INCORPORATING SAFETY INTO TRANSPORTATION PLANNING AND DECISION MAKING IN MID-SIZED METROPOLITAN AREAS

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SUMMARY

Motor vehicle fatalities and crashes are a leading public health problem in the United States. Many of these crashes involve speeding, collisions with fixed objects or drugs and alcohol and may be preventable. Reducing the number of injuries and fatalities on our transportation system will reduce the human and economic costs associated with these crashes. Safety is an important concern for the transportation system for many reasons and, therefore, should be an integral part of the transportation planning process.

Mid-sized metropolitan areas face very different challenges and transportation planning issues than those faced by larger metropolitan areas. This is especially true in the area of safety conscious planning (SCP). Metropolitan areas are where most Americans live and work. More strategic consideration of safety can improve the overall quality of the transportation system and prevent these cities from developing greater safety problems as they experience growth. Conflicting organizational cultures and limited staff and technical tools are major challenges in SCP efforts for mid-sized metropolitan areas (200,000 to 600,000 population).

This research effort surveyed mid-sized metropolitan planning organizations (MPOs) and conducted seven case studies of mid-sized metropolitan areas to better understand the challenges and opportunities facing SCP in such a context. The national survey and case studies focused on long range planning, data collection, human resources, technical analysis, and collaboration aspects of SCP as applied today.

The results indicate that the majority of mid-sized MPOs have incorporated safety consideration into their long range transportation plans' vision, goals and objectives, but

some mid-sized MPOs are more proactive in the quantitative analysis of project safety outcomes than others.

The dissertation recommends that the institutional and technical issues faced by mid-sized MPOs can be overcome by engaging government at all levels of planning in SCP efforts, identifying a safety champion in the management ranks, encouraging state departments of transportation to provide mid-sized MPOs with more tools and training in SCP, promoting a stronger relationship between the Governor's Safety Representative and the MPO, and creating a more comprehensive forum for collaboration among safety professionals.

CHAPTER 1

INTRODUCTION

Motor vehicle fatalities and crashes are a leading public health problem in the United States. In 2006, motor vehicle crashes claimed the lives of 42,642 people and injured approximately 2.6 million people. That is a fatality rate of 1.42 deaths per 100 million vehicle-miles traveled (National Highway Traffic Safety Administration 2007). This rate has changed very little during the past decade. In 2000, the staggering costs of crashes for the public was estimated to be more than $230.6 billion annually (National Highway Traffic Safety Administration 2005). Many of these crashes involve speeding, collisions with fixed objects, drugs and alcohol, etc. and may be preventable.

Motor vehicle crashes are the leading cause of injuries, the sixth leading cause of death, and the single largest cause of death for people ages 4 to 33 (Centers for Disease Control 2005). If this trend continues, the safety of America's transportation system should become an even greater priority for the general public, planners, lawmakers, and advocacy groups. Improving transportation safety can help alleviate a growing number of health, financial, and quality-of-life issues for the general public. Reducing the number of injuries and fatalities on our transportation system can reduce the costs associated with these crashes and address a major public health issue.

Safety is an important concern for the transportation system for many reasons and, therefore, should be an integral part of the transportation planning process. Transportation safety is directly influenced by the design, construction, operation and maintenance of the transportation system. Transportation planning is a vehicle for change

in the transportation system, therefore, safety should be considered during the planning process.

Transportation safety also affects the operations of the transportation system. Congestion has become a major issue for many states and metropolitan areas, and vehicle crashes are a major source of congestion. Motor vehicle crashes also exhaust emergency services and law enforcement resources. Integrating safety considerations into the transportation decision-making process may provide opportunities to improve the transportation system from an operational standpoint.

Due to the complex nature of transportation safety issues, a comprehensive safety program is necessary to address various transportation planning challenges. The development of a comprehensive safety program requires the support of multiple agencies and groups. The transportation planning process could provide a forum for the coordination of safety stakeholders and the development of a comprehensive safety program.

Finally, transportation planning has been governed by federal mandates on the factors that should be considered in the planning process. In 1998, Congress passed the Transportation Equity Act for the 21st Century (TEA-21), which marked the first time federal legislation focused on transportation safety as a specific goal for transportation planning. TEA-21 required that "[e]ach statewide and metropolitan planning process shall provide for consideration of projects and strategies that will increase the safety and security of the transportation system for motorized and non-motorized users" (United States Department of Transportation 1998b).

The latest federal transportation legislation, the Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users or SAFETEA-LU, builds upon the principles, values, and achievements of TEA-21. For the first time, safety and security of the transportation system are now separate planning factors to be considered during both the metropolitan and statewide planning processes. SAFETEA-LU mandated that each state develop and implement a comprehensive strategic highway safety plan (SHSP). SAFETEA-LU provides incentives for passing primary safety belt laws, a reduction in highway fatalities and injuries, and greater flexibility to state and local governments to use funds consistent with a comprehensive strategic highway safety plan. This is an important concept because it is believed that local and regional transportation challenges can be more effectively addressed if metropolitan areas have greater say in the design and implementation of transportation policy (Puentes and Bailey 2003). This idea holds true for safety issues facing metropolitan planning organizations (MPOs). By involving MPOs in policy issues related to safety, these challenges could be addressed early in the transportation planning process and by the decision makers that understand the region best.

1.1 Research Goals and Objectives

The goal of this research is to apply and assess a framework to incorporate safety into the transportation planning process of midsized MPOs. A midsized MPO has been defined as 200,000 to 600,000 in population for the purpose of this research. This range was selected to include MPOs that are designated Transportation Management Areas (TMAs) (at least 200,000 in population) and the maximum population of 600,000 was selected to target MPOs that are not considered major metropolitan areas.

The National Cooperative Highway Research Program (NCHRP) 8-44 has published a guidebook for the incorporation of safety into transportation system planning (Washington et al. 2006). A framework is provided for assessing the level to which safety has been incorporated into a municipality's planning process and ultimately influencing the safety performance of the transportation system. The guidebook mainly targets state Departments of Transportation (DOTs) and large metropolitan areas that have well-established metropolitan planning organizations (MPO). Little attention was paid to midsized metropolitan areas, which have a special set of issues associated with incorporating safety into the planning and decision making processes. More details regarding this assessment framework will be discussed in Chapter 2.

Although urbanized areas of more than 50,000 are required to have an MPO, many of these midsized MPOs are relatively new and do not have the technical resources and experience in data collection that characterize larger, more established MPOs. Midsized MPOs often have more limited resources for conducting transportation planning. Many midsized MPOs have limited safety data available for analysis, and do not have many resources to collect and analyze safety data. In addition, the organization of newly established MPOs is often very different from those of more established MPOs of larger metropolitan areas.

This research will: 1) examine the characteristics of transportation planning in midsized MPOs, 2) investigate the application of the NCHRP framework, and 3) modify the existing framework to specifically address the needs of midsized cities in incorporating safety into the planning and decision-making structures. The modified framework will allow midsized MPOs to carefully evaluate the areas in which safety

should be more carefully incorporated into the planning process early on to improve the safety and efficiency of the transportation system for their areas.

1.2 Research Questions

The methods and practices involving safety planning in midsized MPOs have not been examined comprehensively. The development of a revised framework to suit the needs of midsized MPOs requires the investigation of several research questions:

- What are the characteristics of transportation planning in midsized MPOs?
- What methods or practices are midsized MPOs currently using to incorporate safety into the transportation planning process? What challenges do they face in this endeavor? How can these challenges be mitigated?
- How can midsized MPOs better incorporate safety into the transportation process? How can they monitor safety performance and better develop safety considerations comprehensively?
- How should the assessment framework be modified to reflect the planning characteristics of midsized MPOs?

These questions relate to how midsized MPOs factor safety into their transportation planning process, what safety considerations are deemed important, and who is responsible for investigating and informing decision makers of safety issues. The data collection and processing methods used by MPOs to determine safety-related goals is also an important area to explore. What performance measures are MPOs using to monitor their transportation system? How is safety incorporated into the project selection process? What type of collaboration is in place to ensure that safety decisions are addressed in a timely manner and with the cooperation and input of all safety

stakeholders? What are the barriers to further incorporation of safety in the planning process? Do State DOTs encourage and support the incorporation of safety into the planning process of midsized MPOs?

1.3 Methodology

This research effort uses a combination of a multiple-case study approach and a web-based survey to identify the factors that are most important in the integration of safety into the planning and decision making process of midsized MPOs. The results of the survey and case studies are used to develop a revised safety incorporation framework for midsized MPOs.

The case studies consist of a battery of questions that explore the safety conscious planning practices of MPOs. The questions survey the level of safety incorporation in the MPOs' long range transportation plan, the safety data and technical analysis issues faced by the MPO and the methods used by the MPO to bring safety professionals together to resolve problems.

The NCHRP guidebook is used as a guide in applying and assessing a framework to specifically target midsized MPOs. Seven midsized MPOs are selected for in-depth case studies. The case studies consist of document review and structured interviews with planners, engineers, and law enforcement. A comprehensive assessment of the safety-related factors the agencies consider during the decision making process is determined.

A web-based survey of midsized MPOs nationwide is also conducted to determine the special challenges midsized MPOs face when incorporating safety into the planning process and the current level of policy basis and procedures or methods for incorporating safety considerations into the planning process of the MPOs. The

information collected in the survey is used to identify the safety-related planning issues that the case study interviews should more comprehensively examine.

The findings of the case studies and survey are used to develop a modified framework that addresses the issues of midsized MPOs in safety planning. As a final step, the revised framework is reviewed and evaluated by a focus group made up of midsized MPO representatives and other planning officials familiar with regional planning. This step provides an evaluation of the effectiveness of the modified framework and recommendations.

1.4 Relevance of Research

With the signing of SAFETEA-LU, it is more important than ever for MPOs to plan strategically for safety improvements. Metropolitan areas are where most Americans live and work. More strategic consideration of safety can improve the overall quality of the transportation system and prevent these cities from developing greater safety problems as they experience growth.

Historically many MPOs have not looked at safety seriously. The reasons for this are many:

- Many MPOs find it challenging to fund safety projects because the majority of MPOs' funding sources are for capital projects. This problem makes it difficult to fund safety projects unless they are tied to a capital project. MPOs have limited discretion over federal and state funds. State DOTs are required to sub allocate a small percentage of funds directly to MPOs.
- The politics of transportation planning often impede the inclusion of safety considerations in the planning process. Congestion mitigation is a politically-

charged transportation problem and thus receives great attention from both lawmakers and the general public. Congestion is a problem that people face daily while safety issues affect isolated individuals. Safety projects often fall short of the attention needed for projects to successfully navigate the planning process.

- Some MPOs do not have the professional staff capabilities to comprehensively address safety challenges. There is often a mismatch between safety issues and the professional capacity needed to analyze and evaluate them.
- The planning horizon of MPOs is typically long term (i.e. 20 to 30 years) or futuristic. MPOs do not have the methodology, tools, or modeling capacity to evaluate and predict safety in the future.
- A comprehensive safety program includes engineering, education, enforcement, and emergency services. Historically, MPOs have focused on engineering responsibilities. It is necessary for MPOs to partner with law enforcement, emergency management, and public agencies responsible for safety education. The transportation planning process must combine all of these efforts.
- Safety is often viewed purely as an operational issue. Typically MPOs do not oversee operations. These responsibilities are traditionally handled by State DOTs and local jurisdictions.

The aforementioned challenges are characteristics of MPOs of all sizes. However, midsized MPOs must deal with these challenges and additional problems such as lack of

human resources, dual responsibilities of MPO staff, and a deficiency in technical tools needed to enhance safety conscious planning.

Fatalities and injuries due to highway crashes are a major public health issue. However, by comparing crash statistics to crime statistics or by comparing the cost of congestion to the cost of highway crashes, it becomes painfully obvious that this problem is not only a public health issue, but also a major economic problem.

It is interesting to note that both crime and congestion are major public concerns that often find their way into political debates and legislation. But for some reason, the public does not concern itself with transportation safety the way it does with public safety. This may be due to the fact that crashes are generally considered unintentional wrongdoing while crime is intentional.

There are also other reasons to make transportation safety a major public issue. For example, congestion is often caused by or made worse by crashes that impede the flow of traffic. Improving the safety of the transportation system would lead to fewer crashes and less congestion. Decreasing the number of crashes would also increase the likelihood that incidents could be cleared from the roadway sooner leading to fewer delays as a result of crashes.

It is also possible that midsized metropolitan areas stand to benefit greatly from a reduction in vehicle crashes and a safer transportation system. A recent study has shown that cost of crashes with respect to the cost of congestion is quite large in midsized metropolitan areas whereas this ratio is typically much closer to one for large metropolitan areas (Herbel et al. Undated). This result suggests that the cost of crashes is

much greater than the cost of congestion in midsized metropolitan areas while in large metropolitan areas, the costs are near the same with a one-to-one ratio.

The safety characteristics of any transportation system must be strategically planned and monitored. One way of doing this is to integrate safety into each phase of the transportation planning process. In many cases, safety is considered after the project or facility is constructed and in operation. This allows mistakes in the planning and design stages to be repeated because problems are not addressed in a proactive manner. By handling safety issues in a reactive manner, many lives are lost unnecessarily, and a great deal of money and time is wasted.

Finally, many may believe that adding safety as a specific target in the transportation planning process implies that safety is not a "built in" factor for all facilities and projects. Many agencies may hesitate to develop specific safety factors in its planning process for fear of failure in meeting those aims and thus opening the agency to possible litigation.

All of these issues deserve considerable attention and offer some insight to the problems involved. This research will identify the most common challenges midsized MPOs face in safety conscious planning and develop a set of recommendations to enhance the consideration of safety in the transportation planning process.

1.5 Organization of Dissertation

This dissertation is divided into seven chapters. Chapter 2 discusses the context of the research questions identified by this work. It explains the circumstances and facts that make this research important. This chapter also identifies the initial assumptions that served as the point of departure for this research. Chapter 3 includes a comprehensive

review of the literature related to the incorporation of safety into the transportation planning process. This review discusses the definition of safety conscious planning and the current state of practice. The progression of safety-related transportation legislation is also reviewed in this chapter.

Chapter 4 describes the methodology of the research. This chapter discusses the case study selection process, the components of the data collection process, and the methods by which the researcher analyzes the data. The strengths and weaknesses of the research methodology will also be discussed.

Chapters 5 and 6 present the research results. Chapter 5 discusses the data collected from survey instrument and Chapter 6 discusses the data collected during the case study interviews. Chapter 7 introduces the revised framework and recommendations developed as a result of this research.

CHAPTER 2

CONTEXT

2.1 Safety Conscious Planning

Safety conscious planning (SCP) is a proactive approach to the reduction and prevention of motor vehicle crashes and unsafe transportation system conditions by integrating safety considerations into the transportation planning process at the federal, state, regional and local level. An important aspect of safety conscious planning is the inclusion of safety considerations in the Long Range Transportation Plans (LRTP) and Transportation Improvement Programs (TIP) developed by metropolitan planning organizations (MPOs).

2.2 NCHRP 8-44

An important aspect of SCP that needs special attention is guidance in incorporating safety into the planning and decision making process. A framework that serves as a guide for State DOTs and MPOs to incorporate safety into the planning process has been developed by researchers (NCHRP Report 546) (Washington et al. 2006). This framework does not adequately address the unique challenges midsized MPOs face when enhancing the consideration of safety in the planning process. Therefore, this research will modify the existing framework created in NCHRP Report 546 to specifically address the needs of midsized MPOs in the incorporation of safety into the transportation planning process.

2.3 SCP in Mid-sized MPOs?

Midsized MPOs have a special set of challenges that differ from the planning issues faced by large MPOs. Institutional issues, availability of safety data, and adequate project funding make integrating safety into the planning process difficult. These issues appear in literature about the SCP process (Washington et al. 2006, FHWA Undated). Though these issues are not unique to midsized cities, they are typically more difficult for midsized MPOs to overcome. It is important that these challenges be addressed during the incorporation of safety into the planning and decision making process. The modified framework that will be developed as a result of this research will specifically address these challenges.

2.3.1 Institutional Issues

The institutional framework of the various agencies responsible for safety planning creates an issue for project implementation. Table 2-1 shows some major institutional differences in large and midsized MPOs. Several key issues in SCP serve as challenges to integrating safety in planning and decision making processes at all levels of government. The responsibility for safety planning is split over multiple agencies, which makes collaboration and streamlining of processes addressing safety issues necessary. In many cases, the responsibilities and control over safety planning are not clearly defined. Thus states, MPOs and local governments must make greater efforts to understand each other's goals and capabilities. This complex institutional framework also makes collaboration and the formation of new partnerships among organizations not traditionally involved in safety difficult to cultivate and maintain. Due to the

collaborative efforts necessary in SCP, institutional frameworks present many barriers to SCP implementation.

Table 2-1: Comparison of Large and Midsized MPOs

Large MPOs population > 600,000	**Midsized MPOs population (200,000-600,000)**
larger safety, planning staff	limited safety, planning staff, dual responsibilities to city and MPO
High priority congestion issues	Mobility issues common, fewer congestion priorities
safety data collected in-house; capabilities to improve it	limited access to safety data
large pool of decision makers	smaller group of decision makers
includes various local jurisdictions (i.e., counties)	includes fewer local jurisdictions (i.e., counties)
large-scale educational programs/campaigns	opportunities for small-scale, highly targeted programs/campaigns
Formal, more rigid project selection process that includes many stakeholders	Informal, less rigid project selection process with more involvement from local jurisdictions

The institutional differences of midsized MPOs provide the greatest differences in safety related planning. Midsized MPOs have more limited safety and planning staffs in many cases. Often times safety experts and planners are responsible for multiple roles in an agency to make up for the shortages in planning and safety personnel. The lack of expertise may be due to budget restraints. Newly established MPOs may not have the added support of safety and planning experts. To address these issues, the framework for midsized MPOs must provide strategies for planning and safety personnel to develop safety programs that can be implemented in smaller agencies. In addition, the framework

will provide options for these agencies to create partnerships with organizations that can aid in safety planning and make up for the shortage of personnel. For example, small agencies can employ private consultants to conduct safety-related studies that may be beyond the agencies' capabilities.

2.3.2 MPO Structure

This research requires the examination of the organizational structure of MPOs. The structure under which an MPO operates directly affects the decision-making process. Safety conscious planning must be coordinated with the decision making process for safety to be considered during multiple phases of the planning process. To determine specialized recommendations for medium size MPOs, the typical structure of such MPOs must be analyzed.

MPO organizational structures differ from state to state. Federal regulations do not require MPOs to have a specific organizational structure. The MPO policy board is the only explicit requirement. States may have specific legislation governing the formation and organization of MPOs in addition to the federal regulations.

Seventy new MPOs were created after the 1980 Census and another eleven MPOs were created following the 1990 Census. Smaller, newer MPOs are more likely to be housed within an individual city or county government (Dempsey et al. 2000). In most of the cases studied in this research, the medium size MPO operates within the functions of an individual city or county government. One must wonder if such a structure causes the MPO to be perceived, not as a separate regional entity, but as the city or county government under a different name. The dual roles of city or county planning staff as the

MPO staff also questions whether the decisions made for the region are in the best interest of the entire region or the city or county government.

2.3.3 Availability of Safety Data and Tools

Another challenge midsized MPOs face involves the availability of safety data and technical analysis tools. Although this is an overall challenge to SCP, this issue creates greater limitations in midsized MPOs. More effort needs to be made to promote data sharing. Unfortunately, access to crash data is a major issue because the agencies that collect and maintain the data are reluctant to share data for fear of liability issues (Federal Highway Administration Undated).

The quality and consistency of safety data drives decisions related to safety issues. The data must be processed and analyzed accurately to make decisions that take the safety data into account. Therefore, if an agency's technical analysis tools are limited or not up to date, decision makers cannot make informed choices. There is limited purpose for the data and the outcomes of safety planning are unpredictable if the proper analyses are not available to determine the advantages and disadvantages of various alternatives and strategies.

The collection and analysis of data requires a special set of technical tools and resources. Many local agencies need to provide more technical training for personnel and greater access to data analysis tools. The revised framework offers strategies agencies can use to obtain quality data. The adapted framework provides advice on collaborative efforts that may aid in improving data processing and analysis techniques.

2.3.4 Project Funding

Project funding is another important SCP challenge. Project prioritization is a controversial issue due to the fact that transportation funding is in high demand. Safety projects must compete with other goals key decision makers prioritize as more important (Federal Highway Administration Undated). Many safety issues require immediate attention and limited funding sources are available in the short term. Another issue is the categorical allocation of funds for transportation projects. Funds are often designated for specific types of projects, and flexibility in how the funds are spent makes collaborative efforts difficult.

2.3.5 Advantages in SCP

Though midsized MPOs have greater challenges in SCP than larger MPOs, there may be advantages to their size. Midsized MPOs have opportunities for localized educational programs and safety campaigns that may be more effective in a midsized city than large metropolitan areas. The educational programs and safety campaigns can target the needs of citizens and conducted in locations that appeal to the region's citizens. Educational programs can target a smaller, more precise group of participants and can be specialized to suit the needs of the community. Safety campaigns can be designed to make safety a community effort with programs and campaigns that involve the activities and issues of the community.

Nontraditional collaboration with safety professionals can be considered in midsized MPOs. Relationships can be forged with a unique group of safety stakeholders due to the size and simplicity of the midsized MPOs institutional structure.

Last, the benefits of incorporating safety into the planning and decision making process of midsized metropolitan areas may be more readily noticed than in large metropolitan areas. A recent American Automobile Association (AAA) study has shown that the cost to society of motor vehicle crashes in large metropolitan areas is approximately the same as the cost of congestion while the cost of crashes in midsized metropolitan areas is far greater than the cost of congestion (Herbel et al. Undated). The study estimates the cost of crashes with respect to the cost of congestion in metropolitan areas of various populations. The ratio is quite large in midsized metropolitan areas whereas this ratio is typically much closer to one for large metropolitan areas. Table 2-2 shows four examples of the concept.

Table 2-2: Ratio of Cost of Crashes to Cost of Congestion

Metropolitan Area	Population	Ratio*
Los Angeles, CA	12,500,000	1.03
Detroit, MI	4,050,000	2.31
Charlotte, NC	725,000	8.08
Akron, OH	590,000	12.46

*Ratio = cost of crashes/cost of congestion
Source: Herbel et al. Undated

Mid-sized MPOs gain a greater economic benefit from reducing motor vehicle crashes than from reducing congestion. Reducing motor vehicle crashes in a large metropolitan area has a near equal benefit as reducing congestion on roadways. This suggests that midsized metropolitan areas stand to benefit greatly from a reduction in motor vehicle crashes and a safer transportation system. Larger MPOs often have to

address congestion issues first and place less emphasis on safety strategies. This is due in part to the fact that citizens pressure planners and lawmakers to ease congestion. Therefore the benefits of SCP are realized to a greater degree.

2.4 Framework for Integrating Safety into Transportation Planning and Decision Making

NCHRP 8-44, "Incorporating Safety into Long-Range Transportation Planning" conducted surveys and case studies to determine how agency officials currently handle planning for safety. The results of the study found that safety was often considered to be a concept that is best handled during the project design process or the responsibility of enforcement agencies (Washington et al. 2006). In the past, most agencies have given limited or no consideration to how safety can be considered during the early stages of the planning process. The framework developed in the NCHRP Report 546 assumes that "incorporating safety considerations and strategies into the transportation planning process includes not only a consideration for safety-related capital projects and system operations strategies, but also a concern for public education, enforcement, and emergency response to incidents". The NCHRP Report 546 concludes that considering safety in transportation planning in a more comprehensive and effective manner can take place with significant consequences.

