FHWA-NJ-2005-01

New Jersey Congestion, Security, and Safety Initiative

FINAL REPORT
January 2005

Submitted by

Dr. Claudia Knezek
Program Development Administrator

Joseph Orth
CAIT-LTAP Director

Dr. Ali Maher
Professor and Chairman

Dept. of Civil & Environmental Engineering
Center for Advanced Infrastructure & Transportation (CAIT)
Rutgers, The State University
Piscataway, NJ 08854-8014

NJDOT Research Project Manager
Dr. Nazhat Aboobaker

In cooperation with

New Jersey
Department of Transportation
Bureau of Research and Technology
and
U.S. Department of Transportation
Federal Highway Administration

Disclaimer Statement

"The contents of this report reflect the views of the author(s) who is (are) responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the New Jersey Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation."

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein. This document is disseminated under the sponsorship of the Department of Transportation, University Transportation Centers Program, in the interest of information exchange. The U.S. Government assumes no liability for the contents or use thereof.

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FHWA 2005-01		

4. Title and Subtitle	5. Report Date
NJ Congestion, Security, and Safety Initiative	January 2005
	6. Performing Organization Code: Rutgers CAIT-LTAP
7. Author(s): Dr. Claudia Knezek, Joseph Orth, Dr. Ali Maher	8. Performing Organization Report No.: FHWA 2005-01
9. Performing Organization Name and Address: New Jersey Department of Transportation, CN 600, Trenton, NJ 08625	10. Work Unit No.
	11. Contract or Grant No.
12. Sponsoring Agency Name and Address: Federal Highway Administration, U.S. Department of Transportation, Washington, D.C.	13. Type of Report and Period Covered: Final Report, 12/11/2002 – 03/31/05
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The purpose of this project was to examine the relationship between effective national transportation congestion, security, and safety technology transfer applications. Next, a comparison had been made between national trends and the conditions found in New Jersey, and then the most appropriate solution was implemented. When examining the national transportation congestion, security, and safety technology transfer trends, the findings showed that security and congestion were interrelated through safety. Specifically, reduction of roadway crashes, adjustment of driver behavior, and use of safety counter measure applications had impacted both domains. They were similarly reflected in New Jersey with safety being an integral component of security and congestion.

As a result, the Safety Conscious Planning (SCP) Model, a comprehensive safety system, had been selected and implement as the network because it promoted the reduction of crashes that affect the security and congestion of the entire transportation infrastructure in New Jersey. The intended benefit of this implementation effort was realized when funding opportunities, resources, and technical support had reached county and local municipalities, where over sixty percent of the roadway fatalities occur annually. Another gain had been the collective empowerment of a partnership being applied to resolving regional safety issues. Also, SCP facilitated the involvement of local elected officials working together with safety professionals to organize local safety networks in their own communities.

17. Key Words	18. Distribution Statement
Safety Conscious Planning, Local Safety Agencies, Technology Transfer, Metropolitan Planning Organizations, and Safety Networks	

19. Security Classif (of this report)	20. Security Classif. (of this page)	21. No of Pages	22. Price
Unclassified	Unclassified	126	

Form DOT F 1700.7 (8-69)

Acknowledgments

During the past several years, Lawrence Cullari and Patricia Leech (FHWA-NJ Division) and Dr. Nick Vitillo (NJDOT, Research) have recognized and equally promoted technology transfer services of the New Jersey CAIT-LTAP Program throughout New Jersey. Their continued support has enabled New Jersey CAIT-LTAP to form partnerships with other agencies such as the New Jersey Division of Highway Traffic Safety, where they have worked with Mr. Al Tindall to provide roadway safety training for local governmental agencies. More recently, Dr. Ali Maher, Director of CAIT, and Joseph Orth (Director of CAIT-LTAP), have received support from Patricia Ott, Director NJDOT Division of Traffic Engineering to develop the New Jersey Transportation Safety Resource Center (TSRC) that is being developed to support local transportation safety efforts throughout the state.

The LTAP staff members are also recognized for their work on the project, which includes support provided during the editing and data collection tasks. Also, this group was instrumental in coordination of the many meetings and forums that were held in conjunction with this project, which establishes the first statewide safety network in the New Jersey and possibly the nation.

Rosemarie Anderson, Delaware Valley Regional Planning Commission, was instrumental in sponsoring the county wide forums and the local pilot project in her region. Gregory Sandusky and George Filak, Mercer County Engineering Department, are acknowledged for their efforts in supporting the development of a safety network in Mercer County. Also, the Princeton Township Ad Hoc Safety Committee is commended for their foresight in establishing a local comprehensive network many years ago.

The Safety Conscious Planning Committee, consisting of the following representatives, is recognized for their tireless efforts in promoting Safety Conscious Planning within their own organizations and throughout the state:

Rosemarie Anderson, Delaware Valley Regional Planning Commission
William Beans, NJDOT Bureau of Safety Programs
Ann Burton, National Highway Traffic Safety Administration
Tim Chelius, South Jersey Transportation Planning Organization
Steve Decker, NJDOT Transportation Planning
Charles Feggans, New Jersey Division of Highway Traffic Safety
Raymond Glowacki, New Jersey State Police
Lois Goldman, New Jersey Transportation Planning Authority
Claudia Knezek, Rutgers CAIT-LTAP
Patty Leech, FHWA-NJ Division
Jerry Mooney, NJDOT Transportation Planning
Marhaba Omer, NJDOT Bureau of Safety Programs
Scott Oplinger, NJDOT Traffic Engineering and Safety
Joseph Orth, Rutgers CAIT-LTAP
Patricia Ott, NJDOT Traffic Engineering and Safety

Jill Parham, Rutgers CAIT-LTAP
Chris Rotondo, Federal Motor Carrier Safety Administration
Bill Schiavi, South Jersey Transportation Planning Organization
Richard Simon, National Traffic Safety Administration
Dale Sulpy, NJ Transit
Albert Tindall, New Jersey Division of Highway Traffic Safety
Karen Yunk, FHWA – NJ Division

The abovementioned individuals have been responsible for providing input on the sponsorship of the statewide forum, development of county forums, and distribution of safety resources for program participants.

Lastly, Drs. Susan Herbel and Michael Meyer are to be recognized for their roles in developing and promoting Safety Conscious Planning as a comprehensive solution for reducing transportation injuries and fatalities.

TABLE OF CONTENTS

	Page
ABSTRACT ……	1
INTRODUCTION……	1
PROBLEM SUMMARY……	2
LITERATURE REVIEW……	3
National Perspective on Transportation Congestion……	3
Technology Transfer Review……..	4
Studies and Tools……	5
Annual Urban Mobility Study……	5
FHWA Quality Improvement Review……..	6
Networks……..	7
National Perspective on Transportation Security……..	7
Technology Transfer Review……	9
Networks……...	9
U.S. Department of Homeland Security……..	10
U.S. Department of Transportation (USDOT)…….....	11
Federal Highway Administration (FHWA), Office of Operations Security…….....	11
Training……..	12
Tools and Resources……..	12
American Public Works Association (APWA)…….. ……	13
International County and Municipal Association (ICMA)…….....	13
Institute of Transportation Engineers (ITE)……	13
Military Traffic Management Command Transportation Engineering Agency (MTMCTEA)…….....	14
National Fire Service (NFS)…….....	14
National League of Cities…….....	15
U.S. Conference of Mayors……	16
National Perspective on Transportation Safety……	17
Technology Transfer Review…….....	17
Studies…….....	17
Federal Highway Administration (FHWA) and the Transportation Research Board (TRB)…….....	19
National Model…….....	19
Safety Conscious Planning Model……	20
Best Practices: Incorporating Safety Into Short Range Planning…….....	22
Tools and Resources……..	23
United State Department of Transportation (USDOT).....	24
National Transportation Safety Conference……	24
Federal Motor Carrier Safety Administration (FMCSA)……..	25

National Highway Transportation Safety Administration (NHTSA) and the National Center for Statistics and Analysis (NCSA)..... 25
Networks..... 28
American Association of Motor Vehicle Administration (AAMVA)..... 28
American Association of State and Highway Transportation Officials (AASHTO)..... 28
Institute of Transportation Engineers (ITE)..... 29
National Safety Council & Association of Transportation Safety Information Professionals (ATSIP)..... 29
Tools and Resources..... 30
Safety Conscious Planning Guidebook..... 30
Roadway Safety Tools for Local Agencies..... 37
Roadway Safety Audit and Roadway Safety Audit Review..... 39
Safety Study Data-Effective Safety Tools..... 40
Local Partnerships..... 40
Local Safety Management System..... 41
COMPARATIVE ANALYSIS..... 41
New Jersey Congestion, Security, and Safety Initiative..... 43
State Perspective on Roadway Congestion..... 44
Technology Transfer Review..... 44
Metropolitan Planning Organizations (MPOs)..... 44
Congestion Busters Task Force..... 45
New Jersey Congestion Study..... 46
State Perspective on Transportation Security..... 47
Technology Transfer Review..... 47
NJDOT – Office of Transportation Security..... 48
State Perspective on Transportation Safety..... 49
Technology Transfer Review..... 49
NJDOT Statewide Traffic Records Coordinating Committee (STRCC)..... 50
Crash Records..... 51
New Jersey State Police Fatal Accident Unit and the Fatal Analysis Records System (FARS)..... 52
New Jersey Division of Highway Traffic Safety..... 52
New Jersey (Rutgers) Local Technical Assistance Program..... 53
Networks..... 55
New Jersey Police Traffic Officers' Association..... 55
South Jersey Traffic Safety Alliance..... 56
Tools and Resources..... 56
SELECTION PROCESS..... 57
Adoption of the SCP Model in New Jersey..... 58
Characterization of the Group..... 59

Characterization of Information in the SCP Process…… 61
Formation of the New Jersey SCP Partnership Network…….. 62
IMPLEMENTATION …… 63
Tier 1: Establishment of the New Jersey Statewide SCP Network……. 63
Statewide SCP Partnership ……. 68
Delaware Valley Regional Planning Commission (DVRPC)…….. 68
Federal Highway Administration – New Jersey Division Office…….. 69
National Highway Traffic Safety Administration (NHTSA)……..... 69
New Jersey Department of Transportation (NJDOT)…… 69
New Jersey Division of Highway Traffic Safety(NJDHTS)…… 70
New Jersey State Police (NJSP)…….. 70
New Jersey Transit……..... 71
North Jersey Transportation Planning Authority (NJTPA)……. 71
New Jersey CAIT-LTAP…….. 71
South Jersey Transportation Planning Organization (SJTPO)……... 72
Forum Outcomes……..... 73
MPOs Safety Review…..…….....…… 75
Delaware Valley Regional Planning Commission (DVRPC) Profile…….. 75
Planning Work Plan…… 75
Roadway Safety Audits…….…….. 76
Observation…….. 77
North Jersey Transportation Planning Authority (NJTPA) Profile…… 77
Regional Transportation Plan (RTP)…….. 78
Project Pipeline……. 79
Observation……. 80
South Jersey Transportation Planning Organization (SJTPO) Profile……... 80
South Jersey Traffic Safety Alliance……... 81
Observation…… 81
Tier 2: DVRPC Countywide Forums and Regional Safety Task Force Plans…….. 83
Forum Resources…… 85
Federal Highway Administration – NJ Division…… 86
New Jersey Department of Transportation -- Local Aid Programs…… 87
New Jersey Division of Highway Traffic Safety (NJDHTS) Programs……. 87
New Jersey Center for Advanced Infrastructure and Transportation – Local Technical Assistance Program (CAIT-LTAP)……. 88

Evaluation…… 89
Session 1: Burlington/Mercer Counties…….. 89
A. Knowledge…….. 89
Comments…….. 90
Partnership…… 90
Programs…… 90
Philosophy…… 90
B. Motivation for Attending…….. 90
C. Burlington/Mercer County Resources…….. 91
D. Safety Issues in Burlington and Mercer Counties…… 91
Engineering…… 91
Partnerships…… …….. 91
Enforcement…… …….. 91
Education…… ……... 91
E. Overall Response……... …….. 92
Comments…… 92
Session 2: Gloucester/Camden County…….. 92
A. Knowledge……... 92
Resources…..…….. 92
Comments……... 93
B. Motivation for Attending…… …….. 93
C. Gloucester/Camden Resources…… 93
Comments……..…… …….. 94
D. Safety Issues in Camden and Gloucester Counties…….. …….. 94
Comments……... …….. 94
Assessment…… 95
COUNTY PROFILES…… …….. 96
Burlington County…… …….. 97
Camden County…… 97
Gloucester County…… 99
Mercer County……..…… 99
Assessment……..100
CASE STUDY……..…… ……..100
Survey Results…… ……..102
Development of the Mercer County Partnership…….....104
Tier 3: Outreach to Local Elected Officials……..107
SUMMARY……108
CONCLUSIONS…….....110
REFERENCES…….....111
APPENDIX A SCP SURVEY……..116
APPENDIX B TRANSPORTATION SAFETY RESOURCE CENTER.....118
APPENDIX C BURLINGTON COUNTY LOCAL SAFETY NETWORK…. ……...124
APPENDIX D. CAMDEN COUNTY LOCAL SAFETY NETWORK……..125
APPENDIX E GLOUCESTER COUNTY LOCAL SAFETY NETWORK….. ……126

LIST OF FIGURES

		Page
Figure 1.	Types of federal security projects	11
Figure 2.	NHTSA and NCSA projects	26
Figure 3.	Commonalities between congestion, safety, and security	42
Figure 4.	Professions of respondents	64
Figure 5.	Percentage of participation in the Long Range Safety planning process	67
Figure 6.	Percentage of participation in the State or MPO Long Range Plan	67
Figure 7.	Mercer/Burlington County Forum attendance	84
Figure 8.	Gloucester/Camden County Forum attendance	85
Figure 9.	Information learned at the DVRPC sponsored forums	90

LIST OF TABLES

		Page
Table I.	Technology transfer methods used for addressing congestion	5
Table 2.	Technology transfer methods used for addressing security	9
Table 3.	Twelve practical points of security planning	16
Table 4.	Technology transfer methods used for addressing safety	18
Table 5.	Transportation Improvement Program (TIP) safety scoring	22
Table 6A.	Meyer's model for integrating safety into transportation planning and the decision making process (vision statement)	32
Table 6B.	Meyer's model for integrating safety into transportation planning and the decision making process (goals and objectives)	33
Table 6C.	Meyer's model for integrating safety into transportation planning and the decision making process (performance measures)	33
Table 6D.	Meyer's model for integrating safety into transportation planning and the decision making process (data)	34
Table 6E.	Meyer's model for integrating safety into transportation planning and the decision making process (tools)	35
Table 6F.	Meyer's model for integrating safety into transportation planning and the decision making process (evaluation criteria)	35
Table 6G-H.	Meyer's model for integrating safety into transportation planning and the decision making process (safety actions and prioritization scheme)	36
Table 6I.	Meyer's model for integrating safety into transportation planning and the decision making process (monitoring process)	36
Table 6J.	Meyer's model for integrating safety into transportation planning and the decision making process (key safety stakeholders)	37
Table 7.	Summary of safety tools	38
Table 8.	Reactive safety considerations	38
Table 9.	Technology transfer methods used for addressing congestion	44
Table10.	Traffic management and public education subcommittee recommendations	47
Table11.	Technology transfer methods used for addressing security	48
Table12.	Technology transfer methods used for addressing safety	50
Table13.	New Jersey Police Accident Report (NJTR-1) categories	54
Table14.	New Jersey Police Traffic Officers' county organizations	56
Table 15.	2002 municipal safety programs (response by percent)	57
Table 16.	Activities of the New Jersey MPOs	60
Table 17.	Internal and external components of SCP	61
Table 18.	New Jersey SCP (external) partnership network model	63
Table 19.	2003 Safety Conscious Planning Survey respondents by percent	64

Table 20.	Rank of current safety interests and concerns	65
Table 21.	Percentages of current local safety programs	65
Table 22.	Importance of safety to your agency and self	66
Table 23.	Percentage conducting initiatives for addressing safety concerns	66
Table 24.	Response to challenges of integrating safety by percent	68
Table 25.	SCP assessment checklist	82
Table 26.	Safety based action items per MPO	83
Table 27.	NJDHTS Comprehensive Traffic Safety Programs (CTSPs)	88
Table 28.	Potential networking opportunities by county	95
Table 29.	Overview of County safety issues, services, and programs	101
Table 30.	Assessment of Mercer County SCP elements	102
Table 31.	Safety data used for Mercer County roadways	103
Table 32.	Status of Local Transportation Safety Organizations in Mercer County	106
Table 33.	Comparison of safety ratings between counties	107
Table 34.	Technology transfer innovation adoption process	109

ABSTRACT

The purpose of this project was to examine the relationship between effective national transportation congestion, security, and safety technology transfer applications. Next, a comparison had been made between national trends and the conditions found in New Jersey, and then the most appropriate solution was implemented. When examining the national transportation congestion, security, and safety technology transfer trends, the findings showed that security and congestion were interrelated through safety. Specifically, reduction of roadway crashes, adjustment of driver behavior, and use of safety counter measure applications had impacted both domains. They were similarly reflected in New Jersey with safety being an integral component of security and congestion.

As a result, the Safety Conscious Planning (SCP) Model, a comprehensive safety system, had been selected and implement as the network because it promoted the reduction of crashes that affect the security and congestion of the entire transportation infrastructure in New Jersey. The intended benefit of this implementation effort was realized when funding opportunities, resources, and technical support were able to reach county and local municipalities, where over sixty percent of the roadway fatalities occur annually. Another gain had been the collective empowerment of a partnership being applied to resolving regional safety issues. Also, SCP facilitated the involvement of local elected officials working together with safety professionals to organize local safety networks within their own communities.

INTRODUCTION

Transportation safety has been severely impacted by the traffic demands that approach or exceed the capacity of the roadway system. Traffic volumes throughout New Jersey have increased to the point that many urban, suburban, and even rural roadways are experiencing congestion which affects the number of crashes and incidents that interrupt the State transportation system, thus adversely impacting both the economy and “quality of life” due to congested roadways. Transportation activities are estimated at twelve percent of the gross domestic economy and nearly all of the economy is heavily dependent upon transportation for success. These non-recurring interruptions influence the mobility and reliability of the transportation system in the eyes of the public. “Mobility” is defined as the ease of getting to a destination; and “reliability” is the predictability of travel times for usual trips. Safety plays an important role in helping to prevent crashes and incidents that create half of the congestion in the United States.

Also, Polzin (2003) posits that a safe transportation system is critical to the overall national security. High profile transportation facilities (e.g. bridges and airports) may be viewed as targets because of their appeal. The common characteristics of transportation systems are openness and accessibility, extent and ubiquity, emphasis on efficiency competitiveness, diversity of owners, and entwinement in society. The Federal Highway Administration (FHWA, 2003) acknowledges that “transportation may

be the target of a terrorist act or the method of delivery of an attack, but it is always the primary method through which response and recovery are carried out." Furthermore, the events of September 11, 2001 created the need for ensuring mobility, function, and integrity of the Nation's surface transportation system. Reliability requires the efficient and ongoing management of both the capacity and operation of the transportation system and is critical for a functioning transportation system especially in emergency situations or incidents that effect homeland security.

Roadway safety affects the security and travel time of all users, who are the customers of the transportation industry. Congestion is predominantly attributed to roadway crashes, a leading cause of injuries and deaths in the United States. Last year, over 700 persons died in New Jersey, while a total of 43,000 persons were killed on our nations' roadways. FHWA (2003) has partnered with other state transportation agencies and metropolitan planning organizations, the transportation industry, the transportation research community, transportation system users, and the general public to seek solutions for reducing these roadway fatalities. Also, FHWA recognizes that two of the transportation industry goals are to meet the public's need for improved access to safe, comfortable, convenient, and economical movement of people and goods; along with improved surface transportation safety through a coordinated effort to reduce fatalities, injuries, property damage, and hazardous materials incidents.

PROBLEM SUMMARY

In New Jersey, problems from chronic congestion are manifesting themselves in many ways that directly impact quality of life and public safety of the citizenry. Roadway congestion is caused when traffic demands approach or exceed the available capacity of the roadway system. Throughout New Jersey, traffic volumes have grown so great that many urban, suburban, and even rural roadways are experiencing congestion on a routine basis. A side effect of this widespread congestion is the opportunity for increased number of crashes and incidents each year causing an interruption in the State transportation system. Also, the economy is adversely affected when transportation is halted due to congested roadways. These non-recurring interruptions affect the mobility and reliability of the transportation system in the eyes of the public. "Mobility" is the ease of getting to a destination; and "reliability" is the predictability of travel times for usual trips. The non-recurring congestion, caused by crashes and other incidents, accounts for over half of all the traffic congestion in the United States. Furthermore, the events of September 11, 2001 emphasize the need for ensuring mobility, functionality, and integrity of the Nation's surface transportation system. Reliability requires the efficient and ongoing management of both the capacity and operation of the transportation system and is critical on a functioning transportation system especially in emergency situations or incidents that effect homeland security.

As part of the 1998, 2002, 2004 Federal Certification Reviews, the FHWA, New Jersey Division Office identified the need for a statewide planning process to be in place for congestion mitigation, public safety, and disaster relief. The federal process has

promoted stakeholder partnerships for producing maximum results by not replicating efforts needlessly. Another important issue for establishing a partnership is that resources and technical support need to reach the county and local levels to affect change. Therefore, the Congestion, Safety, and Security Initiative has been structured as an innovative technology transfer project with several phases that follow the Transportation Research Board (TRB) recommendations for managing technology transfer. The process includes characterizing the audience, characterizing the information, comparing technology transfer methods, applying them effectively, and continually modifying the technology transfer process until successful.

After examining the status of congestion, security, and safety issues on the national and statewide levels, the determination was made to implement a comprehensive safety network that would support the reduction of over 42,000 transportation fatalities that occur on our nation's roadways. Safety is an integral part of the security and congestion consideration of the transportation network. Therefore, the Safety Conscious Planning (SCP) Model has been selected as the network to be implemented, which also supports the reduction of crashes that impact the security and congestion of local roadways where a majority of the crashes and fatalities occur in New Jersey.

According to the TRB Research and Technology Coordinating Committee (1999), local public agencies would be hindered without technology transfer programs due to limited knowledge of innovative technologies, lack of funding, and limited technical background. Also, existing technologies can qualify as innovative because they are "new" to the implementing agency.

LITERATURE REVIEW

The purpose of this project is to review the current technology transfer methods (e.g. training, tools, networks, models, peer exchanges, etc.) and conduct a comparative analysis between the national, state, and local practices for the factors of transportation congestion, safety, and security. Afterward, a determination will be made on the appropriate innovation technology to adopt in New Jersey. Several technical resources, including peer reviewed articles, federal and state reports, websites, interviews, and governmental documents, will be used as part of the selection process that is described in the following section.

National Perspective on Transportation Congestion

During the 1990's, a majority of highway funds were designated for rehabilitation and reconstruction of the highway system, which meant that congestion had been negatively affecting motorists. The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, created the need for many highway projects to be constructed during the evening, in order to reduce the congestion and safety hazards on roadways. The National Quality Initiative (NQI) was formed as a public/private partnership to address safety issues that

were related to the highway system (Sorenson, Terry, Mathis:1998.) This group distributed 2,205 surveys whose results confirmed that the public valued night work, when there is less traffic. Three top improvement priorities of safety, pavement conditions, and traffic flow were identified by the public; therefore the FHWA worked with state DOT's and implemented a formal roadway safety assessment plan (FHWA, 1998.) This plan addressed procedures for enhancing safety, promoting vehicular mobility, and reducing congestion when conducting road projects. State agencies were expected to establish a baseline for reducing travel delays, identify best practices, examine barriers to innovative contracting, promote value-added activities, and develop a model for reducing congestion. Also, the Review Team was organized to collect baseline data that was used as an evaluation tool for assessing congestion and enhancing safety on roadways. After visiting several state Departments of Transportation, including New Jersey, best practices were combined with baseline data obtained from interviews to develop a traffic management model that served as the benchmark for the transportation industry (Sorenson, Terry, Mathias: 1998.)

A major finding of the Review Team was the realization that work zone traffic management of long term projects consisted of strategies that were in place to move people and goods safely through these corridors, which directly supported the users' need for mobility and safety. Other benefits of these long-term projects were the pre-planning phase that incorporated worker and motorist safety into the entire duration of the project while quality products, Intelligent Transportation Systems (ITS), innovative contracting methods, and incident management strategies were employed as established standards for the industry. Additionally, other options helped to control roadway congestion that included advanced traffic management systems, incident management systems, traveler information, and managed lanes.

Technology Transfer Review

Several important national research studies were conducted on the significance of traffic congestion and it is important to review them as a possibility for implementation. As noted, the National Quality Initiative is a federally sponsored program that is credited with developing a traffic management model for the industry and establishing a comprehensive network of public/ private sector partners that meet regularly to promote strategies on reducing traffic. Other national programs of importance include the Annual Urban Mobility Study, produced by the Texas Transportation Institute, and federal publications on Incident Management Strategies. There appeared to be an absence of training programs on congestion mitigation. Further information is available in the following section on the resources identified in Table 1.

Table 1. Technology transfer methods used for addressing congestion

Sponsor	Studies	Tools	Networks
NQI	Congestion Survey		State/County/Local
TTI	Urban Mobility		
FHWA		Incident Mgmt Assessment Work Zone Baseline	Public/Private Partnership

Studies and Tools

In addition to the NQI, two important studies were conducted on congestion and mobility: the 2002 Annual Urban Mobility Study and the FHWA Quality Improvement Review. There were several important findings that provide a better understanding of mobility problems and how they are effectively addressed elsewhere in the country. Also, several "best practices" are presented that offer insight on effectively reducing the negative impacts associated with congestion.

