public Transit Travel Safer
- Improving Motorcycle Safety and Increasing Motorcycle Awareness
- Making Truck Travel Safer

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- Reducing Farm Vehicle Crashes

Highways

- Improving the Design and Operation of Highway Intersections
- Keeping Vehicles on the Roadway and Minimizing the Consequences of Leaving the Road
- Reducing Head-On and Across-Median Crashes
- Improving Work Zone Safety
- Accommodating Older Drivers
- Reducing Train-Vehicle Crashes
- Reducing Deer-Vehicle Crashes
- Implementing Road Safety Audits

Emergency Response

- Enhancing Emergency Response Capabilities to Increase Survivability

Management Systems

- Improving Information and Decision Support Systems
- Using Intelligent Transportation Systems (ITS) to Improve Highway Safety
- Creating More Effective Processes and Safety Management Systems Designing Safer Work Zones
- Developing and Encouraging Multidisciplinary Safety Teams

Safety Management System Membership

Iowa SMS membership is comprised of representatives from the private and public sectors. The following organizations are members of the SMS.

Federal Agencies

- FHWA- Federal Highway Administration
- FMCSA- Federal Motor Carrier Administration
- NHTSA- National Highway Traffic Safety Administration

Associations and Local Government

- American Public Works Association
- Iowa County Engineer's Association
- Iowa State Sheriff's and Deputy's Association
- Iowa Traffic Control and Safety Association

Private Sector

- AAA Iowa / Minnesota
- AARP Iowa
- Union Pacific Railroad
- Iowa Motor Truck Association
- State Farm Insurance

Transit Safety Plans

The traditional safety planning by many highway agencies often ignores the safety need of transit operators and users. The Iowa SMS toolbox covers both school bus and public transit travelers. It is the goal of SMS to:

1. Move toward an injury free record for public transit employees, including drivers and mechanics, and
2. Provide increased overall safety for public transit passengers.

The toolbox identified exhaustive lists of potential strategies to address transit safety issues that will help meet the public transit safety goals. These strategies include:

- Seek adequate funding to allow transit systems to replace rolling stock in a timely manner and to add appropriate safety enhancements to new vehicles being purchased.
- Update the Transit Manager's Handbook with special focus on safety issues, including drug and alcohol testing, reporting of transit crashes, etc.

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- Encourage cooperation between local transit officials, law enforcement, and emergency services to provide training for both transit staff and first responders on bus evacuation techniques and appropriate response to on-board bus emergencies.
- Consider a statute requiring motorists to yield to public transit buses returning to the traffic stream after passenger pick-up/drop-off.
- Develop and publish “safe bus riding” brochures, to help riders and potential riders understand how to safely wait for buses, board them, signal for stops, and then alight.
- Maintain transit driver training standards and encourage driver refresher courses.
- Investigate and pursue statewide deployment of automated vehicle location and advanced communications systems for public transit.
- Investigate and pursue incorporation of new technologies for increased conspicuity of transit vehicles into future procurement specifications (LED flashers, etc.).
- Investigate and pursue incorporation of new crash attenuation technologies (HELP bumpers, etc.) in future vehicle procurement specification.
- Encourage local transit or public works officials to survey established bus stops to identify and remedy any locations with visibility problems either for waiting passengers or for approaching motorists.
- Develop and publish guidelines for “transit- and pedestrian-friendly development” to encourage greater safety for transit passengers on and off the bus.
- Support local transit systems in the continued deployment of video surveillance aboard buses/routes where rider behavior tends to be a problem.

An initial grant to study and implement statewide transit ITS strategies has been secured. It is anticipated that the study will proceed shortly. Also currently underway is the updating of the *Transit Manager's Handbook*.

Safety Data and Tools

Iowa has devoted significant resources to improve its safety data. Iowa's safety data efforts focus on improving statewide application of data collection and management technology to improve highway safety and the development of GIS tools for safety analysis.

The statewide application of data collection and managements covers traffic and criminal system (TRaCS) data. Iowa is one of the 17 states licensed to deploy TRaCS. The other states are Alabama,

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Arizona, Arkansas, Colorado, Connecticut, Delaware, Florida, Georgia, Nebraska, New Hampshire, New York, Oklahoma, South Carolina, Tennessee, Washington, and Wisconsin.

TRaCS and electronic data capture for crashes, citations, incident reports, and other types of safety data has a “Smart Map” location tool that enables consistent, automated capture of event locations on all reports statewide.

The SAVER suite of tools was developed to enhance traffic safety analysis and evaluation. There are more than 400 SAVER users integrating safety data with ArcView GIS software. This software is routinely available in most transportation planning offices across the country.

The suite of tools includes the following specialized software:

- CMAT – Crash Mapping Analysis Tool – enabler for pre-GIS legacy software (no license required by users)
- Intersection Magic (proprietary software for which the Iowa DOT maintains a license for 150 users)
- ERIS – Emergency Response Information System (an ArcExplorer application customized for emergency response agencies in Iowa)
- CARE – crash analysis software developed at the University of Alabama and implemented in a number of states.

Iowa is now poised to incorporate safety as part of the transportation planning process. Safety conscious planning is being highlighted as the next generation of transportation system safety strategies. On January 28 and 29th, 2003, the Iowa Safety Conscious Planning forum and Peer Exchange will be held in Ames to further explore ways of incorporating safety into the transportation planning processes.