The NCHRP Report 546 provides a comprehensive framework for the incorporation of safety into the transportation planning process. The guidebook offers tools and approaches for transportation practitioners and decision makers that can be used to achieve greater consideration of safety in the transportation planning process. The framework highlights major elements and tasks that are instrumental to the development

of a more safety conscious planning process. Information is presented on different types of analysis tools and methods that can be useful in developing a better understanding of safety issues. Finally, the guidebook offers a checklist of questions that agency officials can use to determine the level of consideration of safety in the planning process.

The NCHRP Report 546 suggests answering the following questions to assess whether the transportation planning process currently in place considers safety in a meaningful way:

- Does the vision statement for the planning process include safety?
- Is there at least one planning goal and at least two objectives related to safety?
- Are safety-related performance measures a part of the set being used by the agency?
- Are safety-related data used in problem identification and for identifying potential solutions? Are safety analysis tools used regularly to analyze the potential impacts of prospective strategies and actions?
- Does the evaluation criteria used for assessing the relative merits of different strategies and projects include safety issues?
- Do the products of the planning process include at least some actions that focus on transportation safety?
- To the extent that a prioritization scheme is used to develop a program of action for an agency, is safety one of the priority factors?
- Is there a systematic monitoring process that collects data on the safety-related characteristics of transportation system performance, and feeds this information back into the planning and decision-making process?

- Are all of the key safety stakeholders involved in the planning process? (Washington et al. 2006)

2.5 Steps to Incorporating Safety into Transportation Planning

There are many different stages in the planning and decision making process where safety considerations can be incorporated. If safety is integrated into the planning process at the correct phases, more decision making emphasis can be placed on safety-related strategies and projects. Though incorporating safety considerations into every phase of the planning process is ideal, it is likely that even incorporating safety into a few elements of the planning process can greatly influence the decision-making outcomes.

The NCHRP Report 546 provides steps to enhance the safety considerations in various components of the planning process and questions to consider when assessing the level of safety considerations. Midsized MPOs can use this framework as a basis for safety planning, but several important changes are necessary to enable midsized MPOs to enhance safety conscious planning. In some cases, more basic questions are needed. These changes are discussed with each step of the planning process.

2.5.1 Step 1: Incorporate Safety into the Vision Statement

The transportation planning process begins with the establishment of a vision. A vision statement is a general description of community's character. The vision statement for a community communicates what the community desires to be in the future. It also communicates what it desires for its transportation system. Transportation safety should be incorporated into the transportation system performance element of the vision statement.

The visioning process involves engaging the community in discussion of the characteristics of the community and transportation system they wish to see in the future. The development of the vision statement sets the stage for the focus of the planning process and allows decision makers to understand what needs to be considered when analyzing and evaluating the transportation alternatives under consideration. Some considerations include:

- Is safety incorporated into the current vision statement of the jurisdiction's transportation plan? If not, why not?
- Is safety an important part of the mandates and enabling legislation of key agency participants in the planning process?
- Is safety an important concern to the general public and planning stakeholders? If not, should it be?
- How is safety defined by the community?
- What type of information is necessary and desired to educate the community on the importance of a safe transportation system? (Washington et al. 2006)

The development of a vision statement is driven by the involvement of the community. Midsized MPOs may have more opportunities for greater involvement of transportation professionals in the visioning process. Due to midsized MPOs' lack of resources on many occasions, the visioning process may need additional questions that address ways to improve community involvement since consultants are often retained for plan updates.

2.5.2 Step 2: Incorporate Safety into the Set of Goals and Objectives

A set of goals and objectives is developed to communicate specific information and guidance on what the planning process should accomplish. The goals and objectives communicate to the community what the transportation planning process is working to achieve. Specific safety goals should be included in the goals and objectives to target important safety considerations.

Safety goals and objectives can be made specific by including targets that reduce rates of fatal and serious injury crashes, drug and alcohol related crashes, pedestrian and bicycle related injuries and fatalities, school-zone crashes, and emergency response times to motor vehicle crashes. Specific targets can provide guidance and motivation to engineers, planners, and law enforcement to strive to achieve safety goals. The following are questions decision makers should ask when determining how safety is incorporated into their goals and objectives:

- Is safety incorporated into the current goals and objectives set of the jurisdiction's transportation plan? If not, why not? If so, what, if anything, needs to be changed in the way safety is represented?
- How does the safety goal relate to the community understanding of safety as discovered through the vision development process?
- Does the safety goal lead only to recommended project construction and facility operating strategies, or does it also relate to strategies for enforcement, education and emergency service provision?
- Does the safety goal reflect the safety challenge of all modes of transportation, that is, is it defined in a multi-modal way?

- Are there goal-related objectives that provide more specific directions of how the goal is going to be achieved? Are these objectives measurable?
- Do the objectives reflect the most important safety-related issues facing a jurisdiction?
- Can the desired safety-related characteristic of the transportation system be forecasted or predicted? If not, is there a surrogate measure or characteristic that will permit one to determine future safety performance?
- What type of information is necessary and desired to educate the community on the importance of a safe transportation system as it relates to planning goals and objectives?
- If target values are defined in objective statements (for example, fatal and serious injury crashes will be reduced by 20%), have these targets been vetted through a technical process that shows that the target value can be reached? (Washington et al. 2006)

Safety goals and objectives are an important beginning for the integration of safety into the planning process for all MPOs. It is likely that many midsized MPOs include safety in their goals but may fall short of actually developing objectives to accomplish these goals and performance measures to assess progress toward the goals. If target values are not possible, the plan can at least list general engineering, enforcement, education and emergency service strategies that will be used to enhance safety planning.

2.5.3 Step 3: Incorporate Safety into System Performance Measures

To determine the extent to which targeted goals and objectives are being achieved, performance measures should be developed. Performance measures are used to monitor the characteristics of system performance and assist decision makers in determining what data should be collected. The development of performance measures should take into consideration the safety data available. In other words, they should be based on existing data and methods if possible. The performance measures should also be monitored continuously over time that they might be most beneficial to decision makers. In addition, the number of safety-related performance measures should be limited to the most important measures because developing too many measures can make it difficult, if not impossible, to assess the consequences of implementing safety programs. The following questions can help determine how well safety is incorporated into performance measures:

- What are the most important safety-related characteristics of the transportation system that resulted from community outreach efforts to date? If performance measures are used, are these characteristics reflected in the articulated set of performance measures?
- Will the safety performance of the transportation system (as defined in the performance measures) likely respond to the types of strategies and projects that result from the planning process? That is, are the performance measures sensitive enough to discern changes in performance that will occur after program implementation?

- Is the number of safety performance measures sufficient to address the safety concerns identified in the planning process? Alternatively, are there too many safety measures that could possibly "confuse" one's interpretation of whether safety is improving?
- Does the capability exist to collect the data that are related to the safety performance measures? Is there a high degree of confidence that the data and the data collection techniques will produce valid indicators of safety performance? Who will be responsible for data collection and interpretation?
- Can the safety performance measures link to the evaluation criteria that will be used later in the planning process to assess the relative benefits of one project or strategy over others? If so, can the safety performance measures be forecast or predicted for future years? (Washington et al. 2006)

It is suspected that midsized MPOs are especially struggling in the area of performance measures. This is a difficult task for planning agencies of all sizes. The approach to this portion of the assessment may need to be revised to ask some more basic questions about measuring performance. The technical analysis component of the planning process should be improved in combination with performance monitoring.

2.5.4 Step 4: Incorporate Safety into Technical Analysis

The technical analysis element of the transportation planning process has two critical components. The first component is the availability of safety data and the identification of the constraints of the data. The second component is accessibility and use of technical tools and data analysis techniques to analyze the data. The analysis process involves understanding the interactions among a transportation system and its

environment, the components of the system and how they work both separately and together, and the sensitivity of the system to changes. Safety-related data and analysis tools are used to identify problems and opportunities to improve the transportation system. An agency cannot assess its planning process as it relates to SCP without examining the safety-related data and analysis tools it has available.

2.5.4.1 Available Safety Data and Data Constraints

An important issue in SCP is the availability and quality of safety data. Transportation safety data can be used for trend analysis and for determining the relationship between harmful events and basic characteristics of people, vehicles, and environments. On many occasions, agencies are limited by the availability and quality of the safety data they can obtain or access.

The National Transportation Safety Board (NTSB) conducted a special investigation of safety databases sponsored and operated by the U.S. Department of Transportation (National Transportation Safety Board 2002). NTSB studied the databases to highlight the value and potential uses of safety data, described and highlighted some safety databases commonly used by the Board, and evaluated the Bureau of Transportation Statistics (BTS) efforts to establish data quality standards, identify information gaps, and ensure compatibility among databases. A variety of databases were identified and investigated including aviation, highway, marine, pipeline, railroad, intermodal.

The NTSB report concluded that the DOT's data collection programs should be improved and expanded to better support the monitoring of crash risk for specific transportation modes, to support more detailed analysis of risk factors, and to determine the effectiveness of strategies for preventing transportation crashes. The Board also

concluded that BTS audits of DOT-sponsored safety databases should be completed as expeditiously as possible to support timely, coordinated reengineering efforts by the modal agencies.

The data issues identified in the NTSB report are similar to the problems State DOTs, MPOs and local governments are addressing. Many local agencies rely on data maintained by State DOTs or MPOs. This is especially true for smaller agencies that do not have the resources to collect data. Local agencies need reliable, consistent safety data for transportation planning. The examination of safety-related data and technical analysis tools will allow practitioners to determine the availability of tools necessary to conduct safety-related planning. Effective technical analysis requires valid and high quality data. The technical tools and data analysis techniques available to practitioners are important to the integration of safety in the planning process.

SCP can provide a more comprehensive source of information for planners, engineers, and others involved in the process. Guidance is needed to help practitioners determine the tools that can be used for safety planning early in the process. It is also important for decision makers to understand the safety implications of the choices they make. The following questions regarding safety-related data should be examined by planners and decision makers:

- Given the definition of safety that resulted from the visioning and goals/objectives phases of the planning process, what types of data are needed to support the safety desires of the community?

- Are the data available currently? If not, who should collect the data? Are there ways of collecting data, or are there surrogate data items that can be used to reduce the cost and burdens of data collection?
- Does the state (or region) have a systematic process or program for collecting safety-related data? If not, who should be responsible for developing one?
- Is there a quality assurance/quality control strategy in place to assure the validity of the data collected? If not, who should develop one?
- Are there opportunities to incorporate data collection technologies into new infrastructure projects or vehicle purchases (e.g., surveillance cameras or speed sensors)?
- Are there opportunities for implementing an electronic crash data collection system?
- Does the safety database include safety data for all modes of transportation that are relevant to the planning process (e.g., pedestrians, bicyclists, transit, intermodal collisions, etc.)? If not, what is the strategy for collecting such data? Who should be responsible?
- What types of database management or data analysis tools are available to best use the data (e.g., a geographic information system)? Are such tools available to produce the type of information desired by transportation decision makers?
- Are there other sources of data in your state or region that might have relevant data for safety-related planning (e.g., insurance records, hospital admissions, non-

profit organizations, etc.)? If yes, who should approach these groups to negotiate the sharing of data?

- Are there any liability risks associated with the collection and/or reporting of crash data? If so, how can your agency be protected against such risk? (Washington et al. 2006)

The availability and constraints of safety data are important issues for midsized MPOs. Due to the lack of focus on data analysis in these MPOs, often effort is not made to seek out data sources that can be incorporated with crash data to develop a more comprehensive safety program. These MPOs also are not aware of the data sources available for analysis nor have they developed a relationship with agencies that can offer safety-related data and assistance in analyzing the data. Midsized MPOs likely need more focus on collaboration with agencies and organizations that have data that can complement the crash data being used in safety conscious planning. Midsized MPOs should also explore opportunities to obtain data assistance from their state DOTs.

2.5.4.2 Technical Tools and Data Analysis Techniques

A variety of safety tools and techniques are available for agencies to use in safety planning. These tools offer exploration of roadway safety tools, statistical methods useful in safety analysis, and best practices. The NCHRP Synthesis 321 offers a look at roadway safety tools for local agencies (Wilson 2003). The synthesis is designed as a resource guide for local government agencies as they select tools and develop programs to implement proactive and reactive road and street safety improvements. The synthesis also offers other tools such as safety study data, professional organizations, computer-based software and safety references that can aid practitioners.

The NCHRP Synthesis 295 (Persaud 2001) summarizes the current practice and research on statistical methods in highway safety analysis. The synthesis focuses on establishing relationships between crashes and the factors associated with them, identifying locations for action, and evaluating the safety gains that result from engineering improvements. This synthesis also points out, as many other pieces of literature (Kononov and Allery 2004), that engineers have relatively little information on the safety implications of their design and operational decisions. Kononov and Allery recommend safety-based standards be considered in transportation planning. The standards would involve the use of Level of Service of Safety (LOSS) as design standard. Currently no standards that quantify the level of safety expected exist. If a particular level of safety cannot be quantified, it is highly unlikely a certain level of safety can be planned for in the planning and decision making process. Therefore much needs to be done to improve the state of practice.

Other safety tools and resources include traffic safety manuals, highway safety plans and comprehensive safety plans. Federal and state agencies have begun to implement strategic highway safety plans that address the strategies necessary to lower crash rates, all fatalities and injuries. SCP involves all modes of transportation so comprehensive safety transportation plans would provide a more multimodal plan for the safety community. Many State DOTs or MPOs create plans that explicitly state the goals and strategies they will implement in safety planning. These manuals and plans can be very useful to local agencies in determining strategies that should be considered for implementation.

The American Association of State Highway and Transportation Officials (AASHTO) has developed a Strategic Highway Safety Plan with twenty-two specific strategies to reach these goals. A series of manuals that provides guidance for implementation of the AASHTO Strategic Highway Safety Plan is being developed (Various 2003-2007).

The Southeast Michigan Council of Governments (SEMCOG) has developed a Traffic Safety Manual (Southeast Michigan Council of Governments 1997) that describes a comprehensive approach to traffic safety analysis. The manual addresses issues such as data collection and maintenance, identification of high-crash locations, determination of countermeasures, and benefit/cost analysis. SEMCOG has a leading reputation in safety conscious planning.

The tools and techniques used to analyze safety-related data are as important to the planning process as the data itself. The availability and efficiency of technical analysis tools will determine the level of technical analysis the agency will be able to accomplish. A range of tools is needed to conduct analyses for projects on various scales. In many cases, planners and engineers find that collaboration with safety stakeholders and decision makers is an excellent way to identify safety analysis tools that can be used for different types of safety problems. The following questions can assist in assessing the technical analysis tools used in safety planning:

- What is the scale of the safety problem being faced? Regional? Corridor? Site-specific? Are tools available that analyze safety problems at the same scale of analysis?

- What is the information needed and desired by decision makers? Can existing analysis tools produce this information with reasonable levels of validity?
- What are the possible types of strategies that could be implemented to deal with this safety problem? Are there analysis tools currently available in the agency or in partner agencies that can be used to determine the effectiveness of these types of strategies? If not, are there analysis tools available elsewhere?
- Is the safety planning challenge one that requires predicting or forecasting the future safety characteristics of a transportation system or facility? If so, what approach will be taken to predict such future performance? What are the underlying assumptions in this approach (e.g., future crash rates are the same in the future as they are today)? Or, in other terms, what are the sources of uncertainty associated with safety predictions?
- Can existing analysis tools, or if necessary, the process of developing new ones, be undertaken in the timeframe associated with when decisions have to be made? If not, is there a more timely analysis procedure that can be used to produce information that is relevant to decision makers?
- If the safety challenge includes problems associated with multiple modes of transportation, are there tools that can address multimodal safety issues? For example, most available analysis tools focus on road safety. If the state or region is facing safety problems with pedestrian, bicycle, transit, or freight trip-making, are there analysis tools available that can analyze these types of problems? If not, how will these problems be addressed in the safety-related planning effort (Washington et al. 2006)?

Many midsized MPOs possibly will find these questions premature if the MPO does not have the staff and technology to analyze safety data. Additional questions regarding the availability of State DOT assisted data analysis support and training should be included.

2.5.5 Step 5: Evaluate Alternative Projects and Strategies

After safety-related data and analysis tools have been employed to investigate and analyze the problems and operating capabilities of the transportation system, alternative projects and strategies are evaluated by planners. Evaluation is the process of determining the desirability of various strategies and alternatives. This information is presented to decision makers in a comprehensive and useful manner. The benefits and costs are determined and a level of effectiveness is assigned for each strategy. Three common methods of safety evaluation are simple listing of criteria with comparison among alternatives, assigning weights to evaluation factors, or conducting benefit/cost analysis. The NCHRP Report 546 gives examples of each method and discusses advantages and disadvantages of each. The following guidebook questions can help in the assessment of the evaluation process:

- For the types of evaluation decisions that have to be made, is an evaluation methodology in place that produces the type of information that will be useful? Will this methodology have to deal with tradeoffs among many different types of projects and strategies? Or will the methodology be dealing primarily with a single type or category of project?

- Is a simple rating sufficient to provide the type of information desired? Or is there a need to have a more sophisticated assessment of benefits compared to dollars expended?
- How will non-infrastructure-related strategies and actions be evaluated? For example, if dollars are to be expended on safety education programs, how will the relative effectiveness of these programs be assessed, if at all?
- Does the state or metropolitan area have values associated with the cost to society of different crash types? If not, where can such values be obtained?
- Who will be conducting the evaluation, that is, who will be assigning the points in a scoring scheme or estimating discounted benefits in a benefit/cost methodology? Does the capability exist to undertake such efforts in a fair and unbiased way?
- Are there computer-based tools that can conduct the evaluation process in an efficient manner?
- How are the underlying assumptions in the evaluation process (such as value of life, discount factors, etc.) best explained to decision makers and to the general public?
- Will the evaluation results be so sensitive to these assumptions that a sensitivity analysis must be conducted by varying uncertain inputs to see what happens to the corresponding results?
- What is the best way of presenting evaluation results to decision makers (Washington et al. 2006)?

Midsized MPOs are more likely to have an informal project evaluation and selection process. The pool of decision makers is smaller than a large metropolitan area and the midsized MPO often covers far fewer jurisdictions. Local governments can likely have more involvement in the project evaluation and selection process. The revised framework can incorporate questions pertaining to local government participation in the project selection process.

2.5.6 Step 6: Develop Plan and Program

The completion of the analysis and evaluation stages lead to the implementation of products. These new products can include policies and regulations, operations strategies, education and awareness, the formation of partnerships and collaborative undertakings, and financial strategies. For statewide and metropolitan planning agencies the overall product is a plan. For a metropolitan area, this plan is referred to as the transportation improvement program (TIP) and for the State it is called the state transportation improvement program (STIP). Programming is the process by which desired actions are matched with the available funds. In most cases, the process of setting programming priorities is undertaken with input from various stakeholders interested in the wide variety of issues involving transportation planning.

The manner in which safety is incorporated into transportation plans and programs directly determines the level of incorporation of safety in the planning process. It is not enough for safety to simply be mentioned in the plans and programs developed as a result of the planning process. Specific activities that will enhance safety must be targeted. For example, planners must identify specific traffic enforcement activities to be enhanced, specific data collection and management efforts that should be improved and

specific target groups that need additional education. These specific targets can be communicated in the form of safety strategies. The following questions aid in the assessment of safety in plan and program development:

- Does the transportation plan and program include safety-related projects and strategies? Are they so indicated in the documents?
- If other comprehensive safety plans exist for the state or region, are the transportation plan and program consistent with the goals, performance measures, actions and strategies as indicated in these comprehensive plans?
- If some form of prioritization scheme is used to rank projects in the programming process, is safety included in this scheme? If so, what is the relevant weight of safety compared to other factors?
- Are key safety stakeholders involved in the final development of the transportation plan and program (Washington et al. 2006)?

Additional questions regarding the MPOs' involvement in the State Strategic Highway Safety Plan development process should also be included. Midsized MPOs have a great deal to gain from increased participation in the SHSP process. Participation in the process is also an opportunity for MPO representatives to develop a more comprehensive understanding of safety conscious planning areas in which they have little experience. The forum will also allow midsized MPOs to develop relationships with statewide safety professionals. These relationships could prove beneficial to the MPO's future planning efforts.

The project development process begins as the planning process is completed. The projects recommended as a result of the planning process are developed conceptually first. After the concept design is complete, more detailed project planning is done and the preliminary and final engineering process follows.

2.5.7 Step 7: Monitor System Performance

Following the implementation of projects identified by the planning and decision making process, the system's safety performance should be monitored to determine if the expected outcomes are achieved and if other unforeseen changes in the system occur. System performance monitoring gives feedback to the vision, goals, and performance measures originally established during the planning process. This feedback loop allows planners and decision makers to modify alternatives and strategies after identifying problems and successes. Monitoring system performance can be incorporated into an agency's routine data collection program or it can be handled by a data management system that monitors the safety performance of the system.

A Safety Management System (SMS) is a comprehensive, systematic process that is designed to help decision makers select effective strategies to improve the safety of the transportation system. An SMS is not a program but a process that requires communication, coordination, and cooperation among safety stakeholders. A research project has developed a guide to developing an integrated safety management process (Bahar et al. 2003).

Important components of an SMS include linkage of safety data, identification of safety responsibilities, public information, education activities, and the identification of

resources and training for planners and decision makers. The following questions address monitoring system performance:

- Is there a systematic program or strategy for monitoring the safety performance of the transportation system? If so, is it effective? If such a program does not exist, how can it be developed?
- Is the feedback provided by the monitoring system used in refining goals, objectives, performance measures, problem identification, project analysis and evaluation? Is this feedback provided in a timely manner?
- Are there new vehicle or system management technologies that can be used to provide the desired data more cost effectively? Can such data collection be integrated into other efforts by the state or region to collect system performance data? For example, if the state has an intelligent transportation system (ITS) architecture, is safety an important feature of this strategy?
- Who are the major players in a safety management system? What are their responsibilities? Is there a need to define in more formal terms these responsibilities and inter-relationships (Washington et al. 2006)?

The system performance monitoring questions may not require revision. The questions midsized MPOs should consider are the same. Midsized MPOs however, may have to keep their system monitoring process simple.

2.6 Conclusion

The NCHRP Report 546 offers a comprehensive approach to incorporating safety in the planning and decision making process. Safety considerations are incorporated into

the key planning steps and questions to consider in assessing the process are explored. In addition, suggestions are given in the guidebook for actions that can be taken to improve the role safety considerations play in the key planning steps. This guidebook simply provides guidance in determining the factors to consider.

The NCHRP Report 546 offers comprehensive guidance to large MPOs that have a well established MPO and a multitude of data resources. However, special attention is needed for MPOs that have more limited resources. In most cases, these midsized MPOs have a special set of circumstances surrounding their planning processes. Midsized MPOs have institutional issues distinct from large MPOs. Midsized MPOs typically have fewer data collection and analysis capabilities, a unique organizational culture and a small planning staff. These institutional challenges hinder the inclusion of safety considerations in long range planning, implementation of performance measures, and use of safety criteria in project selection.

CHAPTER 3

LITERATURE REVIEW

3.1 Introduction

There are important background topics related to the integration of safety into the transportation planning process. The policy context for this research requires a thorough review of prior safety-related transportation legislation. Understanding the transportation process requires one to know how policies and procedures have developed as a result of legislation. Lastly, a look at prior legislation will give the reader a picture of the evolution of safety and other transportation issues in the transportation planning process.