Annual Urban Mobility Study

The 2002 Annual Urban Mobility Study, published by the Texas Transportation Institute (TTI), was another important study that provided information on congestion and mobility trends from 1982 to 2000. This research included findings on how congestion had changed during the past twenty years and offered recommendations for improving mobility. Although New Jersey was not directly identified in the results, the findings provided valuable insight on the impact of roadway congestion. Specifically, the demand for highway travel continues to grow as the population increases, especially in the metropolitan areas. The pace of construction has not kept in line with the demand because 1.5 percent of the highway miles increased while vehicle miles travel increased to 76 percent. Over half of the congestion problems are recurring patterns known as rush hour traffic; while the remaining congestion is non-recurring and can be classified as traffic incidents (crashes), work zones, weather, and special events.

TTI researchers found that in order to be effective, improvements must gain public confidence, have sufficient funding, and provide a valued service. Customer needs will vary according to region, so it is critical to gain a consensus during the early stages of the project. Major transportation improvements require planning, design, implementation, dedicated funding and communication of goals to partners. Also, they found that there are four strategies for addressing congestion: adding new or expanding existing roadways, increasing efficiency on the existing system, better management of projects, and managing the demand. The benefits will be reduced travel delay, lower trip times, reduction of emissions, and improved efficiency for travelers. Congestion locations are not static and can be moved over time with adjustments made to the recurring causes.

The report findings also identified congestion as growing in all urban areas with a severity that lasts longer than in the past. The average annual delay jumped from 16

hours in 1982 to 62 hours in 2000. More trips were accommodated on the transportation system with passenger-miles of travel increasing over 85 percent on highways, which has contributed to the rising congestion, but has improved economic quality of life for commuters. Congestion costs continue to increase because carpooling, alternative transit models of travel, or a combination of these issues were not adopted by motorists. There needs to be a realistic vision of the future with urban areas planning jobs, schools, and homes in the same area, while understanding the fact that large cities will continue to be congested. Also, improvement of the transportation system is important for reducing recurring congestion on the roadways.

This study identified the need for congestion to be reduced through the formation of partnerships that promote improvement of intersections with traffic signals, freeway entrance ramps, coordination of special events and incident management. Shortening the duration of construction and maintenance projects proved to be important, as well as conducting night work, and other strategies that reward the contractor for completing the work ahead of schedule.

FHWA Quality Improvement Review

Another consideration in reducing congestion was the review and improvement of planned incidents. In 1998, the FHWA Office of Program Quality Coordination conducted a quality improvement review on planned incidents (e.g. construction and maintenance operations.) They developed a work zone baseline as an assessment tool for evaluating future programs. This “self-assessment” tool was designated as important due to raising the level of awareness of practices and strategies used in mitigating work zone congestion and crashes. Next, the tool facilitated communication for sharing best practices among transportation professionals. Furthermore, it served as a working tool to identify areas of congestion and safety management strategies that need more investigation and performance evaluation.

According to Beatty, Carmichael, Henderson, Johnson, Reagan, Ritchie, Stoner, & Umbs (2003), the “best practice” was to apply planned incident management approaches to unplanned incidents. Regional and statewide traffic incident management programs were established that used strategic program plans to identify and allocate resources of partner organizations for traffic incident management and to evaluate program initiatives. They would facilitate the enhancement of on-scene operational practices that aid rapid response to and clearance of traffic incidents while enhancing the safety of responders and travelers through on-scene traffic control, corridor traffic management practices, and accurate and current traffic information. Additionally, these systems employed the latest technology to disseminate information among traffic incident management partners, to improve the clearance rate of traffic incidents, the use of technology to improve emergency services through faster incident detection, faster emergency response, and real-time wireless communications links. Frequently, transportation units are the first responders to a roadway incident, so the Intelligent Transportation System (ITS) Public Safety Program integrates on-scene

incident response, clearance, and recovery operations that support a partnership between the transportation and public safety community. The length of the traffic delays were shortened, which improved community preparedness for disasters.

The Traffic Incident Management Self-Assessment tool was developed to identify project gaps for upgrading incident management operations, creating standards, and establishing guidelines for cross agency systems. Urbanik (2001) confirmed that multiple systems had been needed to achieve a seamless transportation network, especially since the basic transportation system has a tendency to be fragmented. These studies on congestion confirmed that partnerships were effective venues for addressing roadway problems that required multiple-level solutions for reducing congestion on local/regional/national roadways.

Networks

Partnership networks were formed to promote the understanding of local/regional/statewide congestion problems, scope and quantify the problem, then identify and implement effective solutions. This network helped to streamline the roadway users' needs into three goals that addressed congestion on the local and national level:

- Mitigate overall impacts of congestion through effective local partnerships.
- Over the next five years, reduce work zone delays by ensuring that all States, the District of Columbia, Puerto Rico, and Federal Lands offices are engaged in aggressively anticipating and mitigating congestion caused by highway work zones.
- Over the next five years, reduce traffic incident delays by ensuring that all States, the District of Columbia, Puerto Rico, and federal land offices are engaged in aggressively anticipating and mitigating congestion caused by traffic incidents. (FHWA, 2003.)

National Perspective on Transportation Security

There are over four million miles of roads and streets and thousands of bridges in the national highway network. The role of FHWA is to enhance and support roadway security through awareness, guidance, and technical assistance. Federally sponsored activities on surface transportation security are aimed at ensuring that surface transportation agencies throughout the country have the necessary resources and understanding to prevent, prepare for, respond to, and recover from both natural and security disasters. Specifically, transportation agencies must have enough resources and background to enable people and goods to move safely during a threatening situation.

Since September 11, 2001, the transportation industry has been modifying statewide disaster plans to address the challenges of national security. A formal definition of Homeland Security was adopted that defined emergencies as having six stages: detection, preparedness, prevention, protection, response, and recovery. Detection involved collection and distribution of intelligence information, while preparedness was effective and thorough planning, and prevention reduces further acts of terrorism. Protection included securing information and people during special events, while response covered the actions that began at the moment of the emergency, and recovery started on the day following an emergency. Other issues were addressed that included reliable communications, defining new roles for personnel, responding to security factors, Incident Command System practices, protection of first responders, addressing chemical and radiological hazards, evacuation plans, as well as traffic control. The Department of Homeland Security is another new agency that is responsible for coordinating all efforts in the event of an attack.

Technology Transfer Review

As noted in Table 2, several manuals and guides are available on topics that range from establishing an emergency response plan to successful case studies. It appears that electronic publications serve as a cost effective alternative to training. Many professional organizations provide websites, networking opportunities, and training programs for their membership, including elected officials. It was not surprising that major research studies were not available on security efforts. Lastly, standardized procedures have been developed for responders by the National League of Cities.

Table 2. Technology transfer methods used for addressing security

Sponsor	Training	Tools/Resources	Network
US Dept. of Homeland Security			National System of Fed. Agencies
USDOT		Security & Emergency Response Plan	
FHWA – Operations Security		Website Best Practices	Responder Meetings
AASHTO	Highway Plan Homeland Sec	Assessment Guide	
APWA		Website Best Practices	
ICMA		Case Study (Arlington, VA) Regional Guide	
ITE	Emergency Management	Publication	Transportation Professionals
MTMCTEA		Deployment Guide Procedures Guide	
National Fire Service	Conference	Highway Incident Guide	
National League of Cities		Fed. Resources Lessons Learned 12 Points	
US Conference of Mayors		National Action Plan	Mayors' Summit

Networks

This next section of this report will help to identify the public sector agencies and partnerships that have been established for securing the transportation infrastructure and information systems. Both security and transportation organizations will be described, along with resources that are available for use by local transportation agencies.

U.S. Department of Homeland Security

The Department of Homeland Security was established in 2001 to consolidate several existing federal agencies into a single department that maintains the goal of securing our homeland from potential terrorism activities. There are five major divisions that include the Border and Transportation Security Division, Emergency Preparedness and

Response Division, Science and Technology Division, Information Analysis and Infrastructure Protection Division, and the Management Division. This agency is responsible for coordinating domestic response efforts of all departments and agencies in the event of terrorist attacks and in the immediate aftermath of attacks within the United States.

Another agency, the Border and Transportation Security Division consists of the Transportation Security Administration, the US. Customs Service, and the Federal Law Enforcement Training Center. The Emergency Preparedness and Response Division also houses Federal Emergency Management Agency (FEMA). The Science and Technology Division coordinates the research and development efforts related to terrorist threats. Warnings and guidance are issued from the Information Analysis and Infrastructure Protection Division, while the Management Division handles the budget, management, and personnel. Also, Homeland Security has created an initiative to reduce unwarranted information barriers in federal government, to share security information with states, municipalities, and relevant private sector partners. A uniform national threat advisory system has been established to inform federal agencies, states and local officials of terrorist threats and appropriate protective actions according to a four-level alert system.

The Federal Emergency Management Agency (FEMA) is the lead federal agency for planning and incident management. FEMA coordinates the state Emergency Management agencies to ensure that resources, manpower, and funds are available during a Presidential Disaster Declaration. The agency is responsible for distributing supplies and communication equipment, in order to establish a Disaster Field Office in cooperation with local and state emergency personnel. FEMA provides public information and support through their Office of National Preparedness, which oversees training funds, planning, and exercise drills. This agency also created the Rapid Response Information System (RRIS), a tool for local government to seek information on appropriate responses to chemical and biological agents. The FEMA Homepage contains information on disaster preparedness, new agency initiatives, training resources, and updates related activities.

U.S. Department of Transportation (USDOT)

The United States Department of Transportation (USDOT) is responsible for overseeing the nation's transportation network including highways, mass transit, railroads, seaports, and aviation. The USDOT controls industries that transport non-nuclear materials, such as gas, oil, and hazardous materials that are transported by rail, highways, and waterways. Therefore, the USDOT plays a major role in the development of security and emergency response plans for the various transportation modes.

Federal Highway Administration (FHWA), Office of Operations Security

According to FHWA (2003), the nation's transportation system is the lifeline when disaster strikes. It guides those at risk away from danger, and provides access to emergency response and recovery operations. The mission of the FHWA's Office of Operations Security is, before the incident to have transportation and other responders interact regularly in planning for emergencies and practice those plans in joint exercises. A new website was established, in June 2003, to provide state and local agencies access to information for improving security in the operation of surface transportation (Peters, 2003). This website was established to help local transportation agencies improve security through effective planning, operation, and application of technology. A series of "best practices" are available on-line for state and local public sector employees, as well. Other important projects of this agency include working with the USDOT and other partners to gain technical information, offer education and training, conduct research, coordinate deployment, and advocate for improved emergency preparedness plans. Current FHWA Public Safety and Security projects include the activities in emergency management, cargo safety, bridge security, military deployment, ITS systems, and freight management.

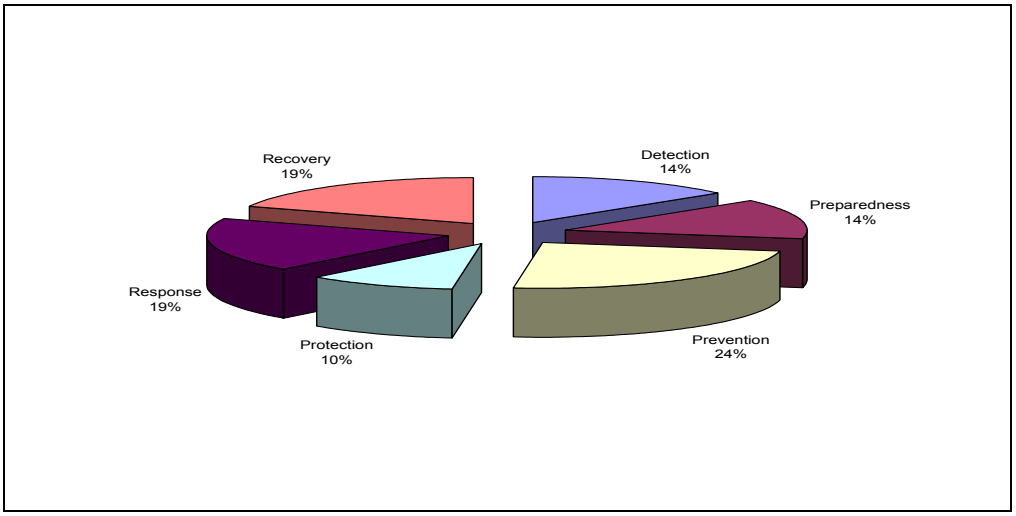

Figure 1. Types of federal security projects (n=21 initiatives)

Figure 1 identified the types of federal security initiatives that range from prevention through preparedness, with prevention being the most popular project. It is speculated that future endeavors will encompass new threats, including biological and chemical weapons, evaluation of routes and alternate routes, the incorporation of the Homeland Security Advisory System (HSAS) into local emergency preparedness plans, the role of public information and media relations during emergencies, cooperation with other agencies, and preparedness exercises. FHWA is currently involved in developing information on planning for support of movement of military equipment and personnel on the highway system, effective coordination among military, state, and local transportation agencies, and effective mobilization plans.

Several transportation partnerships have been developed for the purpose of distributing resources to public sector transportation agencies that are faced with securing the safety of their customers, especially when the system is as open and accessible as the transportation infrastructure. In addition to offering training, professional organizations have compiled guides that outline procedures for obtaining security funds, developing security plans, and deployment of military operations that are identified in the following section.

Training

The American Association of State Highway and Transportation Officials (AASHTO) Task Force on Transportation Security and the National Transit Institute partnered with the Washington State Department of Transportation (WSDOT) for developing training to increase employee's security awareness of their surroundings. This training covered the Homeland Security Advisory System, identification of likely infrastructure targets, simple surveillance techniques, and procedures for responding to suspicious activities. Several other workshops were developed for the three groups: non-field personnel, field employees, and vessel crews, while supervisors received a specialized training course. This management-training program addressed information gathering and analysis, hazard identification, communications, and decision-making skills.

Two publications, "*A Guide to Highway Vulnerability Assessment for Critical Asset Identification and Protection"* and "*A Guide to Updating Highway Emergency Plans for Terrorist Incidents*," were issued by AASHTO to assist state agencies in transportation, security, and emergency planning. The guides built on existing emergency management practices, generated from a standard Federal model, outlined state efforts, as well as assisted local government in responding to, recovering from, and mitigating the impact of a disaster. The first publication addresses the assessment of vulnerabilities, estimates of countermeasures, and improvement of security within the agency. The planning guide is designed to support state DOT's in planning or highway emergency responses during or following a terrorist incident through the update of current emergency response plans and procedures. Content includes expanding institutional relationships, roles, plans, examples of best practices, and other relevant emergency management documentation. Part 1 provides the background and context of Emergency Management and the terrorist threat found in the United States. Guidance is offered on updating existing plans, while the remaining text contains checklists for focusing on modifications of the plans.

Tools and Resources

It is interesting to observe that technical manuals, publications, and resources have been used by several organizations as effective tools for educating personnel responsible for securing the infrastructure, especially after the 9/11 attack. Most of these resources have been developed by organizations representing the transportation,

fire, police, publics, and engineering professions. All of the following publications are available on-line to the general public, except for the ITE publications that are released to their membership.

American Public Works Association (APWA)

The American Public Works Association (APWA) provides space on their national web page to identify Emergency Management. However, many of the publications are not related to security. One example of a "best practice" program was the "*Denver Preparedness Guide for Public Works Agencies"* that addresses both natural disasters and catastrophic emergencies. This edition is available in English and Spanish. Other resources include reports on flooding, disasters, national hazards, and snow & ice policies.

International County and Municipal Association (ICMA)

A case study of Arlington, VA has been published by the International County and Municipal Association (ICMA) on events after 9/11. It has a listing of many priority conditions, such as protecting employees by ensuring that responders are equipped with appropriate personal safety gear. Support for workers needs to be extended past the post-disaster period. An Emergency Plan should be developed, along with emergency declarations that were prepared in advance. Activate mutual aid and make sure that all agencies are current with their handouts. During the event, establish a broad based control of the scene and use the resource team to obtain supplies for emergency workers.

ICMA also publishes a document, entitled "*The Regional Transportation Operations Collaboration and Coordination*," which supports the collaboration of regional transportation managers and public safety officials from cities, counties, and states within a metropolitan area. This collaboration includes traffic engineers, managers, transit officials, police, fire officials, municipal managers, medical services representatives, emergency response managers, and port authority managers. The primer helps them to understand what regional collaboration and coordination means, why it is important, and how to get started with the process. This document also encourages local, state, and regional agencies to build a broader public safety program. Other security information is available through this organization and addresses homeland security, 511 deployments, and several case studies of best practices.

Institute of Transportation Engineers (ITE)

The Institute of Transportation Engineers (2002) membership was able to download on-line resources for urban transportation professionals that need to respond to transportation security emergencies. Several publications are available on General

Transportation and Emergency Management, transit, and case studies with information directed at engineering and management personnel, who are directly responsible for the safe, efficient, and environmentally sound movement of people and goods on streets, highways, and transit systems. In addition, the organization offers technical resources, networking opportunities, and other advanced training for transportation and safety professionals.

Military Traffic Management Command Transportation Engineering Agency (MTMCTEA)

During the past several years, FHWA worked closely with the Military Traffic Management Command Transportation Engineering Agency (MTMCTEA) to support military mobilization. The initiative was designed to insure that States offer coordinating procedures to support military deployment and manage civilian traffic during national security emergencies. A guide was produced to assist states in developing or updating their Emergency Highway Transportation Regulations (EHTR) Plans include military deployment procedures, state/local responsibilities, recommended coordinating procedures, special considerations of communications, ITS technologies, and force protection. This publication provides generic procedures for states to adopt entirely or partially when revising their plan. While the text focuses on military deployment, the information is also applicable to national security events.

The guide is written for government officials who are responsible for developing, coordinating, and maintaining the state's emergency operations transportation plan. The publication's content includes permitting, traffic engineering, incident management, ITS planning and operations, and law enforcement procedures. Key agency responsibilities, activities, and recommended coordination procedures are outlined in the first chapter of the publication. After the general overview on the need for rapid deployment, the publication describes the roles of the six key agencies that are responsible for deployment, identifies typical activities for deployment, and then a five-step procedure is highlighted, along with the potential options for mitigation.

National Fire Service (NFS)

In the early 1970s, two incident management systems evolved in the fire service industry, which created inconsistencies in handling the fire scene. During the 1989 International Association of Fire Chiefs Conference, there was discussion of merging the two systems into one unit. In July 1990, the staff and members of the National Fire Academy met to form the National Fire Service Incident Management System Consortium. This organization later collaborated with the United States Department of Transportation Intelligent Transportation Systems Joint Program Office to create the publication, entitled "*Model Procedures Guide for Highway Incident*." This manual provides guidance on responder safety at the highway incident, while mitigating the incident and maintaining traffic flow in and around the area. Often the responder needs

to be better organized to implement the Incident Management System (IMS). This system was applicable for emergency incidents on highways or elsewhere, while providing direction for effective management of personnel and resources to maintain the safety of everyone in the area. The guide covers the responsibility of Incident Command for reducing risk to motorists that are trapped in a traffic queue caused by the incident. This model balances several considerations that included expediently providing emergency services and removing the traffic blockage, protecting incident responders, protecting motorists, facilitating emergency vehicles, and facilitating traffic flow past the incident.

National League of Cities

In 2002, the National League of Mayors organized a working group that was charged with developing references on homeland security. Two publications, entitled Homeland Security: Practical Tools for Local Government and Federal Resources for Local Government, were compiled for the organization. The Practical Tools for Local Government outlines the security planning process and service provider's guidance on handling explosives, bio-terrorism, and nuclear attacks. Information is also provided on internal problems and communication crisis that may be encountered during an emergency. Some guidance is offered on training requirements that is available for law enforcement personnel.

The companion publication, *Federal Resources for Local Government,* reviews the funding process that cities encounter when seeking security funding. Several types of threats are described in the report, along with a listing of available resources for obtaining funding. Also, a directory of agency contacts was compiled for those who desire to seek funding for security preparedness.

Approximately 650,000 police officers work in cities and the Federal Bureau of Investigation has 11,500 agents that need to share information between these two agencies. Unfortunately, there were existing restrictions that prevented local law enforcement agencies from accessing databases that would provide important information to local government. Local police officers should also be assisting Federal agencies in providing information on potential threats. The Conference recommended that funds be made available for increased security of the infrastructure, as well as special events.

The National League of Cities (2003) reported that several lessons have been learned from the key responders of the September 11th terrorist attack on the World Trade Center. Twelve points of practical guidance, outlined in Table 3, were developed for local officials to help them organize and refine local and regional homeland security plans.

Table 3. Twelve practical points of security planning

Point	Description
Communications	Focus on effective communications to ensure effective emergency preparedness, response, and recovery.
Relationships	Build strong working relationships well before an emergency
Leadership	Define and communicate clearly who's in charge and who is responsible for specific response components
Preparation	Be prepared to operate alone in an emergency for 24 to 48 hours before other local/state/federal support arrives.
Plan	Plan for continuity of government during and after an emergency
Practice	Practice, practice, practice of regular drills, simulations and table-top exercises will ensure that all personnel know the plan and know what to do
Preliminary Preparation	Prepare boilerplate emergency proclamations, citizen alerts, etc. which can be put into effect immediately and have all mutual aid agreements signed and in place
Technology	Maximize the use of technology to support emergency preparedness, response, and recovery
Training	Emphasize training and cross training for all personnel.
Response	Respond only with the necessary people on site so that other operations can be sustained.
Consideration	Consider the human element of employee response.
Engagement	Engage citizens in new ways as part of the planning process.

U.S. Conference of Mayors

The National Action Plan for Safety and Security in America's Cities was developed during the 2002 summit for the U.S. Conference of Mayors. The four priorities of this document include transportation security, emergency preparedness, coordination of federal-local law enforcement, and economic security. Transportation security would be addressed through the enactment of airport security legislation to federalize airport security screening; supplemental resources would be provided to secure and strengthen the nation's surface transportation network; support the nation's infrastructure; assist local agencies to increase security personnel; and place additional security measures at the nations' ports.

National Perspective on Transportation Safety

FHWA has designated roadway safety as one of the three “vital few goals” for lowering death rates at roadway intersections, among pedestrians, and decreasing roadway departures by ten percent by 2007. Roadway safety has been addressed through the formation of partnerships with organizations that include other US Department of Transportation (USDOT) administrations, State highway agencies, local and tribal governments, governmental agencies, the public, and others (Peters, 2003.) Also, the safety role at FHWA includes concentration on crash data, design alternatives, and partnerships with local stakeholders, as well as personal safety driving habits.

Six national strategies have been identified by FHWA (Ostensen, 2003) as being most suitable for saving lives. They include the implementation of strategic safety programs on the state, local, and metropolitan planning organization levels; the AASHTO Strategic Highway Safety Plan of the 4Es; protecting vehicle occupants; preventing roadway departures; minimizing the consequences of roadway departures; conducting comprehensive intersection analyses; and supporting a systematic approach to community safety. FHWA has assumed the role of sharing best practices and success stories of their partners and assisting State agencies to help improve highway safety in the United States.

Technology Transfer Review

Most of the research was federal studies on safety issues and crash causations. Again, training opportunities were absent while an abundance of safety programs, databases, guides and tools filled the void. Half of the partnerships were federally sponsored with the remainder being professional networks.

Studies

In order to effectively reduce roadway fatalities, Trentacoste (2003) stated that it became important for the highway safety community to improve the coordination of research, development, and implementation of technology programs. The American Association of State Highway and Transportation Officials (AASHTO) adopted a Strategic Highway Safety Plan, in 1997, to save lives and reduce serious injuries on roadways. Several examples of safety resources, identified in Table 4, include the National Cooperative Highway Research Program (NCHRP) Project 17-18 was created as a multi-disciplinary panel to guide the safety community by developing an informational website. Also, six guidebooks were published by the organization to help state and local agencies reduce highway crashes that were related to aggressive drivers, those on revoked lists, run-off-road crashes, head-on crashes, crashes into trees, and un-signalized intersections. In 2000, seven additional guidebooks were funded by FHWA that address roadway curves, older drivers, pedestrians, signalized intersections, trucks, unbelted drivers and occupants, and utility poles.

Table 4. Technology transfer methods used for addressing safety

Sponsor	Studies	Training	Tools/Resources	Network
NCHRP 17-18	Safety Research Initiative		Safety Research Initiative	
NCHRP 321	Safety Tools		Safety Tools	
FHWA/TRB			HSIS Database IOWA Model SCP Guide	SCP Partners
USDOT BTS		Transportation Safety Conference	BTS Database	
FMCSA	Truck Crash Causation		CVISN MCMIS PRISM SafeStat	
NHTSA			MMUCC FRAS NASS/CDS NCSA CODES	GHSA
AAMVA			Data Dictionary DRIVERS	
AASHTO			TSIMS	Transportation Professionals
ITE	Reports on Crashes			Transportation Professionals
National Safety Council				ASTIP
WSDOT			Local Safety Systems Management	

During this period, the National Highway Traffic Safety Administration (NHTSA), AASHTO, FHWA, and the NCHRP17-18 technical panel formed a partnership in order to coordinate the Safety Research and Technology Initiatives. This integrated approach to crash data has improved the implementation procedure and the ability to track safety research initiatives from the public and private sectors. The following safety themes and emphasis areas were identified by the partnership for future research consideration:

- Safety Management & Data Systems
- Driver Competency
- High-Risk Drivers
- Light-Duty Vehicle Safety
- Highway Infrastructure and Operations
- Vulnerable Road Users
- Heavy Truck and Bus Safety
- Post-Crash Management

Another important study, the NCHRP Project (Synthesis 321) addressed local safety needs through a national survey that was conducted by Wilson (2003.) This research indicated that safety tools were identified as a possible solution for promoting safety locally. Tools are defined as ideas, practices, procedures or actions that benefit local agencies to improve safety on their roadway network and may be proactive or reactive, dependent upon their application. The report emphasized that safety tools should be tailored to the problem and the resources of the agency, so there is not a "one size fits all" solution. First, recognize the need to implement a basic safety program and then to select the tools to meet the goals of the representative community. Each agency begins addressing with a basic program that includes subclassifying the local road network, develop a program (plan), implement the program, identify solutions, seek funding, and document results.