Case Studies of Successful Coordinated Efforts

Safety has historically been considered after a project has been selected for funding and during the design and implementation phase. Incorporating safety into the planning process implies that safety considerations will be addressed during project development and selection. MPOs and state planning agencies have started to include a safety incentive in the project selection process. For example, if a given project improves safety, the project is awarded an additional 10 points in the overall priority ranking system. This is far from the vision of a systematic approach to safety planning that is fully integrated into the standard transportation planning process.

Truly incorporating safety in the planning process calls for multi-modal and inter-agency collaboration in order to ensure that the ultimate strategy fully supports both safety and mobility objectives. The safety implications of various actions can be very different for different modes of transportation. There are also situations where a given action may be safer from one perspective and less safe from another. In other words, the safety objectives themselves are conflicting. For example, a bus pull-out from the roadway may increase the safety for pedestrians during bus access, but reduce the safety of vehicles on the roadway by requiring the bus to pull in and out of traffic. This, and other similar types of trade-offs, is best addressed when regional planners and stakeholders work together.

The Leadership Conference identified the need to document efforts where a range of agencies with differing goals and objectives worked together to plan and implement safety projects. The State of Rhode Island, the Rogue Valley Council of Governments, and the Southeast Michigan Council of Governments are examples of agencies that identified a safety problem that needed to be addressed and developed ways to partner with other agencies and stakeholders to solve the problem.

Walkable Communities for Rhode Island

The walkable communities initiative within the State of Rhode Island has become a model for coordinated and collaborative safety planning. This case study describes the catalyst for their efforts, their collaboration strategies and players, the Rhode Island Pedestrian Safety Plan, and the results of the work to date.

Background

In 1998, the Sierra Club's Surface Transportation Policy Project (STPP) produced a report entitled "Mean Streets 1998." This report ranked the Providence urbanized area as the fourth "meanest" area for

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pedestrian transportation in the country. The release of this report served as a catalyst for Rhode Island transportation planners, safety engineers, politicians, public health administrators, and bicycle and pedestrian advocates to understand the extent of pedestrian problems statewide, and find ways to solve these problems. In the short term, this prompted the Rhode Island Department of Transportation (RIDOT) to conduct a detailed analysis of the real pedestrian issues within Providence and the state overall. RIDOT found that the problems identified in the STPP report were slightly overstated because they were based on regional data that included areas outside of the state. Further, this analysis found that Rhode Island's pedestrian safety was much better than most of the nation. Regardless, this report caught the attention of public officials, which in turn prompted transportation planners to conduct a general assessment of the state's pedestrian safety and develop a plan to address subsequent problems.

Rhode Island Pedestrian Safety Advisory Committee:

§ ***RI Department of Transportation***

§ *RI Department of Health*

§ *Federal Highway Administration*

§ *RI Public Transit Authority*

§ *Statewide Planning (MPO)*

§ *Governor's Office on Highway Safety*

§ *Main Street, RI*

§ *RI Greenways Council*

§ *SAFEKIDS, Sierra Club*

§ *Injury Prevention Center*

§ *Path to Health*

The most immediate result of the report was the creation of a Pedestrian Safety Advisory Committee. The formation of this committee marked the beginning of a systematic coordinated effort between public and private sector pedestrian safety stakeholders in Rhode Island. The membership spans a wide range of agencies from RIDOT to FHWA to local health centers. The group seeks to build coalitions to serve as advocates for pedestrian safety and support local and statewide policies for long-term change. One of the outgrowths of this effort was the drafting and implementation of the Rhode Island Pedestrian Safety Plan.

Rhode Island Pedestrian Safety Plan

Making pedestrians a priority is the general theme of the Rhode Island Pedestrian Safety Plan, authored by RIDOT. The plan identified the need to place pedestrian planning initiatives on the same plane as the planning of other modes (highway and transit). "Instead of allowing pedestrian improvement to be a by-product of efforts to deal with traffic in a safe manner, pedestrian planning requires concurrent concentration on the needs of the pedestrian." With that as the number one goal, the plan was developed to serve as a communication tool to inform all state and local agencies, private sector stakeholders, and individuals about Rhode Island's transportation policies and planning initiatives.

The plan outlines several hard goals, including reducing the number of pedestrian crashes, injuries and fatalities; making all public facilities accessible by foot; and creating an urban and suburban environment

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that is conducive to walking. The plan then outlines a series of recommendations to implement these goals. The recommendations are programmed in six categories, the first of which is Coordination and Implementation.

In the Coordination and Implementation section, the plan raises the following questions related to a statewide coordinated effort to combat the perceived pedestrian safety problem:

- Will there be a constituency for pedestrians?
- Who will coordinate the safety-related efforts of engineering, planning, enforcement, and education in Rhode Island?
- Who will provide input on local and state planning issues and initiatives to improve walking facilities?

The plan then calls for coordination between all pedestrian safety programs to maximize the effectiveness of each. In addition, it calls for coordination of the “3-Es” (engineering, enforcement, and education) and coordination at all levels of government.

In order to most effectively coordinate, the plan calls for the continuation of a pedestrian safety advocacy group which will most likely remain a sub-committee to the state Traffic Safety Coalition, an advisory panel to the Governor’s Office on Highway Safety. The state Traffic Safety Coalition, represents a wide variety of public and private agencies which relate to the safety of Rhode Island motorists and pedestrians and will be able to “provide technical assistance to cities and towns and obtain input on local and regional planning issues and initiatives to improve walking facilities, particularly through the local comprehensive planning process.”