Another important topic to cover is the history, origin and definition of safety conscious planning (SCP) and transportation safety planning (TSP). SCP has been the focus of a number conferences, forums, peer exchanges, papers and research projects. Though SCP is a relatively new concept, many states and MPOs are conducting forums, conferences and peer exchanges to educate themselves on the topic and the process. The papers and research projects conducted in the area of SCP deal with a number of questions about the relationship between SCP and the transportation planning process.

Despite the fact that very little research has been conducted in this area, a few significant sources of guidance are available. It is also important to note that special attention is needed in the area of this issue as it relates to midsized MPOs. The majority of research efforts on safety planning have explored the practices of safety planning in large metropolitan cities. This is a particularly important point because there are a significant number of midsized MPOs that are responsible for transportation planning in

areas outside of large cities. These midsized metropolitan areas have their own transportation safety issues that are equally as important and in some cases more influential in changing a state's safety record.

3.2 Safety Legislative/Regulatory History

For the past 40 years the federal and state governments have played a profound and active role in highway safety. In the last two decades reducing the nation's highway fatalities has been a major focus of national transportation policy. As transportation policy has evolved, the roles and responsibilities, where safety is concerned, have shifted to improve the effectiveness of safety planning. This section summarizes the major legislative changes in national transportation policy with respect to safety.

3.2.1 Federal Highway Act of 1962

The Federal-Aid Highway Act of 1962 introduced the federal requirement for urban transportation planning. To receive federal funding for transportation projects, urbanized areas with populations greater than 50,000 were required to establish a comprehensive plan that undertakes transportation planning in a cooperative manner between states and local governments. At this time, MPOs were established to carry out the planning process. This legislation marked the birth of the "3C" planning process-continuing, comprehensive and cooperative.

3.2.2 Highway Safety Act of 1966

The Highway Safety Act of 1966 marked the establishment of a new process for identifying and addressing highway safety issues. The act placed the federal government in a regulatory role in highway safety and kept the responsibility of implementation of highway safety programs in the hands of states. The legislation

required each state to have a highway safety program approved by the Secretary of Transportation. Each State highway safety program was required to reduce traffic accidents and deaths, injuries and property damage. Funds earmarked for the highway safety improvements legislated by the Highway Safety Act of 1966 were named Section 402 funds.

The National Highway Traffic Safety Administration (NHTSA) within the U.S. Department of Transportation (U.S. DOT) was created by Congress to oversee the safety grant program in 1970 (National Highway Safety Act of 1970). Projects funded by this program were to be developed by the states and responsibility for the administration of the program was given to the governors of each state. The Governors' Highway Safety Agencies Program mandated by a federal law makes the governor of each State responsible for the administration of the State Highway Safety Program by way of the Governor's Highway Safety agency. The Governor's Representative for Highway Safety is responsible for approving an annual highway safety plan that details Section 402 programs and activities. The State's progress towards attaining its highway safety goals and a description of how funding allocations for Section 402 projects helped meet the goals must be reported annually.

3.2.3 Highway Safety Act of 1973

The Highway Safety Act of 1973 is also a federal mandate for roadway safety. The act established categorical funding for five specific program areas: highway-rail crossings, high hazard locations, pavement marking demonstration programs, elimination of roadside obstacles, and the Federal-aid safer roads demonstration. The legislation requires each state to conduct and systematically maintain a survey of all highways to

identify high-hazard locations that may be dangerous to vehicles and pedestrians, conduct a benefit/cost analysis of proposed mitigation and prioritize improvements.

The Surface Transportation Assistance Act of 1978 (Public Law No. 95-599) consolidated these programs into the Highway-Rail Grade Crossings and Hazard Elimination Programs. The Hazard Elimination Program established a benefit-cost methodology for identifying safety project locations and earmarked a funding source for improvements (Highway Safety Act 1973a). The Highway-Rail Grade Crossings Program is intended to develop and implement safety improvement projects to reduce the number and severity of crashes at public highway-rail grade crossings (Highway Safety Act 1973b).

To make certain that the Hazard Elimination Program and Highway-Rail Grade Crossings Program are carried out in an organized, systematic manner where the greatest benefits can be achieved, a formalized Highway Safety Improvement Program (HSIP) was established in 1979. The purpose of the HSIP was to assist in the policy development and implementation of a comprehensive safety program in each state. The highway safety improvement programs were required to include a process of collecting and maintaining key traffic and highway data and identifying hazardous locations, a process for scheduling and implementing the proposed safety projects, and a process for evaluating the effects of the proposed transportation improvements.

3.2.4 Intermodal Surface Transportation Efficiency Act of 1991

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) changed the focus of federal transportation policy considerations. The act made system preservation one of the most important goals of transportation policy along with mobility

and environmental protection. The legislation allowed federal funds to be used for transit facilities and services, ride-share, bicycle, pedestrian, and historic preservation projects. The purpose of the bill was to develop a national intermodal transportation system that was economically efficient and environmentally sound, provide the foundation for the United States to compete in the global economy, and move people and goods in an energy efficient manner.

ISTEA also imposed several improvements to the transportation planning process for State DOTs and MPOs. The legislation mandated the consideration of 23 planning factors for statewide transportation plans and 16 for metropolitan plans. These factors included considerations such as land use, intermodal connectivity, mobility and access, system performance and preservation, environment, quality of life, methods to enhance transit service, and needs identified through management systems. A strong emphasis on proactive public involvement in the transportation planning process was also an important target. It is important to note that safety was not included in the mandated planning factors nor mentioned as a consideration in the planning process (Herbel 2001).

ISTEA mandated an enhanced role for local governments by making MPOs responsible for developing, in cooperation with the State and affected transit operators, a Long Range Transportation Plan (LRTP) and a Transportation Improvement Program (TIP) for the area. The TIP for the metropolitan area must be consistent with the long range transportation plan and must include all projects proposed for funding with Title 23 or Federal Transit Act monies. ISTEA also called for areas with populations of more than 200,000 to be designated as Transportation Management Areas (TMA).

ISTEA mandated each state to develop, establish and implement highway pavement, bridge, highway safety, traffic congestion, public transportation facilities and equipment, and Intermodal transportation facilities and systems information management systems. The highway safety management system was expected to be a vehicle for identifying and prioritizing safety projects at the statewide level. While the management system foundation would be a comprehensive crash database, the framework would also include defining performance measures, developing a system performance process, and involving an array of safety stakeholders.

The National Highway System Designation Act of 1995 rescinded the federal requirement for the six information management systems with the exception of the congestion management system in transportation management areas. The majority of states did not continue to maintain and expand their safety management systems after the federal requirement was made optional.

3.2.5 Transportation Equity Act for the 21st Century

In 1998, Congress passed the Transportation Equity Act for the 21st Century (TEA-21). Prior to TEA-21, federal legislation addressed the safety of the transportation system in separate laws with no single law encompassing the safety of the entire system as a goal. For the first time, this legislation specifically targets transportation safety and security as an explicit goal and requires state DOTs and MPOs to plan for the consideration of projects to improve safety for transportation users across all modes (United States Department of Transportation 1998a). TEA-21 appropriated funds for safety programs promoting highway safety, incentives for seat belt usage, incentives to

prevent driving under the influence (DUI), occupant and child protection, state highway improvement incentives and safety data improvements.

A new incentive grants program was introduced (under Section 411 of Chapter 4 of Title 23) to assist in the improvement and effective implementation of programs to advance State safety data needed to support national, state and local traffic safety programs. These appropriations are intended to increase the compatibility, accuracy, completeness, and accessibility of traffic safety data. (United States Department of Transportation 1998a).

3.2.6 Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users

In August 2005, the Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law. For the first time, safety and security of the transportation system are now separate planning factors to be considered during both the metropolitan and statewide planning processes. This change was due in part to the broadening of security issues after the terrorist attacks of September 11, 2001.

As a part of the Highway Safety Improvement Program, SAFETEA-LU mandated that each state develop and implement a strategic highway safety plan (SHSP). The SHSPs are used in the Highway Safety Improvement Program to identify and analyze highway safety problems and opportunities.

The SHSP is a statewide coordinated plan that establishes implementation strategies to address the safety problems identified and evaluates the accuracy of data and the priority of proposed improvements. The SHSP incorporates engineering, education,

emergency medical services and enforcement strategies into the statewide goals, objectives and key emphasis areas developed. The SHSP must be based on accurate and timely safety data, consultation with safety professionals at the State, regional, and local level, and performance-based goals addressing infrastructure and behavioral safety problems on public roads. Finally, States are required to develop an evaluation process to assess results and use the information to set priorities for highway safety improvements. States must have a SHSP in place to take advantage of these new and expanded safety programs.

With the signing of SAFETEA-LU, it is more important than ever for MPOs to consider their level of incorporation of safety into the transportation planning process. Safety has become an important factor in transportation policy and planning. An increased interest in reducing lives lost and injuries incurred as a result of vehicular crashes has prompted policy makers to consider strategies that account for safety considerations at every level of the transportation planning process. This concept has been identified as safety conscious planning or more recently as transportation safety planning.

3.3 Definition of Safety Conscious Planning

The Federal Highway Administration defines safety conscious planning (SCP) as the integration of safety considerations into the planning and decision making process at all levels of government. This process is comprehensive, proactive, system-wide and multimodal (Federal Highway Administration Undated). SCP is comprehensive in that it considers engineering, education, enforcement and emergency management. The process includes the implementation of numerous transportation safety campaigns and

educational programs. The process is proactive because it is designed to reduce the number of vehicle crashes, pedestrian fatalities, and other unsafe transportation conditions by improving road conditions, pedestrian facilities, and other transportation facilities. SCP is system-wide in that it involves the entire transportation network at the local, regional and state levels, thus requiring the involvement of all governing agencies. Lastly, SCP is a multimodal process because it requires the integration of safety into the planning process across all modes of transportation (Federal Highway Administration Undated).

SCP involves both long and short term integration into the planning process. In the short term, safety considerations may be integrated into the planning process through goals targeting safety in Statewide Transportation Improvement Plans (STIP) developed by State DOTs, or Transportation Improvement Plans (TIP) developed by the MPOs. For long term planning, safety may be incorporated into 20 and 30-year plans developed by State DOTs and MPOs.

3.3.1 Safety Stakeholders

Key participants in the SCP process include all governing agencies and organizations that are responsible for or interested in transportation safety. Federal agencies such as Federal Highway Administration, National Highway Traffic Safety Administration, Federal Motor Carrier Safety Administration, and Federal Transit Administration administer programs undertaken by the U. S. Department of Transportation. State Agencies such as State DOTs, State Departments of Public Safety, State Departments of Emergency Management, and the Governor's Office of Highway

Safety also implement program initiatives and set transportation goals for their respective states. These programs are usually based on federal mandates.

Key regional participants in the SCP process include MPOs, transit agencies, local DOTs, and city and local government planning agencies. Included among these participants are state and local planners, city managers and planners, traffic engineers, public works directors, transit agency managers and planners, highway safety managers and planners, law enforcement personnel (including motor carrier enforcement), emergency management professionals, bicycle/pedestrian advocates and consulting firms.

Collaboration among the various stakeholders is an important part of the planning process. The large number of agencies involved in safety planning makes developing partnerships extremely key to the implementation of comprehensive safety strategies. In many cases, agencies do not consider safety planning a responsibility of their organization. As a result, collaboration is minimal or nonexistent.

3.3.2 Transportation Safety Planning

Following the passage of SAFETEA-LU which required each state to develop and implement a strategic highway safety plan (SHSP), FHWA wanted SHSP development and implementation to be incorporated into its SCP efforts. The process of addressing the development of SHSPs in conjunction with considerations of safety in the planning process was identified as Transportation Safety Planning (TSP). SCP is the familiar term for most states and MPOs. SCP is used throughout this thesis since MPOs are the audience targeted.

3.4 A Review of the Literature

A thorough review of the current state of practice in safety conscious planning shows that most agencies are in three general stages. Due to the relatively new state of SCP, some agencies have not begun to assess how safety is integrated in the planning process. Many other agencies are in the beginning stages of a more conscious practice of implementing safety into the early stages of the planning process. Last, other agencies have assessed the planning process and implemented plans to integrate safety into all aspects of the process.

3.4.1 Safety Conscious Planning Forums

More than two dozen states have held Safety Conscious Planning Forums including Iowa, Michigan, Georgia, Maryland, Arizona, Texas, and Oregon. A national SCP steering committee defined the following objectives for the forums:

- Assist state and local entities with the implementation of the TEA-21 safety planning requirement.
- Facilitate introductions and discussions among the key players.
- Determine the role of safety and its integration with the traditional planning targets, e.g., congestion, land management and environmental protection.
- Assist at all levels in meeting safety goals by providing technical expertise and information, identifying resources, etc.
- Identify the institutional, resource and other challenges that must be overcome to achieve safety integration.
- Identify realistic strategies and facilitate the development of action plans.
- Build a process to assist state DOTs and MPOs with safety integration activities.

The forums are an opportunity for collaboration among transportation planners and engineers, law enforcement, highway safety personnel, motor carrier safety personnel, transit operators, pedestrian advocates, and other stakeholders. Practitioners have the opportunity to collaborate with other safety advocates and find out what tools and practices are successful, how to best implement them, and where others are securing funding for safety improvements. Reports documenting the forums are available for early forums sponsored by the Transportation Safety Planning Working Group (TSPWG) (Federal Highway Administration 2003a, 2003b, 2003c; Herbel 2002; Marshall University 2001; Transportation Research Board of the National Academies 2001-2006).

3.4.2 SCP Peer Exchanges and Conferences

SCP has been the subject of a number of conferences and peer exchanges since an initial meeting facilitated by the Transportation Research Board in May 2000 (Tri-State Safety Conscious Planning Roundtable 2005; Chatterjee 2006; Roberts 1999; Roberts and Johnson 1998; Transportation Research Board 2003, 2004; Transportation Research Board et al. 2006). Some MPOs and local planning agencies engaged in safety-related activities but the subject may not be addressed in their planning documents (Chatterjee 2006). The SCP conferences have been the catalyst for several research initiatives and have helped to bring the questions regarding safety planning to the planning and transportation community.

3.4.3 Papers and Research Projects

Several projects have tried to define the concept of safety conscious planning and to identify the key characteristics and processes for enhancing the consideration of safety in the transportation planning process (Federal Highway Administration Undated;

Goldman et al. 2006; Herbel 2001; Herbel 2004; Hoffman and Epstein 2003; Petzold 2003).

A few research initiatives have investigated the extent to which DOT and MPO transportation planners consider safety in the traditional planning process and planning documents (Chatterjee et al. 2000; Dempsey et al. 2000; Depue 2003; Herbel 2005). The findings report that safety is often mentioned in vision and goal statements, but the subject is seldom addressed in the project selection process and performance measures.

Several SCP reports have documented attempts to integrate safety into planning processes (Anderson and Hacker 2006; Bruff 2006; Knezek 2005). The reports provide a look at the challenges many state DOTs and MPOs face in safety planning. The reports also document the initiatives state DOTs and MPOs are currently undertaking with respect to SCP.

A number of papers and projects document proposed methodologies and tools that promote SCP (Hadayeghi et al. 2007; Harkey et al. 2005; Kononov et al. 2007; Tarko 2006). These projects are early attempts to quantify safety and develop prediction models that can be used for long term planning.

In response to the results of the SCP forums and peer exchanges, a few documents that provide practical guidance in SCP to state and local planners have been developed (Campbell et al. 2005; Herbel 2002; Roberts 2001; Washington et al. 2006). These papers provide strategies for planning agencies to assess the level of safety consideration in their planning processes and guidance in incorporating safety into planning products.

The linkage between SCP and other planning factors has been the subject of few papers and articles (Bahar et al. 2004; Berkovitz 2001; Knezek et al. 2005; Meyer 2005).

SCP is complementary to many of the planning factors, such as land use, context sensitive design, and access management, traditionally considered during the planning process. The relationship between SCP and the strategic highway safety plan (SHSP) process is an important topic that has not yet been addressed in published work. However recent SHSP guidance does acknowledge the important link between the two processes (Federal Highway Administration et al. 2005).

Due to the complexity of the planning and decision making process in different agencies at various levels, determining the exact processes and actions to be taken to incorporate SCP is an important step. Significant research in the incorporation of SCP into the planning process has been explored by (Dumbaugh et al. 2004; Roberts 2001; Washington et al. 2006). The NCHRP Report 546 findings suggest that a significant incorporation of safety entails the integration of safety considerations throughout the planning process. But it is also suggested that incorporating safety into even one or two elements of the planning process will influence decision making and provide more opportunities for safety consideration.

Some states DOTs and MPOs have made a number of accomplishments in the area of SCP. These examples can serve as great resources to other agencies in all levels of government. A thorough review of the literature regarding safety conscious planning shows that much has been done to identify the characteristics of the planning process that should be adopted by MPOs and DOTs, but until recently very little research has been done to guide agencies in the process of improving collaboration and coordination amongst planners, safety practitioners, political officials, and others responsible for transportation safety.

A survey of state highway safety agencies in the United States was conducted to determine the degree to which state highway safety agency programs are compatible with planning and programming activities implemented by MPOs and state DOTs. The survey concluded that state highway safety agencies have only a moderate level of organizational capacity for participating in the programs and planning efforts of state DOTs and MPOs due to the limited staff size and the ability to commit staff to the ongoing transportation planning process (Dumbaugh et al. 2004). Many respondents also believed that their office had the ability to influence the planning processes of the state DOTs and MPOs. Furthermore, most respondents did not believe that safety was seriously considered by State DOTs and MPOs during the formal planning process (Dumbaugh et al. 2004).

Midsized MPOs face a unique set of problems that set them apart from large metropolitan cities. Safety considerations can and should be integrated into an agency's vision statement, goals and objectives, system performance measures, technical analysis, project evaluation, and plan and program development (Washington et al. 2006). Though the planning process is similar in large and midsized MPOs, it is necessary to use different methods to incorporate safety into the decision making process.

3.4.4 Safety Conscious Planning Resources

As SCP becomes a more important issue, resources and guidance regarding its practices are being developed and made available. The resources are provided in the form of websites, guidebooks, and desk references.

3.4.4.1 Transportation Safety Planning Working Group

The Transportation Safety Planning Working Group (TSPWG), formally known as the Safety Conscious Planning (SCP) Working Group, is an informal, ad hoc

consortium of U.S. Department of Transportation agencies including Federal Highway Administration, Federal Motor Carrier Safety Administration, Federal Transit Administration and the National Highway Traffic Safety Administration; and representatives from various State DOTs and other safety professionals. The group hosts a website that offers a host of resources and guidance for transportation safety planning professionals. The website offers safety tools for planners, research and publications, a quarterly newsletter highlighting notable transportation safety planning news, a noteworthy practices section that features best practices across the nation, and a question and answer tool that allows users to ask the working group and its email list serve transportation safety planning questions. The TSPWG website (http://tsp.trb.org) offers a comprehensive knowledge base for safety professionals (Transportation Safety Planning Working Group 2007).

3.4.4.2 Transportation Planner's Safety Desk Reference

The TSPWG has also developed a Transportation Planner's Safety Desk Reference (Cambridge Systematics 2007). This document is a companion to the NCHRP Report 500 Guidance for Implementation of the AASHTO Strategic Highway Safety Plan. The Transportation Planner's Safety Desk Reference provides a collection of strategies in the 17 emphasis areas for implementation by transportation planners. In addition to providing transportation safety strategies, the guide also offers an overview of transportation safety planning, a discussion of the role of transportation planners in the planning process, and a list of potential funding sources for safety programs.

3.4.4.3 AASHTO Strategic Highway Safety Plan

The Transportation Research Board's National Cooperative Highway Research Program (NCHRP Project 17-18) has developed a consortium of tools to help States

improve their statewide highway safety programs. A panel of state and national safety experts has developed tools for the development of Strategic Highway Safety Plans, technology transfer, implementation guides, integrated safety management tools, and a website and a web safety portal.

The Strategic Highway Safety Plan identifies 22 key emphasis areas that affect highway safety. The plan identifies strategies that, if implemented, can significantly reduce highway deaths and injuries. The panel has also developed separate Implementation Guides for each of the 22 emphasis areas (NCHRP Report 500). NCHRP Report 501 provides a Model Approach to Reducing Statewide Injuries and Fatalities. Highway safety responsibilities are divided among multiple agencies and therefore require coordination and cooperation. NCHRP Report 501 gives planners and decision makers a toolkit of ideas for integrating and coordinating engineering, enforcement, emergency management, and education efforts within a state or region.

An additional resource of the NCHRP Project 17-18 is the website that is used to facilitate technology transfer related to highway safety research and state initiatives. The website also features a Web Safety Portal which is a password protected area where parties engaged in the development of implementation of state highway safety plans can log in, exchange information, ask questions, and get advice from the developers of the AASHTO Strategic Highway Safety Plan guides.

To facilitate roadway design and operational decisions based upon explicit consideration of their safety consequences, the Transportation Research Board (TRB) is in the process of developing a Highway Safety Manual. The Highway Safety Manual will have attributes similar to those of the Highway Capacity Manual. The manual will be

developed with guidance from safety researchers and practitioners and will provide factual information and tools in a useful and widely accepted form.

3.5 Best Practices

Several agencies have made great strides in transportation safety planning and offer noteworthy practices. SCP is growing in importance as agencies realized the human and economic benefits. Various strategies have been incorporated throughout the transportation planning process to provide greater consideration of safety. These practices range from short term to long term strategies. Though these organizations have found successful strategies for incorporating safety into the planning process, these examples serve only as suggestions. Each jurisdiction and agency has a unique situation.

3.5.1 Iowa Center for Transportation and Education

The state of Iowa is often cited as a leading example of TSP practices. Iowa is offering a variety of safety tools that aid in the incorporation of safety into the planning process. The Center for Transportation Research and Education (CTRE) at Iowa State University regularly partners with the Iowa Department of Transportation's Office of Traffic and Safety, the Iowa Safety Management System, and the Governor's Traffic Safety Bureau to develop and enhance safety-related resources. CTRE is the central provider of safety data, training opportunities, and other important safety data related services.

CTRE also coordinates and manages transportation related research, education and technology transfer. The center developed the Iowa Traffic Safety Data Service which is a software program that provides geographic information system (GIS) safety data to Iowa's local agencies on request. CTRE also developed the Traffic Enforcement

Liaison which provides enforcement-related safety training statewide. As a part of the state's Local Technical Assistance Program (LTAP), the Safety Circuit Rider program travels the state offering safety workshops to local governments. The workshops provide suggestions on safety management systems, improving roadway safety, pavement markings, county engineers' safety policies and other safety topics (Petzold 2003).

3.5.2 Southeast Michigan Council of Governments

The Southeast Michigan Council of Governments (SEMCOG) also demonstrates leading SCP practices. As a result of efforts to consider safety in the planning process, SEMCOG has integrated safety into its overall transportation program, programmed and implemented safety projects using state transportation plan funds, increased the sensitivity of the public and media to safety issues, and increased the use of traffic and safety partnerships (Bruff 2004).

SEMCOG has incorporated safety into its long range planning goals and objectives. These objectives include promoting a safe and secure transportation system, reducing traffic crashes, increasing safety for transit riders, addressing roadway incidents, developing pedestrian friendly communities, and assisting local communities in defining safety needs (Bruff 2004). SEMCOG has also developed and maintains a Traffic Safety Manual and Data Management Tool. The SEMCOG Traffic Safety Manual assists local agency personnel in their analysis of roadway-related traffic safety problems. The manual describes a comprehensive approach to traffic safety analysis, from collecting potentially useful information to ranking tentative solutions.