Federal Highway Administration (FHWA) and the Transportation Research Board (TRB)

FHWA has also sponsored many projects that support crash data analysis. The framework of these systems combines both roadway issues and safety applications. The Highway Performance Monitoring System (HPMS) was developed in 1978 as a national highway system database. This system included information on all public roads, along with a detailed sampling of arterial and collector systems, and a limited summary of urban, small urban, and rural areas. Descriptions of this database are published annually as part of the Highway Statistics Series and other FHWA publications that are used in the Report to Congress. Also, the Highway Safety Information Systems (HSIS) is a multi-state safety database that includes crash records, roadway inventory, and traffic volume data for several participating states that include California, Illinois, Maine, Michigan, Minnesota, North Carolina, Utah, and Washington. This database is used to examine how much safer National Highway System (NHS) roads are in comparison to other roads. The results determined that non-NHS roads experienced higher rates of crashes on all types of roadways. The implication is that the intersection design and other roadway features are better on NHS roads than other systems.

National Model

In 2002, the FHWA designated the State of Iowa Data Collection System as a national model of statewide application of data collection and management technology for improving highway safety. This partnership has successfully integrated data collection, management, and communications of safety information to the key stakeholders through several new approaches that include shortening data collection time, minimizing the disruption of traffic, increasing officer safety, and improving the quality of the data. Iowa Department of Transportation (IDOT) and the Iowa Department of Public Safety (IDPS) worked together to incorporate computer technology and a fiber optics network, which moves a high volume of data and images through the system.

The results of the project were a reduction in the effort needed to collect relevant data, electronic data acquisition and dissemination of timely and accurate incident information, common access among agencies to vital incident information, data transmission and feedback with the court system, and advancement in the use of analytical tools. The integrated set of electronic forms eliminates duplication of entries and provides immediate transmission to remote locations at both the state and local levels. The forms include crash reports, commercial vehicle inspections, citations, drunken driving reports, and incidents reports. The information is transmitted from pen-based computers, portable printers, bar code readers, digital cameras, Global Positioning Systems (GPS), Geographical Information Systems (GIS), along with other laser measuring and voice recognition devices.

Future plans for the National Model are to expand the GPS Dispatch project to include one hundred enforcement, fire, and other emergency vehicle units, along with the expansion of the rural ten county transit operations, to share the GPS dispatch with enforcement. ALERT vehicles will be incorporated into the National Project so that police officers can videotape images of crash scenes and merge them into the crash reports. Also, the NHTSA CODES project will link the IOWA National Model to the Iowa Department of Public Health to further identify the severity of crashes. Lastly, the AASHTO Traffic Safety Information Management System (TSIMS) project will be incorporated into the National Model once it is developed.

Safety Conscious Planning Model

Safety Conscious Planning (SCP) has been sponsored by FHWA and Transportation Research Board (TRB) as a proactive approach to the prevention of accidents and unsafe transportation conditions through the establishment of a safety planning network. The short-term objective is to integrate safety into the transportation planning process at all levels, including the Statewide Transportation Improvement Plans (STIP) and the Transportation Improvement Plan (TIP). Also, this step is followed by the long-range, 20 year plans that the State DOT and the MPOs are required to prepare and update periodically. The Safety Conscious Planning (SCP) model recognizes safety as an essential part of transportation that needs to be considered by all agencies involved with State DOTs, MPOs, transit agencies, and local government agencies.

Safety Conscious Planning (SCP), a program developed by FHWA, is the most comprehensive program that impacts each of the safety-related areas. Forums are the venue that is used to identify the safety issues, which apply to reduction of congestion, countermeasures, and even security issues. The short-term objective of SCP is to integrate safety into the transportation planning process at all levels, including the Statewide Transportation Improvement Plans (STIP) and the Transportation Improvement Plan (TIP). Also, this step is followed by the long-range, 20 year plans that the State DOTs and the MPOs are required to prepare and update periodically.

The Safety Conscious Planning (SCP) model has recognized safety as an essential part of transportation that needs to be considered by local, regional, and state agencies. In 2001-02, FHWA and the Transportation Research Board (TRB) jointly sponsored a series of forums that brought together transportation planners from all levels to discuss safety and planning efforts and help to increase coordination. There are many ways that safety can be incorporated into the transportation planning process, specifically through long-range and short-range planning procedures. Project needs are identified as improvements of the system infrastructure; while non-project needs are improvement of the operation/management of the system. Long-range plans for the transportation system are based on the goals of the system and solutions to address them. The long-term plan is carried out by a series of short-range planning activities, which are programmed through the transportation improvement program (TIP) or the statewide transportation improvement program (STIP). The STIP is the state's transportation system and services. Improvements are scheduled for a twenty-year period with both project and non-project solutions being implemented in these plans.

Partnerships provide input throughout the various stages of the planning process, especially in the development of safety goals and identifying future safety needs. State DOTs are responsible for developing long-range goals for their transportation systems, while the MPOs focus on their areas that include several goals. These groups coordinate with each other to form appropriate safety goals, objectives, and measures of effectiveness for the transportation systems. The coordinated efforts also include law enforcement, emergency management, community groups, and safety advocates. The safety goals and objectives are future-oriented while any short-range planning activities, known as the TIP for MPOs and STIP for DOTs must be compatible with them for consideration. Crash data analysis, special studies, and corridor studies are used to identify additional safety projects that will be needed in the future.

Performance measures further support the success of meeting the goals and objectives of the plan. Progress is assessed regularly to determine whether or not the goals and objectives are being achieved. Interestingly, the Delaware Valley Regional Planning Commission (DVRPC) is one example of progress toward the completion of the goals and objectives found in their 2020 long-range plan. A report was compiled, as part of the two-year effort to update the long-range regional plan for the Delaware Valley. The mobility goals were to "improve access to efficiency of the region's transportation network and ensure safety and security of the system's user." Crash data from 1988 to 1995 was used by the group to determine that the total number of crashes decreased by 17 percent for the region.

Transportation planners use several reliable methods of evaluating alternatives to predict mobility related performance measures for highway and transit use. These methods include employing expert judgment of transportation safety professionals in predicting future safety performance of safety alternatives. Predictive modeling uses crash, traffic, and geometric data to predict future crashes based on past performance. An algorithm for predicting safety performance of a rural two-lane highway has also been developed to predict annual frequency of crashes on rural roadways and at-grade

intersections. Also, travel forecasting is applied by transportation planners to predict future travel demands for analyzing long-range transportation alternatives. Long-term analysis tools may be used in the future to review "hot spots" and different land-use scenarios.

Best Practices: Incorporating Safety into Short-Range Planning

The Transportation Improvement Program (TIP) is a multi-modal programming document for defined projects. Projects are rated by Planners to be included in the TIP or STIP. Safety elements should also be included in the proposed projects. Transportation planners can improve transportation systems safety by assisting their member agencies in providing safety and crash data, conducting crash analysis, providing crash analysis tools to empower agencies to identify safety projects, and identifying targeted areas through special studies. The project evaluation and selection process varies according to the MPO, state planning offices, and the project-funding category. Many MPOs and state planning agencies do use safety as criteria for prioritizing TIP and STIP projects because it can be assessed quantitatively as well as qualitatively through crash records and expert judgment. Several organizations, outlined in Table 5, have identified safety as part of the TIP scoring process.

Table 5. Transportation Improvement Program (TIP) safety scoring

Organization	Item	Weighted Score for Safety
DVRPC, Pennsylvania	Improve safety and security	15%
SANDAG, San Diego	Safety	10% State Highway Project 19% Regional Arterial System
OKI, Cincinnati	Safety	10% Highway Projects 5% Flexible Funding Criteria
Metroplan, Little Rock	Safety: transit, intersection improvement, roadway, bridge, enhancement	12%
Bi-State Regional Commission, Illinois & Iowa	Safety	20% Highway Projects
Mid-America Regional Council, Kansas City	Safety: highway and enhancement	20% Missouri Roadway 10% Kansas Bridge 30% Kansas Roadway 15% Enhancement

The Denver Regional Council of Governments (DRCOG) includes safety as one of the eight project categories in their project evaluation for the TIP; while the Colorado Department of Transportation evaluates projects based on their benefit/cost ratio. Other ways of accomplishing safety improvements is through add-on items to proposed projects, such as including improved pedestrian crossings and pavement markings in

the highway-widening project. A dedicated safety program may also be available for transportation projects, while citizen input and public outcry for remediation can provide the needed support for selection for the TIP.

Also, the Pennsylvania Department of Transportation (PENNDOT) has developed a targeted program for implementing low cost improvements to reduce fatalities. These improvements are being completed by district safety engineers through the Safer Travel Strategic Focus Area (SFA) program at high crash segments and spots. The twelve crash categories include signalized intersections, stop-controlled intersections, guide rails, utility poles, trees, curves, head on/side swipe crashes, pedestrians-midblock, pedestrian intersections, safety belts, aggressive driving, and driving under the influence. The low cost improvements to reduce fatalities appear below.

Tools and Resources

The FHWA sponsors several software programs that format roadway and safety information into useful information. The Interactive Highway Safety Design Model (IHSDM) program was designed for two-lane rural roads but will be modified to include multi-lane rural highway applications in the future. IHSDM software modules include crash prediction, design consistency, driver/vehicle information, intersection reviews, policy applications, and traffic analysis. The second program, Safety Analyst, identifies safety improvement needs and develops a system of site-specific improvement projects. This database includes crash data collected from Colorado, Georgia, Indiana, Maryland, Minnesota, New York, Washington, and Wisconsin to determine appropriate countermeasures that reduce crashes, and provide cost estimates for the improvement. The user, not the software, selects the appropriate countermeasure for safety applications.

The Pedestrian and Bicycle Crash Analysis Tool (PBCAT) software program was designed for state and local bicycle coordinators, planners and engineers to use for analyzing bicycle crashes. Also, TraCS (Traffic & Criminal Software) was developed for Iowa enforcement agencies and enables local agencies to conduct electronic field reports of crashes and citations. The program is free of charge, has the capacity to be customized, and a total of 19 states have been licensed to use the system. FHWA has worked with IACP, NCSA, NHTSA, and FMCSA to develop a video for police officers entitled “Safety Starts with Crash Data” that promotes the collection of accurate information at crash sites. To date, over 9,000 copies have been distributed to law enforcement officers throughout the country.

The Finite Element Analysis (FEA) was developed by FHWA to simulate crashes using structural mechanics. The FEA evaluations include performance limits for secure mailboxes, guidance on performance limits for portable concrete barriers, and the height tolerances for guide rails. The reduction of and severity of horizontal curve crashes was recognized, plus the safety upgrading with paved shoulders and the installation of a 45 degree angle asphalt fillet along each side of the paved edge. GIS based crash

systems enabled the analyst to visualize where crashes were occurring by linking the crash database to the roadway data. Often the GIS system has been used to analyze the crash data by types of roadway or crash characteristics (FHWA, 2003).

There are several useful resources recommended for safety analysis including the "South East Michigan Council of Governments (SEMCOG) Traffic Safety Manual", developed for planners, engineers, and traffic safety professionals as a comprehensive approach to traffic safety analysis. Also, "The Implementation of GIS-Based Highway Safety Analyses: Bridging the Gap" produced by FHWA addresses the use of GIS in safety analysis. The publication identifies the benefits of GIS technology, collection of historical safety data, and provides an overview of how GIS manages network data. "NCHRP 295: Statistical Methods in Highway Safety Analysis" identifies current research practices in highway safety analysis, identification of hazards, and evaluation of countermeasures for transportation officials.

United States Department of Transportation (USDOT)

The United States Department of Transportation (USDOT) maintains the Bureau of Transportation Statistics (BTS) that is similar to NCSA. The BTS was created in 1991 and is responsible for publishing a listing of 173 databases and systems, of which 40 databases address transportation crashes. Also, the BTS and the National Transportation Safety Board (NTSB) conducted a major safety study that identified the value of transportation safety data, described the primary crash and incident databases used, made recommendations on deficiencies in the existing data, evaluated governmental efforts to establish quality standards, and ensured compatibility among DOT safety data systems. These findings confirmed that most governmental transportation safety databases were developed to collect surveillance information on harmful transportation-related events in addition to property damage, personal injury, or pollution (USDOT, 2003).

Risk factors were attributed to human, vehicular, and environmental characteristics that increase the chance for transportation crashes, injuries, or harmful events. Further recommendations include tracking "best practices" for preventing damage of underground utilities; while the Fatal Analysis Reporting System (FARS) database should include storing drug test results and wheel failure. Lastly, the underreporting of hazardous material incidents needs to be addressed by the transportation industry.

National Transportation Safety Conference

The BTS also organized the National Transportation Safety Conference that addressed ways of improving transportation safety data. The outcomes of the Conferences provide direction for maintenance of data systems. These recommendations include the following:

- Re-engineer existing data systems.
- Develop common criteria for reporting deaths and injuries.
- Develop common denominators for safety measures.
- Advance the timeliness of safety data.
- Develop common data on accident circumstances.
- Develop better data on accident precursors.
- Expand the collection of “near miss” data to all modes.
- Link safety data with other data.
- Explore options for using technology in data collection.
- Expand, improve, and coordinate safety data analysis.

Working groups have been established to address these issues and are included in the internal audit of the US DOT database systems.

Federal Motor Carrier Safety Administration (FMCSA)

The Federal Motor Carrier Safety Administration (FMCSA), an organization within the USDOT, has been instrumental in the development of five crash data systems. They are the Large Truck Crash Causation Study (LTCCS), the Commercial Vehicle Information Systems & Networks (CVISN), the Motor Carrier Management Information System (MCMIS), the Performance and Registration Information Systems Management (PRISM) and the Safety Status Measurement System (SafeStat) (USDOT, 2003). The LTCCS project consists of a 1,000 large truck crash database that addresses the fatalities and injuries of those involved in the accidents, while CVISN provides an electronic system for users to collect and transmit data to appropriate networks. MCMIS is a centralized system that contains information on the safety fitness records of motor carriers and hazmat shippers. PRISM contains commercial vehicle registration information for the purpose of improving motor carrier safety. Lastly, SafeStat is a very popular program because it identifies the safety status of motor carriers by evaluating crashes, drivers’ records, vehicle status, and the overall safety of an organization.

National Highway Traffic Safety Administration (NHTSA) and the National Center for Statistics and Analysis (NCSA)

Many federal agencies use the data obtained from crash reports to create national databases that are controlled to be as accurate as possible. Figure 2 represents the projects that federal agencies have supported relative to crash data. Specifically, National Highway Traffic Safety Administration (NHTSA) is the responsible agency for maintaining the Fatality Analysis Reporting System (FARS), while the FHWA and other federal agencies sponsor several other database systems. NHTSA also has maintained three highway databases: Fatality Analysis Reporting System (FARS), the National Automotive Sampling System/General Estimates System (NASS/GES), and the

National Accident Sampling System/Crashworthiness Data System (NASS/CDS). These databases and other NHTSA sponsored projects recently became the responsibility of the National Center for Statistics and Analysis (NCSA), a newly formed research agency. Further descriptions of these resources are provided in the following section.

In 1975, FARS was established for recording all fatal crashes on public roads in the United States. This information is still collected at the state level from local police officers, coroners, emergency medical services, and state motor vehicle agency employees who must file a report within 30 days of a crash. The information is electronically submitted to NHTSA headquarters during the first half of each calendar year, checked for errors, and then forwarded for entry into the FARS system that nets 40,000 yearly fatal crashes in its database. Also, alcohol-related data on driver and non-occupant Blood Alcohol Content (BAC) levels are submitted and used to supplement this fatal injuries database.

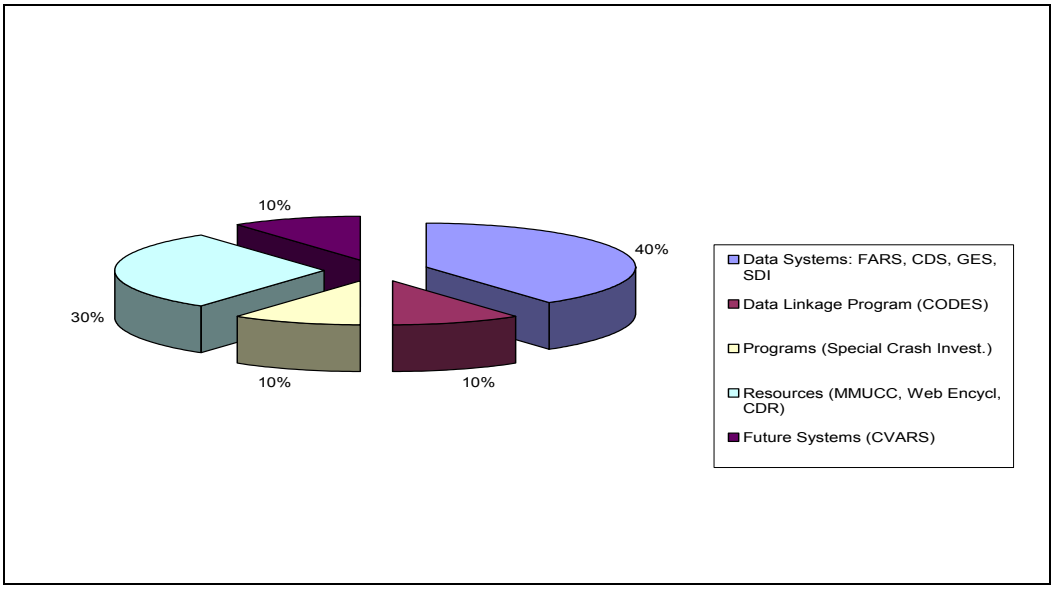

Figure 2. NHTSA and NCSA projects

Another project, belonging to NCSA, is the National Automotive Sampling System (NASS) that consists of two units: the Crashworthiness Data System (CDS) and the General Estimates Systems (GES). The NASS system database contains samples of 400 police crash reports; while the CDS system uses data from a random sample of minor, serious, and fatal crashes. The CDS research database contains 5,000 crashes per year that have been submitted by teams of trained crash investigators, while the GES processes data from 400 police departments on a weekly basis that is later combined with FARS to prepare the “Traffic Safety Facts.“

The State Data System (SDS) is another database system sponsored by NCSA that evaluates the data to determine safety problems, identify vehicle and driver countermeasures, evaluate motor vehicle standards, and study crash related issues. A total of eighteen states have been participating in this program where the coordinating

agency in each state receives the Statistical Analysis System (SAS) information that is placed onto the NHTSA Local Area Network (LAN) and made available for data analysis. The participating states are California, Florida, Georgia, Illinois, Indiana, Kansas, Maryland, Michigan, Missouri, New Mexico, North Carolina, Ohio, Pennsylvania, South Carolina, Texas, Utah, Virginia, and Washington.

Other specialized systems are the Crash Outcome Data Evaluation System (CODES) and Commercial Vehicle Analysis Reporting System (CVARS) that were developed to capture additional information. The purpose of CODES is to account for the financial and medical consequences associated with crashes. The program links crash and medical data together in order to identify the types of injuries and costs which result from driver, vehicle, and crash characteristics. Also, Commercial Vehicle Analysis Reporting System (CVARS), co-sponsored by NHTSA and FMCSA, was developed to improve the reporting of truck and bus crashes. This data is also entered into the newly established Motor Carrier Management Information System (MCMIS). The Commercial Vehicle Analysis Reporting System (CVARS) is similar to the CDS and data is being collected from several states (Louisiana, Ohio, Tennessee, and Virginia) with the intent of adding thirteen additional states to update commercial vehicle crash data.

The Governors Highway Safety Agencies (GHSA) are administered through the National Highway Traffic Safety Administration (NHTSA) and is known as 402 funds. This funding requires at least 40 percent of all federal allocations be distributed to local agencies within the state. Annual performance plans must be developed by the states that contain measurable transportation goals and objectives for addressing safety problems. These activities include human factor conditions such as driving under the influence (of alcohol) checkpoints, seatbelt checks, and promoting safe driving in high risk areas that include work and school zones.

Several major resources have been developed by NHTSA that include a system for standardizing data elements, a crash data report, and a web-based encyclopedia. First, the Model Minimum Uniform Crash Criteria (MMUCC) was designed to help standardize the data elements that are collected at the scene of an accident. These data elements have been classified into four major categories: crash, vehicle, person, and roadway groups. Data elements are collected by the police at the crash scene and recorded onto the crash report, which may be entered as computerized crash information. Other elements may be further generated when the crash data file is linked to injury, driver history, vehicle registration, roadway inventory, and informational files. Next, the 1990-1999 Crash Data Report CD was created from the State Data System (SDS) and has the advantage of using census data, instead of the estimates that are the framework of the FARS, NASS, CDS, and GES. Currently, NHTSA is recruiting other states to join the SDS, which will enhance this valuable system. Also, the FARS Web-Based Encyclopedia allows users to obtain data, from 1996 to the present on fatal crashes by month, time of day, day of week, weather conditions, vehicle type, location related to junction and traffic control device, speed limit, type of crash, number of lanes, and traffic flow. National statistics are also available on traffic crash victims: occupants/non-motorists, vehicle miles traveled, resident population, registered vehicles, licensed

drivers, and the number of national fatalities. Lastly, there are a variety of database systems that are supported by NHTSA/NCSA with FARS being the most influential program because it drives the national safety effort. The CDS and GES are supplemental systems that provide the transportation industry with additional information on crash analysis trends. The Web-based Encyclopedia and the MMUCC are efforts that support standardization of crash database systems and enhance the ability to share data between states.

Networks

Many professional organizations have partnered with federal and state agencies to provide support for the development and maintenance of crash data systems. The American Association of Motor Vehicle Administrators (AAMVA), American Association of State and Highway Transportation Officials (AASHTO), Institute of Transportation Engineers (ITE), National Safety Council (NSC), and the newly formed Association of Transportation Safety Information Professionals (ATSIP) publish resources and offer training to transportation officials, while advocating for safer roadways.

American Association of Motor Vehicle Administrators (AAMVA)

In 1979, the American Association of Motor Vehicle Administrators (AAMVA) published the “Data Element Dictionary for Traffic Records Systems” which provides instruction on coding data that is related to highway safety, drivers’ licenses, and vehicle registration. Also, the AAMVA Code Dictionary (ACD), sponsored by this organization, provides a listing of standard codes used for transmitting conviction and withdrawal information between jurisdictions. The Drivers’ License Automated Systems (DRIVers) is a national integrated drivers license information system that will replace other functioning programs and is anticipated to contain over 200 million records. To date, the assessment has been completed and now the organization is reviewing applicable technologies and processes that will accommodate the proposed system.

American Association of State and Highway Transportation Officials (AASHTO)

Transportation Safety Information Management System (TSIMS) was developed, jointly by the AASHTO membership, for the purpose of providing a comprehensive collection and disseminating the safety data system. This format serves as the working prototype of a functional system. The Work Plan (Phase 2) includes future production of a complete crash records management system, a data warehouse, data analysis, reporting, and linkage component features for the database. This system will also be incorporated into the IOWA National Model that is being supported by FHWA.

Institute of Transportation Engineers (ITE)

The Institute of Transportation Engineers (2002) membership has partnered with NHTSA as direct users of the reports generated from the 6,394,000 crash records. The organization has committed to adopt the AASHTO/US DOT goal of reducing 10 percent of fatal crashes through the use of a safety audit on the NHS system that will bring it up to standard. These professionals are directly responsible for the safe, efficient, and environmentally sound movement of people and goods on streets, highways, and transit systems. In addition to supporting the NHS System Audit, the organization provides technical resources, networking opportunities, and training to transportation and safety professionals.

National Safety Council & Association of Transportation Safety Information Professionals (ATSIP)

The National Safety Council's National Agenda (2002) has emphasized the importance of highway safety information systems being able to provide "high quality" information that maintains the safety of our nation's transportation network. Their National Agenda includes several goals that are related to this issue; specifically creating an appreciation for quality highway safety information systems, establishing a coordinated means of collecting and managing highway safety information, integrating planning of highway safety programs and highway information systems, providing managers and users with resources, creating a professional organization, and promoting technical standards for highway safety information systems.

The Executive Board of the National Safety Council agreed, in January 2001, to reorganize their Traffic Records Committee and form the Association of Transportation Safety Information Professionals (ATSIP), an organization that is now recruiting safety data professionals, managers, and data users groups. Some of their activities will include providing training seminars and possibly offering a certification program. Other services provided by the NSC and the ATSIP are the evaluation of State crash data systems and provision of technical support to the agencies being reviewed. There is no cost for the initial visit to the state.

The Traffic Safety Information System (TSIS) Guidelines have been established for the hardware, software, personnel, procedures, storage, transmission analysis, and interpretation of highway safety data. This document provides guidelines in the following areas: crash data, drivers' license, vehicle registration, roadway injury control, enforcement, motor carriers, exposure, and an overview of the data analysis process (National Safety Council, 2003). Other publications include the MMUCC Report, the Inventory of State Traffic Safety Data Systems that highlighted several of the state programs, and a Crash Forms Catalog that provides images of the crash forms that were collected during the past ten years.

Tools and Resources

There are three important guidebooks that have been developed for implementation of safety in the public sector. The Safety Conscious Planning Guidebook is dedicated to adopting safety in all aspects of an organization, while the other two resources identify the adoption of a safety system as a solution to improving transportation safety conditions.

Safety Conscious Planning Guidebook

A comprehensive guidebook was also developed, by Meyer (2004), for the purpose of integrating the Safety Conscious Planning Model into the transportation planning and decision making process. Results from the 2001 Highway Safety Improvement Program (HSIP) were highlighted as the framework for this publication, which provides examples of best safety practices for states to consider and use in reducing transportation fatalities.

This sample of "best practices" includes 194 safety programs that were sponsored by fifteen state agencies, which included 83 educational programs on a variety of topics, 41 engineering activities, 59 enforcement efforts, and 9 emergency medical service projects. The remaining two administrative functions were reported in the "other" category. Interestingly, the safety initiatives were accomplished in a variety of ways through planning, technology transfer, safety management systems and CTST committees, pedestrian/bicycle programs, school bus crash reductions, and several enforcement campaigns that addressed wearing safety belts, the use of occupant protection campaigns, work zone safety programs, as well as transportation safety engineering projects.