In addition to this recommendation, the plan calls for interagency coordination throughout the document. In the planning recommendation section, the plan calls for RIDOT to work closely with cities and towns in order to develop a comprehensive network of walkways and bikeways throughout the state. The plan also calls for direct coordination with land use planners and developers and requests their commitment to developing pedestrian friendly zones. The plan also states that RIDOT will work with local planning and public works departments to establish a school trip safety committee. This committee would remain abreast on all traffic aspects relative to Rhode Island schools and establish a plan for safe walking routes.

§ *“Implementing the plan will require the **coordinated action** by state and local agencies and private organizations. We seek new opportunities for partnerships with local and private interests to encourage more walkable communities throughout the state.”*
- Rhode Island
Pedestrian Safety Plan

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In addition, any traffic control, construction, enforcement, and education will be agreed upon and coordinated through this committee. This committee will consist of police, state officials, engineers, teaches, school board members, and parents.

The Rhode Island Pedestrian Safety Plan clearly outlines goals for the state, and makes recommendations to meet the goals. But most importantly, RIDOT addressed and included all agencies and groups with an interest in pedestrian safety, and called for their action. It is critical that transportation plans in any capacity outline and highlight methods by which all stakeholders can be involved.

Rhode Island Walkable Communities Conference

As an outgrowth of the Rhode Island Pedestrian Safety Plan and the RIDOT Director's initiative to focus on pedestrian safety, Rhode Island held a Walkable Communities Conference. The conference was a collaborative effort of RIDOT, FHWA, Rhode Island Department of Health, the statewide MPO, and National Highway Traffic Safety Administration (NHTSA). The conference brought together city planners, engineers, and law enforcement officials to brainstorm ideas relative to pedestrian safety. This conference provided a highly visibility demonstration of public interest and support for the efforts to improve pedestrian safety.

Statewide Planning and Momentum of Walkable Communities

The State of Rhode Island has only one metropolitan planning organization, responsible for preparing the long-range transportation plan and the one TIP for the state. The MPO has strong working relationships with state agencies and communities. Through the participation and support of the MPO, the State of Rhode Island has been successful in building momentum for, and planning for, walkable communities. Since the STPP report and the related momentum, Rhode Island has implemented several projects, policies, and programs. These include:

- An inventory of sidewalks on state roadways for ADA conformance,
- \$1 million per year for ADA sidewalk improvement projects,
- In the recent TIP, there are many communities seeking sidewalk improvement projects,
- The Walkable Communities conference,
- Implementation of a Pedestrian Safety Advocacy Committee,
- Support from the MPO and the Transportation Advisory Committee governing the MPO,

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- A new policy to expand the priority of pedestrian infrastructures,
- A new policy to elevate the consideration of pedestrian transportation to that of other modes,
- Conduct of a “Safe Routes to School Day” (October 1-5th, many communities and participants),
- Plans to host the June 2003 “Rails to Trails” international conference, and
- A walkability emphasis for Rhode Island growth.

The Role of Coordination in this Success

Clearly, Rhode Island has been successful in its goal of pedestrian safety improvement. This success can be credited to a number of factors directly related to the close collaboration of the players. These are all collaboration strategies, which can work on any safety related project, not just those related to pedestrian issues. They include:

- *A commitment from all players including political leadership.* After the STPP report, RIDOT led the effort to involve any and all possible supporters in the effort. They broadly brainstormed agencies and advocacy groups, which have an impact in the safety of Rhode Island pedestrians and sought their participation. In so doing, RIDOT rallied great momentum for this effort and was able to proceed with its efforts. In addition, RIDOT had the support of its director, which assisted in the continuation of this initiative. RIDOT’s philosophy is “Leadership + Direction + Community Support and Advocacy = Results.”
- *The development of a plan with coordination as a specific safety goal or recommendation.* In the Rhode Island Pedestrian Safety Plan, RIDOT made the coordination of all pedestrian safety programs and the continued efforts of the pedestrian advocacy group, which represents a wide range of relevant agencies, a priority in the plan.
- *A conference to kick-off the effort.* As a first step, RIDOT supported a Rhode Island Walkable Communities Conference as a collaborative effort between RIDOT, Rhode Island Department of Health, the MPO, and NHTSA. There were over 125 participants including planners, engineers, and law enforcement personnel to brainstorm collaborative solutions for statewide walkable communities.
- *Creation of a continued advocacy and a permanent “heart.”* The support of safe walkable communities is not a temporary effort. It requires permanent attention and a constant desire to improve. RIDOT has identified one individual who serves as the bicycle and pedestrian program manager. This person acts as a coordinating focal point for all agencies, advocacy groups, and individuals. It is one mechanism by which DOTs can keep constant communication with interested stakeholders.

Rogue Valley Council of Governments – Improved Safety Data through Coordination with ODOT

The State of Oregon has achieved enormous success in its transportation safety initiatives. The state saw a reduction of 23 percent in its transportation fatalities in 1999, and this trend has continued in the past 2 years. These reductions come as a direct result of the ongoing efforts of the Oregon Department of Transportation (ODOT) Office of Safety, which houses the Governor’s Highway Safety Representative. This office makes consistent efforts to increase coordination with other ODOT offices, MPOs statewide, city planning offices, and the state’s transit agencies, in order to provide technical assistance and funding whenever available. This case study documents the efforts of one Oregon MPO, the Rogue Valley Metropolitan Planning Organization (RVMPO) and its collaboration efforts with ODOT and other regional agencies.

Background

The Rogue Valley Council of Government (RVCOG) is an association of local governments that provides a forum for coordinated problem solving and regional transportation planning for two Oregon counties. Though participation in the council of governments is voluntary, RVCOG has received active participation from local agencies for many years. Its mission statement is:

To be a catalyst to promote quality of life, effective and efficient services, and leadership in regional communication, cooperation, planning, and action in Southern Oregon.