The SEMCOG Data Management Tool is an online database that allows users to perform crash analysis at the corridor and location level. This tool allows local agencies

access to crash data and the resources needed to perform analysis of hazardous locations. The management tool uses GIS to combine crash data with other important transportation planning data such as road geometrics, traffic volumes, congestion, land use, and pavement conditions. Users can also examine crash types, frequencies and rates. This powerful tool offers local agencies access to technical tools and data (Bruff 2004).

3.5.3 Pennsylvania Department of Transportation

The Pennsylvania Department of Transportation has developed a targeted program to implement low-cost improvements that reduce the number of traffic fatalities statewide. The Safer Travel Strategic Focus Area (SFA) program allows district safety engineers to implement low-cost improvements at high crash segments and spots. The program concentrates on signalized intersections, stop-controlled intersections, guide rails, utility poles, trees, curves, head-on/sideswipe crashes, pedestrians, aggressive driving and driving under the influence.

The Bureau of Highway Safety and Traffic Engineering (BHSTE) developed a toolbox of low-cost highway safety improvements to address the targeted crash categories based on analyses of collision data for the State. As a part of the program district engineers are required to develop a plan to meet their target fatality reduction goal as a part of a District Business Plan. The number of lives saved annually and the number of low cost improvements implemented are used as measures of progress and reported quarterly. For a segment to be considered for low-cost improvements, each category has a minimum criterion for the number of clustered collisions. Improvements and crash-reduction factors have been developed for each category. Each district must maximize its resources to meet its target by implementing low-cost improvements at locations with the

highest potential for a reduction in crashes based on the crash data (Federal Highway Administration Undated).

3.5.4 Arizona Department of Transportation

The Arizona Department of Transportation developed the Local Government Safety Project (LGSP) analysis model to help local governments identify potential safety projects in their jurisdictions. The model helps identify sites and implement strategies for local safety improvement projects. The model allows local governments to assign priority to potential projects in local safety programs so that resources can be used most effectively and allocated appropriately among safety alternatives.

The LGSP model is incorporated into a Microsoft Access program and allows the user to select a subset of locations within an area of concern based on user-define parameters. The model uses defined weights to generate reports that identify dangerous sites and reports detailed information such as crash frequency and severity, and costs of crashes for the sites. The list of hazardous sites is used by local jurisdiction safety engineer to select treatments. The user then inputs the possible safety treatments for each of the sites and each treatment is given an effectiveness value. From these inputs, the model calculates the expected benefit for each project and outputs a benefit-cost analysis that is used to prioritize safety projects in the area (Federal Highway Administration Undated).

3.5.5 Rogue Valley Council of Governments

The Oregon Department of Transportation's (ODOT) Traffic Safety Division is partnering with the Rogue Valley Council of Governments (RVCOG) in southern Oregon to complete a prioritization and selection process for traffic safety projects. The Rogue

Valley Council is an association of local government agencies designed to provide a forum for regional planning and problem solving. During 2002 the MPO updated elements of its regional transportation plan to include a traffic safety element. A part of this update includes an analysis of accidents within the region using GIS and ODOT accident data. MPO grant funds are used to develop and test a GIS file that pinpoints accident locations using state accident data and to develop safety project prioritization criteria and a project selection process (Petzold 2003).

3.6 Educational Programs

Many state and local government agencies have implemented educational programs and initiatives to promote transportation safety. These multidisciplinary programs integrate engineering, enforcement and education activities. Educational programs addressing impaired driving, speeding, safety belt use, graduated licensing, older drivers, work zone safety, and red light running are also being facilitated in many states. These programs provide a special link between the planning and safety professionals and the general public.

Florida has also implemented a Safety Management System and Community Traffic Safety Teams. The state of Kansas has a “Get the Picture, Listen to the Signs” campaign promoting the importance of highway signs. New Mexico has developed a Traffic Safety Almanac Program that provides analysis and reports that link problem and countermeasure data. North Carolina has a school bus safety program which reminds motorists of the state’s no passing law and has law enforcement officers monitoring school bus routes to enforce the no passing law.

Many more programs emphasizing education and enforcement are in existence nationwide. The implementation of such programs encourages and promotes safety in the transportation process and creates a forum for nontraditional partnerships, communication, and outreach for leaders and decision makers.

3.7 Gaps in Knowledge

The concept of incorporating safety into the transportation planning process as opposed to accounting for safety only during the design process is relatively new. The references cited in this literature review are the most relevant documentation of this concept and the issues surrounding it.

3.7.1 SCP Linkages

The relationship between safety conscious planning and strategic highway safety plans is a question that needs to be addressed. Though several publications have addressed the linkage between SCP and other transportation planning issues, the institutional and organizational differences in agencies that may affect the process have not been addressed. With the implementation of the new SAFETEA-LU requirement regarding SHSPs, it is expected that this question will receive some attention.

3.7.2 Quantitative Safety Analysis

Safety is difficult to define and measure. Quantitative measurement of safety with respect to transportation planning is necessary to help planning agencies monitor safety performance. A standard set of safety performance measurements and implementation strategies for system performance should be developed to provide a basis for a comprehensive system monitoring process.

Planning agencies also need assistance predicting safety performance. No comprehensive safety prediction tools existed at the time of this review. Crash prediction models would be a reasonable place to start. Such a model could also be useful in managing congestion.

Long term transportation planning requires forecasting in 20 to 30 year terms. Safety is not adequately addressed in long term plans because planners do not have the capabilities to make an assessment of safety in the future.

3.7.3 Institutional Characteristics of Midsized MPOs

This research initiative looked at midsized MPOs from the standpoint of SCP, but future research could explore their institutional and organizational characteristics. It would be interesting to understand the general characteristics of midsized MPOs and how those characteristics directly influence the planning process.

3.7.4 Collaboration and Communication

Perhaps the strategies necessary to improve communication and collaboration within the planning organizations to support safety planning improvements will vary greatly based on institutional and organizational characteristics. The inherent differences between midsized and large MPOs may help or hinder communication and collaboration.

3.7.5 Funding Challenges

Securing adequate funding sources is a major issue in SCP. Perhaps the development of a framework that guides MPOs in seeking and enhancing the use of funds for safety planning activities is necessary. The framework could identify various methods of funding safety projects. The development of such a framework may also influence the federal and state funding structure for transportation safety projects.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 Introduction

This research uses a combination of the multiple-case study approach complemented by a web-based survey to: 1) examine the characteristics of transportation planning in midsized metropolitan planning organizations (MPOs), 2) investigate the application of the NCHRP 8-44 framework, 3) modify the existing framework to specifically address the needs of midsized MPOs in incorporating safety into the planning and decision-making structures, and 4) develop recommendations for federal, state and regional planning practices to enhance safety conscious planning (SCP).

The research was conducted in several steps (see Figure 4-1). The first step was a search of literature and internet resources to collect significant information on safety conscious planning and the transportation planning process. The literature review was presented in Chapter 3. Additional methodology steps included: selection of case studies, development and dissemination of survey, development of case study interview protocol interviews with MPO representatives, development of recommendations and a revised framework, and validation of the recommendations by a focus group.

4.2 Survey Instrument

A web-based survey of midsized MPOs nationwide was conducted to determine the challenges midsized MPOs face when incorporating safety into the planning process and the current policy basis and procedures for safety conscious planning. The information collected in the survey was used as a supplement to the case study interviews

conducted during this research. The survey was also conducted to provide a national snapshot of safety conscious planning practices in midsized MPOs. A copy of the survey instrument is provided in the appendix.

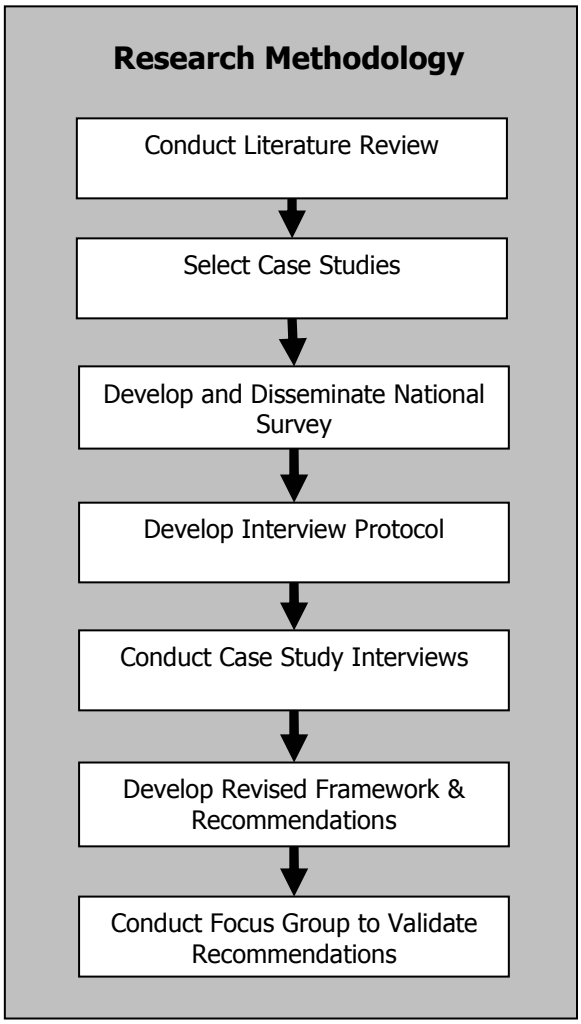

Figure 4-1: Research Methodology

4.2.1 ZapSurvey Service

The survey instrument was administered through the ZapSurvey service. ZapSurvey is an online survey service designed to create surveys using a web browser. The online tool allows its users to build, distribute, manage and analyze survey data. The

surveys were distributed via email to the Executive Director or Director of Planning at midsized MPOs (200,000 to 600,000 population) in the United States.

Contact information and world-wide web addresses for the MPOs was collected from the Association of Metropolitan Planning Organization's (AMPO) *2005 Profiles of Metropolitan Planning Organizations*. Survey participants were telephoned to solicit participation in the survey and to obtain an appropriate email address to send the survey invitation. An email was sent to the MPO representative through the ZapSurvey service including a direct link to the survey and instructions for completion.

4.2.2 Survey Components

The survey consisted of six sections with a total of eleven questions. The survey could be completed within 10 to 15 minutes. All questions had to be answered for the survey to be complete and submitted. Participants were not required to complete all questions at one time. The survey could be returned to at a later time by clicking on the link sent in the email invitation.

Section one of the survey asked basic background information questions. The first question identified the respondent's role or position in the MPO and a second question asked the participant to identify the states included in their MPO boundary.

Section two of the survey covered long range planning. The questions determined whether the MPOs included safety as a topic of study or as a policy issue in their vision statement, goals, objectives, regional transportation plan, and transportation improvement plan. Additional questions dealt with the explicit inclusion of safety in the planning goals and objectives and the MPO's project selection process.

Section three addressed the importance of various safety data for transportation planning and decision making in the region. Section four explored the methods and tools used by the MPOs to incorporate safety considerations into the transportation planning process. Sections five and six discussed performance monitoring, and the MPO's collaboration with various federal, state and local agencies that have a stake in safety planning.

4.2.3 Survey Sample Size & Response Rate

Surveys were sent to MPOs with a population of 200,000 to 600,000 as of 2005. Census Bureau estimates were used to identify the targeted MPOs. Seventy-eight MPOs received requests to participate in the survey. Thirty-one completed surveys were returned, resulting in a 40% response rate. Phone calls were made to MPOs to encourage participation in the survey. Reminder emails were also sent to participants to complete surveys that were incomplete as of March 1, 2007.

4.3 Case Studies

The case studies were designed to offer guidance in assessing the needs of midsized MPOs when incorporating safety into the planning and decision making processes. Each case provided insight into special areas of interests related to safety conscious planning. Initially, each case study was approached with similar expectations, but as differences in the MPOs' planning and decision making processes became apparent, each study was approached in a case-specific manner.

Case study interviews were used to conduct an in-depth assessment of the safety-related factors the agencies consider during the decision making process. A set of interview questions was adapted from the NCHRP 8-44 framework. The questions

pertained to the incorporation of safety into the MPOs' long range transportation plan, safety-related data collection and analysis, performance measures and system performance monitoring, and the MPOs' collaboration with other safety professionals. The partnerships and collaborative efforts the agency used to address safety issues were also explored. Information about the safety-related education and prevention programs in place was reviewed. The sources for safety data, methods of data collection, and tools for technical analysis were identified. Specific safety-related topics were used to determine the availability of data, data constraints, and the processing and analysis procedures used. Each case also identified performance measures used to monitor the transportation system.

4.3.1 Interview Format

The case studies consisted of a series of interviews with MPO managers, planners and engineers. As a supplement to the MPO interviews, law enforcement and emergency management representatives in the region were also interviewed. A sample copy of the interview questions is included in the appendix. Initial interviews were designed to last approximately 45 to 60 minutes. Additional informal meetings and phone calls varied in length based on purpose. The majority of the interviews were conducted in private meetings or by telephone. In some cases, the interview questions were answered via electronic mail. In such cases, follow-up questions were addressed by telephone.

4.3.2 Case Study Selection

As a baseline for defining a midsized MPO, a population of greater than 200,000 but less than 600,000 was chosen. This interval was chosen because the federal breakpoint for transportation management areas is a population of 200,000. The upper

limit of 600,000 was chosen to isolate MPOs that are urban areas, but not major urban metropolitan areas. This range includes MPOs that are not a part of an extremely large metropolitan area, but are within a transportation management area. The MPOs in this population range are relatively small and have a unique set of challenges with SCP.

Limiting the study to seven MPOs allowed a thorough investigation to be conducted, although seven cases does raise the question of how representative these cases are. This is a common concern with case studies and is not problematic because the case study, like the experiment, does not represent a "sample", the goal is to make analytic generalizations as opposed to statistical generalizations (Yin 1989). To ensure this research effort is comprehensive and to identify any regional differences, the national survey discussed in Section 4.2 was conducted as a complement to the case studies. The following section discusses the survey instrument, response rate and the questions that were asked.

4.4 Data Analysis

The case study interviews and survey analysis focused on four major areas of SCP: long range transportation planning, decision-making and data collection, human resources and technical analysis, and safety leadership and collaboration. This research evaluated SCP practices in midsized MPOs, identified current practices and institutional barriers related to each focus area reviewed, and made recommendations for SCP practices and policy changes at the federal, state, regional and local levels.

4.5 Validation Process

The recommendations developed as a result of this research were evaluated by planning professionals to determine their feasibility. This process was needed to measure

the reaction of MPO managers and planners to the policy recommendations and strategies developed. Participants in the validation focus group represented midsized MPOs, State DOTs, federal agencies involved in safety planning, and law enforcement officials.

CHAPTER 5

SURVEY DATA ANALYSIS

5.1 Introduction

The data collection for this research consisted of a national survey and case study interviews. This chapter discusses the data collected from the survey of midsized MPOs. A detailed description of the survey questions was included in Chapter 4 and the survey is included in the appendix.

A web-based MPO survey was conducted to better understand the SCP practices of midsized MPOs in the U.S. The purpose of the survey was to determine the common challenges midsized MPOs face when integrating safety into the transportation planning process. The survey also highlighted some of the common practices midsized MPOs use in safety conscious planning. Areas of interests included the long range transportation plan, data collection and analysis, the project selection process, and collaboration with other safety professionals. The following sections summarize the survey results and analyze the data.

5.2 Respondents' Background Information

The survey had a total of 31 respondents out of 78 requests. Midsized MPOs from all four regions of the U.S. participated in the survey. Table 5-1 shows the geographical mix of the respondents by region. Sixty-eight percent of the survey participants held managerial positions in their agency, some of which were executive directors, and 29% were classified as a planner or analysts. The remaining respondents were engineers (see Table 5-2).

Table 5- 1: Regional Representation of Survey Respondents

Region	Num. of Responses
South	12
Midwest	6
Northeast	8
West	5

Table 5- 2: Survey Respondents' Role/Position in MPO

MPO Role	% (#)
Planner/Analyst	29% (9)
Engineer	3% (1)
Manager	68% (21)
GIS Support	0% (0)

* # in parenthesis represents number of survey respondents

5.3 Long Range Transportation Planning

Section one of the survey discussed the respondents' long range planning process and what aspects of the process included safety. The MPOs were asked to identify whether their transportation planning process explicitly included safety as a topic of study or a policy issue in several important elements of the process (Table 5-3). Fifty-two percent of the respondents reported the inclusion of safety in its vision statement while 16% reported no inclusion of safety in their vision statement. It is also important to note that 22% of the respondents reported that the question was not applicable meaning their agency had no vision statement.

Ninety-four percent of the respondents reported the inclusion of safety goals and objectives that aimed to improve safety in their long range transportation plan. Overall, 97% of the MPOs surveyed reported the explicit inclusion of safety in their regional

transportation plan, while 90% reported safety as a policy issue in their Transportation Improvement Program (TIP).

Table 5-3: Elements of Transportation Planning Process That Explicitly Include Safety as a Topic of Study or as a Policy Issue

	YES	NO	NOT SURE	N/A
Vision Statement	52%(16)	16%(5)	10%(3)	22%(7)
Goals	94%(29)	0%(0)	3%(1)	3%(1)
Objectives	94%(29)	0%(0)	3%(1)	3%(1)
Regional transportation plan	97%(30)	0%(0)	0%(0)	3%(1)
Transportation improvement program	90%(28)	7%(2)	0%(0)	3%(1)

* # in parenthesis represents number of survey respondents

With the exception of the vision statement, the majority of the MPOs reported that safety was explicitly included in their MPO's goals, objectives, regional transportation plan and transportation improvement plan. This is the first step in SCP. However, SCP must be incorporated into the planning process beyond simply being in the transportation plan. It was not clear why 22% of the MPOs do not have a vision statement.

Each MPO was asked to report if its transportation planning goals and objectives explicitly include safety concepts related to several modes of transportation (Table 5-4). Ninety-four percent of the MPOs surveyed included pedestrian safety in their planning goals and objectives, while all participants reported roadway/highway safety planning goals and objectives. Ninety percent of the participants already have explicit bicycle safety goals and objectives. Approximately 65% of respondents reported the inclusion of transit safety in their goals and objectives. Nineteen percent reported no inclusion of transit safety in their goals and objectives and 16% were not sure if it was included.

Surprisingly, only fifty-two percent of the MPOs included railroad/highway crossing safety in its goals and objectives. Also, 58% of the survey participants reported the inclusion of the Safe Routes to School Program in their agency's goals and objectives. Finally, only 36% of the MPOs have planning goals and objectives that include freight safety. Forty-eight percent of the respondents reported that freight safety was not included in their goals and objectives.

Table 5-4: Safety Concepts Explicitly Included in MPO's Transportation Planning Goals & Objectives

	YES	NO	NOT SURE	N/A
Pedestrian Safety	94%(29)	6%(2)	0% (0)	0%(0)
Roadway/Highway Safety	100%(31)	0%(0)	0% (0)	0%(0)
Bicycle Safety	90%(28)	6%(2)	3% (1)	0%(0)
Transit Safety	65%(20)	19%(6)	16%(5)	0%(0)
Railroad/Highway Crossing Safety	52%(16)	32%(10)	16%(5)	0%(0)
Safety Routes to School	58%(18)	39%(12)	3%(1)	0%(0)
Freight Safety	36%(11)	48%(15)	16%(5)	0%(0)

* # in parenthesis represents number of survey respondents

Safety is a multimodal, multifaceted issue. SCP promotes the incorporation of safety into all modes of transportation. Roadway/highway, pedestrian, and bicycle safety are the basic safety areas and, as expected, the majority of the survey participants have incorporated these concepts into their LRTPs. Fewer MPOs have integrated railroad/highway crossing safety, the Safe Routes to School Program and freight safety into their transportation plans. These safety issues are important to the development of a comprehensive safety program.

5.4 Project Selection Criteria

Survey respondents were asked to describe their MPO's project selection process and if safety was included as a factor. Eighty-one percent of the participants reported the use of safety as a project selection criterion although the weight of safety in the selection process was not identified. Three out of four of those MPOs did not identify quantitative measures of safety in the project selection process. Thirteen percent stated that safety was not a consideration in the project selection process.

Though 25 of the 31 respondents reported that safety is included in their project selection process, it is not evident that safety is being used as a selection criterion for all projects. Safety is generally not being considered in the selection process for all projects in the LRTP and TIP, but instead for projects that are categorized by specific funding sources. Many MPOs reported using safety as a selection criterion for STP projects. A survey participant responded:

> "Safety is a factor in scoring applications for competitive STP funds. Other projects are selected by individual jurisdictions and submitted with their local TIPs."

This practice implies that safety considerations are only important to funds specifically designated for safety projects, and the percentage of funds designated for safety is a small fraction of the federal funds available to a metropolitan region. This practice limits safety to a small portion of the transportation funding and reduces the consideration of safety in the overall project selection process.

In other cases, when safety is considered, the weighting factor is dependent upon the funding category. An MPO even reported a sliding scale weighting factor for safety depending on the funding category:

> ”Projects are scored based on 10 factors. Depending on the funding category, safety represents 10-30% of the weighted score.”

When safety is included in the project selection process, the analysis is often not quantitative. This survey participant illustrates the subjective manner in which safety can be incorporated into the selection process:

> “Safety is a criterion in project prioritization, but it is not usually backed up with any quantitative analysis at the MPO level. The [state DOT] programs safety specific projects.”

Safety is casually considered to be a factor that influences the project selection process for some MPOs. One respondent suggested safety was used only when a tiebreaker is needed:

> “Our current project selection process includes V/C ratios, traffic volume increase percentage and cost. Safety is part of the selection process as a tie breaker.”

Four MPOs reported that safety is not considered at all in the project selection process. Other factors such as volume to capacity ratios, funding sources, and economic vitality are used to select projects for the LRTP and TIP. An example of such a response is the following statement:

> ”Projects are based on sponsor’s ability to pay match for project. Safety is not a factor.”

The project selection process is an important part of the transportation planning process. If safety is not incorporated into the project selection process, the efforts to include safety considerations into goals and objectives will be a waste of time. The

project selection process is the point at which the planning process produces the products that embody the vision, goals, and objectives.

5.5 Safety Data

The survey also discussed the importance of various data types for transportation planning and decision making. Survey participants were asked to rate the importance of various data for transportation planning and decision making in their region. The range of importance included “definitely not important,” “probably not important,” “neutral,” “probably important,” “definitely important,” and “don’t know.” Table 5-5 shows the results for all categories.

Vehicle crash data, truck crash data, bicycle crash data, pedestrian crash data, injury/fatality data, vehicle miles traveled growth rates, and population growth rates were rated as “definitely important” by the majority of survey participants. Surprisingly, safety belt use was considered “definitely important” to 26% of the participants and “probably important” to 22%.

Responses for safety belt use, driving under the influence and transit/paratransit crashes varied across the board with a significant number of respondents showing neutral importance for these categories. One explanation for this is that participants might be neutral with regard to data that are not available to their agency. For example, 39% of respondents were neutral with regard to transit/paratransit data. These MPOs may not have transit/paratransit data available or the region may not have significant transit/paratransit services.