Additionally, travel safety is highlighted as a viable replacement for the descriptor of roadway safety. The definition of travel safety is dependent on the transportation system design, construction, operation, and maintenance. Meyer (2004) identified crashes as being the leading public health concern in the US with 46 percent of motor vehicle fatalities involving speed, 27 percent of fatal collisions were with fixed objects, and 15 percent of fatalities involving drugs or alcohol. The multiplicity of this health issue involves many agencies that must coordinate and exchange information.

Several recommendations are made by Meyer (2004) for establishing a collaborative safety partnership. Specifically, it is important to consider bicycle safety advocates, enforcement agencies, governors highway safety representatives, local public works agencies, school administrators, parent organizations, civic groups, local store owners, and emergency response providers as partners to ensure that behavioral or human aspects of transportation safety are being adequately addressed during the planning process. Also, emergency medical service agencies play a vital role in planning because of their knowledge of the crash scene, while the police handle enforcement

and public safety during a crash incident that may require special attention during the planning phase.

Once a diverse partnership is established, safety is then incorporated into the vision of the organization because it is a critical component of public outreach that raises critical awareness. Next, safety is addressed in the goals and objectives to provide direction of the planning process and thus lead to system performance measures. Performance measures typically include monitoring of traffic safety, congestion, average speeds, system reliability, and mobility options that may change over time. Analysis procedures are then examined in order to determine how safety components of transportation systems work and how changes to the systems alter performance. Analysis tools range from data analysis tools to simulation models that produce evaluation information that determines benefits, costs, and outcomes so that judgments can be made concerning the merit of actions.

The products generated by a MPO partnership may include, but are not limited to, plans that range from a statement of investment policies and strategies to the master plan for a twenty year period. However, projects may be constructed in the near future and identified in the Transportation Improvement Program (TIP) and the State Transportation Improvement Program (STIP) that go through the programming process. Once the planning process is completed, a project development process is followed that includes three steps: systems planning, preliminary, and final engineering. Safety stakeholders are part of planning for local projects. The final phase of the planning framework is system monitoring that contains a feedback loop to the goals and objectives and the use performance measures.

A safety assessment checklist was developed by Meyer (2004) for integrating safety into an established organization. It requires the leadership to examine the presence of safety elements in the following areas:

- Vision statement.
- Goals (one to two.)
- Safety related performance measures.
- Safety related data use in problem identification.
- Presence of safety analysis tools for impacts.
- Evaluation criteria assessed merits of strategies that contain safety.
- Products of the process include some actions that focus on transportation safety.
- Safety is a priority factor in the prioritization process.
- Systematic monitoring process exists for collecting data on safety system performance.
- All key safety stakeholders are involved in the planning process.

It was also noted that state DOTs and MPOs have developed separate safety plans that focus exclusively on transportation safety improvements and are linked to the comprehensive transportation plan through common performance measures. The monitoring system must feed into both efforts, as well.

When incorporating safety into the vision statement (Table 6A.), the partnership must examine the current vision statement of the transportation plan, identify the importance of safety in mandates and enabling legislation, determine the importance of safety to the stakeholders and the community, and consider the types of information that are needed for educating the community on the importance of a safe transportation system. Three steps, required for successful integration, include obtaining background information on transportation safety, identifying the benefits as a result of implementing safety strategies, and preparing a sample vision statement to be presented at a public meeting. Once the vision statement is completed, then the goals and objectives found in Table 6B are examined in a similar manner.

Table 6A. Meyer's model for integrating safety into transportation planning and the decision making process (vision statement)

Factor	Questions
Incorporate Safety Into Vision Statement	• Is safety incorporated into the current vision statement of the transportation plan? • Is safety an important part of the mandates and enabling legislation of participants in the planning process? • Is safety an important concern of the general public & stakeholders? • How is it defined by the community? • What types of information are necessary to educate the community on the importance of a safety transportation system?

Enforcement, education, and emergency service strategies are identified as the safety goals and objectives that should be a consideration for all transportation modes. The safety goals and objectives should also be measurable and forecasted, if applicable. The public involvement process should be used for determining safety related goals and objectives. Analysis procedures should be used to determine whether or not the target is achievable and the public needs to be educated about the safety benefits of these goals and objectives.

Table 6B. Meyer's model for integrating safety into transportation planning and the decision making process (goals and objectives)

Factor	Questions
Incorporate Safety Into the Set of Goals and Objectives	• Is safety incorporated into the current goals and objectives set of the transportation plan? • How does the safety goal relate to the community understanding of safety during the vision development process? • Does safety goal relate to strategies for enforcement, education, and emergency services? • Does the safety goal reflect the safety challenges of all modes of transportation? • Are these objectives measurable? • Do the objectives reflect the most important safety-related issues facing the jurisdiction? • Can the desired safety-related characteristic be forecast? • What type of information is necessary to educate the community on the importance of a safety transportation system? • Have target values been technically reviewed to determine realistic attainment.

As identified in Table 6C, it is important to identify existing community efforts when establishing safety performance measures, which should be compatible with strategies of the planning process. The determination needs to be made so that the safety performance measures can sufficiently address the safety concerns identified in the planning process. Other implementation considerations include the capability to collect data, linking the safety performance measures to the evaluation criteria and the benefits related to other strategies. Internal discussions with staff members, responsible for collecting the data, are important to the successful integration of safety into the framework of any organization.

Table 6C. Meyer's model for integrating safety into transportation planning and the decision making process (performance measures)

Factor	Questions
Safety-Related Performance Measures in Agency Set	• What are the most important safety-related characteristics of the transportation system that resulted from community outreach efforts to date? • Will the safety performance respond to the types of strategies and projects that result from the planning process? • Is the number of safety performance measures sufficient to address the safety concerns identified in the planning process? • Does the capability exist to collect the data that are related to the safety performance? • Can the safety performance measures link to the evaluation criteria that will be used later in the planning process to benefits over other strategies?

Table 6D indicates that types of safety-related data must be identified to determine if it is currently available for use by the organization. It is critical to know if a systematic process for collecting this data exists and the quality control measures applied to the system. A determination should also be made about existing opportunities for incorporating data collection technologies into new infrastructure projects. All modes of transportation need to be considered when identifying the availability of safety data, along with the liability that is associated with the reporting of crash results. A memorandum of understanding should be developed if using information from outside agencies. Lastly, determinations should be made in advance about the type of data that needs to be collected for accomplishing each safety-related goal, while templates are developed on how safety-related data will be portrayed for internal purposes and public presentations.

Table 6D. Meyer's model for integrating safety into transportation planning and the decision making process (data)

Factor	Questions
Safety-Related Data	• What types of data are needed to support safety desires of community? • Is the data currently available? • Does the state (region) have a systematic process for collecting the data? • Is there a quality assurance/quality control strategy? • Are there opportunities to incorporate data collection technologies into new infrastructure projects? • Does the database include safety data for all modes of transportation? • What types of data would be relevant for safety-related planning? • Are there liability risks for collection and/or reporting of crash data? • Define type of data required to produce outcome. • Investigate sources of existing data. • Develop MOU with agencies for developing safety database. • Create a presentation template of safety-related data. • Obtain input from staff members in safety-related database management.

As noted in Table 6E, it important to determine if safety analysis tools already exist for determining impacts of strategies and actions and whether or not they produce information that is reasonably valid. Strategies need to be determined in advance for implementation in dealing with the safety problem, along with the timeframe allotted for the process. Also, multimodal safety considerations need to be addressed when selecting safety analysis tools.

Table 6E. Meyer's model for integrating safety into transportation planning and the decision making process (use of safety analysis tools)

Factor	Questions
Use of Safety Analysis Tools for Impacts of Strategies & Actions	• Are tools available that analyze safety problems at the same scale of analysis? • Can existing analysis tools produce this information with reasonable levels of validity? • What types of strategies could be implemented to deal with this safety problem? • Do the safety planning challenges require forecasting future characteristics of the transportation system? • Can the process be undertaken in the timeframe associated with the decisions to be made? • Are tools available if multimodal safety issues occur?

Table 6F describes considerations for using evaluation criteria in assessing merits of strategies. First, the criteria should be defined early in the planning process by reviewing different safety-related evaluation methods that are currently being used by other MPOs or state agencies. Consideration should be given on how the evaluation criteria can be used for the selection of best projects. A template needs to be prepared that identifies the evaluation methodology, which may be a simple rating system or advanced procedure, if required. Accommodations may need to be provided for non-infrastructure related strategies. Another evaluation consideration is to examine the cost associated with different crash types to society.

Table 6F. Meyer's model for integrating safety into transportation planning and the decision making process (evaluation criteria)

Factor	Questions
Evaluation Criteria Used for Assessing Merits of Strategies	• Is an evaluation methodology in place to produce the types of information that will be useful? • Is a simple rating sufficient to provide the type of information desired? • How will the non-infrastructure-related strategies and actions be evaluated? • Does the state or MPO have values associated with cost of different crash types to society? • Who will be conducting the evaluation, specifically assigning points in a scoring scheme? • Can computer based tools conduct the evaluation process? • How are the underlying assumptions in the evaluation process best explained to decision makers? • Will the evaluation results be so sensitive to these assumptions? • What is the best way of presenting evaluation results to the decision makers?

Transportation plans and programs should include safety-related projects and if other comprehensive plans exist, they should be consistent with the comprehensive plans. As noted in Table 6 G-H, safety should be included in the prioritization scheme for ranking projects. Key stakeholders must be involved in the final development of the transportation plan and program. It is also important to develop a public marketing campaign that highlights the benefits of safety from the plan and program.

Table 6G-H. Meyer's model for integrating safety into transportation planning and the decision making process (safety actions and prioritization scheme)

Factors	Questions
Products of Planning Process Contain Transportation Safety Actions Safety Priority Factors in Prioritization Scheme	• Does the transportation plan and program include safety-related projects and strategies and are they indicated in the documents? • If other comprehensive safety plans exist for the state or region, are they consistent with the goals, measures, actions, strategies of the comprehensive plan? • If some form of prioritization scheme is used to rank projects in the programming process, is safety included in this scheme? • Are key safety stakeholders involved in the final development of the transportation plan and program?

Lastly, Table 6I identifies the need to have a strong monitoring system present for the safety performance of the transportation system, along with a feedback loop that reexamines goals, objectives, performance measures, problem identification, project analysis, and evaluation of the plan. A forum should be conducted to illustrate the importance of the safety data for the multimodal transportation system.

Table 6I. Meyer's model for integrating safety into transportation planning and the decision making process (monitoring process and key safety stakeholders)

Factors	Questions
Systematic Monitoring Process	• Is there a systematic program or strategy for monitoring the safety performance of the transportation system? • Is the feedback provided by the monitoring system used in refining goals objectives, performance measures, problem identification, project analysis and evaluation? • Are there new vehicles or system management technologies that can be sued to provide the desired data more cost effectively?

Most importantly, stakeholders should be included in all steps of the safety integration process, including the culmination activities (Table 6J.)

Table 6J. Meyer's model for integrating safety into transportation planning and the decision making process (key safety stakeholders)

Key Safety Stakeholders Involvement in the Planning Process	• Who are the major players in a safety management system? • What are their responsibilities and is there a need to define them in more formal terms?

Roadway Safety Tools for Local Agencies

The NCHRP Report: Synthesis 321, developed by Wilson (2003), highlighted the importance of safety tools being effective and simple otherwise they will not be used by local agencies (Table 7.) This has presented a problem because many safety analysis tools are complex, but this problem has recently been overcome by the following methods:

- Rely on national studies
- Identify practical tools that "fit" the agency
- Hire the expertise (permanently or through consultants.)

New tools exist that do not focus on crash analysis, but asses the issues of safety by using an independent team approach, the Roadway Safety Audit. This practice is a safety procedure in the assessment of a plan or existing road/street segment. These tools were generated out of Europe and are an alternative or supplement to the traditional crash analysis posture. Both, experienced and inexperienced professionals are required for a local agency to become a "more professional" safety organization.

According to Wilson, in order to reduce significantly reduce roadway fatalities, local agencies need to do the following:

- Evaluate safety performance of their network
- Identify key location of safety concerns
- Compare effectiveness of possible solutions
- Plan and design a chosen improvement
- Obtain funding
- Implement the improvement
- Evaluate the improvement

Table 7. Summary of safety tools

Type	Tools
Reactive	Basic – high crash locations. Advanced – statistical analysis.
Proactive	Basic – roadway safety assessment of roads. Advance – roadway safety assessment of a plan.
Other (Resources)	Safety study data. Local partners. Professional organizations. Computer-based software. World Wide Web. Safety references. Work zone safety. Economic analysis and priority improvement tools. Known safety improvements.

Table 8 indicates that crash analysis is the basic reactive approach that begins with deciding the types of crashes, which are typically property damage, personal injury, and fatalities that are linked to the location of where they happen. Often geographic information systems (GIS) and global positioning systems (GPS) are used in concert with the crash data to determine accurate locations of crashes. Local agencies have been known to use color coded push pins on a map as an alternative measure. Next, traffic volume is needed at conflicting locations, as well as total volumes to determine volume impacts. The value of this tool is to identify clusters of similar crashes, so treatment will likely reduce crashes at the site.

Table 8. Reactive safety considerations

1. Cluster analysis requires subjective judgment.
2. Check for pattern of similar crashes.
3. Recheck the spot for accuracy.
4. Threshold number of crashes may be used to establish a decision starting point.
5. Local users may provide good information on unreported crashes.
6. Similar approaches are employed for linear segments, but crash clusters most often occur at intersections.
7. Cluster crashes may not be abnormal, depending on other factors.
8. Experience of individual conducting evaluation.
9. Investigation of intersection crashes requires consideration of several variables (e.g. speeds, vehicle types, sight distance at corners etc.)
10. Maintenance factors (adverse pavement conditions) need to be identified.
11. Many safety issues will be identified in analysis of a location, even if it is not a high crash site.

Other considerations are how many years of data are required to normalize trends, typically a one to three year period is considered appropriate for the before evaluation of crash locations. The before and after study will help to determine how effective was the change at the location. After the change occurs, there is usually a three month wait

before recording the results to allow for adjustments to change. Consideration must also be given to additional changes that occurred in the area, other biases in the analysis results; which can be addressed through the analysis of the crash history over time.

Advanced reactive tools are frequently used by cities and larger municipalities and they are prone to focus on in-depth analysis of local data. Wilson notes that state DOTs are the starting source for data and even may provide summary reports about special locations. The recommendation has been made for local jurisdictions to examine the relationship between crash data and possible treatments based on national analysis. Both methods of reactive crash analysis have proven to be excellent basis for the establishment of a safety program.

Roadway Safety Audit and Roadway Safety Audit Review

Using reactive crash data to help identify local sites in need of improvement is difficult because of two reasons: the random nature of crashes and many local crashes have gone unreported. Therefore, the Roadway Safety Audit Review formalizes the documenting of safety issues in a proactive manner. The procedure includes assembling a qualified team of reviewers that report on safety issues. This approach may be used to develop a local safety program, especially in rural areas.

Wilson (2002) describes the procedure as first, classifying the local road network due to funding issues and thus guiding safety improvements. Value judgments are placed on the improvement, as it is related to urgency and required resources. Recommendations are made by an independent audit team. This procedure is usually applied on county roads and then adopted by locals, if applicable to the region. The steps in planning an RSAR program are as follows:

- Classify the local roadway system functionally
- Begin a trial RSAR program
- Prepare a statement of findings
- Seek special funding
- Implement and evaluate the RSAR program
- Make the decision to begin a trial program with a 4 or 5 year plan
- Promote the proactive RSA/RSAR program

Consideration should be given that local agency members are not performing the RSAR, instead the local agency becomes a client of the team. This team must include a variety of experts having local knowledge, understanding of maintenance, traffic engineering, human factors, construction, design, and operations. There is also a need to have some background in bicycle, trucks, and pedestrian issues.

Since the RSA is an advance proactive tool that examines a future roadway project plan by an independent audit team, the process is included in planning, preliminary design, traffic control planning, and construction. This application is geared for a complex

situation and not likely to be used by a local agency. Many DOTs have adopted the RSA for construction projects where formal safety reports are required.

Safety Study Data-Effective Safety Tools

Additional data may be collected to further evaluate safety issues that include traffic volume studies, speed studies, travel time and delay studies, intersection and driveway studies, along with roadway inventories. Inventories should include existing conditions, improvement activities, and crashes in order to support local safety improvement. Traffic access studies are important tools for improving safety based on ingress and egress of the location. Impact studies provide important information on new development that is related to traffic. Also, traffic conflicts support near misses; while pedestrian studies examine human factors that are related to safety. Compliance with the Manual on Uniform Traffic Control Devices (MUTCD) involves bicycle safety and other aspects of human behavior for the driver, as well as the pedestrian. Lastly, photographs and videotaping can be digitized and supplement reviews of the location.

Local Partnerships

Collaboration is key to effective safety programs. A roadway is frequently the responsibility of several local jurisdictions, so a transportation network that works together to advance safety on general and specific issues should not be overlooked (Wilson, 2003.) An effective network of partners includes engineering, education, enforcement, and emergency response services; as well as local decision makers, the media, general public, law enforcement, and local schools. Additional issues that affect local communities are the older driver, and ADA considerations.

Wilson (2003) further acknowledges that adding a safety program is important, but a "luxury" that many local agencies cannot afford due to lack of time, funding, and resources. Also, there are concerns about identified safety issues contributing to liabilities if they are not fixed immediately and that safety issues need to be corrected in all locations or a lawsuit will happen. However, he advises that the Local Safety Improvement Program is actually a defense against liability. Each agency begins with a basic program, consisting of the following steps:

- Subclassify the local road network
- Develop a program to assess local safety issues
- Implement your safety program
- Identify possible solutions
- Seek funding for alternative solutions
- Document the safety program and its results

Local Safety Management System

Another important resource is the Local Agency Safety Management System (manual) that was created by Washington State DOT (2000) as a resource for establishing a comprehensive safety program. All aspects of transportation are addressed including planning, law enforcement, emergency services, education, and engineering. Recommendations are made for reducing the number of crashes and fatalities on local roadways by addressing safety issues that focus on the vehicle, traveler, as well as the roadway. As noted in this document, locals have traditionally focused on safety of the infrastructure and not been proactive toward involving the community as safety stakeholders. The case has been made to integrate engineering with all stakeholders through routine communication, information sharing, identification of needs, and sharing of resources that are coordinated. This guide further confirms that many agencies already have several safety programs in place that serve as the beginning point for creating their community network. Additionally, supportive emphasis has been placed on discretionary immunity, when collecting data for use in planning of transportation safety projects.

COMPARATIVE ANALYSIS

Many national congestion, security, and safety resources have been reviewed, therefore it is necessary to further conduct a comparative analysis of the best application for adoption in New Jersey. According to Farhar et. al. (1990), the procedure for selecting appropriate technology transfer application requires several steps:

- Characterization of the group being served (size, homogeneity, affiliation, access to resources.)
- Characterization of information (knowledge/skill, complexity.)
- Comparison of technology transfer methods (e.g. manuals, implementation packages, workshops, applications.)

In this project, “characterization of the group being served” is pre-determined by results from the Federal Certification Reviews. Specifically, the FHWA, New Jersey Division Office, has acknowledged the need for a statewide planning process to be in place for congestion mitigation, public safety, and disaster relief. The role of the MPO organizations is defined, by legislation, to address congestion mitigation and environmental planning and safety in New Jersey. Further discussion of the group occurs during the adoption process. Therefore, the literature review results are confined to the characterization of information and comparison of technology transfer methods that are described as follows.

Characterization of information required examination of commonalities between the issues of congestion, safety, and security. As found in Figure 3, safety appears in all areas as a component or solution. Reduction of nonrecurring incidents (roadway crashes) is the predominant priority to be addressed; while safety countermeasures (i.e.

signage, signals, traffic conditions) are identified as remediation tools. Safety assumes the role of an independent factor with congestion and security posturing as the dependent factors. Therefore improvement of safety would also directly benefit the conditions related to congestion and security of the infrastructure.

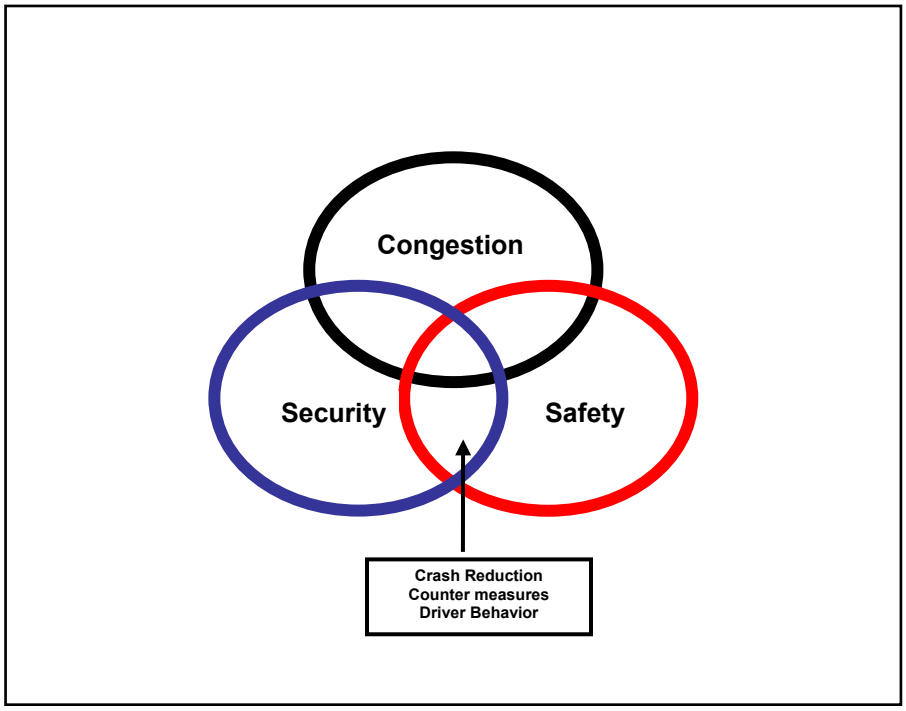

Figure 3. Commonalities between congestion, safety, and security

When comparing the technology transfer applications, there are many similarities that exist between national trends that are used for on addressing transportation congestion, security and safety issues. First, two important congestion studies identified the formation of partnership networks, anticipatory planning, reducing of roadway crashes, implementation of safety countermeasures on roadways, and the promotion of best practices as solutions for reducing congestion. Similarly, transportation security depends on partnerships, planning, standardized procedures, training, technical assistance, and best practices to keep the transportation veins open for evacuating citizens during national disasters. Likewise, roadway safety issues are addressed through the formation of partnerships, standardization of data collection, training and education. Although noted previously, improving roadway safety has a major affect on both congestion and security.

However, Safety Conscious Planning (SCP) appears to be the most global model that is capable of addressing congestion and security, as part of transportation safety. Forums are the venue used to identify the safety issues through comprehensive programming. The short-term objective of SCP is to integrate safety into the transportation planning process at all levels, including the Statewide Transportation Improvement Plans (STIP) and the Transportation Improvement Plan (TIP). Also, this action is followed by the

long-range, twenty year plans that the State DOTs and the MPOs are required to prepare and update periodically.

Partnerships provide input throughout the various stages of the planning process, especially in the development of safety goals and identification of future safety needs. State DOTs are responsible for developing long-range goals for their transportation systems, while the MPOs focus on their areas that include several goals. These groups coordinate with each other to form appropriate safety goals, objectives, and measures of effectiveness for the transportation systems. The coordinated efforts also include law enforcement, emergency management, community groups, and safety advocates. The safety goals and objectives are future-oriented while any short-range planning activities, known as the TIP for MPOs and STIP for DOTs must be compatible with them for consideration. Crash data analysis, special studies, and corridor studies are used to identify additional safety projects that require consideration for adoption.

Safety Conscious Planning (SCP) is most effective when diverse group members from the transportation community work together to address the safety needs of their organization and/or community and also enable Wilson's local considerations to be addressed adequately. In the past, local agencies had limited opportunity to obtain resources to address safety needs so the SCP process may enable them to become proactive participants in addressing the needs of their communities. According to Herbel (2004), Safety Conscious Planning (SCP) is different from traditional planning practices because it is geared toward preventing crashes and unsafe conditions; whereas traditional safety planning is reactive in nature. Specifically, safety issues are resolved through analysis of crash data, use of appropriate engineering, education, and enforcement countermeasures to resolve the issue. In order to promote this new concept, the federal government had established several working groups to develop technical resources that support this new approach to safety issues.

Several states have successfully sponsored forums that promote a dialog between transportation planners, engineers, safety professionals, regional councils, data managers and other transportation professionals. An important feature of the SCP concept is the integration of research, data collection development, and management tools that are used by Metropolitan Planning Organization (MPO) personnel to identify high risk locations for carrying out the federal mandate of integrating safety into the transportation planning process. However, before the SCP model is designated for implementation in New Jersey, it is important to determine whether or not congestion, security, and safety issues are currently being addressed within the State.

New Jersey Congestion, Security, and Safety Initiative

New Jersey is unique because it is the most heavily populated state in the country, so the roadway systems more readily reflect the negative impacts attributed to congestion, safety, and security than elsewhere in the country. It is important to determine how each of these factors, identified by FHWA, New Jersey Division, and the New Jersey

Department of Transportation as statewide priorities, have been addressed, in order to select the most effective solution and technology transfer methodology for implementation within the State.

State Perspective on Roadway Congestion

Congestion is a major concern statewide because it is costly to the residents in terms of fuel consumption, personal time, operating costs, and it negatively impacts the environment. Congestion occurs when travel demands approach or exceed the capacity of a transportation facility to provide service at performance levels acceptable to users. The present congestion level is from 7 a.m. to 9 a.m. and 5 p.m. to 7 p.m. This also impacts on the economy when goods cannot be moved in a timely manner.

Technology Transfer Review

Technology transfer resources, used for address congestion, have been predominantly research studies (Table 9.) The Metropolitan Planning Organizations (MPOs) are responsible for reducing the rate of congestion in the area. In the past, the New Jersey Transportation Planning Authority (NJTPA) had teamed with the New Jersey Institute of Technology (NJIT) to produce a major congestion study. Also, the Congestion Busters Task Force, an ad-hoc committee, was formed to further examine solutions for controlling this problem. A brief description of these agencies and available resources are contained in this section.