RVCOG Board of Directors has delegated MPO responsibilities to a committee of elected and appointed officials from its regional constituency. They were designated by the Governor of Oregon as the RVMPO in 1982.

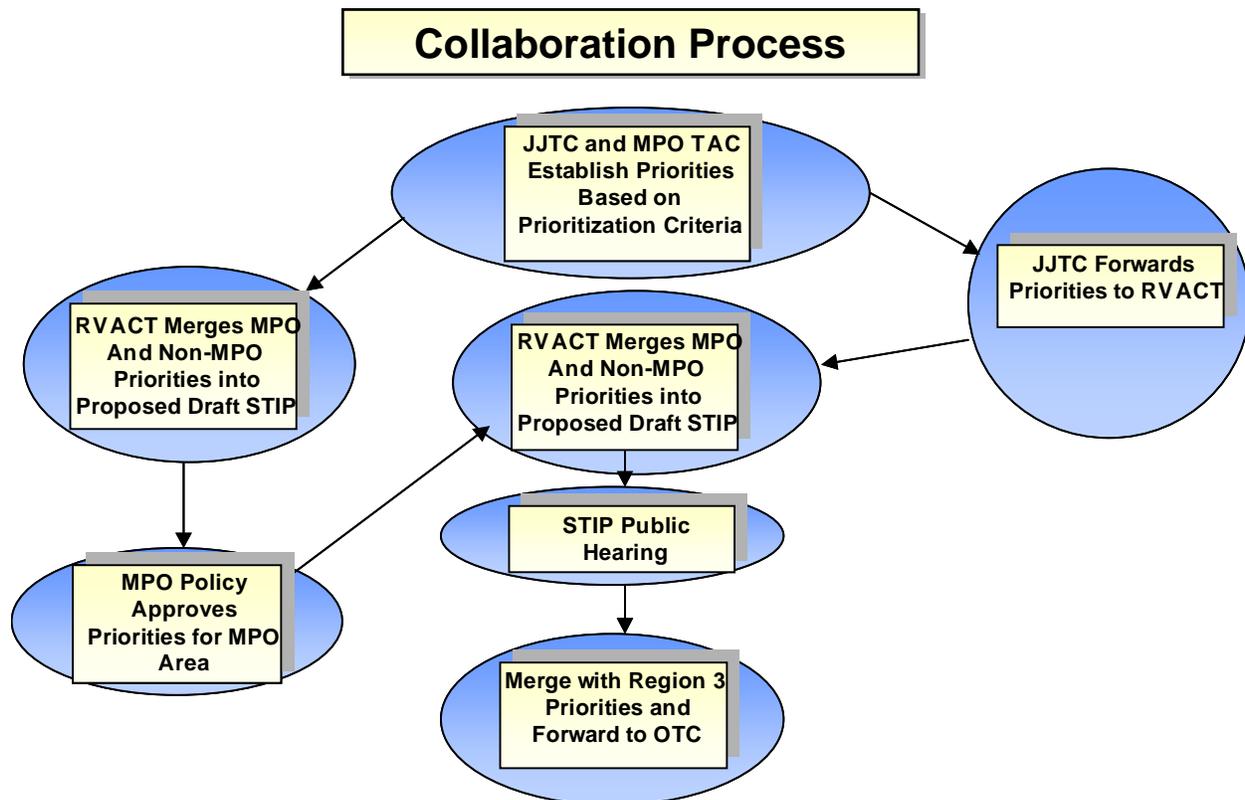
The MPO’s transportation planning process flows to fosters collaboration between its members and stakeholders, including the following:

- Local jurisdictions
- The Rogue Valley Transit District (RVTD)
- MPO Public Advisory Council (MPO PAC)
- MPO Technical Advisory Committee (MPO TAC)
- The Rogue Valley Area Commission on Transportation (RVACT)

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- Oregon Transportation Commission (OTC)
- Jackson Josephine Transportation Committee (JJTC)

This collaboration process is illustrated in the following flow chart.



One of RVMPO's specific goals is to be a coordinating body for multi-modal transportation decisions. They are responsible for the update to the Long-Range Transportation Plan, the development of the Metropolitan Transportation Improvement Plan, the coordination with ODOT, JJTC and RVACT on the Statewide Transportation Improvement Program, technical assistance to member jurisdiction, and transit planning in the RDTD.

RVMPO has a systematic method by which they incorporate safety in their regional transportation plans. Their TIP projects are evaluated using safety as a 15 percent rating criteria. Ten percent of these criteria are based upon an Accident Benefit Cost Ratio developed by ODOT. Five percent is dependent upon whether the project will improve safety. RVMPO also utilizes a number of planning tools including their regional travel demand model, traffic surveys, and data collection in order to develop safety

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countermeasures. They rely heavily upon data from ODOT in order to identify safety problems on state facilities. Recently, however, they have found this ODOT data too general for practical use, and too vague for the development of safety countermeasures. RVMPO has worked with ODOT to fund a project that will help to solve this problem.

RVCOG's Development of Safety and Project Prioritization and Selection Process

As a result of the safety conscious planning forum held in Oregon in June, staff in ODOT's Transportation Safety Division Office set the goal to communicate with Oregon's MPOs regarding safety problem identification and project selection processes. ODOT wanted to ensure MPOs understood methods by which they could utilize the state's data and place safety as a rating criteria in the TIP development.