Table 5-5: Importance of Data for Transportation Planning & Decision-Making in Region

	Definitely Not Important	Probably Not Important	Neutral	Probably Important	Definitely Important	Don't Know
Vehicle crash data	7% (2)	0% (0)	3% (1)	13% (4)	77% (24)	0% (0)
Transit/Paratransit crashes	7% (2)	10% (3)	39%(12)	16% (5)	23% (7)	6% (2)
Truck crashes	3% (1)	3% (1)	19% (6)	23% (7)	48% (15)	3% (1)
Bicycle crashes	3% (1)	3% (1)	10% (3)	19% (6)	61% (19)	3% (1)
Pedestrian crashes	7% (2)	0% (0)	3% (1)	22% (7)	64% (20)	3% (1)
Rail/auto crashes	7% (2)	7% (2)	29% (9)	13% (4)	41% (13)	3% (1)
Injury/fatality data	7% (2)	0% (0)	3% (1)	13% (4)	74% (23)	3% (1)
Property damage data	3% (1)	3% (1)	26% (8)	35% (11)	26% (8)	7% (2)
Safety belt use	7% (2)	7% (2)	29% (9)	22% (7)	26% (8)	10%(3)
DUI's	3% (1)	3% (1)	32%(10)	22% (7)	29% (9)	10%(3)
VMT growth rates	3% (1)	3% (1)	7% (2)	26% (8)	61% (19)	0% (0)
Population growth rates	7% (2)	3% (1)	10% (3)	16% (5)	61% (19)	3% (1)
Emergency medical response	7% (2)	0% (0)	35%(11)	22% (7)	25% (8)	10%(3)

* # in parenthesis represents number of survey respondents

5.6 Technical Analysis

The survey also asked about the methods and tools used by the MPOs to incorporate safety considerations into the transportation planning process (Table 5-6). Sixty-eight percent of the respondents reported using crash data trend analysis while 87% used crash records databases. Ninety percent of the MPOs reported using Geographic Information Systems (GIS) for safety data analysis and 87% acknowledged using hot spot identifications as a safety tool. Before-and-after studies were identified as a tool used for safety planning by 42% of the survey participants. Only 19% of the respondents reported using the Pedestrian and Bicycle Crash Analysis Tool software package to analyze bicycle and pedestrian crashes. Approximately 16% reported using special software such

as Critical Analysis Reporting Environment (CARE) to analyze crash data and 13% reported using accident modification factors.

Table 5-6: Methods or Tools Used by MPOs to Incorporate Safety Considerations into the Transportation Planning Process

	YES	NO	NOT SURE
Crash data trend analysis	68%(21)	29%(9)	3%(1)
Crash records database	87%(27)	10%(3)	3%(1)
Geographic Information Systems (GIS)	90%(28)	7%(2)	3%(1)
Hot spot identification	87%(27)	10%(3)	3%(1)
Pedestrian and Bicycle Crash Analysis Tool	19%(6)	74%(23)	7%(2)
Special Software (CARE)	16%(5)	77%(24)	7%(2)
Accident Modification Factors	13%(4)	71%(22)	16%(5)
Before/After Studies	42%(13)	39%(12)	19%(6)

* # in parenthesis represents number of survey respondents

5.7 Performance Monitoring

A section of the survey was dedicated to understanding the extent to which midsized MPOs use performance measures in safety planning. The first question explored the safety areas in which the MPOs were using performance measures (Table 5-7). The second question was an open-ended question that asked the survey participants to identify the data and tools MPOs need to develop a more comprehensive set of performance measures.

Sixty-one percent of the MPOs reported using system performance measures to monitor highway safety and 84% reported using performance measures to monitor congestion. Only 23% of the MPOs used performance measures to monitor transit safety.

Thirty-two percent reported using performance measures for pedestrian safety and 29% used measures to monitor progress in bicycle safety.

Table 5-7: System Performance Measures Used to Monitor Progress

	YES	NO	NOT SURE
Highway Safety	61% (19)	36% (11)	3% (1)
Transit Safety	23% (7)	68% (21)	9% (3)
Pedestrian Safety	32% (10)	65% (20)	3% (1)
Bicycle Safety	29% (9)	65% (20)	6% (2)
Congestion	84% (26)	16% (5)	0% (0)

* # in parenthesis represents number of survey respondents

When survey participants were asked to identify the data, tools, or resources they need for their MPO to develop a more comprehensive set of safety performance measures, the responses revolved around three categories. Fifteen of the thirty-one responses cited data-related needs, three MPOs needed staff-related resources, and three MPOs had additional communication needs. Four MPOs reported no additional needs for performance measurement and four MPOs were not sure what they needed to develop a more comprehensive set of performance measures.

The majority of the responses to this question cited better access to data, more data, or the implementation of a comprehensive crash database as the greatest need. Many MPOs are responsible for obtaining crash reports from local police departments and developing a crash dataset. This is a time-consuming process that causes a great deal of frustration for many in the planning process. The following responses illustrate this point:

> "Our problem is that we must collect current crash reports from each individual police agency, which takes too much time."

> "It is difficult at times to obtain crash data from the State Police - it doesn't seem to be automated and we have to sift through crash reports by hand."

Several MPOs reported the need for more comprehensive crash data. Many state databases have a delay of up to two years in availability of crash data. Some other state databases do not contain crashes on local roads. Here's what one MPO said about its data needs:

> "We are deficient in some of the main categories of data you noted: bicycle accidents, pedestrian accidents, transit accidents."

The survey results also suggested that many MPOs desire more data for safety analysis than what is available. Some of the needed data is not obtainable because crash reports do not include fields for the data types needed. Consider the following responses:

> "Crash data is limited to state trooper input on incident forms. The form used needs to be revised but the police and state trooper organizations are opposed to these updates."

> "We need better traffic volume data to enable us to calculate crash rates at intersections and on roadway links. Also, better information on crash locations would greatly improve the quality of the safety database."

Three MPOs reported that they needed more staff and technical analysis tools to develop a more comprehensive set of safety performance measures. The development of performance measures would be a time-consuming effort. These are the typical responses related to human resources and technical analysis:

> "More staff resources to dedicate time to analysis and reporting. Good data is available."
>
> "Additional personnel and Additional technology resources for ITS and emergency response."

Several MPOs cited a need for greater communication between agencies involved in SCP. One could argue that all of the needs discussed stem from this disconnect in communication between planners and decision makers and other safety stakeholders such as law enforcement and emergency management. The following are some of the responses related to the need for better communication:

> "Universal agreement on whether/how to use crash data on local roadways. Right now, some jurisdictions allow it, others do not (fear of liability issues)."
>
> "Effective communication with local agency public works staff with traffic engineering staff that continuously monitors traffic and road safety."

The development of a comprehensive set of performance measures related to safety is a difficult task for most midsized MPOs, law enforcement agencies, highway safety offices and state DOTs . MPOs of all sizes struggle in this area, but as evident from the survey responses, many midsized MPOs have data, staff, and communication challenges that make even the most basic implementation of performance measures difficult at best.

5.8 Collaborative Efforts/Partnerships

Survey respondents were asked to rate the level of involvement of several agencies that play an important role in SCP in their MPO's safety planning process

(Table 5-8). Eighty-four percent of respondents reported that their state DOT was very involved in their safety planning process with 13% ranking their state DOT as somewhat involved. Fifty-five percent reported that their local departments of transportation were very involved and 19% ranked them as somewhat involved. Only 13% and 16% of the MPOs reported their Governor's Office of Highway Safety as very involved or somewhat involved in the planning process. Twenty-three percent reported no involvement of their governor's representative for highway safety. Forty-five percent of the MPOs rated law enforcement agencies as very involved and 39% reported that law enforcement agencies were somewhat involved in the safety planning process. Sixteen percent of the MPOs reported that emergency management agencies were very involved in the planning process and 32% had somewhat involved emergency management agencies.

The survey also asked about the strategies the MPOs use to interact with other federal, state, and local agencies interested in promoting transportation safety issues (Table 5-9). Only 32% of the MPOs have a safety board or task force to promote safety planning. Thirteen percent use memoranda of understanding or charters to promote collaboration among safety professionals. Thirty-six percent of the MPOs surveyed reported holding best practice forums related to safety and 58% have technical seminars and training sessions that promote safety conscious planning. Approximately 61% of the survey participants reported that their MPO uses management level meetings and presentations to promote safety while 71% reported the use of agency-wide meetings and presentations that promoted safety.

Table 5-8: Level of Involvement of Agencies in MPO Safety Planning Process

	No Involve-ment	Very Little Involve-ment	Neutral	Some-what Involved	Very Involved	Not Sure
State Department of Transportation	3%(1)	0%(0)	0%(0)	13%(4)	84%(26)	0%(0)
Local Departments of Transportation	16%(5)	0%(0)	7%(2)	19%(6)	55%(17)	3%(1)
Governor's Office of Highway Safety	23%(7)	16%(5)	16%(5)	16%(5)	13%(4)	16%(5)
State Department of Public Safety	23%(7)	23%(7)	13%(4)	26%(8)	10%(3)	6%(2)
State Department of Public Health	32%(10)	10%(3)	13%(4)	26%(8)	10%(3)	10%(3)
Federal Highway Administration	3%(1)	0% (0)	16%(5)	39%(12)	42%(13)	0%(0)
Federal Transit Administration	7%(2)	7%(2)	23%(7)	42%(13)	19%(6)	3%(1)
Department of Education	39%(12)	13%(4)	16%(5)	6%(2)	16%(5)	10%(3)
Local Law Enforcement Agencies	3%(1)	13%(4)	0%(0)	39%(12)	45%(14)	0%(0)
Emergency Medical Responders	19%(6)	10%(3)	16%(5)	32%(10)	16%(5)	7%(2)

* # in parenthesis represents number of survey respondents

Table 5-9: Strategies Used by MPOs to Interact With Federal, State and Local Agencies That Promote Safety Issues

	YES	NO	NOT SURE
Safety Board or Task Force	32%(10)	68%(21)	0% (0)
Memoranda of Understanding or Charter	13%(4)	84%(26)	3% (1)
Best Practices Forums	36%(11)	61%(19)	3% (1)
Technical Seminars/Training Sessions	58%(18)	42%(13)	0% (0)
Management Level Meetings/Presentations	61%(19)	36%(11)	3% (1)
Agency-wide Meetings/Presentations	71%(22)	29%(9)	0% (0)

* # in parenthesis represents number of survey respondents

5.9 Assessment of Survey Results

The survey results show that all midsized MPOs in our sample have incorporated safety into their long range transportation planning goals and objectives. The majority of the MPOs interviewed explicitly included pedestrian, roadway, and bicycle safety in their transportation plans. Though 100% of the MPOs reported the inclusion of safety concepts that explicitly include roadway/highway safety, the long range plans of the respondents were reviewed and it was determined that roughly half of the MPO had explicitly addressed road and highway safety. The others included a broad statement of roadway/highway safety as a goal. Roughly half of the survey participants reported the inclusion of transit safety, railroad/highway crossing safety, and the Safe Routes to School Program. These MPOs may have very small transit programs and, therefore, do not place major emphasis on the safety of their transit systems. It is not clear why more MPOs are not including railroad/highway crossing safety and the Safe Routes to School Program in their long range plans. Nearly half of the MPOs do not have freight safety concepts in their long range plans. Freight safety has been overlooked by many MPOs and midsized MPOs may not be well-equipped to develop a comprehensive freight safety program.

The majority of the MPOs have not comprehensively integrated safety considerations in their project selection, performance measurement, and system monitoring. These results indicate that many midsized MPOs have not included safety in the part of the transportation planning process that has the potential to produce the greatest results. Project selection is the point at which the vision, goals, and objectives of the transportation plan began to become reality. If safety is not incorporated into the

project selection process, the efforts to include safety considerations in goals and objectives will be a waste of time.

The lack of quantitative safety criteria in the project selection process is likely a direct result of the challenges midsized MPOs face in data collection, technical analysis and system monitoring. Midsized MPOs typically have fewer data collection and analysis capabilities and a small planning staff.

The survey participants reported using basic data analysis tools such as crash data trend analysis, GIS, and hot spot identification. Very few of the MPOs are using special software such as CARE to analyze safety data. The results of the survey suggest that the majority of midsized MPOs do not use specialized technical tools to analyze pedestrian and bicycle data. The software may not be available to the agencies or the staff may not be trained to use the software. It is also possible that many of these regions do not have a significant enough number of bicycle and pedestrian crashes to invest the resources to conduct a high-level analysis.

The survey results also suggest that midsized MPOs have significant challenges in safety performance monitoring. Sixty-one percent of the MPOs surveyed used system performance measures to monitor highway safety. However, far fewer MPOs use performance measures in transit, pedestrian, and bicycle safety. The majority of the MPOs use performance measures for congestion management. This is likely due to the fact that all of the survey participants are in transportation management areas (TMAs) and are required by federal law to have a congestion management plan. The majority of the MPOs cited better data, more data, or the implementation of a comprehensive database as their greatest need for monitoring performance. A significant number of

MPOs also believe that additional staff and better communication could improve performance monitoring. For many of the MPOs, the development of performance measures is another task that they are not equipped to handle.

Interactions among safety agencies can lead to opportunities to combine resources. These findings suggest that midsized MPOs have a high level of involvement with state and local DOTs but minimal involvement with their Governor's Safety Representative. According to the survey, midsized MPOs are involved with their local law enforcement agencies and to a lesser degree, with emergency management agencies. The Governor's Safety Represntatives are well-connected with law enforcement agencies and state DOTs. Improving communication between the MPOs and their Governor's Safety Representative could open the door to more involvement with law enforcement agencies. Many midsized MPOs may be overlooking opportunities to coordinate their activities with safety professionals from other agencies. The problem could also be that law enforcement, emergency management, and the Governor's Safety Representatives do not view the MPOs as an important player in their planning activities.

CHAPTER 6

CASE STUDY DATA ANALYSIS

6.1 Introduction

The data collection for this research consisted of a national survey and case study interviews. This chapter discusses the data collected from the case study interviews of midsized MPOs. The case studies explore the issues identified by the national survey discussed in Chapter 5 and offer and opportunity for further investigation. Seven case studies were conducted. The case studies include interviews with planners, law enforcement, and emergency management. The areas of focus included incorporating safety considerations into long range transportation planning, decision making, data collection, technical analysis, and collaboration with planning partners. The following sections summarize each case study the conclusions of the study.

6.2 Case Study #1

The metropolitan area has a population of approximately 377,000 (2006). The region is composed of four cities and a portion of an additional county. The MPO is the result of a signed agreement among the four cities, the portion of one county, a regional council of governments, and the state DOT. The MPO's staff is supported by the planning and engineering departments of the largest city in the region. The MPO staff also acts as staff of the city government. The assistant director of planning, the city traffic engineer, a police officer from the city police department's traffic services unit, and a representative from the state law enforcement and traffic safety division were interviewed as a part of the case study.

6.2.1 Long Range Transportation Planning

The MPO's 2030 LRTP does not have a vision statement, but the executive summary does discuss the vision of the overall plan. In this summary, safety is mentioned as it relates to operational improvements and congestion management. These improvements include geometric re-designs, traffic signalization, and maintenance improvements.

The LRTP does not have any specific goals related to safety. However, safety management is specified as a program element to be considered in the planning process. Safety management involves the elimination of hazards that may pose problems within the transportation network to improve the safety and security of the transportation system. The strategies identified include upgrading traffic control devices, geometric improvements and infrastructure maintenance.

6.2.2 Decision-Making and Data Collection

The process of identifying safety issues in the region is a combination of a complaint-based system and visual identification of problems by staff driving the city streets. The engineering department identifies safety issues and notes corrections to locations through visibility improvements, signalization, intersection improvements, increasing turning radii, realignment of roadways, shoulder improvements, and channelization improvements. Safety projects are generated by the engineering department and specified in the LRTP. No weighting scale or ranking criteria has been established for the project selection process. The recommendations for projects and safety strategies are communicated to the MPO once a year when the staff is requested to

submit suggested roadway and intersection improvements to the Capital Improvement Plan.

6.2.3 Human Resources & Technical Analysis

The MPO does not use formal performance measures to monitor the transportation system. If they were to use them for safety purposes, it was suggested that they would start by using collision rates at intersections (collisions per million-vehicles-entering) and collision rates on roadway segments (collisions per million-vehicle-miles). The engineering department uses before and after analyses to look at the effectiveness of traffic safety mitigation projects, but no analysis of the impacts of safety projects is performed prior to project selection.

The local engineering departments are responsible for maintaining safety data for the region. This agency typically has two or three individuals per jurisdiction that are responsible for safety data. The department has access to a collision database maintained by the police department, with some additional information entered by traffic engineering staff.

6.2.4 Safety Leadership & Collaboration

The MPO communicates with the law enforcement agency to collect crash data. Emergency management works with the MPO to determine changes in evacuation routes. The MPO also works with county and city governments regularly through the MPO process and the approval of projects like bridge reconstruction. The agency also reported working with the state DOT to collect traffic crash data outside of its jurisdiction. The majority of the agency's communication with stakeholders is through the MPO planning process and informally by talking on the phone when problems arise.

This MPO does not currently have an official board or task force in place to handle safety issues. However, depending upon certain situations, boards or committees have been created comprised of local officials, technical personnel, and citizens to determine how to best address “hot” issues.

A law enforcement agency in the region (not the city police department) was contacted to determine how the agency interacts with the MPO. The police official reported very little interaction with the MPO directly. Most of their input is communicated through the city engineering department, city traffic engineers, city planning department and state DOT. Since the MPO staff is the city planning staff, the law enforcement officials may not realize it is the MPO staff that they are communicating with.

The city police department typically communicates transportation safety problems, concerns, and hazards to the city engineering department traffic engineers. For traffic problems related to or near municipal roads such as tall grass or large bushes that obstruct a driver’s line of sight, the city police department contacts the city public works department. For problems on state highways or interstates, the police department works with the State Department of Transportation by contacting its division office.

The police department collects traffic data by way of an in-house Unisys Corporation Mapper System that uses a custom crash information program. This system gives updated statistics every shift. The department also uses the statewide Critical Analysis Reporting Environment (CARE). The drawback to this program is that you have to wait until crash data is updated statewide every few months.

The city police department reports a good relationship with its Governor's Safety Representative. The department obtains information from, and sends representatives to, the Governor's Office of Highway Safety as needed. The department also receives information on a regular basis concerning crash data and monetary grants for traffic enforcement and enforcement-related equipment purchases. The regional highway safety office and the state department of community and economic affairs/law enforcement traffic safety division works with the police department to develop and implement traffic safety enforcement and education programs aimed at reducing crashes, injuries, and fatalities in the region. The aforementioned agencies target education efforts and the enforcement of state traffic laws to increase the quality of life for citizens in the jurisdiction.

6.3 Case Study #2

The metropolitan area has a population of approximately 426,000. The MPO's boundaries cover four counties that include four cities. Formed in mid-1993, the MPO replaced three smaller, existing MPOs while incorporating other areas no previously served. The MPO employs a full-time staff of eight individuals. The executive director, safety analyst and a law enforcement representative participated in interviews for the study.

6.3.1 Long-Range Transportation Plan

The MPO targets safety by using safety criteria for selecting capacity improving projects, emphasizing bike safety, promoting safety for all system users and recognizing that safety includes evacuation capacity. Safety goals and objectives encompass all

modes of transportation including bikes and pedestrians. Rail safety with respect to motorists, pedestrians, and bikers is also included.

The MPO's LRTP identifies "improving safety" as a goal in the planning process. To accomplish this goal, the MPO has identified the following policies or objectives: 1) ensure the safety and security of users of highway, transit, bicycle, pedestrian and freight systems, 2) fully integrate emergency evacuation issues into all regional planning, as well as corridor planning and project development, and 3) integrate traffic, bicycle and pedestrian safety considerations into programs.

6.3.2 Decision-Making and Data Collection

The MPO is in the process of implementing a regional Safety Management System (SMS). The SMS will use a regression model that taps into crash statistics, road volumes, and road characteristics to predict safety performance. The SMS will improve the MPO's safety planning and will better formalize and structure the measurement of safety performance. Though safety targets are not currently formalized, the SMS will help achieve this process and will allow for automatic generation of regional safety facts. The SMS will also estimate the cost and benefits of potential projects. The economic cost of the project will be used to generate safety improvement targets for each project. The SMS is being developed with the use of federal safety planning funds.

The MPO is currently formalizing and expanding the use of safety performance measures with the implementation of the SMS. The SMS will allow the calculation of the quantity and severity of crashes at certain locations. The SMS will also improve the quality of performance measures by incorporating more details related to volume, road characteristics and possibly population.

The MPO has a well-defined project ranking and selection process that consists of four distinct phases. The first involves screening candidate projects for eligibility; next, projects are scored by the sponsor. Thirdly, a subcommittee reviews the scores and accepts or adjusts, in consultation with the sponsor. Finally, the accepted rankings are fit into a financial plan and adjusted if necessary to reflect funding availability, prior commitments, and geographic equity. Project scoring is based on seven categories each with a maximum number of points possible. The maximum overall project score is 100 points. The seven categories are:

1) Support the regional economy (15 points)
2) Improve safety (20 points)
3) Reduce congestion/Promote mobility (15 points)
4) Protect and improve the environment (10 points)
5) Preserve and maintain the existing transportation system (20 points)
6) Favor projects for more important facilities/services/programs (15 points)
7) Favor cost-effective projects (5 points)

Safety considerations make up a significant percentage of the point system in this MPO's project selection criteria. The score for the safety category is based on points given if the project corrects or improves a potential safety problem, provides an intermodal safety improvement, enhances safety movement of bicycles, pedestrians, or vehicular traffic; provide for or enhance a safe alternate route or mode for travel; or is located on an official emergency evacuation route.

The state DOT provides crash data to the MPO and other users via its website. The crash data is released in June of each year. The data is for the previous calendar year.

This means that it takes from six to eighteen months to receive crash data for a particular date. The MPO is investigating the possibility of developing a clearinghouse of safety-related information as a part of the SMS. This information would be updated regularly by the safety organizations that contribute to the data.

6.3.3 Human Resources & Technical Analysis Tools

The MPO's safety analyst conducts data analyses and maintains safety data. The analyst is familiar with the evaluation criteria and participates in the planning process. The tools used for technical analysis include Access, Excel, and the safety management software that was being developed at the time of the interview. The SMS will allow a database of road characteristics, crash data and other information to be incorporated into a single system.

6.3.4 Safety Leadership & Collaboration

The MPO teamed up with its state highway traffic safety division to create a regional traffic safety coalition. The MPO works with the coalition to identify safety issues in the community. The coalition is an alliance of traffic safety professionals from law enforcement, education, emergency medical services, engineering and planning. The state DOT, city governments, county governments, and governor's safety representative are members of the coalition. These stakeholders participate in programs that are designed to increase safety in the region. The purpose of the coalition is to help the MPO carry out federally-funded regional planning and project development.

The MPO in conjunction with the coalition attempts to influence the safety data that is collected and how it is distributed to users. This is accomplished by the coordination between the MPO, the state DOT and organizations that represent police,

emergency management services and health care professionals on safety-data related projects.

As a portion of the coalition's responsibilities, the board collects information from safety-related professionals and the public. Monthly meetings are held with law enforcement and emergency management professionals. Narratives of safety issues are collected and discussed. Stakeholders can fill out a safety needs assessment and participate in safety issue group meetings. The coalition also distributes important safety data to the proper county and city departments.

6.4 Case Study #3

The metropolitan area has a population of approximately 497,000. This bi-state MPO has a portion of two counties and fourteen city governments in its boundaries. The MPO is a joint agency of the largest city in the region and a county that the region completely contains. The MPO employs a staff of eight individuals. The transportation planning organization coordinator, a senior planner, and a representative from the state highway patrol contributed comments to the interview process.