Table 9. Technology transfer methods used for addressing congestion

Sponsor	Studies	Training	Tools/Resources	Networks
MPO	NJ Congestion	Regional Workshops	Publications Funding Projects	Regional
CBTF	Economic Impact		Report on Recommendations	Ad-hoc Subcommittees
NJIT	NJ Congestion			

Metropolitan Planning Organizations (MPOs)

The federal government created Metropolitan Planning Organizations (MPOs), to locally control planning functions for each region of the country, insure that public funds are optimally spent on programs that improve mobility, support economic growth, and protect the environment. There are three MPOs that serve New Jersey with the NJTPA representing the largest territory of thirteen counties, while the Delaware Valley Regional Planning Commission (DVRPC) supports both New Jersey and Pennsylvania, and the South Jersey Transportation Planning Organization (SJTPO) addresses the issues of the southern region of the state.

The three MPO agencies coordinate comprehensive planning efforts that address future growth of their respective regions. The services that these agencies provide include technical assistance, priority studies on governmental issues, and offering advice on policy and capital funding programs affecting transportation, the environment, and the economy. Congestion Mitigation and Air Quality Improvement Program are transportation-related funding efforts that support the reduction of highway emissions to meet the National Clean Air Act standards.

Subcommittees of county and state transportation officials, environmental representatives, and business professionals review plans and select the most appropriate projects, based on ranked emission reduction criteria. Successful projects have included truck emission reduction efforts, rail freight options over truck transportation, plus the development of bicycle and hiking trails. These efforts have netted continued success toward reducing congestion while improving the environment.

Congestion Busters Task Force

Additionally, the Congestion Buster Task Force (CBTF) was formed to examine the economic impact attributed to the loss of time. The CBTF has met regularly since June 2001 to address congestion in New Jersey through public comments and technical support from the transportation industry. Research information was obtained from the NJDOT, NJ Transit, Transcom, the TMAs, MPOs, New Jersey Pinelands Commission and the State Planning Commission.

The purpose of the study was to examine five items that would potentially reduce vehicle trips and reduce traffic delays. The criteria used for each recommendation included ways that it would reduce congestion, which it affects, the cost, potential cost savings, method of implementation, and the type of legislation that would be required for implementation. Also, five subcommittees were formed to address the following issues that encompass congestion management, which include congestion, traffic management, transit and passenger rail, goods movement, demand management, land use and growth management, legislative, and public education.

The Traffic Management Subcommittee was charged with reviewing roadway operations, accessing input from the public, and offering recommendations that would relieve congestion (Table 10.) The Public Education Subcommittee supported an aggressive public information campaign on traffic congestion problems and promoted an understanding of controlling growth of commuter congestion. Several recommendations, involving the use of intermodal transportation solutions, were made by this group for further consideration by the Governor.

According to Sinclair (2003) the Task Force identified “hot spots” in the state and then examined the causes of congestion for these areas. Their findings paralleled with other research that further defined two main types of congestion, recurring and nonrecurring incidents. Recurring congestion is identified as rush hour traffic; while nonrecurring

congestion includes vehicle breakdowns, crashes, work zones, special events, and the weather. Also, this group recognized that consumers (customers) are the most important part of the transportation system and their choices have a major effect upon the system. Single occupancy vehicles are the predominant form of travel throughout the state. Past marketing of transportation alternatives has not been successful, which is why the transportation industry must be involved to provide alternatives and restrictions on travel. Therefore, alternative commuting choices were established for state employees that include carpools, the "Parking Cash Out" program, telecommuting, flexible work hours, and other alternatives.

New Jersey Congestion Study

According to the 2000 NJIT Mobility and the Cost of Congestion in New Jersey study, the total cost of traffic congestion in New Jersey amounts to $4.9 billion in lost time, operating cost, and fuel consumption. The cost of congestion per county varies with Bergen County residents absorbing the highest fee of $1.063 billion and Camden County having the lowest loss of $290 million. Individual congestion is the highest in Somerset County ($2,110) and Camden County remains the lowest with the amount of $830. per driver.

This recent New Jersey Institute of Technology (NJIT) study identified that traffic congestion costs amounted to $7 billion dollars annually due to lost time, wasted fuel, and operating costs (Sinclair, 2003.) Furthermore, the state's population continues to grow with an expected 500,000 more people by 2010 along with 400,000 new jobs that will clearly impact on the travel pattern of New Jersey residents. Furthermore, the Congestion Buster Committee has recently been reactivated to focus on short-term solutions for reducing congestion and improving the quality of life in the state.

Table 10. Traffic Management and Public Education Subcommittee recommendations

	Traffic Management Subcommittee
1.	Facilitate rapid clearance of traffic incidents on New Jersey roadways by legally establishing the duty of drivers to move vehicles to the side of the road if no major injury or vehicle damage is sustained.
2.	Implement, maintain and/or expand congestion relief pricing on all toll facilities in New Jersey.
3.	Provide a real-time travel time information system.
4.	Provide real-time traffic and alternate route information systems to be used by the general public and continue to help divert demand away from congested roadways.
5.	Re-time traffic lights on congested State roadways to be more responsive to the current traffic conditions.
6.	Increase the present level of services of the Emergency Service Patrol (ESP) along selected Interstate highways to add service to chronically congested areas and provide new service in other facilities not served presently.
7.	Deploy more high-speed E-Z pass installations on toll roads.
	Public Education Subcommittee
1.	Develop and implement multi-year, multi-media Public Information Campaign.
2.	Use Division of Motor Vehicle Services inserts to educate motorists about a variety of topics that will help change behavior and reduce congestion, trips and auto emissions.
3.	Design, produce and install new highway signs promoting ridesharing, along with a toll free number and website. Re-do toll free number menu to be user friendly. Utilize smart highway alert programs (MAGIC) when not in emergency use.
4.	Use driver's education curriculum, manual, and test to educate motorists about the implications of single travel, commuter incentives, and transportation mode choices. Offer driver refresher courses that provide the same information.

State Perspective on Transportation Security

AASHTO produced the 2002 State DOT Emergency Response Contact List of individuals who were responsible for coordinating and overseeing emergency response services that include evacuation, incidents, or events that disrupt any portion of the State's critical infrastructure. F. Rodney Roberson, former Assistant Commissioner of the NJDOT, was listed as the key contact for the State of New Jersey. However, Art Eagan (NJDOT Operations) had recently replaced him as the Coordinator of Emergency Services; while Chester Lyszczek has been designated to be responsible for establishing working partnerships for the NJDOT Office of Transportation Security.

Technology Transfer Review

As described in Table 11, both the AASHTO and NJDOT Office of Transportation Security are two highly integrated networks where personnel receive optimal training

and resources for responding to emergencies. The NJDOT provides resources to County representatives; while the NJ State Police training the local units. Descriptions of the programs are provided in this section.

Table 11. Technology transfer methods used for addressing security

Sponsor	Training	Tools/Resources	Network
AASHTO	State Emergency Responders	National List Website	National Network
NJDOT – Office of Emergency Management	NJ State Police Program	County Emergency Response Plans	State & County Personnel

NJDOT – Office of Transportation Security

Currently, the NJDOT is a lead support agency to the New Jersey State Police (NJSP) - Office of Emergency Management (OEM) during statewide emergency responses. The NJDOT Office of Transportation Security is responsible for maintaining a designated highway network for military movement during any and all emergencies. Other lead support agencies to the OEM included the New Jersey Department of Environmental Protection (NJDEP), the New Jersey National Guard, and the New Jersey Department of Corrections (NJDOC). Federal agencies partnered with the NJDOT in filling a void in the transportation community during previous emergencies, such as moving outside cargo, military assignments, and federal security needs (Roberson, 2003.)

A comprehensive emergency management plan is being completed at the NJDOT that includes personnel and resources from the Atlantic City Expressway, NJ Turnpike, and the Garden State Parkway. All groups will participate in the planning, response, and recovery phase of a transportation emergency. They will be addressing non-routine emergencies such as hurricanes, floods, natural disasters, major accidents, infrastructure failure, civil emergencies, and non-recurring congestion.

In addition to the plan, other benefits are realized from this partnership that include receiving “real-time” accurate information for decision-making, reduction of duplicate effort, access to resources, shared needs and limitations, coordination of the effort, and finding the solution to an emergency. Customer benefits can also be measured in dollars being saved, ensuring a successful execution of the emergency management plan, and a clear response to the customer.

A total of fourteen counties have completed their Emergency Management Plans that provide evacuation routes to be used during emergencies. According to Kurt Aufschneider (2003), the NJDOT has been coordinating the planning process for the counties during the past four years. Local police chiefs, first responders, and public sector employees participate in the process, along with county representatives. Four

additional plans are expected to be completed during the next year. Therefore, support does exist for developing local emergency management plans.

State Perspective on Transportation Safety

There are two state agencies that are responsible for funding and offering transportation safety programs: the New Jersey Department of Transportation and the New Jersey Division of Highway Traffic Safety. The NJDOT Commissioner Lettiere has made a commitment to statewide transportation safety initiatives (NJDOT: 2003.) A dedicated task force has been organized to promote "safe corridors", doubling of the fines in high risk areas, installation of barriers on interstate highway medians to prevent collisions, adoption of technologies to improve emergency response times for crashes, installation of signs to alert motorists of high accident locations, and revision of the written driver's test. The focuses are somewhat different with NJDOT being primarily concerned with the state roadway system; while the NJDHTS provides outreach services to local agencies. Additionally, Rutgers CAIT-LTAP addresses the safety training needs at the local level; while the New Jersey Police Traffic Officers' Association provides statewide support to their local membership.

Technology Transfer Review

It appeared that two unconnected networks have developed in New Jersey: a statewide and local system that is due primarily to National Highway Traffic Safety Administration (NHTSA) funding for local safety projects. Most of the agencies, identified in Table 12, offer a variety of services to their client groups while the New Jersey Division of Highway Traffic Safety (NJDHTS) and the South Jersey Traffic Safety Alliance (SJTSA) had the broadest range of services. New Jersey Department of Transportation (NJDOT) and the New Jersey Police Traffic Officers' Association (NJPTOA) and Rutgers CAIT-LTAP sponsor training workshops for the enforcement community. Brief program descriptions are presented in the remainder of the section.

Table 12. Technology transfer methods used for addressing safety

Sponsor	Studies	Training	Tools	Network
NJDOT – STRCC		Police NJTR-l	Police Guide Crash Database Website	Statewide Data User System
NJDHTS	Municipal Safety Study	Work Zone Training	Seat Belts Drug & Alcohol Safe Kids Website	CTSPs SJTS Alliance Work Zone
Rutgers CAIT-:LTAP	Municipal Safety Study	Work Zone Training Road Scholar	Work Zone CD Website Newsletter	Municipal Work Zone
NJPTOA		Police NJTR-1 Seat Belt Work Zone Enforcement	Website Newsletter	State/County/Local Enforcement
SJTPO SJTSA	Regional Safety Analysis	Enforcement Human Factors Work Zone	Publications Newsletter Equipt Loan Campaigns	Regional Municipal Community

NJDOT Statewide Traffic Records Coordinating Committee (STRCC)

In 2002, the New Jersey Department of Transportation (NJDOT) reorganized their Accident Records System Advisory Committee (ARSAC) into the Statewide Traffic Records Coordinating Committee (STRCC) that represents a partnership between transportation, enforcement, safety, health and education professions. This action was taken at the recommendation of a nationally recognized team of safety experts that performed a Traffic Records Assessment of New Jersey's Traffic Data System. Several suggestions were made for restructuring the Accident Records System Advisory Committee (ARSAC) to become the current Statewide Traffic Records Coordinating Committee (STRCC) that is chaired by William Beans, Manager of the NJDOT Bureau of Safety Programs.

Two advisory levels were formed as working committees and subcommittees that are charged with reviewing high priority functions and making recommendations for the improvement of the system. The recommendations are then brought to the Executive Committee for approval. The STRCC will be responsible for approving data elements collected, developing training curricula, preparation of manuals for data collectors, evaluation of the system, and developing cooperation and support from stakeholders to ensure high quality data is available for all users in a timely manner.

During March 2003, representatives from the USDOT, BTS, NHTSA, and NCSA conducted a briefing session for the membership of the STRCC that introduced the group to several types of crash records systems that are readily available to enhance the State Crash Records Database. Shortly afterward, another meeting was held at NJDOT's Safety Program Bureau for committee members to gain insight from the

locators (Accident Record Reviewers) and other data users on the errors that were made by police officers when completing the New Jersey Police Accident Report. According to N.J.S.A. 39-4-131, “Every law enforcement officer who investigates a vehicle accident of which a report must be made as required by this title, or who otherwise prepares a written report as a result of an accident, or thereafter by interviewing the participants or witnesses, shall forward a written report of the accident to the division, on forms furnished by it, within five days after his investigation of the accident.” Reports must be submitted to all law enforcement agencies for any reportable traffic crashes that result in injury to or death of a person, or property damage in excess of $500.00.

Currently, the STRCC is developing a Traffic Records System Strategic Plan that includes input from “end users” as well as the committee members. This plan includes updating the New Jersey Police Crash Report (NJTR-1) and a proposed direction for the expansion of the NJDOT Bureau of Safety Programs. The database now serves as a vital resource for other state agencies to confidently use to identify long range and short-term transportation projects.

Crash Records

The New Jersey Department of Transportation is the lead agency that maintains the statewide crash records database, while the FARS database is housed at the New Jersey State Police (NJSP) Headquarters. The NJDOT, FARS, NJSP, New Jersey Division of Highway Traffic Safety (NJDHTS) and the Motor Vehicle Commission (MVC) share information between groups, in order to provide the most accurate information for data users in the state.

In 1996, management of the NJDOT Crash Records System was contracted to a private company that was unsuccessful in providing timely and accurate information for crash data users in New Jersey. After a period of time, control of the Crash Records System returned to the NJDOT, Bureau of Traffic Safety Programs, and is currently being managed by William Beans and John Semler. All municipal police departments are required to submit crash reports to this department for processing. In order to address the data entry backlog, a vendor is being used to scan the NJTR-1 image and input the data into the NJDOT Oracle Database. This function is outsourced to the Philippines, but it takes only one or two weeks to receive the electronic product. The processed information is downloaded for the locators to review. A comparison is made between the digital and scanned version with built-in mechanisms ensuring that the data is accurate. The present system is linked to the NJDOT Straight-Line Diagrams that helps ensure report conformity.

The New Jersey Police Accident Report (NJTR-1) requires the police officer to submit information on pedestrian maneuvers, presence of traffic controls, roadway characteristics, vehicle types, road conditions, location(s) of vehicles, victim’s physical conditions, ejection from the vehicle, personal information, description of injuries, use of

safety equipment, ambulance run numbers, description of contributing circumstance, axles on the vehicle, direction of travel, pre-accident conditions, sequence of events, types of injuries, location of incident, driver information, vehicle information, damage, presence of alcohol, status of hazardous materials, and other related information (Table 13.)

Also, a companion manual, entitled "*Police Guide for Preparing Reports of Motor Vehicle Crashes"* was developed by a group of fifteen state and local police and safety professionals to provide direction on completing the updated NJTR-1 Report. The identified changes include the use of "crash" instead of "accident", the elimination of the Supplemental Commercial Vehicle Report, verification of the commercial vehicle type, completion of all 123 boxes by using a dash (-) for non-applicable boxes, the use of other symbols for lack of information, entering the numeric street name before the alpha name, and the reporting of bicycle crashes.

A second section of the manual highlighted the Motor Vehicle and Traffic laws that govern completion of the crash reports. Other information addressed the need for completing more than one NJTR-1 form, the requirements for completing the Change Report Form, fatal crash reporting requirements, recommendations for handling crashes that were not investigated at the scene of the infraction (SR-1 Form), and the Department of Banking and Insurance requirements and other general information, including a section entitled, "*Most Commonly Asked Questions*". The remainder of the text provides detailed explanations for completing each of the 123 boxes of the report, examples of other vital information on descriptions of intersections, a bus seating chart, crash descriptions and sample crash reports.

New Jersey State Police Fatal Accident Unit and the Fatal Analysis Records System (FARS)

Police Officers complete the form at the scene of the crash and submit the information to the appropriate agencies. There is a 12-hour reporting requirement for the State Police (NJSP), while a 24-hour requirement is imposed by FARS. DMV also shares information between the NJSP, NJDOT and FARS. Typically there are discrepancies between the four units at the end of the year. At the present time, the reports cannot be electronically submitted to the agencies, which often slow down the process for those who are on field assignments. The NJSP is developing a system for electronic data transfer that is compatible with the New Jersey Crash Records System.

New Jersey Division of Highway Traffic Safety

During the past several years, local safety programs have evolved in New Jersey, due to funding provided through the New Jersey Division of Highway Traffic Safety, an organization that is focused on reducing fatalities, injuries, and losses resulting from motor vehicle crashes and enforcing safety standards on roadways. This agency is also

responsible for supporting statewide and local efforts for reducing drunk drivers, promoting safety belt use, work zone safety, organizing child safety seat installations, as well as several other roadway safety campaigns.

In the 1980's, the New Jersey Division of Highway Traffic Safety (NJDHTS) sponsored several community based traffic safety committees with eleven programs remaining active today. As previously noted, these committees have been designed to bring local agencies together for the purpose of promoting traffic safety initiatives. Many of these county based programs are known as Offices of Highway Traffic Safety that build safety alliances within the community. Additionally, the Morris County Safe Communities/Northern NJ Safe Kids Program and the South Jersey Traffic Safety Alliance are two unique programs, partially funded by the NJDHTS, which support integrated transportation safety models.

New Jersey (Rutgers) Local Technical Assistance Program

Local Technical Assistance Program Centers were created over twenty years ago to provide training, technical assistance, and technology transfer products to local transportation agencies. This program is sponsored by the Federal Highway Administration *(FHWA)* Office of Technology Applications, in partnership with state departments of transportation *(DOTs)* and, in some states, with local governments and universities. LTAP incorporates a hands-on method of moving innovative transportation technologies from research institutions into the field where local streets and roads are maintained. These technology transfer *(T2)* centers provide low-cost or free training; publish newsletters; circulate publications, videotapes, and software; and offer technical assistance to local roadway and transportation personnel. Currently the National LTAP Network consists of 57 LTAP centers that include a program in every state, six Tribal Transportation Assistance Programs *(TTAP)* and one center located in Puerto Rico (Bennett, 1998).

In 1999, the New Jersey Center joined the Center for Advanced Infrastructure and Transportation located in the Rutgers University, School of Engineering, and has become known as CAIT-LTAP. The move from a governmental training unit to the Department of Civil Engineering enabled CAIT-LTAP to better serve as a technology transfer clearinghouse, improve the distribution of technical information, establish national recognition, and expand the customer base (Orth, 1999).

Table 13. New Jersey Police Accident Report (NJTR-1) categories

Box	Title	Box	Title
1.	Pedestrian Maneuver	55,56,57& 58.	Distance From Nearest Cross St.
2 & 3.	Traffic Controls	59,60,61& 62.	Ramp Identification
4.	Road System	63 & 64.	Latitude and Longitude
5.	Road Character	65.	Policy Number
6.	Road Surface Type	66.	Insurance Company Number
7.	Road Surface Condition	67 & 90	Driver's Name
8.	Weather	68 & 91.	Number and Street
9 & 10.	Oversize/Overweight Permit	69 & 92.	City, State and Zip code
11 & 12.	Vehicle Type	70 & 93.	Driver's License Number
13 & 14.	Cargo Body Type	71 & 94.	State
15.	Road Divided By	72 & 95.	Date of Birth
16.	Is Road Under Construction?	73 & 96.	Eyes
17.	Which Vehicle Occupied	74 & 97.	Sex
18.	Position In/On Vehicle	75 & 98.	Owner's Name
19.	Victim's Physical Condition	76 & 99.	Number and Street
20.	Ejection From Vehicle	77 & 100.	City, State, and Zip Code
21.	Age	78 & 101.	Make and Model and Color
22.	Sex	79 & 102.	Year
23.	Location of Most Severe Physical Injury	80 & 103.	Plate Number
24.	Type of Most Severe Physical Injury	81 & 104.	State
25 & 26.	Safety Equipment Available and Used	82 & 105.	Vin Number
27.	Ambulance Run Number	83 & 106.	Vehicle Removed To
28 & 29.	Apparent Contributing Circumstance	84 & 107.	Authority To Remove Vehicle
30 & 31.	Number of Axles	85.	Areas Damaged
32 & 33.	Direction of Travel	86.	Posted Speed
34.	Light Conditions	87.	Accident Diagram
35, 36, & 37.	Physical Status	108	Alcohol Data
38 & 39.	Pre-Accident Vehicle Action	109.	Hazardous Material
40a-41d.	Sequence of Events	110.	US DOT Carrier Number
42.	Collision Type (W/Other Motor Vehicle)	111.	ICC Carrier Number
43.	Case Number	112.	Vehicle Weight
44.	Police Department	113.	Carrier Name
45.	Station/Precinct	114.	Accident Description
46.	Date of Collision	115	Damage to Property
47.	Day of Week	116 & 117.	Charge-Summons Number
48.	Time	118.	Officer's Signature
49.	Municipality Code	119	Badge Number
50.	Total Killed	120.	Reviewed By
51.	Total Injured	121.	Status
52.	Accident Occurred on (Road/Street Address)	122.	Number of Vehicles
53 & 54.	Route Number & Milepost	123.	DEP Case Number

During the past four years, the CAIT-LTAP Center has been establishing itself as an operational unit of the Rutgers Center for Advanced Infrastructure and Transportation (CAIT), a recipient of the University Transportation Center (UTC) grant. It is the only T2 Center in the entire county to operate in this capacity due to several changes that happened when the program moved into the Rutgers Department of Civil Engineering. Training programs changed from management to technical offerings and outreach services include school age students, as well as adults. According to the Annual Profiles, continuous progress is being made regarding the number of courses offered, technical resources distributed, and technical support offered to local customers.

Networks

There are two important local traffic safety networks that exist in New Jersey for local police officers. The South Jersey Traffic Safety Alliance is a community based effort that supports several traffic safety projects and the New Jersey Police Traffic Officers Association is a statewide organization that was created to keep their membership informed about traffic safety.

New Jersey Police Traffic Officers' Association

The New Jersey Police Traffic Officers' Association (NJPTOA), led by Chief Anthony Parente, recently celebrated its fortieth year of existence. The purpose of the association is to organize Police Officers so that they are kept informed about traffic safety, to provide educational opportunities for the membership, to offer technical support on NJDOT sponsored committees, and to educate the membership on legislative issues that pertain to their profession. As identified in Table 14, there are seven regional subcommittees that meet regularly with local traffic officers, in order to provide technical support for their membership. Since several transportation safety agencies already exist, it is important to use them as the support system for integrating safety on all levels of the industry. Additionally, the NJ Police Traffic Officers' Association should not be overlooked as a resource since the organization reaches out to its' membership which serve as the "front line" for reporting roadway crashes.

Table 14. New Jersey Police Traffic Officers' Association county organizations

County	Contact
Region 1: Bergen	Chief William Cicchetti, Washington Twp.
Region 2: Essex & Hudson	Lt. Steve Flanagan, Bloomfield
Region 3: Morris, Passaic, Sussex & Warren	Sgt. Gary Gouck, Randolph Twp.
Region 4: Hunterdon, Mercer, Middlesex, Somerset, & Union	Cpl. Michael Brunson, Branchburg
Region 5: Monmouth & Ocean	Sgt. Richard Maxwell, Colts Neck
Region 6: Burlington, Camden, Gloucester, & Salem	Lt. Mark Wilson, Voorhees Twp.
Region 7: Atlantic, Cape May, & Cumberland	Sgt. Edward Newman, Northfield

South Jersey Traffic Safety Alliance

The South Jersey Traffic Safety Alliance was organized in 1998, as a traffic safety organization that covers four New Jersey counties. The South Jersey Transportation Planning Organization (SJTPO) established this alliance in order to integrate traffic safety into the metropolitan and state planning process. SJTPO is the federally designated Metropolitan Planning Organization (MPO) for the southern region of New Jersey.

This alliance of traffic safety professionals includes representatives from law enforcement, education, fire, rescue, engineering, and planning that work closely together with the SJTPO, in order to decrease fatalities and injuries on regional roadways. In order to accomplish this goal, region-wide traffic safety programs have been developed, technical support is provided, and best practices are shared among the member agencies. Also, the membership participates in a bi-annual safety survey to determine current traffic safety issues. Other projects include an aggressive driving campaign, child passenger seat inspection programs, seat belt clubs, bicycle safety events, and a buckle-up stencil program.

Tools and Resources

A municipal study, conducted by NJDHTS (2002), examined local safety needs in the State. A total of 344 municipalities completed the survey with 41% reporting that they maintained crash analysis programs, while 44% actively identified high crash locations for their jurisdiction. Specialized funding was also available for safety improvements in 33% of the municipalities (Table 15.) Local government was actively involved in assessing unsafe roadways through investigation/inspection (24%); safety committee reviews (22%), and recommendations of Police Traffic Officers (17%).

Table 15. 2002 municipal safety programs (response by percent)

	Yes	No	Unknown
Crash Analysis Program	41	48	11
Identified High Crash Locations	44	33	23
Specialized Municipal Funding for Safety Improvements	33	43	24
Most Frequently Used Procedures for Assessing Unsafe Roadways	Investigate/Inspect 24 Safety Committee Review 22 Police Recommendations 17		

When asked to determine the organizations that provided support for their municipal safety improvement program, the respondents overwhelmingly noted that in-house (n=206) support was the most frequent method of assistance. The second organization that the municipalities depended on for support was the NJDOT (n=125), while local consultants were the third group that the municipal departments (n=121) contacted for technical assistance. Other municipalities also offered technical assistance to them (n=75). Although not identified in the survey, OSHA was listed in the "Other" category as an additional safety support system for these departments.

The most common safety measure for municipalities was the scheduling of preconstruction meetings (n=213), while sign inventories (n=175) was rated as being the second most popular component of safety programs. Speed studies and analysis of crash data were rated as the third component of safety programs. Mile markers and video logs were the least used safety measures; probably because mile markers have just recently been issued for collector and local roads and video log systems become expensive and time consuming to develop independently.