The update of RVMPO's Regional Transportation Plan calls for the analysis of accidents within the MPO region using geographic information systems (GIS). Currently, the MPO uses accident data provided by ODOT for this analysis. RVMPO staff are not able to convert the ODOT data into something useable in their ArcView GIS system. Accident data input from different sources were incompatible with each other which made efficient integration of the data within the GIS system difficult.

In ongoing discussions with ODOT, RVMPO learned how they could get state funding to develop and test a GIS accident file that will pinpoint exact accident locations. The funding would also be used to develop traffic safety project prioritization criteria and a project selection process modeling ODOT's. Staff at RVMPO stated that ODOT closely assisted them in the development of the grant application. The objectives of the project, as written in their grant application, are as follows:

1. To reduce accidents in the Rogue Valley metropolitan area through identification and reduction of traffic safety hazard locations.

The first project objective is to develop and test a GIS accident file based on ODOT's existing accident data. The stated objective is to coordinate with ODOT's Traffic Safety Division on methods by which the MPO could automate ODOT data for GIS purposes. The success of this task is critically dependent upon the partnership between ODOT and RVMPO.

2. To convert ODOT's accident data into a useable GIS format for analytical purposes.

The second project objective is to take this converted data and conduct an accident analysis of the MPO area. This analysis will then be plotted on GIS maps to display location, type, and frequency of accidents.

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This information will be a foundation for the MPO TAC planning discussions identifying high priority safety projects.

3. To develop traffic safety project prioritization criteria and a project selection process for the RVMPO.

The final project objective is to develop criteria for the prioritization and selection of safety projects. Ideally, this will result in a prioritized list of safety projects that will be recommended to the MPO member jurisdictions and included as an amendment to the regional transportation plan.

RVMPO also proposed to spend some of the grant money reviewing ODOT's and other agencies' programs, tools, and processes related to safety project prioritization and selection in order to understand if some of these practices could be used as a model in the Rogue Valley. RVMPO recognizes the value they can add to their own processes by learning about the efforts of other agencies.

ODOT agreed to fund this project with \$31,500 of Traffic Safety Funds. In addition to assisting with the grant application process and funding the project, ODOT will participate in the collaboration efforts. The success of this type of system is critically dependent upon cooperation not only from ODOT, but also from the jurisdictions hoping to use this data. A Project Coordinating Groups has been established to facilitate this process. Its members include:

- Oregon Department of Transportation,
- Department of Land Conservation and Development,
- Department of Environmental Quality,
- Rogue Valley Transportation District,
- FHWA,
- Jackson County,
- The City of Medford,
- The City of Phoenix, and
- The City of Central Point.

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This project is not yet underway, but the staff at RVMPO estimate the project will start in January 2003. What is critically important is that by working together, ODOT and the RVMPO were able to develop and fund a planning solution to their regional transportation safety problems. They also have plans to work closely together on safety related projects in the future. RVMPO is a model of coordinated safety efforts in transportation planning because it seeks a multi-modal approach and input from partner agencies.

Coordination of Safety Activities at SEMCOG

As the case study on data investment strategies suggests, SEMCOG's (Southeast Michigan Council of Governments) data integration and analysis efforts clearly demonstrate an exemplary approach to integrating safety into the transportation planning process. These types of best practices have enabled SEMCOG to be a leader and establish partnerships with federal, state, and local agencies in order to plan and implement safety improvement projects. This focus on safety has also lead to a number of collaboration efforts that are worth noting. A few of these efforts were highlighted in the case study description included in the data investment strategies section of this report. SEMCOG has facilitated several other safety partnerships that are yielding tangible results. Two of these partnerships are described below.

Elderly Mobility and Safety

In October 1994, SEMCOG hosted one of the White House mini-conferences on elderly mobility and safety to complement President Clinton's White House Conference on Aging. The conference addressed a broad variety of elderly mobility issues, including: health, highway and traffic engineering, elderly housing and land use implications, education and awareness, elderly pedestrians, alternative transportation, vehicles, insurance and licensing, testing, and enforcement.

Several key local and state officials from both the private and public sectors participated in the conference. One outcome of this conference was the establishment of the Elderly Mobility Task Force by the Michigan State Safety Commission, a statutory body chaired then by the Secretary of State, Ms. Candice Miller.

The Elderly Mobility Task Force, made up of members from the public and private sectors, was charged with reviewing the current and future mobility needs of the elderly population in Michigan. SEMCOG chaired this task force that made comprehensive recommendations related to the Michigan aging population. The importance of this task force in alleviating the elderly mobility concerns, particularly the need to preserve the mobility and the choices available to elderly, may be seen in the fact that elderly

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mobility is one of the three safety emphasis areas for the Michigan safety program developed by the Office of Highway and Safety Planning.

Fostering Regional Partnerships that Work – the Freeway Courtesy Patrol

The Freeway Courtesy Patrol was established as a pilot project that provided responsive mechanical and personal assistance to motorists on I-75 and I-94 within Detroit city limits and adjacent communities. The Patrol was implemented by the Alliance for a Safer Greater Detroit and was administered by a coalition of agencies including SEMCOG, AAA Michigan, the Michigan State Police, and the Michigan Department of Transportation. In its first year of operation, the Freeway Courtesy Patrol assisted more than 2,300 stranded motorists. On an average monthly basis, in 1996, the four Courtesy Patrol vans reported over 500 assists. 99.8 percent of surveyed respondents indicated satisfaction with the service they received from the Patrol; and 90 percent said that the Patrol “had definitely influenced their comfort level when traveling on the freeway.” In 1996, the Patrol consisted of four courtesy vans, which traveled I-75, I-94, and M-10 between 6:30 AM and 9:00 AM and between 3:00 PM and 10:30 PM Monday through Friday. Patrol personnel provided services including: repairing flat tires; providing gas/fluids to vehicles; detecting and reporting abandoned vehicles; securing and providing assistance at accident scenes; removing roadway debris, etc.