6.4.1 Long Range Transportation Planning

This MPO retains a consulting firm to develop its LRTP. The consultant conducted a public involvement program to identify the safety issues of the community. MPO #3 does not include a vision statement in its LRTP.

The MPO's LRTP includes two goals that incorporate safety issues. Goal 2 of the plan is to "develop and maintain a multimodal system which provides for the safe, efficient and convenient movement of people and goods." The objectives that aim to reach this goal are to identify safety issues and potential solutions, to identify areas

needing traffic operations improvements, and to expand implementation of intelligent transportation systems.

Goal 6 of the LRTP aims to “increase cooperative intergovernmental programs that enhance the safety, convenience and efficiency of motorized and non-motorized travel throughout the study area.” The plan identifies the objective of establishing a land use/transportation bi-state committee of the transportation planning organization to evaluate potential opportunities for bi-state cooperation.

The plan lists safety projects and clearly identifies projects that will improve the safety of the system. The plan clearly identifies safety-related goals and objectives, but no target values are set.

6.4.2 Decision Making and Data Collection

The MPO uses performance measures to monitor its transportation system. The plan identifies performance measures to match each transportation goal. The performance measures for the goal of “developing and maintaining a multimodal system which provides for the safe, efficient and convenient movement of people and goods” are per capita vehicle miles traveled (VMT), per capita vehicle hours traveled (VHT), crash rates, and average trip time. To measure the level of increased cooperative intergovernmental programs that enhance safety, convenience and efficiency of the transportation system, the MPO looks at the number of projects that cross state lines and the number of projects with joint funding from bi-state jurisdictions.

All of the identified performance measures are a part of the available database. The performance of the system is monitored as an activity of the LRTP update process. The consulting firm retained to update the plan is responsible for these activities.

The project selection process for the MPO uses financial constraint and categorical designation to select projects for planning and programming. Safety is not mentioned, but is assumed. Funds are sub allocated to certain types of projects. Local municipalities prioritize their own project needs and pass those priorities to the MPO for the TIP and LRTP. In the past, the MPO used a point system to select projects, but this process was difficult to work out and provided no flexibility.

6.4.3 Human Resources and Technical Analysis

The MPO uses state crash data for its safety analyses including motor vehicle, pedestrian and bicycle crashes. The region covers two states and both state DOTs maintain crash databases. The MPO believes that data is accurate and sufficient for the safety analyses conducted. The consulting firm retained to update the LRTP is responsible for the technical analysis of the safety data. Cities within the region have traffic engineering departments that analyze some city crash data for intersection improvement projects also. County governments use GIS as an analysis tool, but the MPO does not. It is not clear whether the individuals conducting the technical analysis are completely aware of the project selection process used by the MPO.

6.4.4 Safety Leadership and Collaboration

The MPO provides a forum for a variety of safety professionals to contribute to the transportation planning process for the region. The MPO's primary means of communicating with safety stakeholders is an Incident Management Task Force. The task force is used to bring law enforcement, emergency management services, hazardous materials, county DOTs, and county and city engineers together to compare notes and

discuss responsibilities. The task force meets every other month and is managed by an MPO planner. Eleven municipalities are involved in the task force.

The MPO has frequent contact with both state DOTs though a far less formal process is in place to facilitate communication. The level of involvement of the Governor's Safety Representative for the region was not well articulated by those interviewed.

Law enforcement involvement with the MPO planning process is informal. The state highway patrol collects information on engineering problems, crash reports, types of crashes and traffic congestion areas. This data is gathered by the highway patrol's professional standards department and the state DOT. The highway patrol communicates its transportation issues to the state DOT at the district level or to the strategic highway safety plan committee. Transportation safety issues and concerns are typically not communicated to the MPO. The MPO communicates mostly with the state DOT instead of the MPO.

The highway patrol has a strong relationship with its governor's highway safety representative. The department partners with the governor's representative on many initiatives. The highway patrol reports check points and holiday traffic plans to the governor's highway safety office. The state DOT also has an overtime program for troopers assigned to construction work areas. The highway patrol has regular monthly meetings with the state DOT.

The highway patrol is one of the lead agencies in the state's strategic highway safety plan development process. The highway patrol meets once a month with the SHSP development team. The state DOT oversees the development of the SHSP so it is no

surprise that law enforcement is involved in the SHSP process due to its high level of involvement with the state DOT.

Overall, the MPO reported the availability of funding for safety projects as the greatest SCP challenge. This is due in part to the fact that safety improvements are sometimes incorporated into other redesign projects when possible. When a large project is not related to safety improvement, it is more difficult to identify a funding mechanism.

6.5 Case Study #4

This bi-state MPO has a population of approximately 289,000. The MPO's boundaries include two cities, two counties, and portions of two additional counties. The two cities within the MPO boundaries have a consolidated government. The consolidated government's planning department is responsible for the staffing needs of the MPO. The director of planning, the city traffic engineer and a city police representative participated in interviews. Overall, the interviewees identified a lack of funding and a need for additional resources as the MPO's greatest obstacle to SCP.

6.5.1 Long-Range Transportation Plan

The MPO's LRTP does not include a vision statement, but has incorporated safety into its goals and objectives. The first safety-related goal is to "reduce crashes and fatalities and enhance security." The objectives for this goal include:

- Reduce the number and severity of accidents involving vehicles, bicyclists, pedestrians, and others
- Systematically correct high crash locations
- Identify, inventory, and evaluate locations that pose a significant security threat.

The plan also includes a safety-related freight goal that aims to "assure that freight moves safely and efficiently reaching its destination while minimizing impacts on sensitive community areas." The objectives identified for this goal are to allow truck circulation and movement and to provide for the special infrastructure needs. Safety projects are not listed separately in the LRTP, but safety may be identified as a reason for implementing the project.

6.5.2 Decision-Making and Data Collection

The MPO's jurisdiction spans two states. Safety data is obtained from both state DOTs' crash databases. The interviewee mentioned a delay in the availability of crash data from the state. This is not uncommon. The city traffic engineer is responsible for maintaining the safety data obtained from the state DOTs.

The project selection and prioritization process for this MPO includes safety as a factor. The project selection and prioritization process for the LRTP may be the same as the TIP, but that was not clearly specified. The process discussed in this section pertains to the TIP selection process. The TIP identifies five project evaluation factors: immediate need (based on level of service), financial consideration, safety, land use, and environmental issues. A weighted total is used to calculate the total project score. Immediate need and financial considerations received the most weight, while safety, land use and environmental issues are equally weighted.

The MPO's traffic engineer department obtains copies of crash reports from law enforcement agencies in the regions and compiles a crash database. These tasks are completed using hard copies of the crash reports. The department does not use its state DOT-maintained crash database because the crash locations are accurate to a ¼ mile. The

department is interested in a database that can be merged with GIS coordinates for crash locations.

The MPO reported using crash frequency and severity as typical performance measures. The engineering department locates and maps the top 50 worst intersections in the area based on the number of accidents in a year. This analysis is used in the project prioritization process to give a higher ranking to projects that include within its limits any of the intersections identified. This process is revisited every year as the TIP is developed. The goals and objectives of the MPO are modified every four years as the LRTP is revised and updated. These activities serve as the system performance process.

6.5.3 Human Resources & Technical Analysis Tools

Two individuals are responsible for conducting technical analysis of safety-related data. Their activities are carried out under the supervision of the traffic engineer. GIS is the primary software tool used in crash data analysis. The interviewee did not believe that additional technical analysis tools were necessary. Instead, additional time and financial resources were the most important need.

According to the traffic engineering manager, the department uses SYNCHRO to explain transportation scenarios to non-technical audiences such as commissioners. The manager expressed a need for additional tools that can assist in presenting planning and project scenarios to decision makers and the public.

6.5.4 Safety Leadership & Collaboration

The MPO works with several agencies that are involved in safety planning. The county and city governments are most involved in the MPO planning process as members of the policy, technical coordinating, and citizen advisory committees

The MPO's communication with the law enforcement community is mainly fostered by the traffic engineer. Law enforcement is in direct contact with the traffic engineer by phone or email for a variety of matters. According to the traffic engineering manager, when the city receives a call regarding a traffic safety problem, the information is sent to the traffic engineer. The traffic engineering staff investigates the problem and determines what strategies can be used to mitigate the issue. In some cases the traffic engineer sends a request to law enforcement to increase enforcement in the area.

The traffic engineering manager for the consolidated government is a member of the technical coordinating committee. This individual is highly involved in the project prioritization and selection process. Since the traffic engineering manager is the main contact for the law enforcement agencies, the technical coordinating committee is knowledgeable of traffic safety issues identified by law enforcement agencies.

Communication with the emergency management agency is handled locally. The traffic engineering department has a representative at the emergency management command post during emergency events. The traffic engineering manager also communicates with the emergency management agencies regularly by phone or email.

The director of planning was not aware of any contact with the Governor's Safety Representative for either state. The traffic engineering manager also expressed the need for greater communication with agencies involved in transportation planning decisions. The MPO needs the assistance of the Department of Safety with enforcing truck traffic. The manager had difficulties maintaining clear lines of communication with other traffic safety agencies for the state.

6.6 Case Study #5

This MPO is has a population of approximately 320,000. The MPO boundaries include eight cities and one county. A consolidated planning commission for the largest city in the region and the county provided administrative support for the MPO. The MPO has a staff of three: the executive director, director of planning and a transportation planner. The director of planning and the transportation planner provided the majority of the interview information. The director of the county emergency management agency was also interviewed for supplemental information. The major obstacles in safety planning experienced by this MPO are lack of staff and resources and the need for more detailed guidelines for implementation of requirements imposed by the Federal Highway Administration (FHWA).

6.6.1 Long-Range Transportation Plan

The MPO uses statewide crash data to identify corridors with a disproportionate number of motor vehicle and pedestrian crashes. Public meetings are conducted to involve the public in the planning process.

Safety is an important issue in the MPO's long range transportation plan. Its second goal is to "increase the safety and security of the transportation system for motorized and non-motorized users." The plan identifies the following four objectives associated with the safety goal: 1) minimize frequency and severity of vehicular accidents, 2) promote projects which aid in hurricane evacuation, 3) eliminate at-grade rail crossings, and 4) expand transit service area and increase service frequency. The goals related to safety encompass all modes of transportation, but the objectives do not address pedestrian and bicycle-related issues. The long range plan identifies projects and

categorizes the projects by type. However, safety projects are not identified specifically in the plan.

6.6.2 Decision-Making and Data Collection Processes

The safety goal and objectives have been paired with a set of performance measures to monitor system performance and to aid in the decision making process. The performance measures identified for the safety goal are total accidents per million vehicle miles traveled, injury accidents per million vehicle miles traveled, and fatal accidents per million vehicle miles traveled, hurricane evacuation route status, and transit /other safety projects.

The interviewee expressed an interest in developing county-wide crash rate averages to compare roadway segments. The statewide averages are not useful for comparison to road segments in the MPO's area because the statewide averages are highly influenced by larger metropolitan areas in the state.

The MPO has a project prioritization procedure that reflects the transportation plan goals. A quantitative project scoring criteria allocates each goal a portion of a potential 1000 points. The point allocation is as follows:

Goal	Points
1. Economic Vitality	200
2. Safety and Security	200
3. Accessibility, Mobility and Connectivity	300
4. Environment and Quality of Life	150
5. System Management and Preservation	150

The performance measures identified for each goal are allocated a share of the goal's points. The prioritization of projects in the LRTP is fairly rigid while prioritization for the TIP involves other considerations. This is mostly due to the fact that programming for the TIP is a few years away from project implementation.

The MPO does not have an established methodology for monitoring the performance of the system where safety is related. The congestion management system does have a formal feedback process and some safety projects are included in this system. The interviewee did not feel that the MPO was adequately equipped to successfully monitor safety performance and use the information to revise goals, objectives and performance measures. The staff questioned the comparability of data from today for the evaluation of projects planned nearly 10 years prior.

As with many MPOs, the availability of safety data is a matter of concern. The planner reported that only 75% of the crash data available has x and y coordinates for the crash location. Address matching is currently not available or possible for the remaining 25% of crashes.

6.6.3 Human Resources & Technical Analysis Tools

The MPO dedicates a "fraction of a single individual's time" to conducting technical analysis of safety-related data. The individual analyzing the safety data is aware of the evaluation criteria used to select projects for the LRTP and the TIP. Data is analyzed using GIS software. At the time, no other special software was used to analyze crash data. The interviewee planned to attend a state DOT-sponsored training program for the CARE program in a few weeks. The MPO reported that it was able to adequately

measure the performance measures specified in the LRTP, but obtaining better data was the most important need.

6.6.4 Safety Leadership & Collaboration

The MPO has involvement in safety planning activities with several agencies. The city and county governments in the region are very involved in the MPO planning process as the majority of projects in the LRTP are projects brought to the process through the city or county planning process. As expected, the state DOT plays an important role in the MPO planning process. The MPO also reported working with its Governor's Safety Office Representative by participating in a teleconference on how to be safety compliant.

The MPO has little communication with law enforcement and emergency management agencies in the region. The MPO attempted to get comments on the LRTP from law enforcement representatives, but received no response.

The MPO has some contact with the county emergency management agencies. Most communication involves providing traffic counts to the emergency management agency upon request. The relationship with the MPO was characterized as an informal line of communication by the emergency management representative. The emergency management agency leverages the MPO's personnel capabilities for skills such as GIS analyst when mapping location issues are being discussed. The MPO also provides demographic data to the emergency management agency for the purpose of identifying the demand for transportation options for the disadvantaged during a natural disaster or emergency.

6.7 Case Study #6

The MPO's population is approximately 523,000 and spans two states. The metropolitan area is made up of two cities, two counties and a portion of a third county. The consolidated city and county commission in cooperation with both state DOTs is responsible for MPO activities. Staff services are provided by both state DOTs, the consolidated planning commission, and the county planning staff of the other county in the region. The director of planning provided the majority of the information in the interview. The director of the county emergency management agency was also interviewed for supplemental information. The MPO reported lack of funding, time, resources, and information pertaining to safety data as challenges in planning for safety.

6.7.1 Long Range Transportation Planning

Safety considerations are addressed in some portions of the MPO's long range transportation plan. Overall, the MPO has incorporated safety into its long range transportation planning goals, but has not provided proper explanation of the strategies it will use to accomplish its safety goals. The plan does not have a goal dedicated specifically to safety, but one of its goals has an objective to provide a plan that improves travel safety. This objective does not explicitly include all modes of transportation, but vaguely mentions safety. The long range plan includes individual project sheet pages. Though safety projects are not separately listed, they are identified under the purpose and need section.

Safety issues originate from three main sources. The MPO's public involvement process includes public meetings where safety concerns often arise. The Citizen's Advisory Committee has an issues and concerns agenda item at every meeting. This is an

opportunity for members of the committee or the general public to make comments. Traffic safety issues are sometimes introduced at this time. The MPO also conducts a yearly travel time survey. Traffic safety concerns are sometimes voiced by survey participants.

6.7.2 Decision-Making & Data Collection Processes

The MPO uses performance measures for its congestion management system, but no performance measures to monitor the safety of the system. The interviewees expressed the need for technical assistance with regard to the type of performance measures used for safety and their effectiveness.

The MPO uses the state-wide crash database as its main source of safety data. This database includes motor vehicle, commercial vehicle, transit, bicycle and pedestrian data. The MPO conducts an Intersection Accident Analysis each year to identify high crash intersections in the region. The report is used to make recommendations to the traffic engineer of the city or county in which it is located. In many cases the project is programmed at that point and in other cases the improvement is made with local funds.

The project selection process uses the travel demand model to examine transportation improvements and identifies projects based on congestion, safety, connectivity, and economic development. Congestion and safety are weighted the highest and connectivity is weighted slightly less. Economic development is weighted very low.

The MPO monitors its performance with the use of the travel demand model and the Intersection Accident Analysis Report. The report is the main safety component of the system performance analysis.

6.7.3 Human Resources & Technical Analysis

The MPO's transportation planner and GIS analyst are responsible for conducting technical analyses of safety-related data. Safety analyses currently include the use of statistical software and GIS. The interviewee expressed interest in learning more about the major tools available to analyze safety data.

6.7.4 Safety Leadership & Collaboration

This MPO reported a high level of involvement with the state DOT and the county and city governments in its region. The state DOT provides technical assistance and training. The state DOT is also highly involved in MPO meetings and the policy board. The MPO's communication with its Governor's Office of Highway Safety has been minimal. The governor's representative worked with the MPO on the Bicycle and Pedestrian Plan for the region and the implementation of the Safe Routes to School Program.

The local emergency management agencies have some involvement in the regional transportation planning process. The agency participated in the development of a regional intelligent transportation system. The emergency management agency director for one of the counties reported that the agency does not deal directly with the MPO. The county's engineer and planning staff have more direct involvement and contact.

The MPO also reported a good working relationship with law enforcement agencies in the region. The interaction with law enforcement mainly revolves around the annual Intersection Accident Analysis Report. The law enforcement agencies provide data on each accident. There are no law enforcement representatives on the MPO board or technical committee.

6.8 Case Study #7

The metropolitan area has a population of approximately 229,000 (2006). The region is made up of two cities, one county and a portion of an additional county. The largest city and county in the region have a consolidated government agreement. The MPO's staff is supported by the planning staff of the consolidated government. As a part of the case study, a MPO planner was interviewed. Several attempts were made to contact suggested individuals in law enforcement, but no response was received from the law enforcement contact.

6.8.1 Long Range Transportation Planning

The MPO's 2030 Long Range Transportation Plan (LRTP) does not include a vision statement. However a very lengthy visioning process with a great deal of citizen input was conducted to develop goals and objectives for the long range plan. The MPO's LRTP outlines goals that include safety considerations. The transportation connectivity goal includes an objective to "continuously update major thoroughfare plans to reflect transportation interconnection, safety, and efficiency needs precipitated by land use changes." The mobility goal lists the enhancement of roadway safety as an objective. The goals and objectives encompass all modes of transportation. In the past, safety consideration has focused on streets and highways. In recent years there has been more emphasis on pedestrian and bicycle safety.

Another important issue has been making travel safer within residential neighborhoods. The MPO proposes to promote development of community-oriented neighborhoods and identifies the promotion of walkable/bikable/transit-friendly neighborhoods is a primary objective. For example, the MPO prepared a traffic calming

study that incorporated traffic calming into subdivision regulations and established standards for retrofitting neighborhood streets. This has improved safety in new subdivisions, but local governments have not come up with the funding to do retrofits in existing neighborhoods. Limited resources have made the multimodal approach difficult.

The LRTP does not have a specific safety-related goal, but several objectives are directly related to safety. According to the MPO planner, this approach makes safety comprehensive and blanketing all the goals of the plan. It is probably more important for safety to be included in various goals than to have a single safety-related goal. The objectives do not identify specific safety-related target values. It is believed that given current data availability, developing such targets is not possible. Instead the MPO's efforts are focused on mitigating known problems with the very limited resources available.

The MPO's LRTP includes safety-related projects clearly delineated as such. These projects are incorporated into the master list and map of projects and are also listed and shown on a separate map in a separate section that identifies safety projects. The agency listed safety-related transportation projects separately in its LRTP to highlight its dedication to the mitigation of dangerous intersections and roadways.

6.8.2 Decision-Making and Data Collection

The MPO does not used performance measures to monitor the safety or to develop targets for safety goals and objectives. Efforts have been initiated to better utilize crash data but, these efforts have not achieved the desired effect due to lack of staffing, funding, and intergovernmental cooperation at the local level.

Problems with the accuracy and availability of crash data are very common. Law enforcement in the region does not have GIS locators so the exact location of crashes cannot be recorded. The city police departments do not have the resources to fund the purchase of GIS equipment. Until recently, the agency did not have accurate GIS centerline data for roads and streets so past crash data had not been coded in such a manner that accurately records the location of the crash in the corridor.

Another GIS problem is the fact that there is no standardized accident location technique to record the location of crashes if the equipment was readily available. Due to these issues, it is not believed that the accuracy and integrity of the safety-related data available for analysis is sufficient. It was also stated that lack of funding at the local level will continue to hinder efforts in this area.

The MPO uses an informal process to select and prioritize projects for the LRTP. As noted by the planner, "safety is included as a part of every project, but safety is not designated as an individual priority." The agency is not utilizing any computer-based tools to conduct project selection.

Safety-related system performance is not currently being monitored on a regular basis. Proper data collection would be necessary to complete this task. The revision of goals and objectives to reflect actual performance is done as a part of the LRTP update.

6.8.3 Human Resources & Technical Analysis

The city traffic engineer is mainly responsible for the maintenance of the crash data. The traffic engineer compiles crash reports from police records. However, at the time of this interview, the city was no longer including a salary for a traffic engineer in their budget so an interview with the traffic engineer was not possible.

It is also evident that the individuals conducting the technical analysis process are not aware of the project selection criteria, if they exist. This suggests that the decision making process is, at best, disjointed. The agency needs proper data collection, additional staffing and increased funding to perform more useful analyses of crash data.

6.8.4 Safety Leadership & Collaboration

The main players in the MPO's planning process are the county and city governments and the DOT. Since the DOT controls the major portion of the funds for planning and project implementation, it is the driving force in planning. The DOT works to coordinate and cooperate with the local governments.

The MPO reported that law enforcement representatives are involved in the MPO meetings, though their participation is sporadic. This includes both the city police department and the county sheriff. The city police department does not participate in the MPO meetings at all while the county sheriff representatives occasionally show up at MPO meetings. The interaction between the MPO and law enforcement was described as an informal point of contact when problems or issues arise. Emergency management officials do not participate at MPO meetings. The majority of players in the planning process represent the county and city governments and the DOT.

The MPO does not have a formal set of procedures to communicate with safety stakeholders. Major safety issues are addressed as they have surfaced. This is mostly in reference to high crash areas or hot spots. Safety as a separate issue has not been a high priority. There is no task force or board mandated to address safety issues and the interviewee did not believe that such a board would be useful to the agency.

The MPO is experiencing many of the same challenges other MPOs face in safety conscious planning. The MPO does not have the staff needed to collect, maintain, and analyze additional crash data that would be useful in the planning process. The agency has, however, listed safety-related transportation projects separately in its LRTP in order to highlight its dedication to the mitigation of dangerous intersections and roadways.

6.9 Case Study Analysis

Lack of financial support, mismatched human resource capabilities, and lack of coordination with safety stakeholders were identified as barriers to more comprehensive safety conscious planning. This section focuses on the implications of the case study results.

6.9.1 Organizational Structure

Organizational structure should allow for an inclusive and collaborative process that engages stakeholders on all levels. All of MPOs interviewed had similar organizational structures and transportation safety issues. The planning and decision making processes revolve around the interaction of three committees: the Technical Coordinating Committee, the Policy Committee, and the Citizen's Advisory Committee (Figure 6-1). Each committee has specific goals and objectives with all issues and policies of the MPO being approved by the policy committee. The planning department drafts a long range transportation plan and the plan is adopted by reviewing the plan with the Citizen's Advisory Committee. The Technical Coordinating Committee then reviews and approves the plan before it is sent to the MPO board. The MPO board votes on the adoption of the plan.