These findings confirmed that there are several opportunities for offering support to the local police and public works departments. Less than half of these local transportation agencies are involved in proactive roadway safety activities. Networking appeared to be limited to mainly local agencies and professional safety networks have weakened over time, except for the local police traffic officers' partnership. Many of the respondents had interacted with NJDOT and the NJDHTS, but not together as a united resource network. Although Safety Conscious Planning would be implemented initially with the NJDOT and the MPOs, this unified system would ultimately benefit local agencies if it is integrated in the manner that is specified by Wilson (2003), using the Washington State DOT program.

SELECTION PROCESS

Characterization of information showed that commonalities exist between congestion, safety, and security factors in New Jersey. Safety appears in all areas as a solution with the reduction of non recurring incidents (roadway crashes) and use of countermeasures (i.e. signage, signals, traffic conditions) effective options for reducing

congestion and improving security of the infrastructure. Similar to national trends, transportation safety is the independent factor and congestion and security are dependent upon safety applications to produce results.

There were some differences between the national and state trends available for comparison of technology transfer applications. MPOs offer a variety of outreach services and funding for projects that help reduce congestion and improve the environment, while the CBTF promotes alternative solutions for addressing this issue. Also, technical research has been conducted that measures the impact congestion has on the quality of life of the residents living within the State.

The New Jersey State Police (NJSP) - Office of Emergency Management (OEM) leads the statewide emergency response network with the NJDOT Office of Transportation Security maintaining a designated highway network for military movement during all emergencies. Other state agencies, in this network, provide support in responding to emergencies and other threats. The NJDOT Operations staff has assumed the major role of coordinating the development of County Emergency Management Plans to provide guidance for local agencies and complete the network.

Also, several agencies within the NJDOT have been actively involved in promoting safety, along with other organizations that emphasize transportation safety. Particularly, the NJDOT Bureau of Safety Services is responsible for upgrading the accuracy and timeliness of the New Jersey crash records data system that is shared by a variety of data users. Their represented agencies include transportation, administration, planning, motor vehicles, motor carrier, engineering, health, safety, and law enforcement professions. As a result, the crash data has become useful for driving safety projects.

In summation, the literature review results confirmed that the most beneficial technology transfer method for establishing a statewide planning process for congestion, safety, and security, is found in the safety domain. In particular, the SCP planning model has the best potential for statewide adoption of a network for addressing congestion and security by focusing on safety. The SCP Model was formally accepted by the FHWA New Jersey Division Office and the NJDOT Bureau of Research and Technology as the most appropriate technology transfer application for adoption in New Jersey.

Adoption of the SCP Model in New Jersey

As part of the technology transfer process, characterization of the group is the first step to consider when adopting a method. The needs of the group may affect the level of information to be delivered to the group (audience); therefore the SCP model will be examined to determine if enhancements are required for reaching a diversified statewide audience.

Characterization of the Group

The three MPOs, located in New Jersey, include the Delaware Valley Regional Planning Commission (DVRPC), North Jersey Transportation Planning Authority (NJDTPA), and the South Jersey Transportation Planning Organization (SJTPO.) They were established to provide coordinated planning for the growth and development of their regions. Their predominant roles are to serve in an advisory capacity on regional planning, capital funding of transportation, economic development, promotion of transportation improvements, adopting long range plans, land use concerns, and addressing environmental issues that include Clean Air Act Amendments. However, there are clear differences in the populations they serve with one organization serving both New Jersey and Pennsylvania, another covering the southern area of the state, and the final one representing 6 million people.

In addition to differences in size, the range of service also differs between the organizations (Table 16.) The DVRPC has an extensive outreach program for locals with resources including studies, travel count services, shared computer data, technical support, and distribution of equipment. Also, the NJTPA sponsors a Local Scoping Program as a service to promote local efforts, while the SJTTPO has organized the South Jersey Transportation Safety Alliance that targets local transportation safety needs.

The New Jersey local transportation safety system of 566 municipalities varies widely throughout the state. Local aid is available through the NJDOT and additional safety funding has recently become available for projects. Also, NJDHTS has spent over 40% of their yearly budget on local safety programs. These local safety efforts usually address enforcement of human factor issues (e.g. seat belt usage, drunk driving) which are often adopted by police departments, while some larger municipalities have hired traffic engineers to administer their roadway safety initiatives. Furthermore, municipal planners and engineers are predominantly consultants that work for many agencies which greatly limits the ability of their organization to participate in new safety efforts.

Table 16. Activities of the New Jersey MPOs

MPO	Plans	Services	Networks
DVRPC	• Planning Work Plan • TIP • Long Range Plan • State Implementation Plans	• Regional Policies • Funding Dissemination Approval • Technical Assistance • ITS Aid • Travel counts • Tools brochures • RTP • PDWP • Unified Planning Work Program	• Regional Transportation Committee • Planning Coordinating Committee • Regional Air Quality Committee • Regional Aviation Committee • Regional Housing Com. • Goods Movement • Land Use Dev. • Inf. Resource Exchange • Transit Check • Tri-County Water
NJTPA	• Long Range Plan • Planning Work Plan • Project Development Work Plan • Regional Transportation Plan • Strategic Business Plan • Unified Planning Work Program	• Local Scoping Program • Statewide Transportation Improvement Program • Transportation Improvement Plan • Statewide Transportation Improvement Program	• Board of Trustees • (Committees: P& E, • Project Prioritization, Freight Initiatives) • Regional Transport. Advisory Committee • Technical Advisory Committees
SJTPO	• Planning Work Plan • Long Range Plan • Project Development Work Plan • Regional Transport. Plan • Transportation Improvement Program • Unified Planning Work Plan	• Guide Funding Investments • Newsletters • Transportation Improvement Program • Safety Programs • Statewide Transportation Improvement Program • Unified Planning Work Program • Website	• Policy Board • Technical Advisory Committee • Citizens Advisory Committee • Safety Alliance

Characterization of Information in the SCP Process

Meyer (2004) developed a process for integrating safety into established organizations. It requires planners and the leadership to examine the presence of safety elements in the vision statement, goals, and performance measures used for accomplishing the goals. Data and safety analysis tools are to be used in conjunction with evaluation criteria. Products are examined relative to transportation safety, while safety is a priority factor. Therefore, it is important to identify the functions that are internally based and those that would have merit for external application, especially when enhancing the SCP Model for use by local agencies (Table 17.) All functions involving key stakeholders in all levels of the planning process qualify as internal with a differentiation between organizational and operations systems approaches.

Table 17. Internal and external components of SCP

Functions	Application
• Vision statement. • Goals (one to two.) • Safety related performance measures. • Safety related data use in problem identification.	Internal - Organizational
• Presence of safety analysis tools for impacts. • Evaluation criteria assessed merits of strategies that contain safety. • Products of the process include some actions that focus on transportation safety. • Safety is a priority factor in the prioritization process. • Systematic monitoring process exists for collecting data on safety system performance.	Internal-System Operations
• All key safety stakeholders are involved in the planning process.	External

The intent of the SCP Model is to integrate safety into all aspects of the planning process. This approach is effective for use on state and county levels, with the planning profession, newly formed organizations or committees, and those in leadership roles that have the power to drive the vision of an organization (e.g. elected officials.) The meaning of safety can then adopt a new “proactive” importance within the organization.

Unfortunately, the typical understanding of safety is project based and reactive to crashes that have already occurred, which creates a dichotomy for local safety professionals. One solution is to approach safety from both directions so that the elected official assumes the leadership role of affecting “internal” change within an organization, while the safety professional maintains the responsibility of forming this “external” system (e.g. committee, task force, network) that serves in an advisory capacity for the community, county, region, or state.

Another enhancement to SCP is to maintain the terminology as Safety Conscious Planning in all levels of government. The most important reason is that the word "safety" in transportation has many meanings, which are associated with worker safety, traffic safety, and the reactive approach of the process. These connotations can mislead public sector representatives into feeling that they are actually engaged in the proactive stages of the process when that is not the case. Also, divisions occur in creating a unified network because confusion exists if the state level termination is Safety Conscious Planning and then the same concept is renamed as a "safety system" on the county and local levels. Furthermore, the term, safety, is associated with "business as usual" and Safety Conscious Planning is a "new" concept signifying a driving force that stimulates safety globally, which creates a greater impact toward reducing crashes and saving lives.

The enhancements mentioned in this section have been incorporated into the New Jersey Statewide SCP Network that will be described in the remainder of this project. These minor changes have enabled a statewide network to be adopted that reaches to the local level where the majority of transportation crashes and fatalities are occurring.

Formation of the New Jersey SCP Partnership Network

The SCP Model has been modified to enhance the creation of a statewide SCP Partnership between the MPOs, the NJDOT, and other state level transportation and safety professionals (Table 18.) Tier 1 includes the preparation and development of a survey for state, county, and local transportation agencies to obtain feedback on the importance of transportation safety in their organizations. Also, a Safety Conscious Planning Working Group (SCPWG) was formed and met several times to identify potential partners, plan the forum activities, and invite participants to a statewide event and offer input to three MPOs and the NJDOT. A series of safety technical resources were developed and distributed to transportation organizations during several workshops that were held in conjunction with the project.

As part of Tier 2, regional (county) level forums were scheduled for elected officials and safety professionals that served a similar purpose as the abovementioned statewide event. County and local public sector representatives were invited to provide input to the MPO representatives on their safety needs. The functions of Tier 2 is to assess the existing level of safety within local agencies, target local elected officials and internally drive their organization's commitment to safety, and enable safety practitioners to participate in the development of an external partnership network.

Tier 3 has been accomplished through outreach services to local elected officials. Their role is to drive safety planning internally with the support of planners, while safety professionals (police officers) organize the local community network. An extensive description of the adoption process is described in the following section.

Table 18. New Jersey SCP (external) partnership network model

Level	Procedures
Tier 1 – Statewide SCP Network	• MPO & NJDOT safety integration. • TIP, STIP, Long Range Plans. • Development of the Regional Safety Task Force.
Tier 2 – Regional Forum & Safety Task Force	• Identify existing local ad hoc & enforcement groups of the network • Educate representatives on the role of MPOs. • Create partnership between four county representatives and DVRPC. • Provide updates on safety issues to the Regional Safety Task Force representatives that communicate the information to local agency representatives. • Expand LTAP services provided to locals and counties through newsletter, training, and resource distribution.
Tier 3 –Outreach to Local Officials	• Adoption of SCP within local organization. • Creation of SCP local system

IMPLEMENTATION

Initially, a survey was prepared and distributed to state, county, and local transportation agencies that provided baseline feedback on the importance of roadway safety to their organizations. Next, the Safety Conscious Planning Working Group (SCPWG) met several times to identify potential partners, plan forum activities, and invite participants to a statewide event in order to provide feedback to three MPOs and the NJDOT. Several safety publications, reports, newsletters, handouts, and checklists were developed and distributed to transportation organizations during several workshops that were held in conjunction with the project.

Tier 1: Establishment of the New Jersey Statewide SCP Network

Representatives from the Federal Highway Administration – New Jersey Division, the New Jersey Department of Transportation, the three Metropolitan Planning Organizations (MPOs) and New Jersey CAIT-LTAP met to develop the New Jersey version from the sample survey used during the Michigan Safety Conscious Planning Forum (FHWA, 2003). After an intense review, the instrument was mailed and made available on-line to county and municipal planning, engineering, public works, and law enforcement departments.

Table 19. 2003 Safety conscious planning survey respondents (by percent)

Organization	Response
State	0
County	2
Municipal	95
Private	3

Over ninety-five percent of the 305 respondents were from municipal organizations with sixty-two percent being answered by police traffic officers (Figure 4.) Many individuals represented predominantly suburban municipalities (Table 19.) Their responses served to guide the regional MPOs to include traffic safety issues in future regional plans.

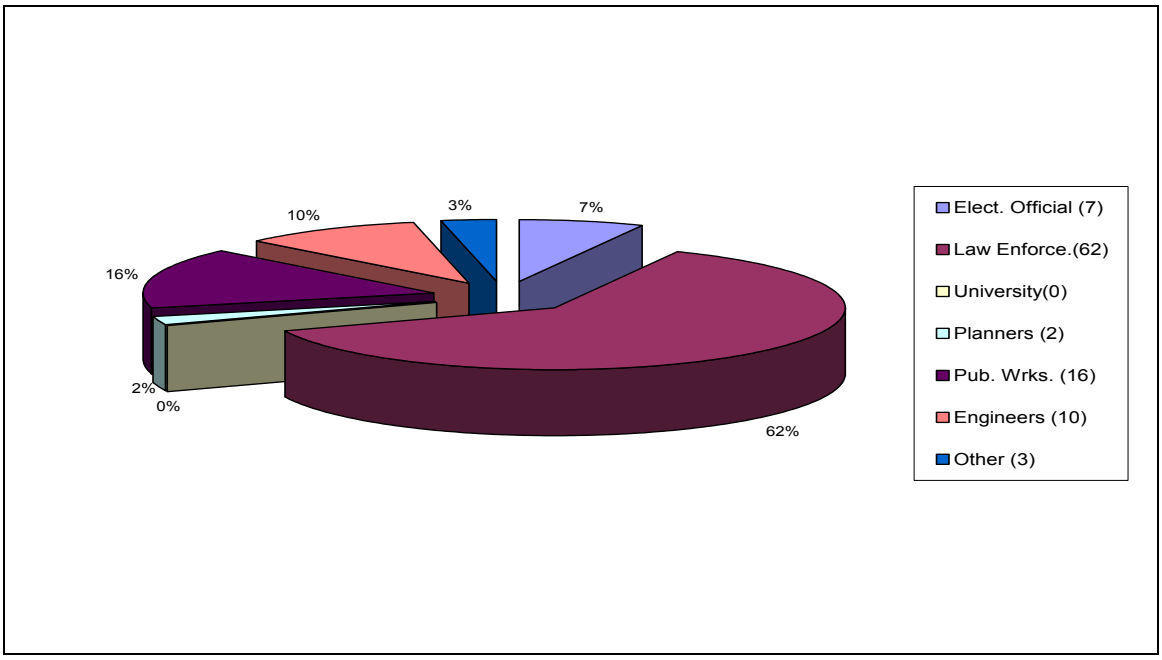

Figure 4. Professions of respondents

Table 20 identifies the responses of participants who were asked to rank order (1= lowest and 10= highest) a listing of their top current interests and future safety concerns. The results confirmed that reducing fatalities (7.7), impaired drivers (7.4), and aggressive driving (7.2) were the primary safety interests. Future safety concerns also yielded the same results from the respondents, who are predominantly police traffic officers. Interestingly, the engineering-related issues (consequences of leaving the road, head on collisions, and keeping vehicles on the roadway) received the lowest ranking scores. Also, truck travel did not appear to be an immediate or future concern on local roadways.

Table 20. Rank of current safety interests and concerns

Safety Interests	Current	Future
Aggressive Driving	7.2	6.9
Commercial Drivers	5.1	4.8
Fatigued Drivers	5.2	4.5
Fatalities	7.7	6.8
Impaired Drivers	7.4	7.0
Influencing Driver Behavior	5.8	5.5
Older/Young Drivers	5.1	4.8
Construction of Safety Projects	6.5	5.0
Designing Safer Work Zone	6.5	5.2
Improve Highway Design Intersection	6.2	5.7
Intersection Safety	6.3	5.9
Keeping Vehicle on Roadway	5.6	4.6
Consequences of Leaving Road	5.3	4.3
Head-on & Across Med. Crashes	6.1	4.9
Ped/Bike & Motorcycles	6.7	5.9
Safety Belts	6.6	5.8
Truck Travel	5.5	4.7
Other	6.0	5.4

Sixty-one percent of the respondents mentioned that their agencies did have programs that addressed safety issues (Table 21.) Also, more than one type of safety program was sponsored, per organization; with the most popular being safety belt checks and enforcement efforts that target impaired drivers on local roadways. Again, very few agencies sponsored engineering-related safety programs.

Table 21. Percentages of current local safety programs

Type	Yes	Unknown	Type	Yes	Unknown
Aggressive Driving	13	87	Improve Design Intersection	3	97
Commercial Drivers	2	98	Intersection Safety	5	95
Fatigued Drivers	2	98	Vehicle on Roadway	1	99
Fatalities	2	98	Consequences Of Leaving Road	1	99
Impaired Drivers	25	75	Head-on & Across Med. Cr.	1	99
Influencing Driver Behavior	6	94	Ped/Bike & Motorcycles	15	85
Older/Young Drivers	4	96	Safety Belts	27	73
Construction of Safety Projects	3	97	Truck Travel	2	98
Designing Safer Work Zone	10	90	Other	23	77

When queried about the importance of safety, many respondents (98%) stated that there was "average or above" emphasis placed on safety by their organization, which was satisfactory to them (Table 22.) Interestingly, a slight disparity exists for the "above average" response where fewer respondents noted that they considered their agencies' effort to be acceptable. Lastly, six percent considered that their agencies were not placing enough emphasis on safety issues.

Table 22. Importance of safety to your agency and self

Importance of Safety	Agency	Self Evaluation
Enough	16	15
Above Average (Enough)	29	22
Average	53	56
Not Enough	2	6

Information found in Table 23 shows that many agencies were involved in local safety initiatives. Fifty-six percent of the respondents were collecting data for use in addressing safety issues, but only 39 percent were actually conducting data analysis as part of their safety procedures. The second ranking responses for addressing safety concerns were through education of personnel. The bottom ranked initiatives were development of a safety plan (21 percent) and conducting research on safety (16 percent).

Table 23. Percentage conducting initiatives for addressing safety concerns

Type	Yes	Unknown
Data Collection	56	44
Data Analysis	39	61
Safety Plan Development	21	79
Education	54	46
Research	16	84
Investment in Safety Projects	25	75
Coordination of Partners	27	73
Other	21	79

Only twenty-seven percent of the respondents indicated that their agencies participated in a long range safety planning process, which is slightly higher (6 percent) than what was previously indicated about how their agency addresses safety concerns (Figure 5.) Significantly few respondents (10 percent) stated that they had been involved in the development of the State or MPO Long-Range Transportation Plan (Figure 6.) This finding is not surprising because most local agencies have not been directly involved in the State or MPO planning process.

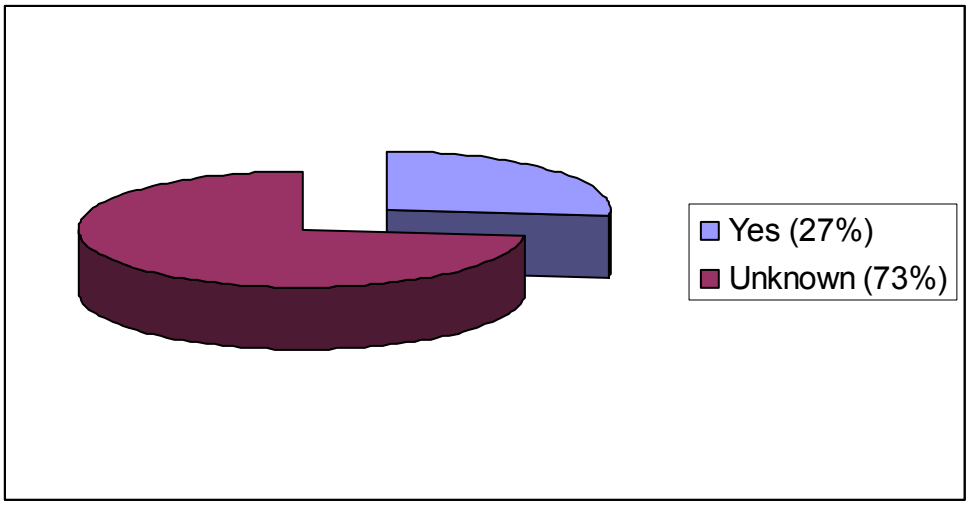

Figure 5. Percentage of participation in Long Range Safety Planning

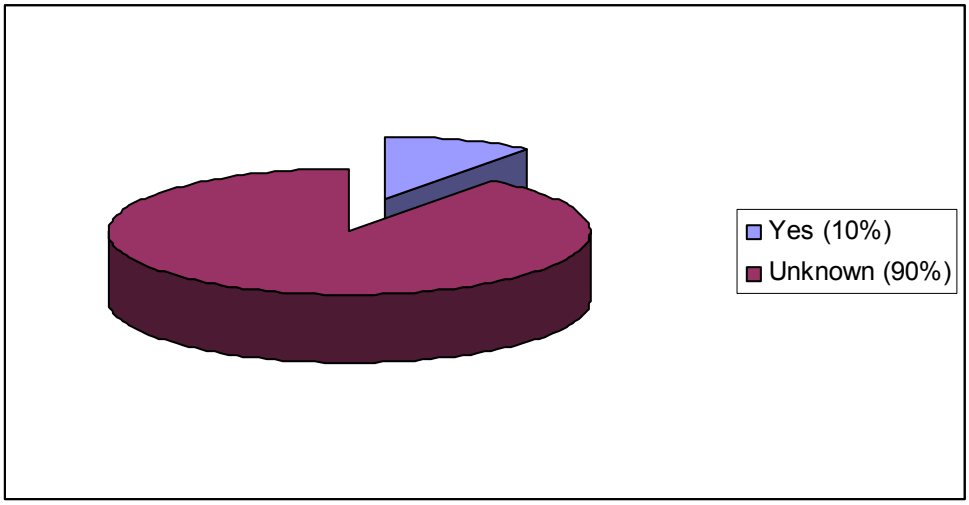

Figure 6. Percentage of participation in the State or MPO Long Range Plan

When asked about the challenges of integrating safety into the planning process, the majority of self-reported answers were lack of funding, personnel, and equipment (Table 24.) Data appeared to be available, as well as planning venues that would factor into the Safety Conscious Planning process.

Table 24. Response to challenges of integrating safety (by percent)

Type	Yes	Unknown
Data	1	99
Education/Training/Best Practices	4	96
Equipment	22	78
Funding	68	32
None	17	82
Personnel	43	57
Planning	2	98
Recognition of Safety Priority	4	96
Time	4	96
Other	2	98

Municipal Police Traffic Officers work directly with roadway safety issues as part of their daily routine and, therefore, can serve as a great resource for the Metropolitan Planning Organizations (MPOs) and the New Jersey Department of Transportation (NJDOT). It appears that engineering issues were not of interest to the survey respondents, but that may be due to the limited involvement of Police Traffic Officers with data analysis and engineering technology. Furthermore, it is important to update this representative group on the relationship that their field reports (NJTR-1) have to reducing fatalities on local roadways. Lastly, the New Jersey Safety Conscious Planning Initiative (NJ SCPI) must include Municipal Police Traffic Officers as partners in the process because they are intimately familiar with understanding the events that lead to fatalities on the local roadways of New Jersey. They are also the source point of data collection.

Statewide SCP Partnership

The initial forum planning meeting followed the procedures outlined in the Transportation Research E-Circular, Number E-C041 (2002). Several organizations were targeted to provide leadership for the Safety Conscious Planning Initiative in New Jersey. A brief description of each agency's role within the state has been provided for a better understanding of the importance of their participation in the Safety Conscious Planning (SCP) process.

Delaware Valley Regional Planning Commission (DVRPC)

The Delaware Valley Regional Planning Commission (DVRPC) was established in 1965 to coordinate planning the growth and development of a bi-state region. This area includes Bucks, Chester, Delaware, Montgomery, and Philadelphia counties in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer counties in New Jersey. The DVRPC serves in an advisory capacity on regional planning, capital funding of transportation, economic development, the environment, and land use concerns.

DVRPC is governed by an eighteen-member body that has the responsibility to make decisions that affect the entire organization, in addition to the nine-county regions that they govern. The mission of this organization is to provide technical assistance and services that include conducting high priority studies for state and local governments, while determining the needs of the private sector. The Board approves the annual planning work program, as well as the approval of regional transportation policies, determination of funding for projects, the prioritization of projects, planning for transportation systems, and other planning concerns that affect land use, air quality, housing, water supply, and water quality (DVRPC, 2000.)

Federal Highway Administration – New Jersey Division Office

The New Jersey FHWA Division office supports the national priority of reducing crashes in the following areas: intersections, pedestrians, and roadway departures through established performance measures. The FHWA-NJ Division office works collaboratively with NJDOT, MPOs, New Jersey Division of Highway Traffic Safety, New Jersey State Police, Rutgers University, and other safety agencies to improve safety on New Jersey's roadways. The FHWA staff members provide leadership for the following projects: Statewide Traffic Records Coordinating Committee (STRCC), the New Jersey Safety Management Task Force, and the Aggressive Driving Initiative, along with other statewide safety efforts.

National Highway Traffic Safety Administration (NHTSA)

The National Highway Traffic Safety Administration (NHTSA) is one of ten regional offices whose mission is saving lives, preventing injuries, and reducing traffic-related healthcare and other economic costs of crashes. Several services are provided to the states, as well as other public and private sector customers on impaired driving, child passenger safety, multicultural outreach, occupant protection issues, older drivers, pedestrian bicycle safety, safe communities, and other youth-related issues. The services that the agency offers include technical assistance, promoting legislation, administering the agency's grant fund programs, assisting in coalition building and delivering training programs.

New Jersey Department of Transportation

The NJDOT Division of Traffic Engineering and Safety, under the leadership of Jack Lettiere and direction of Patricia Ott, has initiated the development of a comprehensive safety plan as part of the Safety Management Task Force. This core group is involved in reviewing safety data to identify emphasis areas that should be included in the Comprehensive Highway Safety Plan (CHSP), a national pilot project. Agencies involved in all phases of highway planning, design, construction, maintenance, and operation will be provided information on the selection and implementation of effective

highway safety strategies and projects. Also, NJDOT has become active in the American Association of State Highway Transportation Officials' (AASHTO), as a lead state program for aggressive driving. Another safety program is the Safety Impact Team that reviews high crash locations on state highways; make engineering determinations for improvement in a brief report.