The Patrol coverage has been increased significantly to cover additional freeways, extended hours of operation and additional vehicles. Additional organizations are also supporting this project.

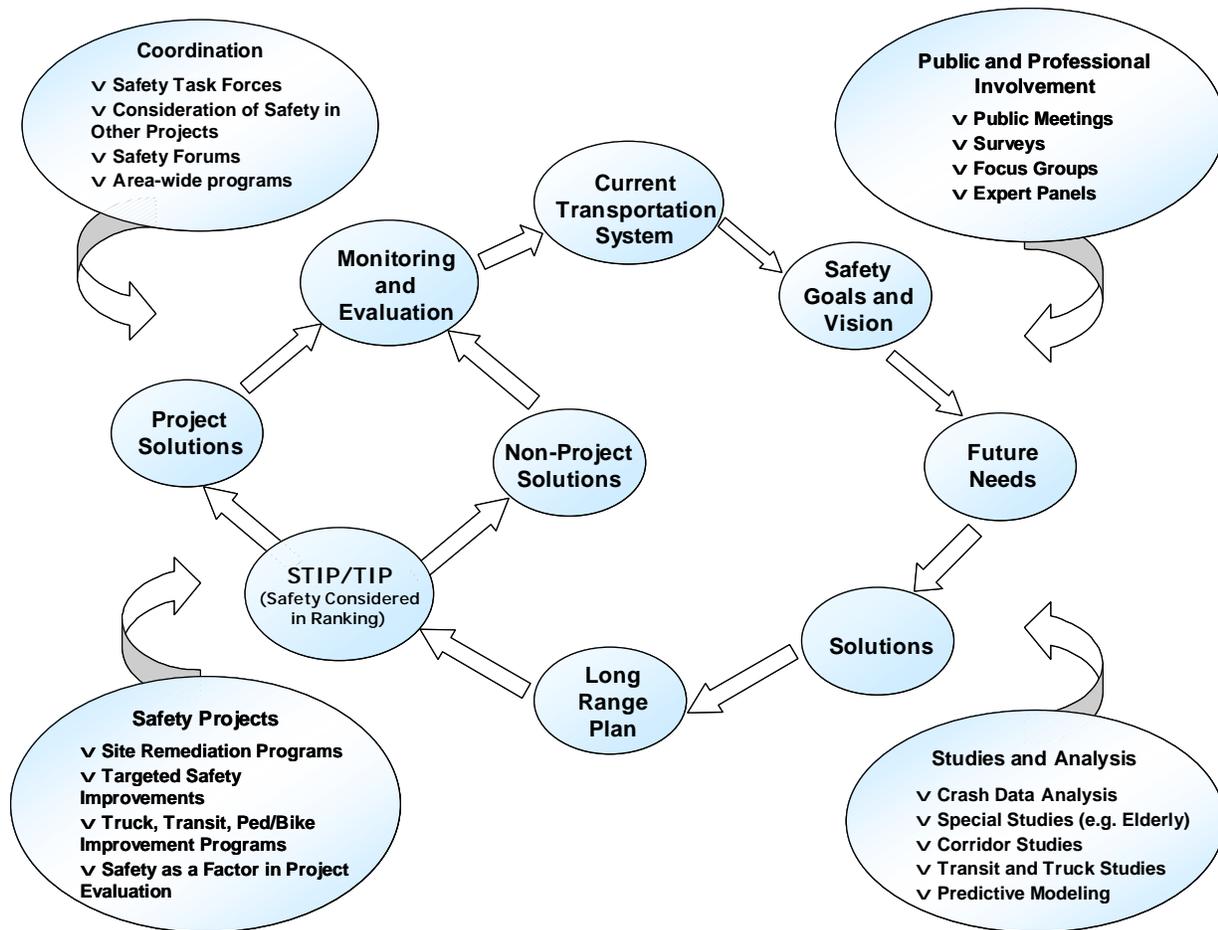
Thoughts and Conclusions

This report identified a few possible approaches to incorporating safety into the transportation planning process. Clearly, the systematic use of data and information is critical to the identification of project solutions. Unfortunately, research shows that the transportation safety community could benefit from some sort of standardized tool that provides clean accident data in a consistent format. MPOs and other planning agencies receive data from a variety of sources, including the state DOT, the department of motor vehicles, and even the highway patrol. However, often this data is inconsistent and too vague to be worthwhile. The case studies in this report document two agencies that have successfully managed their data to create useful information systems for their stakeholders.

In addition, this report suggests that safety cannot be systematically included in the transportation planning process unless all stakeholders in the area are involved. This can be done in a couple of ways, but the conduct of a forum to meet one another and understand each other's program has been one proven method. Another method is the organization of safety task forces for specific problems. Agencies should remember all possible players, to include federal, state, and local agencies as well as advocacy groups, when organizing such task forces. Clearly, this type of method was successful in Rhode Island, where they had both a Walkable Communities conference and organized task forces to identify solutions for pedestrians.

On a more systematic level, the following graphic, developed for the FHWA report "Considering Safety in the Transportation Planning Process," shows methods of incorporating safety considerations in each phase of the planning process. This simplified planning process was taken from FHWA's *Citizen's Guide for Transportation Planning*. As demonstrated by this graphic, there are possibilities for considering safety in all areas and phases of the transportation planning process.