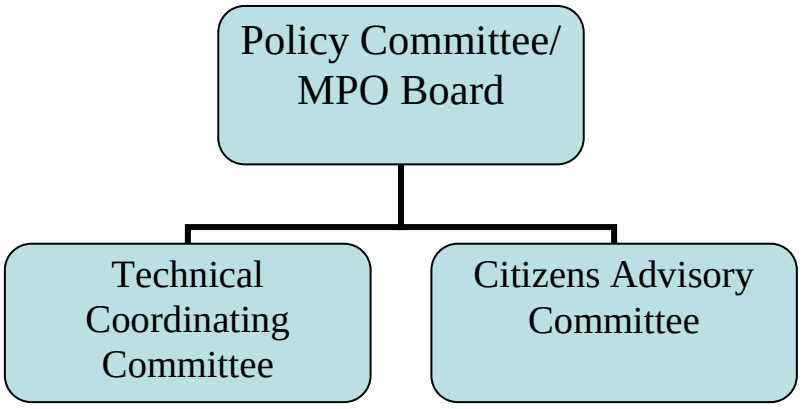

Figure 6-1: MPO Organizational Chart

6.9.2 Long Range Transportation Planning

The MPOs did not report a clear and comprehensive inclusion of safety in their vision statements. Each MPO mentioned safety within or as a goal in some manner. Unfortunately, only one MPO paired safety objectives with a specific goal. Safety projects are clearly identified in the LRTP by all of the MPOs. This suggests the importance of safety projects to the LRTP.

Identifying target values to accomplish objectives is not a strategy used by any of the MPOs in this study. Identifying reasonable target values is beyond the data and technical analysis capabilities currently available to most agencies. Forecasting or predicting future safety targets is not a current practice of the MPOs either. Though MPOs are charged with long range, future-oriented planning, safety planning has not kept pace with other planning capabilities.

6.9.3 Project Selection

Four of the seven MPOs use a formal project selection process that identifies safety as a specific criterion. These MPOs use a weighted scoring system to identify projects for inclusion in their LRTPs. In most cases, points are assigned for projects

based on factors that influence safety. Some MPOs used performance measures and others used less quantifiable factors as measures of safety impact.

Two of the remaining three MPOs reported informal consideration of safety in the selection process. This is not to say that safety is not considered in the project selection process, it is simply not a formal factor like environmental impact, mobility or congestion mitigation. The informal inclusion of safety in the selection process is a dangerous practice. It is very easy for safety considerations to take a back stage to factors that have required and quantifiable criteria.

In the last MPO the city traffic engineer, with the assistance of the engineering department in some cases, was responsible for prioritizing safety-related projects. The projects were selected based on hot spots and problems areas that have been called to the traffic engineer's attention by either public based complaints or the analysis of limited crash data. The planning staff was not involved in the project selection process for safety projects. It was clear that both the planning and engineering staff need to have better clarification of the process in which projects are evaluated and selected.

6.9.4 Performance Monitoring

Five of the seven MPOs are using performance measures to monitor their transportation systems. The majority of MPOs are monitoring the performance of their transportation system as an activity of the LRTP update process. The performance measures, goals and objectives are being revisited on each occasion that the LRTP is updated. No system performance is being conducted between these intervals. It is difficult to determine if performance measures, goals and objectives are truly being

revisited even at the LRTP update. This would be necessary if the goals and objectives included target values.

The two remaining MPOs conduct analyses of high crash locations on an annual basis. The reports generated from these analyses are used to assist local governments in identifying potential safety projects. Though this activity cannot influence the LRTP on an annual basis, it is a form of system performance monitoring.

6.9.5 Human Resources

The staff capabilities of midsized MPOs present challenges in SCP. In five of the seven MPOs, the staff was largely run by the planning and engineering staff of the region's largest city. This is quite different than large MPOs, which typically have a separate, much more extensive staff devoted solely to MPO planning and engineering responsibilities. The dual responsibilities of midsized MPO planning and engineering staff presents both a compromise in resources and time and a possibly a bias in the planning and decision making process.

Even when the midsized MPOs employ their own full-time staff, the staff is typically only 2 to 4 individuals. With such a small staff, the opportunity to have highly specialized staff with modeling or GIS capabilities is difficult. These challenges create the need for guidelines for better safety planning for midsized MPOs necessary because the institutional differences often translate into a different method of making planning decisions.

6.9.6 Data Availability

SCP is a data-driven process. Therefore the availability and quality of safety data are important issues. A major data challenge for the MPOs is the lack of GIS location

identification for crashes. The crash databases MPOs are using to analyze data does not include a geographic location data. Questionable data coupled with a lack of technical analysis tools and individuals trained to conduct in-depth analyses often results in major difficulties in identifying problem areas and making a case for solutions to resolve these problems.

6.9.7 Collaborative Efforts/Partnerships

This research effort highlights some important points regarding the relationship between MPOs and state DOTs, city and county governments, law enforcement agencies, emergency management agencies, and governor's safety representative in the region. The state DOTs and city and county governments in the region have a high level of involvement in the MPO planning process. However, the MPOs interviewed for this study did not have a formal and highly effective relationship with the law enforcement and emergency management agencies in their region or their governor's highway safety representative.

As expected, the MPOs reported that their state DOTs and city and county governments have the most involvement in their planning process. These agencies occupy the majority of the MPO board and committee seats. The city and county planning staffs also heavily influence the projects that are considered for the LRTP. In some cases, the city and county planning staffs are responsible for identifying and developing projects for consideration in their jurisdiction. Since many of the MPOs are staffed by the largest city in their region, their involvement is two-fold.

The involvement of MPOs in the SHSP development process varied greatly. Some MPOs have a number of individuals participating in the process while other MPOs

have little to no involvement in the SHSP development process. It is primarily up to the state departments of transportation to engage regional and local planning representatives in the SHSP process. The state DOT seems to have the most leverage in getting regional and local governments involved in the planning processes that extend beyond their traditional boundaries and responsibilities.

Law enforcement representatives have little or no involvement in the MPO planning process. It seems as if law enforcement agencies are more likely to report transportation safety issues to the state DOT or city engineering departments. In six of the seven cases, no law enforcement representatives are on the MPO board or on the task teams developed to address problems. The relationship between law enforcement and MPOs is informal at best.

Of the law enforcement representatives interviewed, most were involved in the state strategic highway safety planning process in some fashion. This is a logical participation because their involvement with their respective state department of transportation is frequent. The agencies that reported no involvement, suggested that the responsibility belonged to the MPO.

In one case the law enforcement agency failed to respond to requests for information by phone or email and in three other cases, the interviewee was not able to give a specific law enforcement contact. This information has several implications. First, it does not seem as if there is a very formal or frequent relationship between the MPOs and the law enforcement agencies in the region. Also, one might consider this point to lend a view to the level of responsibility the MPOs and law enforcement agencies believe

that the law enforcement community has in the planning process as far as safety is concerned.

Many of the law enforcement representatives contacted during this research did not seem to make the connection between their role in SCP and the involvement of the MPO as a forum for planning in the region. Many representatives that were contacted did not respond even after repeated attempts. This problem seems to be the result of an unclear division of responsibility and a lack of need for involvement in the planning process on the regional level. The MPO has not been identified as a regional forum for transportation planning.

Three of the MPOs interviewed gave contact information for their local emergency management agencies. The level of communication of the emergency management agencies was informal except in the one case in which the MPO has members of the emergency management agency on its safety coalition. The other two agencies that gave contact information for emergency management agencies were located in coastal regions where emergency management is a major planning issue. Both representatives reported giving to and receiving from the MPO general transportation-related data. The relationship was described as informal and initiated on an as needed basis. Neither of the two emergency management agencies was represented on any of the MPOs' planning committees or boards.

Five of the seven MPOs reported minimal involvement or communication with their states' governor's highway safety office. Several of the planners interviewed did not have contact with anyone in their governor's office of safety. The governor's highway safety offices target the law enforcement agencies by providing training and funding

support to increase enforcement efforts and educate the public. Based on the interviews, the governors' highway safety offices do not have a strong partnership with MPOs. MPO #2 has representation of their governor's office of safety on its regional traffic safety coalition. MPO #5 reported communication with its governor's office of safety for a teleconference on safety compliance.

6.10 Conclusion

The case studies and survey provide a look at the challenges midsized MPOs face in SCP. A few common themes can be identified throughout the data presented in this chapter. The common ideas are:

- Many midsized MPOs are short-staffed and overwhelmed with the planning activities and responsibilities assigned to the staff in a dual capacity.
- The accessibility and quality of safety-related data presents major challenges for midsized MPOs.
- The majority of midsized MPOs have incorporated safety consideration into their long range transportation plan, vision, goals and objectives, but quantitative analysis of safety is lacking.
- Project selection and performance monitoring are two important areas of the planning process that need additional efforts for SCP concepts to be realized.
- The collaboration of safety stakeholders involved in the transportation planning process of midsized MPOs is informal in most cases. Agencies

involved in SCP are not directly involved in the transportation planning activities of the midsized MPOs.

SCP is a multi-faceted planning issue that involves a variety of partners and players. The federal, state, regional and local planning agencies should be participants in a major effort to enhance SCP in midsized MPOs. Chapter 6 discusses the recommendations that are a result of this research initiative.

CHAPTER 7

CONCLUSIONS & RECOMMENDATIONS

7.1 Introduction

The SCP framework found in NCHRP 8-44 can be used to assess the safety and transportation planning practices of mid-sized MPOs. However, the results of this research suggest that the framework should be simplified to allow mid-sized MPOs to begin first with an evaluation of basic SCP practices and then move to more advanced questions after the initial evaluation phase. This chapter examines the applicability of the NCHRP 8-44 framework for mid-sized MPOs and recommends actions for federal, state, regional, and local planning agencies to enhance SCP strategies. The prioritization of these recommendations is also discussed to identify the recommendations that should be addressed for the greatest initial impact. The recommendations discussed in this chapter have broad implications for the transportation planning process where safety is concerned.

7.2 NCHRP 8-44 Framework Assessment

Mid-sized MPOs are governed by the same planning requirements as large MPOs. Therefore, at least on paper, the NCHRP 8-44 framework is applicable to both sized MPOs. However, many mid-sized MPO officials expressed reluctance in using SCP resources and guidebooks that have been developed generically for all MPOs. This response was primarily concerned with having the necessary financial, technical, and human resources to implement the strategies effectively. It became clear from this reaction to the NCHRP framework that mid-sized MPOs need a simplified or “starter”

framework during the initial planning assessment phase. The framework presented in the following section provides a starting point for mid-sized MPOs; as the level of safety consideration progresses, the tools and guidance provided in NCHRP 8-44 should be useful and less intimidating.

7.3 Framework for Mid-sized MPOs

The SCP framework for mid-sized MPOs provides the fundamental steps and concepts to incorporate safety considerations into the transportation planning process. The framework provides staff with a roadmap to initiate and implement a successful safety planning process that is integrated into the MPOs' existing transportation planning programs. The revised framework for mid-sized MPOs offers two preliminary steps in the process before following an abbreviated version of the NCHRP 8-44 framework.

7.3.1 Step 1: Institutional Support

The institutional environment of mid-sized MPOs is very different than that for larger metropolitan areas. The first step in building a strong foundation for safety planning in mid-sized MPOs is to establish institutional support for SCP practices. The institutional characteristics and culture of an MPO dictate the organizational and operational practices that help or hinder the conduct of transportation planning. The following questions provide an assessment of the institutional support for SCP:

- Is safety championed by management and high level advocates within the MPO? If not, who could be a good champion? Are there participants in the MPO planning process that could serve as safety champions?

- What are the institutional barriers to enhancing SCP within the MPO planning process? What changes in policy direction are needed to make this happen?
- Are technical guidelines or standard approaches in place for safety planning? If not, can the safety champion(s) influence the development of such procedures?
- What staff and financial resources are available to devote to SCP? Is the reallocation of existing staff and resources possible, or would additional staff be necessary?

7.3.2 Step 2: Outreach and Partnerships

SCP is a multi-disciplinary process that involves many stakeholders. These stakeholders represent various agencies and levels of government. Mid-sized MPOs have a good opportunity to bring safety professionals together for collaborative activities because they generally consist of a smaller number of cities and counties than a larger MPO. A comprehensive safety planning program should therefore promote outreach activities and develop partnerships among safety and transportation groups. As the regional center for collaborative transportation planning, the MPO should develop vehicles for communication, collaboration and data sharing. The following questions relate to outreach and partnership activities:

- Who are the key safety stakeholders in the region? What are the most likely motivators for their participation in SCP?

- Does the MPO provide a forum for safety stakeholders to have input into the planning process? Does the forum identify methods of formal and informal communication for the forum participants?
- Are partner agencies (state and local governments) included and involved in the safety planning process?
- Are advocacy and private sector safety groups included and involved in the safety planning process?

7.3.3 Steps 3-9

Establishing institutional support and developing outreach activities and partnerships lay the foundation for the incorporation of safety into the planning activities of the MPO. From this point, the steps follow the NCHRP 8-44 framework. However, to provide a basic framework that mid-sized MPOs can adopt in a reasonable time frame, the questions for each step have been reduced to the basic questions that are required to incorporate safety into the planning process. These steps will help mid-sized MPOs establish a basic set of SCP practices that can be enhanced as more partnerships are developed and additional resources are available.

Step 3: Vision Statement

- What are the safety issues of the region?
- Is there a regional vision statement? Is safety incorporated into this statement in a way that relates to the identified safety issues?

Step 4: Goals and Objectives

- Is safety incorporated into the LRTP goals? Is safety incorporated into the LRTP objectives and matched with these goals?

- Do the goals and objectives relate to enforcement, education, and emergency service strategies?
- Does a safety goal relate to all of the transportation modes present in the MPO's region?

Step 5: Performance Measures

- Are there safety performance measures reflecting safety-related goals and objectives?
- Do the performance measures relate to all of the modes of transportation found in the region?
- What type of data is needed to report on these measures? Is such data collected on a periodic basis?
- Are project selection criteria related to adopted safety performance measures?

Step 6: Data and Analysis Tools

- What types and sources of data are needed to support safety decisions?
- Who is responsible for collecting this data?
- What improvements could be made to this data collection effort? Are there any database management tools available to improve this process?
- Do other agencies have data that might be useful?
- Can data sharing agreements be put in place to improve data collection?
- Are safety considerations incorporated into the congestion management process (CMP)?
- What information is needed by decision makers and what tools can be used to communicate analyses results to decision makers?

- What analysis tools and staff skills are necessary to produce this information?
- What data analysis support or assistance is available from your state DOT, FHWA, and local agencies?
- Do the analysis tools cover all of the modes present in your region?

Step 7: Project Evaluation

- Is a formal project evaluation process in place and is safety explicitly considered?
- What safety evaluation tools would be desirable to improve project evaluation?
- Does the evaluation process include methods for evaluating non-infrastructure related safety strategies such as education programs?
- How are the evaluation results communicated to decision-makers? Specifically, to what extent is safety a part of this decision-maker interaction?

Step 8: Develop Plan and Program

- Do the plan and program include safety-related projects?
- Are safety benefits of projects clearly communicated in the plan?

Step 9: System Monitoring

- Is there a systematic strategy for monitoring safety performance? If not, how can one be developed?
- What safety factors are being monitored?
- What is the frequency of system monitoring activities?
- How can the system be expanded?

- What is the process for using system monitoring process as a feedback loop?
- Who will the system monitoring results be share with? What will be the format?

The revised framework provides staff with a roadmap to develop a foundation for a successful safety planning program. The steps allow mid-sized MPOs to include safety considerations in the basic components of the transportation process. These steps and questions are important elements of safey conscious planning, and allow mid-sized MPO officials to tailor a safety planning effort to their needs..

Based on a review of the existing SCP practices and needs presented in the case studies and survey, the following recommendations have been developed for mid-sized MPOs to enhance their SCP strategies. The recommendations are divided into federal, state, regional and local levels to comprehensively enhance safety considerations in the transportation planning process.

7.4 Federal Level Recommendations

Federal guidance (and perhaps directives) on SCP planning practices in mid-sized MPOs could lead to improved SCP practice. The U.S. Department of Transportation has adopted the goal of reducing motor vehicle fatalities to 1.0 per one hundred million vehicle miles traveled. The DOT has also given new directives to state DOTs with respect to the development of strategic highway safety plans. These strategies are intended to lead to a statewide focus on SCP. They are also assumed to lead to the development of additional SCP strategies that could benefit regional and local practice.

7.4.1 Best Practices Clearinghouse

Similar to larger MPOs, where peer exchanges and clearinghouses are used to foster learning among agencies, mid-sized MPO officials believe that MPOs can learn a lot from each other. As noted earlier, this is especially important given that mid-sized MPOs exhibit important characteristics that are very different from larger MPOs. The existence of a mid-sized MPO safety best practices clearinghouse would provide a forum to discuss tools used in safety planning, identify relevant issues in SCP, and illustrate examples of collaboration with safety stakeholders. The clearinghouse would provide a forum for mid-sized MPOs to gather information on SCP and to search for strategies to enhance SCP. The clearinghouse may include a message board or chat room, feature stories on mid-sized MPOs, and connect to guidance on relevant federal regulations. A section of the clearinghouse could profile strategies that are being implemented in mid-sized MPOs.

Although the clearinghouse concept described above is found in the federal recommendations section, other institutional models for implementing such a clearinghouse are possible. Organizations such as the Transportation Research Board, university transportation centers, or safety advocacy groups could also serve in this capacity (often with federal support). The Transportation Safety Planning Working Group could adopt this initiative. The intent of placing it in this category is simply to reflect the idea that such a clearinghouse should have a national focus, and thus be of federal concern.

7.4.2 Guides and Tools for Assessment

Federal transportation agencies have a long record of providing guidance or developing tools relating to specific topics (for example, the U.S. DOT has been instrumental over the past 40 years of supporting the four-step modeling process). Federal agencies are in the best position of providing guidance for mid-sized MPOs in SCP. They are also in the best position of supporting the development of new tools. Due to recent federal planning regulations and additional guidance for transportation safety planning, state DOTs and federal agencies have developed several tools for safety planning. The strategic highway safety plan (SHSP) development process is intended to bring federal, state, and law enforcement agencies to the same table for planning purposes. However, very little information has been developed for mid-sized MPOs to enhance safety planning in their regions.

MPOs have not been traditionally active in safety planning. Many planners (and engineers) consider safety to be an operations issue. To change this perception, the expectation must change at all levels of planning. Regional planning agencies should be an active participant, if not in a leadership position, in dealing with transportation safety issues. In fact, the MPO should be creating a regional atmosphere for promoting safety. To do this, MPOs need guidance, tools and resources that aid in the enhancement of safety planning efforts and promote strategies that champion a comprehensive safety approach.

The American Association of State Highway and Transportation Officials (AASHTO) developed a self-assessment tool to assist agencies involved with highway safety in judging how they might better focus or redirect their safety activities to reduce

motor vehicle fatalities and injuries. The heart of the assessment tool is a table that identifies emphasis areas and strategies based on the agency responsible for the task. The agencies included in this tool span federal, state, public works, police, and emergency management agencies. Regional and local agencies are not a part of the assessment.

Tools could be developed for application in all parts of the SCP process, or tools could be targeted on specific needs, For example, several of the mid-sized MPOs interviewed and surveyed for this research indicated that city and county governments played a major role in the identification and selection of projects. In two cases, the MPO staff was not familiar with the process used to select projects. Describing a project selection process that includes safety considerations might be an excellent case study to illustrate how safety could be incorporated into such decision making. Developing a model for project selection would help the agencies involved in the process understand their role in the selection process and the criteria used to select projects.

7.4.3 Research and Development

The federal government, either through Congressional funding of university research programs or through the U.S. Department of Transportation, has been a major supporter of transportation research. Much of the research that has been undertaken in transportation safety has been on the "hard" side, that is, survivability of passengers in crashes and in the recommended design standards or configurations for infrastructure or vehicles. Very little research has examined the institutional and policy linkages between safety and transportation planning. The federal government is in a unique position to recognize the importance of the safety challenge facing mid-sized metropolitan areas, and

in supporting research that will foster greater collaboration, and ultimately improve safety.

Research would be particularly important on implementation strategies for safety performance measures. This effort would identify safety performance measures for various modes of transportation and implementation strategies for MPOs for developing a set of performance measures. Better tools to predict and measure safety are also necessary. Many MPOs do not monitor system performance and adopt target values in their LRTP because they are not capable of accurately predicting safety benefits and do not have a clear understanding of the sensitivity of such measures.

7.4.4 Planning Policy Changes

One of the important observations that come from this research, and confirms research results from others, is that federal regulations and funding has a strong influence on what MPOs do. In many ways, mid-sized MPOs are often focused on satisfying federal requirements, with little resources left for other planning activities. As a result of the passage of SAFETEA-LU, the Department of Transportation has revised the regulations governing the development of metropolitan transportation plans and programs for urbanized areas (Department of Transportation 2007). The new rules require that the metropolitan planning process be consistent with the SHSP. The revised rules also require changes in the development and content of the metropolitan transportation plan where safety is concerned.

The rules require metropolitan transportation plans to include operational and management strategies to improve the performance of existing transportation facilities to relieve congestion and maximize the safety and mobility of people and goods. The plan

should also include a safety element that incorporates or summarizes the priorities, goals, countermeasures, or projects for the metropolitan planning area contained in the SHSP.

The planning rules address several of the inherent safety issues highlighted by SAFETEA-LU, with respect to the metropolitan planning process. However, mid-sized MPOs need greater guidance in the areas of data collection, technical analysis, and performance monitoring. The following sections discuss some of the federal planning policy changes this research proposes.

7.4.4.1 Federal Planning Requirements

Currently, there is very little acknowledgement in federal planning regulations of the differences between large and small metropolitan areas (except for those areas under 200,000 population). And yet, as seen in this research, there are some very important differences reflecting the level of resources and range of participants in the planning process where safety is concerned. To the extent that any change in federal policy is made that links transportation planning more strongly with safety, these differences need to be acknowledged. Federal planning requirements for MPOs should further split MPOs with a population greater than 200,000. Just as MPOs with less than 200,000 in population are governed by separate rules, such should be the case for mid-sized MPOs with populations of 200,000 to 600,000. This range is simply an example of the further division of planning requirements that may be necessary for MPOs that are not major metropolitan areas.

7.4.4.2 Safety Data Improvements

The availability of accurate and accessible safety data is the first issue most planning organizations must address before developing a comprehensive safety program. Section 2006 of SAFETEA-LU establishes a new program of incentive grants (under

Section 408 of chapter 4 of Title 23) to encourage states to improve the timeliness, accuracy, completeness, uniformity, and accessibility of state data that is needed to identify priorities for national, state, and local highway and traffic safety programs.

MPOs have no role in this grant program in its current state. The grants program should require state databases to be available to regional and local governments. The program should also require states to identify procedures to communicate to MPOs what data is available and how MPOs can have access. This program should also require states to provide assistance to MPOs that are deficient in staff and resources to analyze safety data. The state should be allowed to use the funds to provide small and mid-sized MPOs data assistance and access to software and analysis tools needed to analyze safety data. Finally, the grants program should improve safety data by defining good inventory data and institutionalizing improvement toward established performance measures.