The Bureau of Safety Programs, another organization within the New Jersey Department of Transportation, offers technical support to the MPOs and the enforcement community through several different programs. Some of the issues the Bureau addresses include intersections, left turns, fixed objects, motor carrier safety (new entrants training and public school education programs on sharing the road safely with large trucks), older drivers, enforcement, and traffic records. The Bureau has also been partnering with New Jersey CAIT-LTAP to develop the Rutgers Transportation Safety Resource Center (TSRC.)

Other NJDOT agency participation includes the Division of Planning and Research and Demonstration Projects that supports MPOs, counties, and local transportation agencies. Some of the services include providing traffic counts, crash data, inventories, surveys, congestion management data and other resources that are required for transportation improvements. Additionally, the Research Division has supported safety through the sponsorship of specialized training and applied research projects.

New Jersey Division of Highway Traffic Safety

The mission of the Division of Highway Traffic Safety is to reduce fatalities, injuries, and property damage resulting from traffic crashes on the roads of New Jersey. The Division undertakes traffic safety programs related to education, enforcement, and engineering to accomplish this effort. The agency distributes federal funding to local, county and state agencies in the form of grants that address the areas of occupant protection, impaired driving, pedestrian safety, diversity programs, comprehensive countywide traffic safety programs, distracted driving, and aggressive driving. The Highway Traffic Safety Policy Advisory Council (HTSPAC) assists the Governor in preparing traffic safety programs for New Jersey through recommendations of the membership.

New Jersey State Police

The New Jersey State Police protect, preserve, and safeguard the civil rights of all citizens through impartial and courteous law enforcement. The officers are charged with ensuring public safety and providing service in partnership with communities. The traffic enforcement patrol investigates crashes and incidents on highways, conducts inspection, and enforcement programs that ensure the safety of citizens traveling on the New Jersey roadways.

A special unit of the State Police is the Construction Unit that enforces the rules and regulations of traffic control and safety in highway work areas. Unit members inspect

NJDOT construction sites to ensure contractors are in compliance with the traffic control plans established for their project. These troopers receive specialized training in work zone safety and traffic control for highway construction areas. They also offer work zone safety training for local police agencies and for other governmental and private organizations. New Jersey is one of the few states with an institutionalized partnership between DOT, DHTS, Rutgers, FHWA, the State Police and several other agencies from the construction industry. This partnership is credited with New Jersey having one of the lowest work zone fatality rates in the country.

New Jersey Transit

New Jersey Transit has the mission to provide safe, reliable, convenient and cost-effective transit service that is dedicated to their customers' needs. Over 5,000 square miles are served by the agency that is the third largest transit provider in the country. The mission of NJ Transit is to link New Jersey to Philadelphia and New York. Approximately 223 million passenger trips are generated each year by customers using this service. The agency uses a planning process that is data driven and based on riders, which facilitates safer interactions among buses, pedestrians and vehicles. Training is being expanded to address crashes between vehicles and buses.

North Jersey Transportation Planning Authority (NJTPA)

North Jersey Transportation Planning Authority (NJTPA) is one of the largest metropolitan planning organizations in the United States. The NJTPA is the planning authority for 6 million people, who reside in the thirteen northern counties and two major cities of New Jersey. This agency maintains more than $2 billion in transportation improvement projects plus providing a forum for interagency cooperation and input into funding issues. The NJTPA Board of Trustees consists of 20 voting members, fifteen from the representative agencies, the New Jersey Department of Transportation, New Jersey Transit, the Port Authority of New York and New Jersey; the Director of the Governor's Authorities Unit, and a Citizen Representative that is appointed by the Governor.

New Jersey Center for Advanced Infrastructure and Transportation – Local Technical Assistance Program (CAIT-LTAP)

The New Jersey Center for Advanced Infrastructure and Transportation – Local Technical Assistance Program (CAIT-LTAP), one of the only centers leading Safety Conscious Planning, is sponsored by the Federal Highway Administration *(FHWA)* Office of Technology Applications, in partnership with the state departments of transportation *(DOTs)* and, in some states, with local governments and universities. LTAP incorporates a hands-on method of moving innovative transportation technologies from research institutions into the field where local streets and roads are maintained.

These technology transfer *(T2)* centers provide low-cost or free training; publish newsletters; circulate publications, videotapes, and software; and offer technical assistance to local roadway and transportation personnel (Bennett, 1998).

New Jersey CAIT-LTAP also cosponsors the National Transit Institute (NTI) that was established under the Intermodal Surface Transportation Efficiency Act of 1991 to develop, promote, and deliver training and education programs for the public transit industry. The mission of NTI is to offer training, education, and clearinghouse services in support of public transportation and quality of life in the United States. Several cooperative partnerships have been formed between industry, government, and associations that offer support in delivering products for public transportation agencies, training, education, and related services in support of public transportation. The organization also serves as a resource clearinghouse, providing technical assistance, and promoting best practices for the industry.

South Jersey Transportation Planning Organization (SJTPO)

The South Jersey Transportation Planning Organization (SJTPO) is the federally designated Metropolitan Planning Organization for southern New Jersey. The SJTPO was founded in 1993 to cover Atlantic, Cape May, Cumberland, and Salem Counties through the coordination of planning activities, promotion of transportation improvements, and adopting long-range plans to guide funding investments. Another role of the SJTPO is to ensure regional compliance with transportation decisions that include the Clean Air Act Amendments of 1990. Furthermore, the SJTPO is required by TEA 21 to establish an open planning process, and encourage public input in transportation issues and decisions. There was also a renewed emphasis on safety considerations in the planning process that has motivated the SJTPO to integrate roadway safety into the planning and programs of the agency. Therefore the SJTPO has adopted transportation safety as its' primary objective (SJTPO, 2003.)

As mentioned, several safety publications were contributed by these representative agencies that resulted in a successful forum. Several planning meetings were scheduled between October 2003 and May 2004. The New Jersey Forum was held on May 26, 2004 in New Jersey. The FHWA was responsible for providing technical assistance and developing safety resources, while the MPOs served as presenters and facilitators during the program. In addition to being responsible for coordinating the event, the New Jersey CAIT-LTAP staff served as facilitators and scribes for the event. Also, the core committee depended upon the representative agencies to promote the importance of safety and provide best practices that were highlighted at the forum. Technical support was also provided through national consultants from the FHWA, Office of Safety.

Forum Outcomes

With support from national consultants, the New Jersey Safety Conscious Planning Forum was held on May 26 with the anticipation of completing the following goals:

- Increase New Jersey's transportation agencies (state/regional/local) awareness of Safety Conscious Planning in New Jersey and provide a forum for information exchange.
- Create a base level understanding of the planning process and opportunities for safety integration in each phase.
- Develop strategies for quantifying the safety component in long and short range plans.
- Provide an inventory of financial, technical, and human resources available to support safety conscious planning.
- Provide best practices to assist MPOs and other agencies in formalizing an ongoing technical advisory committee (TAC) that regularly communicates, shares information, and develops collaborative strategies to improve transportation safety. (See NJ SCP Forum Report.)

S. Herbel (2004), FHWA consultant, reported that a balanced cross section of the transportation and safety community attended the event, which featured NJDOT Commissioner Lettiere as the opening speaker, along with Dennis Merida, FHWA-NJ Division Administrator. Both presenters emphasized the need to support proactive programs that address pedestrian, elderly, bicyclist, and traveler safety. Merida emphasized engineering, enforcement, education, and emergency medical services and making sure that people have the proper knowledge to drive safely. Also, Ann Burton, the NHTSA representative, confirmed that behavioral change is difficult and provided examples of the most effective countermeasures: wearing seatbelts and reducing impaired driving to save lives. Michael Meyer, Georgia Institute of Technology, served as the keynote speaker and provided the audience with examples of how safety can be integrated into each stage of planning. During the remainder of the session, several representatives from law enforcement, education, and safety conducted workshops or participated in breakout sessions, where input was solicited on integrating safety into the planning process.

Feedback from the discussion groups included identifying the safety definition as being proactive, multimodal, comprehensive (4Es), data driven, and balanced with other planning issues such as congestion management, air quality, and systems preservation. Several goals were also identified for the leadership team to consider adopting; however some concern remains about whether or not they can be realistically attained. Proposed goals for the MPOs are as follows:

- Raise public awareness on how to improve safety by the end of December 2005
- Reduce fatalities to 0 within five years.
- Address safety first but achieve a balance with mobility and access.
- Reduce the number and severity of crashes.

- Improve the safe transportation of goods and people.
- Achieve a 25% reduction in fatalities and disabling injuries by 2014 (baseline 2000-2003 data.)
- Increase safety belt use to 90%.
- Reduce pedestrian and bicyclist fatalities and disabling injuries by 2014.
- Reduce motorcycle fatalities and disabling injuries by 2014.

A series of strategies were then identified for improving safety on New Jersey's roadways that encompassed several of the 4Es and other issues, such as communications, policy, research, and other sources of transportation. Several engineering items were identified that included making access to railroad stations, transit stops, schools and building accessible sidewalks, building additional rest areas along the interstate highways, expanding the use of rumble strips on rural roads, center line of four lane roadways, improving visibility and installing signs and striping on roadways, installing quad gates at railroad crossings, and eliminating utility poles. Educational needs include keeping judges and elected officials informed about safety issues, revising the driver license examination to include safety, educating the public about safety, and teach drivers how to merge onto freeways. Implementation of photo ticketing and increasing enforcement would also promote safer travel. The NJ crash data system should be monitored, uniform reporting is necessary, along with improved data collection techniques (e.g. handheld GPS computers), utilization of both qualitative and quantitative data when focusing on high crash locations, and improving the availability of data for members of the transportation community. Communications must be improved among safety stakeholders and the public, identify the cost/benefit effects of safety improvements, and encourage collaboration between engineers, planners, and the law enforcement community. The policy issues that need addressing include identifying stable safety funds, requiring spray guards for trucks, implement graduated driver's licenses for young and old drivers, and specialized licenses should be issued for all oversized vehicles. Lastly, new technologies should be implemented for the transportation industry, as well as mass transit.

After a thorough review of these action steps, it was decided by the working group that all representatives should determine what goals and steps may be adopted by their agencies. Several of these goals and action items could be accomplished if resources and funding is available to accomplish them. Since the Safety Management Task Force, under the direction of Patricia Ott (NJDOT, Traffic Engineering and Safety), is creating a comprehensive data driven plan for all statewide safety agencies. The decision has been made to have safety goals addressed at the state level where they would gain support and recognition. In December 2004, the list was formally presented to the Safety Management Task Force for further consideration and adoption, if applicable. Program participants also received a copy of the Forum Final Report as guidance on potential safety projects for consideration by their agencies.

MPO Safety Review

Each of the MPOs will be reviewed, using website information and feedback from S.Herbel (2004), to determine the level of safety integration has been implemented by their agencies. This process will help to determine the work that is need for adoption of a statewide SCP system.

Delaware Valley Regional Planning Commission (DVRPC) Profile

The mission of DVRPC is to provide technical assistance and services that include conducting high priority studies for state and local governments, while determining the needs of the private sector. Identified below are the three focus areas that govern this organization:

- Continue and enhance the intergovernmental process to insure coordinated regional development and resolution of regional issues, and the provision of technical assistance to member governments and the region's transportation operating agencies.
- Continue the refinement and implementation of the long-range transportation and land use plan for the region (Horizons 2025) through local area and corridor studies and plans, while developing a new long-range plan to be known as Destination 2030.
- Enhance the sharing of technology and information collection to insure that pertinent information is readily available to the region's governments and decision makers.

The eighteen-member body governs the activities of the DVRPC, which includes the approval of regional transportation policies, funding determinations of projects, and other planning issues that are related to transportation, land use, and the environment.

Planning Work Plan

The annual Planning Work Plan is based on two federal laws: the 1998 Transportation Equity Act for the 21st Century (TEA-21) and the Clean Air Act Amendments of 1990. TEA-21 requires the highway construction funds to be administered through the region's MPO that oversees the Transportation Improvement Program (TIP), the region's short-range investment plan and prioritizes all of the Delaware Valley's transportation related projects. The TEA-21 also has consolidated the sixteen planning factors into seven areas of the planning process that are listed as follows:

1. Support the economic vitality of the metropolitan area.
2. Increase safety and security of the transportation system.
3. Increase accessibility and mobility options available to people and freight.

4. Protect and enhance the environment.
5. Enhance the integration and connectivity of the transportation system.
6. Promote efficient system management and operation.
7. Emphasize the preservation of the existing transportation system.

As part of the Clean Air Act Amendments (CAAA), the key role of DVRCP is developing many of the programs relating to air quality attainment. The projects in the TIP and the Long Range Transportation Plan must conform to the states' air quality implementation plans and must not lead to any further degradation of the region's air quality, but improve it to meet the federal clean air standards. Planning needs of the city and county governments are considered in the plan, as well. Many programs may be broad in scope but they also must affect transportation conditions in the region, in order to be included in the Transportation and Community Development Initiative. DVRPC provides planning grants based on proposals from older suburban communities that support revitalization, economic development, and transportation needs.

Road Safety Audits

Road Safety Audits (RSAs) are tools that can be used to proactively assess safety deficiencies. This is a formal examination of an existing or future roadway by an independent team of engineers, enforcement, and human factor professionals. The results are presented in a brief report that identifies the problems and solutions. Pennsylvania was one state that piloted the program and found it to be very beneficial. They also developed a targeted program for implementing low cost improvements to reduce fatalities. These improvements are being implemented by district safety engineers through the Safer Travel Strategic Focus Area (SFA) program at high crash segments and spots. The twelve crash categories include signalized intersections, stop-controlled intersections, guide rails, utility poles, trees, curves, head on/sides swipe crashes, pedestrians-midblock, pedestrian intersections, safety belts, aggressive driving, and driving under the influence. The successful low cost improvements to reduce fatalities are listed below:

- Centerline rumble strips to reduce centerline crossings.
- Consolidation of pole utilities to one side of the roadway to reduce impacts of errant vehicles (PennDot pays 50 percent.)
- Use of reflective tape on utility poles to delineate poles and reduce possibility of impact by errant vehicles.
- Increase clear zone through tree removal to reduce fixed object impacts by errant vehicles.
- Guide rail upgrade.
- Innovative pavement markings such as "curve ahead" to warn motorists of curve.
- Epoxy dots in the center of lanes to guide motorists in maintaining safe vehicle headway.
- Warning signs for special enforcement activities such as aggressive driving and DUI enforcement.

- Durable crosswalks and pedestrian crossing sign stands to increase the conspicuity of crosswalks.
- Truck rollover warning systems.

Also, the DVRPC works cooperatively with the New Jersey Department of Transportation (NJDOT) in carrying out all of its transportation and air quality-related activities. These activities include the development of the statewide long-range transportation plan, the Statewide Transportation Improvement Program (STIP), and the regional TIP. Additionally, the New Jersey Department of Environmental Protection requires that air quality plans (State Implementation Plans) be adopted in the metropolitan area. The New Jersey Transit Corporation (NJTC) is a principal resource for including transit projects in the TIP; while county planners serve as principle partners in the regional planning process.

Observation

The DVRPC became a national example of "best practices" for use by MPOs when integrating safety into the TIP scoring process (15 percent), along with the development of Roadway Safety Audits (RSA), a low cost improvement program to reduce roadway fatalities. Also, DVRPC has been identified as using crash data to compile reports on the completion of goals and objectives found in their 2025 long-range plan. Mobility goals of improving access and ensuring safety and security of the transportation network were measured and determined a 17 percent decline in crashes for the region. Key stakeholders are industry officials (e.g. state officials, county employees, and elected officials) that are likely not to be directly involved with safety, but they do have influence over others that maintain these responsibilities in their representative organizations.

Herbel (2004) further recognized that safety is a main component of several DVRPC projects and programs including the Transportation Improvement Program, Congestion Management System, "What If" Scenarios, Incident Data Collection, Corridor Planning, Regional Congestion and Accident Mitigation, Freight Initiatives, Bicycle/Pedestrian Planning and the Incident Management Task Force. Future plans for the organization are to incorporate SCP in all aspects of planning. Safety will also be highlighted in the 2030 Long Range Plan, while a Regional Safety Task Force will be created to guide the staff's safety efforts, and offer guidance to the counties and locals for creating a listing of programs and projects to initiate in the future.

North Jersey Transportation Planning Authority (NJTPA) Profile

The North Jersey Transportation Planning Authority (NJTPA) is one of the largest metropolitan planning organizations in the United States. The NJTPA is the planning authority for six million people, who reside in the thirteen northern counties and two major cities of New Jersey. This agency maintains more than two billion dollars in transportation improvement projects plus provides a forum for interagency cooperation

and input into funding issues. The NJTPA Board of Trustees consists of twenty voting members, fifteen from the representative agencies, the New Jersey Department of Transportation, New Jersey Transit, the Port Authority of New York and New Jersey, the Director of the Governor's Authorities Unit, and a Citizen Representative that is appointed by the Governor.

The mission statement identifies NJTPA as a regional forum and technical resource for the people of New Jersey that:

- Creates a vision to meet the mobility needs for people and goods.
- Develops a plan for transportation improvement and management to fulfill the vision.
- Partners with citizens, counties, cities, state, and federal entities to develop and promote the transportation plan.
- Prioritizes federal funding assistance to make the plan a reality.
- Links transportation planning with economic growth, environmental protection, growth management, and quality of life goals for the region. (NJTPA 3/04.)

Other responsibilities of the NJTPA are outlined in the federal regulations (23 CFR Part 450.312 and 23 CFR Part 450.216):

- Act as a forum for interagency coordination among implementing agencies.
- Monitor performance of regional transportation systems.
- Prepare and maintain operational and capital improvement programs.
- Prepare and maintain Regional Transportation Plan (RTP.)
- Develop and annually update the TIP.
- Carry out the annual regional Air Quality Conformity Determination.
- Create prioritization procedures that evaluate and rank proposed projects based on technical measures that fulfill regional transportation goals.

The NJTPA Board of Trustees meets every two months; while three committees, Planning and Economic Development, Project Prioritization, and Freight Initiatives, meet regularly to make recommendations for consideration by the Board of Trustees. Also, a Regional Transportation Advisory Committee composed of planners and engineers from these agencies meet to review regional considerations (NJTPA, 2004.)

Regional Transportation Plan (RTP)

Every three years the NJTPA Board of Trustees must adopt a twenty-year horizon Regional Transportation Plan (RTP). The RTP identifies long-range vision and action agendas for improving transportation for residents within the region. The document provides a decision-making process for the NJTPA to balance the needs of important transportation issues facing northern New Jersey. There are six policy goals that are considered in the process:

1. Environmental Quality.
2. User Response.
3. Economic Vitality.
4. System Coordination.
5. Repair Maintenance Safety.
6. Coordinate Land Use and Transportation Planning (NJTPA, 2004.)

These goals form the basis for the development and implementation of transportation projects. Each year the NJTPA selects improvement strategies identified in the RTP, to advance into the Project Development Work Plan (PDWP) that is included annually in the Unified Planning Work Program (UPWP) that is federally funded. The PDWP is funded as part of the NJDOT Study and Development Program, NJ Transit Work Program; NJTPA's Local Scoping program; and the TIP. These funded programs are used to further develop strategies, examine feasibility of solutions, conduct preliminary engineering and environmental analysis, and implement the project.

Management Systems are organized to assess aspects affecting the infrastructure that include congestion, pavement, bridges, and safety. Data is gathered by the NJDOT and evaluated in the NJTPA planning process, where it is scored for the PDWP. Afterward the projects enter the Project Pipeline and routed through the system. Highway expansion projects must come from the Congestion Management System (CMS), as a means of ensuring reduced single-occupancy vehicle (SOV) demand, transit, car pools, bicycle/pedestrian facilities and other alternatives.

Project Pipeline

Project Pipeline is a mechanism through which transportation projects progress from the identified need to construction/completion. The NJDOT has recently developed new procedures to facilitate the progress of such projects through the Project Pipeline. They have subdivided Project Pipeline into four parallel procedures, in order to respond more efficiently to the needs of different project types that are outlined below:

- Pipeline I – Complex Projects: Feasibility Assessment, Scope Development, Preliminary Design, Final Design, Right of Way, Construction
- Pipeline II – Moderate Projects: Scope Development, Preliminary Design, Design Development, Construction
- Pipeline III – Simple Projects: Design, Development, Construction
- Pipeline IV – Operations Projects: Operations for Implementation

The NJTPA's role is to provide a prioritized list of projects to the implementing agencies, which is determined through evaluation on technical measures of fulfilling the goals of the RTP or funding availability and project duration. This process is administered by the NJTPA staff with support from the Regional Transportation Advisory Committee (R-TAC) and other groups.

Observation

According to Herbel (2004), NJTPA is responsible for the region that represents three-quarters of the state's population. They are engaged in a comprehensive project to develop a strong safety element for its upcoming update of the Regional Transportation Plan. While safety is part of organization's project prioritization criteria, the goals of their new effort are to:

- Integrate safety into the collaborative MPO planning process, building on existing analysis and prioritizing factors.
- Develop and utilize sound analytical methods.
- Develop actual project concepts to address safety needs throughout the region.
- Support coordination among the safety partners.

The project is guided by a broadly representative technical advisory committee (TAC), which serves as a leadership group. A consultant team had geo-coded almost 250,000 crash records for the NJTPA region, surveyed safety stakeholders and the public on their most pressing safety concerns, identified preliminary methods for evaluating strategies, and developed plans to document 25 new initiatives with recommended strategies for distribution to various implementing agencies (Herbel, 2004.)

South Jersey Transportation Planning Organization (SJTPO) Profile

The South Jersey Transportation Planning Organization (SJTPO) is the federally designated Metropolitan Planning Organization for southern New Jersey. The SJTPO was founded in 1993 to coordinate planning activities for Atlantic, Cape May, Cumberland, and Salem Counties. SJTPO carries out planning activities, promotion of transportation improvements, and adopting long-range plans to guide funding investments. Another role of the SJTPO is to ensure regional compliance with transportation decisions that include the Clean Air Act Amendments of 1990. Furthermore, the SJTPO is required by TEA 21 to establish an open planning process to encourage public input in transportation issues and decisions. There was also a renewed emphasis on safety considerations in the planning process that has motivated the SJTPO to integrate roadway safety into the planning and programs of the agency. Therefore the SJTPO has adopted transportation safety as its' primary objective (SJTPO, 2003.)

Similar to the other New Jersey MPOs, the key products of the SJTPO are the development of the Regional Transportation Plan (RTP), a twenty year time horizon that is updated every three years; the Transportation Improvement Program (TIP) that is an annually updated five year capital program; and the Unified Planning Work Program (UPWP) that describes all transportation and transportation-related air quality planning activities. These products are produced by the SJTPO staff in conjunction with the Policy Board that includes eleven voting members, a Technical Advisory Committee (TAC), the Citizens Advisory Committee (CAC), and the specialized South Jersey Traffic Safety Alliance (SJTSA.)

South Jersey Traffic Safety Alliance

As previously noted, the Alliance brings together traffic safety professionals from the fields of enforcement, education, emergency services, engineering and planning to develop region-wide traffic safety programs that share best practices, exchange information, and support the SJTPO plans. Along with work that supports the SJTPO, the Alliance has received national recognition for helping to build safe communities through the "buckle up stencil program", "child passenger seat inspection", and the "bicycle safety bowl." It also sponsors several flagging, police work zone safety, and grade crossing investigation courses.

Observation

According to Herbel (2004), the original leadership in SJTPO was made up of transportation people resulting in an early focus on safety that is unlike the other MPOs. The Alliance is fully integrated with SJTPO and includes a diverse group of 50-60 members. SJTPO first addressed the behavioral aspects of safety and is now focused on the engineering strategies. They conduct a safety needs assessment survey every other year with questions about current traffic safety issues and possible problem locations. This information is used to develop programs which currently include radar speed trailers for counties, alcohol/drug related crash analysis for checkpoints, educational programs for addressing safety issues, media campaigns (saved by the belt club), child passenger safety technicians, defensive driving workshops, "buckle up" stencil program, roadway safety audits, and corridor studies (e.g. Atlantic City.) Additionally, the SJTPO considers safety in the TIP, RTP Goals, and Policies for the Congestion Management System.

The Safety Assessment Checklist, found in Table 25, was developed by Meyer (2004) to identify the presence of safety elements in the MPO organization's vision statement, goals (one to two), performance measures, data use, evaluation criteria, prioritization process, systematic monitoring process, and the key stakeholders that are involved in their planning process. Meyer further noted that separate safety plans may be present that focus on transportation safety improvements and are linked to the comprehensive transportation plan through common performance measures.

Table 25. SCP assessment checklist

Yes/No	Questions
	Does the vision statement for the planning process include safety?
	Are there at least one planning goal and at least two objectives related to safety?
	Is safety-related performance measures 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?

The three MPO organizations exhibited varying degrees of internal and external integration of safety consciousness within their operations. First, the size of the NJTPA, one of the largest metropolitan planning organizations in the country, has prompted this organization to seek national guidance on the integration of safety within their system, while contracting the services of a consultant to analyze their corresponding crash data and then releasing identified safety projects to the appropriate agencies for further action. Next, the SJTPO Traffic Safety Alliance operates as a fully integrated transportation safety agency that offers technical support and services to the local municipalities of the counties that they serve. Lastly, the DVRPC does not have a formal safety network in New Jersey, but has been very much involved with local outreach on projects that include congestion mitigation, corridor planning, and incident management (Table 26.)

Consequently, the DVRPC representatives partnered with New Jersey CAIT-LTAP to establish a local safety conscious planning network in their region. Since the South Jersey Traffic Safety Alliance had already integrated SCP into a formalized network, their representatives also provided input to the DVRPC on creating a similar network. An agreement was then reached by showcasing the Alliance activities during the DVRPC sponsored regional forums and through meetings with the staff members of both agencies. Lastly, the NJTPA had deferred scheduling countywide forums until after the selection of 25 safety projects that would be complete in early 2005.