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Observations about Safety and the Transportation Planning Process

Everyone says that they want a safe transportation system, but few people know how to incorporate safety into the transportation planning process. Studies and efforts like the ones highlighted in this report provide a number of good ideas and are very encouraging. But we still have difficulty identifying strategies that address safety concerns and limited ways of measuring the effectiveness of the strategies we do implement. As a result we often get bogged down by the magnitude of the problem and the number of stakeholders affected. There just doesn't seem to be any way we can get all of the players to agree on a specific set of strategies to address a problem everyone agrees needs to be addressed. Additionally, we walk a fine line between the planning of safety activities, and a more focuses safety conscious planning process, as part of the process addresses above.

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Divide and Conquer

As a first step toward an improved process, Troy Costales, the Governor's Highway Safety Representative at Oregon Department of Transportation, promotes a "divide and conquer" approach. This approach takes a large problem and divides it into smaller, more manageable pieces. This is perhaps the best way to implement broad national policy goals. For example, the national goal might be to reduce fatal crashes by 10 percent per year. By itself this may seem like a large goal that is difficult to address. The federal government could try to work with the states to identify a comprehensive plan that will eliminate 4,000 fatal crashes next year. Alternatively, they could equitably divide the goal into target goals for each state and make the states accountable or responsible for their fair share of the solution. Of course, if the federal government passes down the responsibility it also needs to pass down the financial means.

You could continue the concept further. Now the average state is responsible for eliminating 80 fatal crashes next year. A quick assessment suggests that about half of the fatalities in the state happen in urban areas and half are rural and truck related. Using the divide and conquer method of collaboration, the state could take responsibility for reducing rural and truck crashes and the MPOs can be made responsible for reducing urban crashes. Assuming the average state has about 8 MPOs, this makes the average MPO responsible for eliminating 5 fatal crashes next year.

At the MPO level the national goal seems manageable. It might be relatively easy for the MPO to identify a few problem intersections, make a few operational improvements, and reduce fatal crashes. This could actually be a very popular program at the local level. Alternatively, a different MPO might decide to invest their share of the federal money in a media campaign to reduce drunk driving. This approach may be just as effective as the engineering solution in reducing fatal crashes in the urban area. The point is that each MPO develops their own strategy for addressing their target. They could identify a solution independently or work together with the state or other MPOs to identify coordinated strategies. In the end, the whole nation is collaborating on a common goal through hundreds of locally defined solutions.

Developing a Planning Capability

The divide and conquer approach can work well at getting a process going, but it will eventually produce diminishing returns. After a few years of addressing obvious or simple problems (i.e., the low hanging fruit), it will be increasingly difficult to identify strategies to reduce fatalities further. At this point, the

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short and long range planning process needs to pick up the slack. This, of course, can't happen overnight. A planning capability needs to be developed and nurtured over time before it can be effective.

Part of an effective planning capability is developing the tools and skills to evaluate safety issues. The other part is developing a way for stakeholders from a wide array of disciplines and perspectives to communicate effectively and work together to address mutual goals. That is not to say that all goals and objectives are shared in common. A productive planning process identifies common goals and encourages mutual respect for the individual goals each stakeholder brings to the table.

For example, a safety planning committee may include a traffic engineer and a member of MADD (Mothers Against Drunk Driving). The committee has a common goal of saving lives, but the traffic engineer has the additional goal of facilitating traffic flow. The MADD representative may not be overly concerned about traffic flow as long as she can keep drunks off the road. The point is they both agree that saving lives is important and they both agree to respect and eventually value the variety of perspectives others bring to the table. In most cases this respect must be earned over time through personal experience. It is not the same as saying, "I respect your opinion, but..." It is truly believing the other person's opinion is important and that by considering their perspective the eventual solution will indeed be better.

Planning versus Programming

One of the difficulties in incorporating safety into the transportation planning process is reconciling the differences between planning and programming. Planning is developing solutions to current and future problems. Programming is the implementation of a specific solution. Most transportation planning is done with a long-term perspective (20-25 years). The Transportation Improvement Program (TIP) is the mechanism by which elements in the long-range plan are programmed for implementation. This process works reasonably well for major capital investments, but it tends to hinder safety projects.

Most safety advocates have a relatively short-term perspective. "There is no way we can wait 20 to 25 years to fix our safety problems. This would be political suicide if not down right immoral." This is because safety advocates tend to look backwards. "Here are locations where fatalities have happened in the past, let's fix these locations." Or "Alcohol related fatalities by teenagers are increasing; we need to address the problem." From a transportation planner's perspective these are operations and maintenance issues rather than planning issues. That doesn't mean they are not important. It simply means that finding solutions to these types of problems is somebody else's job. This is why safety is always an

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expressed goal in the long-range transportation plan, but there are rarely any projects that specifically address safety issues.

What is needed is some way to help transportation planners think about short-term problems and safety advocates to think about long-term issues. This may require a restructuring of the transportation planning process to add a short-range plan component. The short-range plan is where specific safety and operations and maintenance projects are identified in response to the general goals set forth in the long-range plan. Projects selected for the TIP could come from both the short-range and long-range plans.

If this type of structure were implemented, two levels of planning and programming would need to be considered. Safety planning would be needed for the short-range plan and the long-range plan. Programming the projects would also need to be done at two levels. The short-range plan would need to be based on a fixed or negotiated percentage of the overall implementation budget. The TIP would then allocate the long-range and short-range investments to specific program years.