7.4.4.3 Safety Funding Programs

One of the most significant ways of influencing MPO decision making and institutional strategies is to provide funding, either for planning activities or for program implementation, or both. The categorical allocations of federal highway funds leave most of the funding decisions to state DOTs, although for certain types of funding programs, the MPOs are the ones who are supposed to make the allocation decisions (for example, Surface Transportation Program funds in metropolitan areas). Not surprisingly, most MPOs focus on those programs and thus those issues for which there are funds. The federal government provides some targeted safety funds to support projects that have large safety benefits. These programs include Section 402, 408, 148, and 130 funds. However, few MPOs typically apply for these funds and very few mid-sized MPOs have received these funds. It is unclear why MPOs typically do not apply for these safety

funds. It is likely that the process requires the attention of numerous staff members and a detailed data analysis. This fact alone may explain why mid-sized MPOs are not applying for the funds. In addition to the additional time required, mid-sized MPOs may not apply for the grant funds because they do not feel that mid-sized MPOs have a chance, when competing with large MPOs, to successfully win the funds. Perhaps the grants program should take population into account and provide separate awards for metropolitan areas of various population ranges.

These matters warrant an investigation of the reasons MPOs are not applying for these safety grants and the fairness of all organizations competing for the same funds. The guidelines and requirements should be revised to receive more participation from MPOs.

7.4.4.4 SHSP Coordinator

SAFETEA-LU requires states to develop a SHSP to receive Section 402 safety grants. States are not required to designate a SHSP Coordinator even though state DOTs are required by federal guidelines to identify coordinators for special areas such as bicycle and pedestrians or congestion management. The development and update of the SHSP is an ongoing process that requires continuous collaboration and communication with safety professionals in various organizations. A SHSP Coordinator would be responsible for facilitating the process and involving representatives from organizations and metropolitan areas that are often overlooked in the SHSP process.

7.5 State Level Recommendations

There are two major actors at the state level that could play an important role in fostering a closer linkage between transportation planning and safety—the state DOT and the Governor's Highway Safety Representative (GR). Both these agencies can set the

tone for SCP statewide. The DOT, in particular, has a major influence on highway operations planning and in establishing the process for allocating investment dollars. The GR has varying roles around the country, although most of their activities relate to supporting targeted enforcement efforts and in supporting data collection. There was very little evidence from this research that the GR office has played an active role in fostering better SCP in the cases that were examined. This represents an opportunity lost.

7.5.1 Technical Support and Training

The most common request from MPOs for assistance regarding SCP is the need for additional training in data analysis and other technical planning support. Training can be supported from a variety of sources, but it does seem that both the state DOT and GR are uniquely positioned to support training efforts statewide. For example, only one MPO analyzed as part of this research employed a full-time safety data analyst.

State DOTs can provide technical training of MPO employees or offer data analysis services for agencies that do not have adequate staff. These services may include an annual safety report for the region or some other basic safety analysis that the MPO can use as a basis for SCP activities. State DOTs may even provide custom datasets and filters for MPOs that have limited staff and data analysis capabilities. These datasets and filters would be derived from the state crash database and save MPOs the time of cleaning and filtering datasets to conduct analysis of their region.

All of the MPOs interviewed for the study used their state's crash database as a primary source of crash data. However, the familiarity of the MPO staff with their respective state DOT's office of planning staff varied greatly. Four of the seven MPOs wanted better knowledge of data and data analysis software provided by the state DOT.

Mid-sized MPOs stand to benefit greatly from a better working relationship with its state DOT's office of safety.

State DOTs should work to strengthen their relationship with midsized MPOs. Larger MPOs often dominate the state planning process. State DOTs should encourage a more close knit relationship between MPO planning staff and the state DOT office of safety. Planners and managers at midsized MPOs should be familiar with the department within their state DOT that maintains the state crash database and the individuals responsible for offering safety data assistance.

This research raises an interesting question concerning the role of the Governor's Highway Safety Representative (GR). Such agencies are themselves limited in terms of staff capabilities and availability of funding. Accordingly, they have focused on what they consider to be their greatest areas of influence, for example, enforcement and education campaigns. However, it was striking in this research that the GR was not really recognized by mid-sized MPO staff members as an influence in transportation safety at all in their region. In many cases, the staff members could not identify what the GR does in the state. Given the need for technical support and training of staff in the basics of transportation safety, there seems to be an important role for the GR, especially in mid-sized metropolitan areas. Whereas in larger MPO regions, there is often sufficient staff and resources to conduct SCP activities, and thus GR support might make such a large impact, in mid-sized MPO regions, GR involvement could have a significant influence.

7.5.2 Strategic Highway Safety Plan Development

State DOTs are also responsible for the development and implementation of a statewide strategic highway safety plan. This plan is supposed to reflect the overall highway safety goals for the state. The new planning rules developed as a result of SAFETEA-LU require the MPO's metropolitan transportation plan to include a safety element that incorporates the priorities, goals, countermeasures, or projects for the metropolitan area in the SHSP (Department of Transportation 2007). In many cases, mid-sized MPOs were not involved in the development of these plans, nor did they know how these plans would even influence their activities or the safety experience in their regions. Again, this represents a loss of opportunity of involving important transportation planning process participants in the safety program of the state. State DOTs may benefit from the development of a more detailed plan for the participation of regional and local government planning representatives in the SHSP process.

Participating in the SHSP development process is a great opportunity for MPOs to understand the transportation safety issues statewide and make connections with safety professionals that partner in the process. Exposure to the SHSP process allows MPO planners and decision makers to develop beneficial relationships with safety professionals that can aid in the MPOs' planning activities. The process also helps safety professionals better understand the responsibilities and challenges of transportation professionals.

The SHSP development process requires the merging of engineering, enforcement, emergency management, and education. Professionals in each of these areas often do not understand the challenges of their counterparts. For example, law enforcement professionals play a key role in identifying traffic safety issues because they

work in the field dealing with motor vehicle crashes. But often police officers are not aware that the crash reports they complete are used to compile crash databases for state and local governments. The accuracy and integrity of the crash reports directly influence the crash reporting and collection systems used by state, regional and local agencies.

The development of a comprehensive SHSP process that involves all MPOs in a state is also beneficial for promoting data sharing. Many agencies that collect data related to traffic safety planning do not have agreements or provisions for the sharing of data, an institutional linkage that would be mutually beneficial to many different agencies. For example, crash database records are often not linked to citation information from driver services and emergency management response information because the various agencies do not have a formal agreement to share the data. Often, agencies charge a fee for such data queries. For mid-sized MPOs, this lack of coordination can be particularly challenging. State and local agencies should work together and develop clear procedures and provisions for data sharing. The SHSP development process offers a forum for such collaboration.

In addition to the involvement of MPOs and local governments in the SHSP process, the LRTP and TIPs of these agencies should reflect the goals of their state SHSPs. Around the country, many state DOTs have developed the SHSP with the assumption that "others will follow suit." This is not likely to happen unless more active engagement between the state DOT and the GR occurs.

7.5.3 Partnership Development

The state DOT and GR can act as enablers for MPOs to develop stronger partnerships with safety professionals. These relationships can be cultivated by both

agencies because of their unique statewide responsibilities. The governor's highway safety office deals mainly with educational programs involving highway safety. This agency already maintains a positive and strong relationship with law enforcement agencies. If MPOs and governor's highway safety offices can develop a more formal relationship, an important bridge would be built between the law enforcement and planning communities.

The governor's highway safety representatives provide grants and incentives to law enforcement agencies to improve highway safety. This agency could provide grants and incentives for the purchase of GIS equipment by local law enforcement agencies needed to improve crash database location information. Many governors' safety offices provide supplementary training opportunities for members of law enforcement that specialize in traffic safety operations. The agency could incorporate training modules that focus on the role of law enforcement in crash data collection and transportation safety planning. In addition, training programs could be developed specifically targeted at MPO, city and county planners with special consideration given to the safety challenges of mid-sized metropolitan areas.

7.6 Regional Level Recommendations

Regional transportation planning is a collaborative process in which the MPO is supposed to play a significant role. The MPO is charged with providing a fair and impartial setting for effective regional planning. The process is supposed to include all parties that might have an interest or stake in the effective performance of the region's transportation system. SCP also calls for the planning process to bring all stakeholders in traffic safety to the planning table.

The MPOs studied in this project showed a high level of collaboration with agencies responsible for engineering services. However, there was very little formal relationship with the enforcement, education and emergency management agencies in their region. The following recommendations can assist mid-sized MPOs in creating a more comprehensive SCP forum.

7.6.1 Safety Leadership

An important aspect of bringing about change in an organization is the presence of a champion. One of the most important steps that an MPO can do to foster greater concern for safety is to establish an institutional foundation for a safety champion. By this is meant that the "champion" could be a committee or task force, or for that matter, the MPO could identify a prominent leader in the community and support this person in acting as a spokesperson for improved safety on the transportation system.

A champion might also be on the staff of the MPO, and thus could act as a catalyst for change in the organization. The MPOs that reported significant accomplishments in SCP were led by individuals who have made safety an important mission for the organization. It is also important to note that if the MPO's leadership is dedicated to SCP initiatives they can work to engage leadership of collaborating agencies in the process. For mid-sized MPOs, which have limited staff resources, the best internal champion would most likely be the executive director or director of planning.

7.6.2 Safety Information System

The identification and communication of regional safety issues from other safety stakeholders is an area that needs improvement. The implementation of a Safety Information System would allow safety professionals and the general public to voice

concerns about transportation safety. The system could be telephone or internet based, or a combination of the two. As reports are received by the system, the MPO could identify the best approach for handling them. This procedure should identify:

- Individual(s) responsible for documenting receipt of the reports,
- Individual(s) responsible for reviewing the reports,
- The process for documenting the MPO's response or action taken, and
- An archival system for reports for future references.

This approach might be an ideal role for the MPO. The focus of the safety information system is not its complexity but the identification of a formal procedure to address traffic safety concerns. Law enforcement, emergency management, city and local government agencies are more likely to get involved if a formal process to handle their concerns is in place.

7.6.3 Safety Advisory Committee

Mid-sized MPOs should establish formal and informal means of collaborating with law enforcement, emergency management, the GR, and other safety stakeholders. One way of doing this is to create a Safety Advisory Committee for safety stakeholders to interact, learn procedures to communicate problems, understand each stakeholder's purpose and intent, exchange information, and to find solutions to common problems. Such an advisory committee or coalition should hold meetings outside of the regular MPO meetings so that safety issues can be at the forefront of the agenda. Activities that promote formal collaboration include regularly scheduled meetings, a list serve, data exchange agreements, and equipment and technology sharing.

Perhaps the most important aspect of a Safety Advisory Committee is the development of procedures for collaboration. Such an initiative helps stakeholders identify processes for handling collaboration and the types and level of resources each agency brings to the process. Participating agencies can gain a better understanding of their role in safety planning and of the goals of other agencies.

7.6.4 MPO Committee Representation

Mid-sized MPOs have a unique opportunity to involve individuals from engineering, enforcement, education and emergency management in the planning process. They typically have fewer jurisdictions to include on the policy board and in the committees. Including law enforcement and emergency management agencies formally on such committees could be an important first step in encouraging greater collaboration. For larger MPOs, where such representation has happened, the limited evidence available suggests that this representation has in fact led to more coordinated safety activities in the region.

7.7 Local Level Recommendations

The case studies presented in Chapter 5 reported that city and county governments in the region have a high level of involvement in the MPO planning process. For mid-sized metropolitan areas, this level of involvement seems to characterize the MPO process. Thus, to some extent, the institutional dynamics of transportation planning and safety in mid-sized metropolitan areas depends on the willingness of local governments to support more coordinated efforts. In addition, the extent to which local governments participate in implementing the state's SHSP will be an important indication of their

willingness to place safety concerns at a higher level in the region's transportation planning process.

7.7.1 SHSP Involvement

City and county planning agencies should participate in the strategic highway safety plan update processes. The SHSP development process is often disproportionately represented by a few leading agencies and typically large metropolitan areas. Mid-sized metropolitan areas contain smaller cities and counties. These jurisdictions need to be sure their cities and counties are represented and their concerns are communicated in the SHSP process. This participation could occur through professional organizations, or could be led by MPO representatives.

7.7.2 Partnership Development

The local governments of the region can play a significant role in encouraging agencies to interact with their MPO. Often, the limited staff size of city agencies constrains the level of effort that can be undertaken with respect to coordinating a much broader planning process. However, smaller agencies often have a more direct line of authority. Thus, a city planning department could work with city police departments to develop a relationship with the MPO. The county planning department could work jointly with county law enforcement and emergency management agencies to participate in activities that open the lines of communication in the planning process. The greater involvement the local agencies have in the regional planning process, the more potential for comprehensive and equitable decisions.

7.8 Prioritization of Recommendations

While all of the recommendations discussed in this chapter are important and have the potential to change SCP in mid-sized MPOs, it is important to discuss which recommendations should have the highest priority. Safety data is the foundation of a comprehensive safety program and thus the recommendations for state DOTs to provide mid-sized MPOs with data, data analysis assistance, and training should be a first priority. Many state DOTs are working diligently to improve their state databases and have safety professionals well-trained in safety planning. State DOTs can provide mid-sized MPOs immediate assistance in their safety planning.

The changes to federal planning policies recommended by this research have the potential to have the most long-term influential effects on SCP. The policy changes can provide more accessible safety grant funding for mid-sized MPOs. Revising the policies for Section 408 funds to include a more specific role for MPOs can also improve the funding capabilities for state DOTs and MPOs with respect to safety data. These changes also require state DOTs and MPOs to understand and address the needs of MPOs where safety data is concerned.

7.9 Focus Group

A focus group of seven planning professionals was conducted to determine how the recommendations, developed as a result of this research, would be viewed by planning professionals in mid-sized MPOs. The participants were asked if the recommendations were feasible and comprehensive. The group was also asked if, in their professional opinion, the recommendations have the potential to improve safety in mid-

sized MPOs. The focus group was comprised of planners, executive directors, and a governor's safety representative director.

The feedback from the focus group was positive. Overall, the entire group believed the recommendations were comprehensive and did not omit any major areas related to safety planning. The participants especially agreed with the recommendation to increase the technical support and training provided by state DOTs.

The focus group also agreed with the recommendations for federal agencies to provide a mid-sized MPO best practice clearinghouse and tools and guidance for improving safety planning practices. The group believed that these resources in addition to increased technical support and training provided by state DOTs would help mid-sized MPOs overcome their staff shortages. The group also overwhelmingly agreed that changes in federal planning policies are necessary.

APPENDIX

Safety Conscious Planning Survey

The survey consists of eleven (11) questions. Please answer each question to the best of your knowledge. The survey will take about twenty (20) minutes to complete. If you have any questions, please call Danena Gaines at (678)245-2227.

Background Information

1. Which best describes your MPO role/position?

- ☐ Planner/Analyst
- ☐ Engineer
- ☐ Manager
- ☐ GIS Support
- ☐ Other (Please Specify)

2. Indicate the state(s) included in your MPO's boundary.

Long Range Planning

3. Do the following elements of the transportation planning process for your region explicitly include safety as a topic of study or as a policy issue.

	Yes	No	Not Sure	Not Applicable
Vision Statement	☐	☐	☐	☐
Goals	☐	☐	☐	☐
Objectives	☐	☐	☐	☐
Regional transportation plan	☐	☐	☐	☐
TIP	☐	☐	☐	☐

4. Do your MPO's transportation planning goals and objectives explicitly include any of the following concepts:

	Yes	No	Not Sure	Not Applicable
Pedestrian Safety	☐	☐	☐	☐
Roadway/Highway Safety	☐	☐	☐	☐
Bicycle Safety	☐	☐	☐	☐
Transit Safety	☐	☐	☐	☐
Railroad/Highway Crossings	☐	☐	☐	☐
Safe Routes to School	☐	☐	☐	☐
Freight Safety	☐	☐	☐	☐

5. Discuss your MPOs project selection process. How are projects selected and is safety included as a factor?

Safety Data

6. Rate the importance of the following data for transportation planning and decision-making in your region:

	Definitely not important	Probably not important	Neutral	Probably important	Definitely important	Don't know
Vehicle crash data	☐	☐	☐	☐	☐	☐
Transit/Paratransit crashes	☐	☐	☐	☐	☐	☐
Truck crashes	☐	☐	☐	☐	☐	☐
Bicycle crashes	☐	☐	☐	☐	☐	☐
Pedestrian crashes	☐	☐	☐	☐	☐	☐
Rail/auto crashes	☐	☐	☐	☐	☐	☐
Injury/fatality data	☐	☐	☐	☐	☐	☐
Property damage data	☐	☐	☐	☐	☐	☐
Safety belt use	☐	☐	☐	☐	☐	☐
DUI's	☐	☐	☐	☐	☐	☐
VMT growth rates	☐	☐	☐	☐	☐	☐

Population growth rates	☐	☐	☐	☐	☐	☐
Emergency medical response	☐	☐	☐	☐	☐	☐

Technical Analysis

7. Which of the following methods or tools are used in your MPO to incorporate safety considerations into the transportation planning process?

	Yes	No	Not Sure
Crash data trend analysis	☐	☐	☐
Crash records database	☐	☐	☐
Geographic Information Systems (GIS)	☐	☐	☐
Hot spot identification	☐	☐	☐
Pedestrian and Bicycle Crash Analysis Tool (software package)	☐	☐	☐
Special software (e.g. CARE)	☐	☐	☐
Accident Modification Factors	☐	☐	☐
Before/After Studies	☐	☐	☐

Performance Monitoring

8. Does your MPO use system performance measures to monitor progress in the following areas?

	Yes	No	Not sure
Highway safety	☐	☐	☐
Transit safety	☐	☐	☐
Pedestrian safety	☐	☐	☐
Bicycle safety	☐	☐	☐
Congestion	☐	☐	☐

9. What data, tools or resources are needed for your MPO to develop a more comprehensive set of safety performance measures?

Collaborative Efforts/Partnerships

10. Rate the level of involvement of the following agencies in your MPO's safety planning process:

	No involvement	Very little involvement	Neutral	Somewhat involved	Very involved	Not sure
State Department of Transportation	☐	☐	☐	☐	☐	☐
Local Departments of Transportation	☐	☐	☐	☐	☐	☐
Governor's Office of Highway Safety	☐	☐	☐	☐	☐	☐
State Department of Public Safety	☐	☐	☐	☐	☐	☐
State Department of Public Health	☐	☐	☐	☐	☐	☐
Federal Highway Administration (FHWA)	☐	☐	☐	☐	☐	☐
Federal Transit Administration (FTA)	☐	☐	☐	☐	☐	☐
Department of Education	☐	☐	☐	☐	☐	☐
Local law enforcement agencies	☐	☐	☐	☐	☐	☐
Emergency medical responders	☐	☐	☐	☐	☐	☐

11. Do you use any of the following strategies to interact with other federal, state and local agencies interested in promoting transportation safety issues?

	Yes	No	Not sure
Safety board or task force	☐	☐	☐
Memoranda of understanding or charter	☐	☐	☐
Best Practices Forums	☐	☐	☐
Technical Seminars/Training Sessions	☐	☐	☐
Management level meetings/presentations	☐	☐	☐
Agency-wide meetings/presentations	☐	☐	☐

Interview Questions

Long-Range Transportation Plan

- Is safety included in the vision statement of the current transportation plan? If yes, what safety aspects are included in the vision statement? If no, what steps would be necessary to include safety in the vision statement?
- What safety issues have been identified by the community? How have these safety issues been identified?
- Is safety incorporated into the goals and objectives of the transportation plan? If yes, are there specific safety-related objectives to match the safety-related goals? If no, what steps are necessary to develop safety-related goals and objectives?
- Can the target values defined in the objectives be forecasted or predicted? If yes, what processed was used to forecast or predict the target values? If no, why is forecasting or prediction not possible?
- Have the target values defined in the objectives been tested to determine if target values can be reached? If yes, what methods were used to test the target values? If no, what would be necessary to test the target values?
- Do the goals and objectives encompass all modes of transportation? If no, what modes of transportation are included in the goals and objectives? Are some modes not included because they are not considered a part of safety analysis or are there some other reason?
- Does the transportation plan and program include safety-related projects? If yes, are the safety-related projects clearly indicated in the plan and program? If no, what is necessary to include safety-rated projects in the plan?

Decision-Making and Data Collection Processes

- Are performance measures used to monitor the performance of the transportation system? If yes, are any of these measures safety-related and which goals and objectives do the measures match? If no, how would you go about developing performance measures related to safety?
- How does the agency ensure that the performance measures selected are sensitive enough to project changes in the system after implementation?

- Does the number of performance measures adequately address the safety goals and objectives?
- Are the selected performance measures a part of the available data stream? If no, how would you implement a process to include the data? Are the capabilities available to collect such information?
- Does the state or region have a systematic data collection process for safety data?
- What are the sources for safety-related data? What types of data are included? Transit, bicycle, pedestrian, etc?
- Is the integrity and accuracy of the safety-related data available sufficient? If no, what do you propose be done to improve the quality of the data?
- Are the safety-related variables needed to assess performance measures available and accurate?
- Are safety-related data shared between departments?
- Is safety included as criteria for project evaluation? If not, how would you go about including safety as criteria for project evaluation?
- Are there computer based tools that can or are being used in the evaluation process? If not, what is necessary to obtain and use such tools?
- Does the agency monitor safety-related system performance on a regular basis? If no, how would you go about monitoring the system?
- As the performance of the system is monitored, what is the process of revising goals, objectives, and performance measures to reflect actual performance?

Human Resources and Technical Analysis Tools

- Who is responsible for maintaining safety data?
- How many individuals are responsible for conducting technical analysis of safety-related data?
- Are the goals of the technical analysis process aligned with the project and alternative evaluation criteria? Are the individuals conducting the technical analysis aware of the evaluation criteria?

- What tools, i.e. software, databases, etc., are used to conduct technical analysis? Is GIS used to organize and analyze safety-related data? Are there additional tools your agency desires to obtain? What are the barriers?
- Do the technical analyses the agency is able to conduct adequately measure the performance measures specified? If no, what additional resources are needed to adequately measure?

Safety Leadership & Collaboration

- How and to what degree does the agency collaborate with the following safety stakeholders?
    - Law enforcement
    - Emergency Management
    - County and city governments
    - State Department of Transportation
    - Governor's Safety Office Representative
- How does the agency communicate its safety desires to other stakeholders and determine the needs of stakeholders?
- Is any type of board or task force dedicated to safety in place? If not, do you see any need for such a board or task force? How would you go about implementing one?

Final General Questions

- What current safety-related programs are in place, and who has partnered to implement these programs?
- What are the major obstacles you have experienced in incorporating safety concerns into transportation planning?

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VITA

Danena Lewis Gaines was born in Warner Robins, Georgia. As a Cooperative Developmental Energy Program Scholar, she received a five-year dual degree scholarship to Fort Valley State University where she obtained a bachelor's degree in mathematics and a bachelor's degree in civil engineering from Georgia Institute of Technology. Upon completing her undergraduate studies, Danena enrolled in the Civil and Environmental Engineering master's program at the Georgia Institute of Technology. She received her master's degree in Civil and Environmental Engineering in May 2003 and a Ph.D. in the same field in December 2007.

During her tenure as an undergraduate and graduate student, Danena was the recipient of many scholarships and fellowships including; the Georgia Institute of Technology Presidential Fellowship, the Harriett G. Jenkins Pre-doctoral Fellowship, the Dwight D. Eisenhower Transportation Fellowship, and the Facilitating Academic Careers in Engineering and Science (FACES) Fellowship. Danena also founded the Women's Transportation Seminar (WTS) student chapter at Georgia Tech in 2005 and served as the organization's first president until December 2007. Danena was an active member of the Georgia Tech Black Graduate Student Association (BGSA), where she served as the University Relations Chairperson. She was also a member of the student chapter of the Institute of Transportation Engineers and served as chapter secretary.

Danena resides with her husband Jason in Smyrna, Georgia. In her spare time she enjoys scrap booking, photography, reading, and biking.