A Short-Range Planning Approach

The fundamental difference between this approach and current practice is that short-range planning would need to take on a multi-modal regional perspective. In current practice most short-range project planning is done by modal agencies (i.e., the highway department, or the transit agency, etc.). Each agency has a budget and they fit their projects into this budget. They submit the program to the MPO for integration into the TIP. The MPO demonstrates how the projects are consistent with the long-range plan and conform with air quality targets, and approves the program.

Safety, like air quality, is difficult to dole out to modal agencies to address. Many safety projects may be mode specific, but a comprehensive and coordinated safety plan is likely to include a number of elements that cut across multiple agencies and multiple organizations within a given agency. If the solutions are left to each group, they are less likely to achieve the overall safety goal in a cost-effective way.

As an illustration of this issue, consider the following chart from the Safety Conscious Planning Leadership Conference. A given safety objective can be approached from a number of perspectives. The approach may include various combinations of education, enforcement, and/or engineering solutions. It could also focus on the roadway/guideway, vehicle, and/or driver/person. From a safety perspective, the most cost-effective solution is often driver education programs and the least cost-effective solution is roadway engineering improvements.

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| | Roadway | Vehicle | Driver |
|-------------|------------|----------|--------|
| Education | \$\$\$ | \$\$ | \$ |
| Enforcement | \$\$\$\$ | \$\$\$ | \$\$ |
| Engineering | \$\$\$\$\$ | \$\$\$\$ | \$\$\$ |

Since the current project implementation process focuses on facility development, the simplest and most straightforward way for a given agency to address safety is through engineering improvements. It is very difficult for a modal agency to justify investments in non-facility, non-engineering programs. This means that some other organization with a broader regional or statewide perspective would need to take responsibility for non-facility solutions. This might be the MPO. It could also be a division within the State DOT that is specifically responsible for managing safety projects. This organization could then distribute the projects and related funding to the facility engineers, law enforcement agencies, public relationships departments, or private organizations as specified by the plan.

Identifying Safety Problems and Solutions

Assuming the institutional barriers can be addressed, safety planning still faces all of the issues associated with getting people from a wide variety of backgrounds and perspectives to identify the best solution to a given problem. This, of course, assumes that you know what the problems are. Simply quantifying the problems can be a major task. Once a problem is identified, the issue becomes one of locating the problem and determining the cause of the problem. For example, are the fatal crashes caused by a faulty geometric design or is it a behavioral issue? If its behavior related, an engineering fix won't solve the underlying problem.

It is at this point that the planning process needs to decide if safety problems will be addressed as separate issues or incorporated into other goals and objectives. Is safety an independent criteria or a component of an overall evaluation? How are safety projects or safety components of larger projects prioritized, weighted, and evaluated? This is not simply quantifying the value of a person's life. It is also having some basis of saying if we pursue a given strategy, what is the probability that someone's life will be saved? It is much more difficult to prove that implementing a non-engineering solution will save lives.

If you add to the potential liability issues, planning can become a dangerous proposition. If we know that there are safety problems at a given location, but we don't immediately address the problem or we try to

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address the problem with a non-engineering solution, and someone else dies, is the agency liable for that person's death? Issues such as these are making a number of state DOTs very reluctant to share their traffic accident data with local governments and safety planning groups. If the data becomes public, it could open a new set of issues that the state has no hope of satisfactorily addressing. How many deaths does it take at a given location before the public demands immediate action? Should a short-term or long-term solution be implemented? How would the solution be funded?

A Long-Range Planning Perspective

Given the magnitude and emotion associated with existing safety problems, it is extremely difficult to get safety advocates interested in long-range planning. This is particularly unfortunate because long-range planning has perhaps the greatest potential for significant safety benefits. The planners can study trends and identify problems before they become problems. The range of solutions is significantly increased and the potential effectiveness of a given strategy is improved.

As a result, long-range safety plans will naturally focus on people more than facilities. There is some potential in being able to predict where fatalities will happen in the future based on estimates of traffic volumes and roadway conditions, but long-range solutions to these types of problems are difficult to incorporate into a long-range plan. The best that can be done is to say that a number of intersections should be signalized or grade separated at some point in the future.

The more likely scenario is to look at the growth trends of various segments of the population and estimate the likelihood that the area will experience more fatalities of a given types. For example, the percentage of the population who are elderly in the future is expected to increase significantly. Is this likely to create safety problems that currently don't exist or don't exist as often? What can be done over the next ten or twenty years to minimize the problem or reduce the likelihood that crashes by this segment of the population will result in fatalities? Should we make traffic signs larger? Should we reduce speed limits? Should we put greater emphasis on ensuring that elderly drivers are physically capable of driving? Should we invest in more public transportation services to reduce the need for elderly people to drive? Should we invest in vehicle technologies that provide greater driver protection or additional warning systems? The options are endless, but few if any of them will actually be implemented unless we look at safety from a long-range planning perspective.

Conclusion

The safety of our transportation system needs to be a higher priority in our short-term planning and programming and our long-term thinking. Integrating safety into the existing transportation planning and programming process is not necessarily easy, but it must be done. This may require changes in the way we think about planning. It may also require changes in the way we think about safety. Getting to the point where safety is fully integrated and integral to the transportation planning and decision-making process will take some time. As this report demonstrates, a number of agencies have successfully started down this road. Their experience will be helpful in moving the rest of the industry in this important direction. Incorporating safety into the transportation planning process is a good thing, and because it is a good thing, we will eventually get there. In this case, getting there as soon as possible is highly desirable.

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