Table 26. Safety based action items per MPO

Organization	Action
DVRPC	• Sponsor Regional Forums • Mercer County Pilot • Outreach to Local Elected Officials • Organize DVRPC Advisory SCP Task Force (County Representatives) to Integrate Potential Forum Goals Into MPO Organization
NJTPA	• Sponsor Regional Forums • Outreach to Local Elected Officials • Sponsor Technical Workshops for Locals
SJTPO	• Introduction of Engineering Safety Countermeasures to Elected Officials • Participate in MPO Forums as a Best Practice Model (Alliance)

Tier 2: DVRPC Countywide Forums and Regional Safety Task Force Plans

Tier 2 of the SCP Implementation Plan focused on sponsoring county forums to gain local input on organizing a Regional Safety Task Force. The DVRPC held a series of regional safety forums for Burlington, Mercer, Gloucester, and Camden Counties. Forum goals differed from the statewide program because the intent was to promote awareness and showcase the Safety Alliance as a local best practice.

- Introduce local agencies to the services provided by the DVRP.
- Promote innovative safety strategies, which SJTSA has been employing successful.
- Recruit transportation safety partners for the TAC.
- Share safety and planning resources with locals.
- Identify safety needs that must be addressed.

A working group was then formed with representation from LTAP, DVRPC, and the Safety Alliance. In addition to coordinating logistics, this working group developed the program, reviewed resources to determine their appropriateness for this targeted audience, and marketed the program. The following groups were targeted in each of the four counties:

- County Personnel
  - Administrators.
  - Planners.
  - Engineers.
  - Traffic Engineers.
- Municipal Personnel
  - Elected Officials.
  - Engineers.
  - Police.
  - Public Works.
  - Planners.

Smaller groups than expected attended the events, which is not surprising because less than 10% of the Safety Survey respondents had ever worked with the MPOs in the past (Figure 7.) However, over 40 participants were in attendance at each forum. Municipal police and MPO representatives yielded the highest participation level, which was followed by the County employees and university members. Also, the regional TMA and Joint Toll Authority were represented at this event as well.

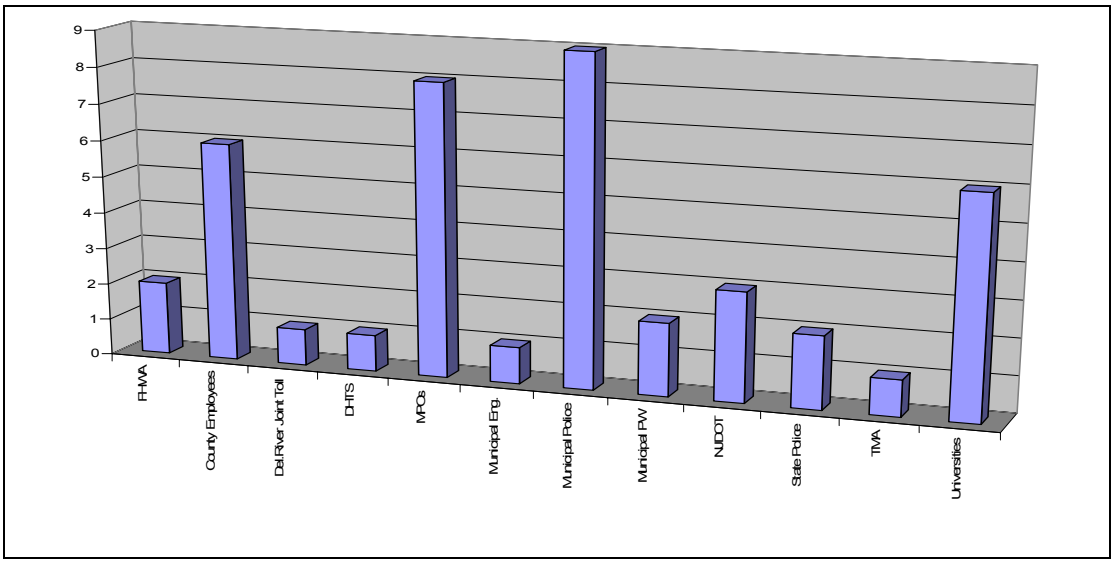

Figure 7. Mercer/Burlington Forum attendance

Attendance was similar for the second workshop, held one week later in neighboring Gloucester and Camden Counties, except the percentage of municipal police participation increased from 22% to 36% of those in attendance (Figure 8.) Again, the Delaware Joint Bridge and Toll Authority was present at this session, but there was no representation from the TMA industry. Also, the Mercer County Engineering Department representative attended this program due to a scheduling conflict during the previous session.

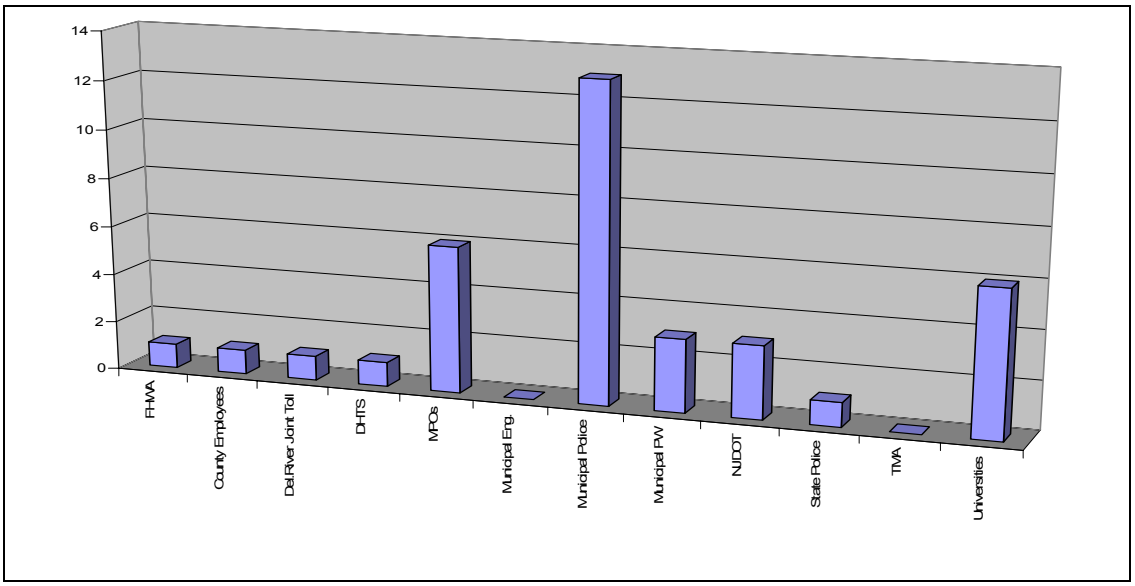

Figure 8. Gloucester/Camden forum attendance

All programs opened with a brief welcome from the SCP Work Group, while Bill Beans, Chairperson, highlighted the statewide forum events. Next the three MPO representatives described their organization's involvement in safety, and then the Safety Alliance was featured as a "best practice" for local agencies. The remainder of the morning session focused on the availability of federal and state funding for local safety projects.

Afternoon sessions were then dedicated to obtaining feedback from county and local agencies. Focus groups provided feedback for the DVRPC on local safety concerns by identifying safety definitions and goals, recommendations on integrating safety into projects, best practices for safety education, communications, collaborations, and recommendations on public outreach. The program concluded with an announcement from John Ward, Associate Director of the DVRPC, that his organization would be partnering with their agencies to form a Regional Transportation Safety Task Force to address safety issues, which are not currently covered by the work program.

Forum Resources

Program participants received several safety publications on the activities of the DVRPC, a catalog of Safety Resources that was produced by NHTSA and several resource guides from the sponsoring agencies. DVRPC provided a resource guidebook that describes the scope of their services for residents of both New Jersey and Pennsylvania. The 2004 NHTSA Traffic Safety Materials Catalog was distributed as a resource for local agencies to order publicity brochures, fact sheets, posters, disks, and toolkits. The resources cover human factor issues of aggressive driving, air bags, bicycle safety, child passenger safety, driver education, drowsy driving, emergency medical services, law enforcement, motorcycle safety, older adults, pedestrian safety,

pupil transportation safety, safety belts, vehicle safety, and safety issues of youth. Also, several state and federal funds and technical resources were outlined in the presentations that were presented by representatives from the NJDOT-Local Aid Program, NJDHTS, and New Jersey CAIT-LTAP.

Federal Highway Administration – NJ Division

The FHWA-NJ Division representatives, (Yunk & Leech) presented a compilation of safety resources that are targeted to assist local agencies incorporating safety into this planning process. Since all of the resources were on-line, the website was provided along with a brief description of the item. A variety of resources were identified that included standards and guides (MUTCD, AASHTO Roadside Design Guide, Design and Safety of Pedestrian Facilities, Guidebook on Methods to Estimate Non-motorized Travel, Roundabouts, NCHRP Report 321 & 500), manuals (AASHTO Strategic Highway Safety Plan, Making Intersections Safer, Handbook for Older Drivers & Pedestrians, Local Safety Management System), software (PBCAT, IHSDM, and Safer Journey), outreach materials (Pedestrian Safety Campaign), and website listings of safety related research.

Participants also received publications on intersection and pedestrian safety countermeasures. The federal publication, entitled Pedestrian Safety Countermeasures by Crash Type, is available on-line and provides useful information on the crash group problem, walking environment, road design, intersection treatment, traffic calming approaches, traffic management, use of signs/signals, and other measures. ITE produced a technical brief on estimates of crash reductions due to the implementation of countermeasures for making intersections safer. Countermeasures were examined as they relate to signalized and unsignalized roadway intersections, along with a brief examination of signs/markings, operational countermeasures that are applied to both types of roadways.

New Jersey Department of Transportation – Local Aid Program

Since the NJDOT and MPO safety activities have been described elsewhere, only “safety resources” will be highlighted in the following section. As described in the 2003 Safety Survey results, the availability of funding is a critical factor required for addressing local roadway safety concerns that include improving crash prone locations, and focusing on pedestrian and vehicular safety. The Federal Local Safety Program, administered by NJDOT Local Aid and Economic Development, fund safety projects that are eligible for quick turn around selection such as traffic signal mediation, crosswalks, raised pavement markers, lane delineation, signing, and traffic calming initiatives. These projects must meet the selection criteria of construction only, construction readiness, and the right of way availability. Minimal environmental issues should be present on municipal and county roadways. Lastly, all projects must possess a demonstrated need for the project that is quantified through crash data results.

Several safety related projects were funded through the NJDOT Local Aid Program during the past year. Each MPO received funding for two programs per region in the following areas:

- Upgrade of school crossing signs at various county roads on unsignalized intersections
- Signal upgrade and replacement
- Raised pavement markers
- Striping
- Use of median wet reflective tape in lieu of raised pavement markers

The outcomes were very successful with five of the six projects being authorized and work began in November 2004. The cost of the improvement ranged between $80,000 and $180,000.

During 2005, each MPO will receive one million dollars for local safety projects. The MPO representatives will select the projects with input from NJDOT Local Aid and the Bureau of Safety Programs that will be used as part of selection criteria. Also, there is a variety of funds that are available to counties and municipalities for safety projects, which are as follows:

- Municipal Aid Program.
- County Aid Program.
- Discretionary Aid Program.
- Safe Streets to Schools Program.
- Federal Local Lead Program.

The program ended with the recognition that bureaucratic paperwork had sometimes deterred local agencies from applying for funding grants. A special effort has been made toward reducing the amount of paperwork that is required for projects, while staff members can also help local agencies to navigate through the documentation process.

New Jersey Division of Highway Traffic Safety (NJDHTS) Programs

Alfred Tindall, representative of the New Jersey Division of Highway Safety, described resources that this organization offers for reducing the frequency and severity of motor vehicle crashes. This is primarily accomplished by addressing human factor issues through increased knowledge, skills development, and changing motorists' attitudes. Enforcement programs are data driven on issues of occupant protection, pedestrian safety, aggressive driving, motor cycle safety, and alcohol/drug enforcement countermeasures. The division sponsors pupil transportation programs for seat belt use, and transporting the physically challenged. Several engineering related programs are available for locals on pedestrian crossing safety, police work zone training, traffic control on roadways, and traffic engineering.

A major investment has been made in the development of the Comprehensive Traffic Safety Programs (CTSPs) that serve as local branches of the DHTS (Table 27.) The program exists in all areas that are covered by the DVRPC, except for Mercer County. As noted, the major functions of the committee are to bring local agencies together for the purpose of promoting traffic safety initiatives. Many of these county based programs serve as Offices of Highway Traffic Safety that build safety alliances within the community, while the South Jersey Traffic Safety Alliance supports an integrated Safety Conscious Planning model between the SJTPO and the local transportation agencies.

Table 27. NJDHTS Comprehensive Traffic Safety Programs (CTSPs)

Atlantic County	Hudson County Safe Communities
Bergen County	Ocean County
Burlington County	Passaic County
Camden County	Somerset County
Cumberland County	South Jersey Alliance
Gloucester County	Union County
Morris County Safe Communities	

New Jersey Center for Advanced Infrastructure and Transportation - Local Technical Assistance Program (CAIT-LTAP)

The services that New Jersey CAIT-LTAP provides for local transportation agencies are educational training, applied research, and technology transfer of best practices from the safety and transportation professions. Applied research is critical because the profession is in need of immediate solutions for reducing fatalities on the roadways and other issues such as work force development, congestion, the environment, infrastructure monitoring, the effectiveness of intelligent transportation systems (ITS), transit, and security of the infrastructure.

In 2003, FHWA recognized that between forty and sixty percent of fatalities are occurring on county and local roadways. Mendocino County (California) served as a "best practice" for the application of countermeasures that reduced fatalities by forty-two percent. A specialized workshop was developed that addressed the benefits of these low cost improvements:

- Overview of Low Cost Safety Improvements.
- Roadside Hazards.
- Signs, Markings & Lighting Countermeasures.
- Intersections.
- Traffic Signals.

In the future, similar workshops will be presented, as part of the SCP Certificate Program for county safety coordinators.

Evaluation

Feedback was then sought on local safety issues that the DVRPC would use in establishing a Regional Safety Task Force and developing proactive regional safety strategies. The following issues were discussed during breakout sessions:

- Feedback on forum content.
- Motivation for attending the forum.
- Resources that exist within this region.
- Safety concerns for the area.
- Evaluation of the event.

The format was similar for both programs with the exception of a main breakout session being held at the Gloucester/Camden event, instead of separating the participants into smaller groups.

Session 1: Burlington/Mercer Counties

A. Knowledge

As identified in Figure 9, most participants learned that funding sources were available for local roadway safety projects, but additional knowledge was needed on where to obtain them. Participants were happy to learn about the streamlined process for "quick fix" and maintenance projects. There was also a greater understanding of the difference between safety programs and projects. Furthermore, the forum provided county and local representatives with information on obtaining crash data that could be used to identify high crash locations in their jurisdictions. Lastly, contacts were identified for obtaining further information.

Comments

- Funding Sources are available! You need to know where to ask for them.
- Information Quick Fix and Capital Improvement Program.
- Federal process – difficulties, problems, streamline process.
- Program vs. Project Differences.
- Accident data available to municipalities and counties.
- Quantitative Thresholds.
- Resources and Contacts.

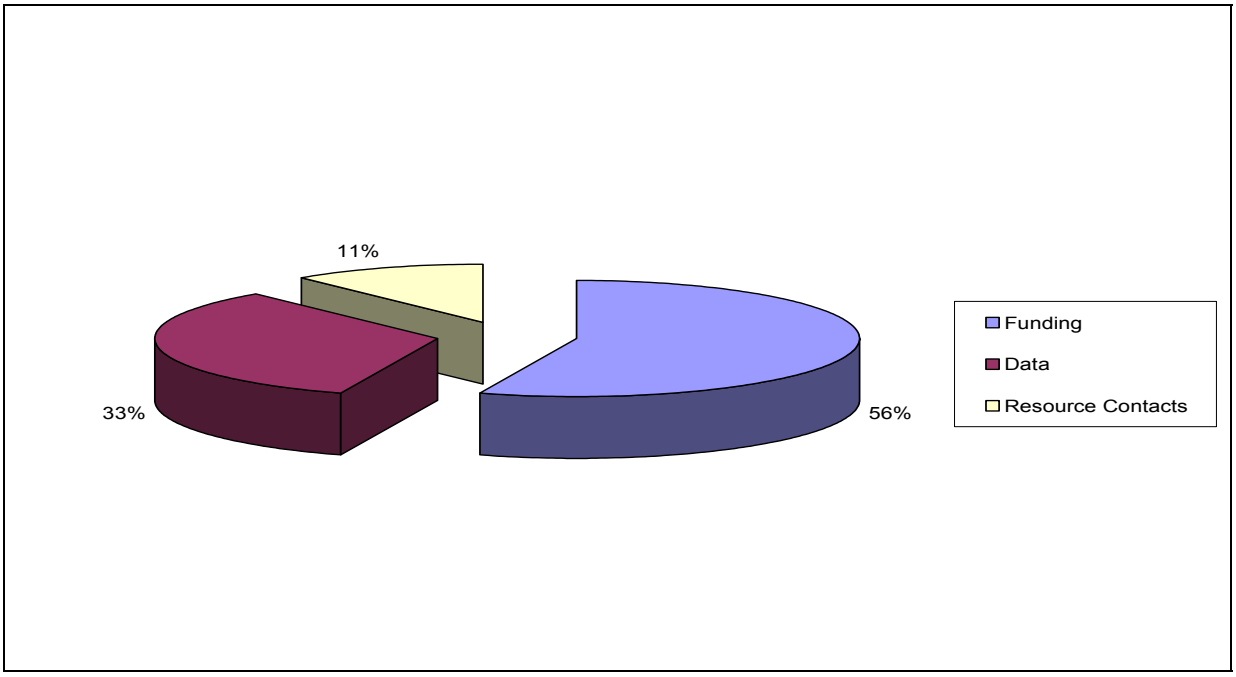

Figure 9. Information learned at the DVRPC sponsored forums

Partnerships: There was much interest in forming a regional Work Zone Safety Partnership, similar to the statewide organization that was reported on by Trooper Neals of the NJSP. The counties were also interested in coordinating the effort by reaching out to the municipalities for the adoption of this model.

Programs*:* Several of the Alliance activities were also candidates for adoption by the agencies in attendance, especially the Buckle Up Stenciling, Child Safety Seat Inspection, and the Bounty Programs. Participants were in agreement that education programs need to be instituted for mobilizing volunteers. Training is necessary for local maintenance and operations in addressing several areas of transportation safety.

Philosophy*:* Transportation safety needs to become proactive, instead of reactive through awareness campaigns. One strong message is that "Safety Includes Everyone" in the community.

B. Motivation for Attending

When asked what brought the participants to the program, the answers were:

- Education.
- Ordered to bring back information for the department.
- (Gain) New information.

- Learn ways to establish a relationship with DVRPC.
- See how federal funds are spent.
- Learn ways of addressing safety issues in the community.

C. Burlington/Mercer County Resources

The Burlington County Traffic Safety Committee and the Burlington County Sheriff's Department are regional leaders in addressing transportation safety. County agencies were also receiving funding from the New Jersey Division of Highway Traffic Safety; while the community residents obtained vital outreach information from the Transportation Management Associations (Cross County Connection and Greater Mercer TMA) located in this region. Also, the Office of Emergency Management had provided resources for transportation safety in Burlington County.

D. Safety Issues in Burlington and Mercer Counties

Engineering: Locations of high crash areas were described, along with a need for improved signage on local streets.

Partnerships: Community safety groups need to be identified, while government employees must be protected when reporting safety issues in their organization. Lastly, internal networking is important within governmental organizations because many individuals hold information to themselves for fear of negative consequences.

Enforcement: There is an additional need to increase impaired driving enforcement programs. Street/parking lot enforcement personnel may provide added support for roadway safety issues. Enforcement organizations need a central location to report safety problems. It is important to forward safety issues to the appropriate departments when building the local safety network. A protocol should be established for promoting "best practices" within the region.

Education: Participants identified one role of DVRPC and New Jersey CAIT-LTAP should be education. The agencies should distribute curriculums to local law enforcement officers on the alcohol and drunken intervention enforcement (DWAI Program.) This curriculum would be available at a centralized location where technical resources are provided to local agencies. Furthermore, it is important to educate residents in the region on what support would be provided through the DVRPC safety network. Issues identified during the safety education discussion included:

- Curriculum for DWAI training.
- Information Center – physical location.
- Technical resources.
- Adjust attitudes in municipalities when reporting safety concerns.
- Uniform TRI training, better guidebook.

- Don't know who the MPO is and how to tap into DVRPC.
- Money and funding network defined.
- Roadway Safety Audits and moving from the county to the local level.
- Promote county resources for planning offices.

E. Overall Response

The program was appropriate for this audience and a formal technical report should be developed and distributed to all county agencies, along with a publication on the available county planning resources. It is important to know the names of the participants and future activities should be "piggy backed" on other established meetings (e.g. Conference of Mayors and local safety organizations.)

Comments:

- Program was audience appropriate.
- Safety Conscious Planning Report for all agencies.
- County planning resources advertised.
- Network list of cards (name of participants.)
- Piggy back on other meetings.

Session 2: Gloucester and Camden County

A. Knowledge

Responses from the Gloucester and Camden County Forum participants were similar to those obtained during the previous session, except there was little mention about network because both agencies had been very active in that capacity. However, they were grateful for the information provided on resources that are available for improving safety on local roadways.

Resources: Participants further confirmed that the funding information was very useful for these municipalities. Traffic calming programs, described by the Alliance, were of particular importance to those in attendance, along with the update on the status of crash reports. Others were looking forward to formation of a safety website for local traffic officers.

Comments:

- Funding Process.
- Programs – what to do, where to go, funding sources.
- Resources.
- Accident Data (taking AD and placing in collision diagram.)
- Traffic calming – results and studies.
- Website – information/education.

Programs: Many police participants were interested in attending the standardized Police Work Zone Safety Programs. The school zone safety program would be easily adoptable within the county, where public education is critical for reducing fatalities on roadways. The shared Public Service Message Board was also of interest to county representatives.

Comments:

- Marketing concept.
- Education – public.
- Public Service Message Board.
- School Zones.
- Work Zone Safety – standardize lesson plan.

B. Motivation for Attending

All participants reported that they attended the Forum to obtain further information on funding and technical resources to improve safety on the local roadways in their represented communities.

C. Gloucester and Camden Resources

Several resources and organizations exist within Gloucester and Camden counties that should not be overlooked when the DVRPC Task Force is established. The following list was developed so that the DVRPC could network with in helping to get safety messages to the public and identify participants.

Comments:

- ***State***
  - League of Municipalities.
  - Conference of Mayors (May.)
  - County Municipal Traffic Engineers Association.
  - Association of Engineers.

- ***County/Regional***
  - (Police) Association Meetings.
  - Police Benevolent Association (PBA.)
  - Cooperation Watch (Camden.)
  - County Mayors Association.
  - Strategic Planning Group (Gloucester.)
  - Police Academy.
  - Thru County (Road Show.)
  - Joint Insurance Fund.

- ***Municipal***
  - Committee Meetings.
  - (Community) Newsletters.
  - Local Safety Organization.
  - Partnerships.
  - Mayors, Financial Officers.
  - Local Traffic Safety Officers.

D. Safety Issues in Camden and Gloucester Counties

All were in agreement that DVRPC and New Jersey CAIT-LTAP must help local agencies navigate through the federal and NJDOT process required for obtaining funding. The NJDOT should continue the dialog and offer support to local transportation agencies, if crashes are to decrease on local roadways. School education programs are important for reaching the next generation of drivers. Lastly, the New Jersey Office of Planning should sponsor "Drive Friendly" messages throughout the state with counties overseeing a Variable Message Sign lending program.

Comments

- Understanding the Federal & NJDOT process.
- State Highway – create avenue for opening dialogue.
- Proactive Approach.
- Variable Message Signs (VMS.)
- Speed Trailers.
- School Education Program.
- Courtesy – NJOP Drive Friendly.

Assessment

The feedback, obtained from the Forums, was necessary to identify existing safety partners for inclusion in the DVRPC Transportation Safety Task Force Plan. A comparative analysis of each county was then conducted to further determine the agency and type of safety services that were present in the counties. Also, Meyer's guidebook was consulted to identify further potential partners for the Task Force.

Comprehensive Traffic Safety Programs (CTSPs) exist in all of the counties represented by DVRPC, except for Mercer County. Some organizations are even fortunate enough to reap the benefits of having two safety associations located in their communities (e.g. Camden County.) The Mercer County participants (county and local agencies) asked New Jersey CAIT-LTAP to organize a safety network in their area, in order not to miss out on new safety opportunities.

When identifying potential networking opportunities for the DVRPC, professional organizations (League of Municipalities, Conference of Mayors, County and Municipal Traffic Engineers Association, and the Municipal Engineers' Association) were thought to be the best contacts for involvement in the safety network; while only the NJDHTS received recognition as a viable state agency (Table 28.) Several county departments (Traffic Safety Committees, Traffic Engineer, Sheriff's Office, Police Academy, and Office of Emergency Management) were potential partners, but the Planning and the Highway Departments were excluded from this group. Instead, police professional organizations were named to the partnership. Also, Transportation Management Associations (TMAs), Local Cable Networks, and Joint Insurance Funds were other organizations that support local transportation safety. Furthermore, important municipal partners had been identified as mayors, financial officers, and local traffic safety officers.

Table 28. Potential networking opportunities by county

County	State/Regional	County	Private & Non-profit
Burlington	NJDHTS	Traffic Safety Committee Sheriff's Office Office Emergency Mgmt Parking Personnel	TMA
Camden	League of Mun. Conf. of Mayors	Police Academy Police Associations Police Benevolent Assn. Cooperation Watch Parking Personnel	Joint Insurance Fund Cable Road Show
Gloucester	League of Mun. Conf. of Mayors	Police Academy Police Associations Police Benevolent Assn. Strategic Planning Group	Joint Insurance Fund Cable Road Show
Mercer	CAMTEA Assoc. of Engineers	Traffic Engineer Greater Mercer TMA	

Since the roles of county agencies vary between organizations, it was important to further explore the profiles of these four counties included in the region being supported by the DVRPC. A review helped to determine the types of formal safety networks that exist in each of the areas, in addition to other organizations that need to be included in this partnership.

COUNTY PROFILES

The information presented in this section was obtained from the official websites of each jurisdiction. These profiles offered a brief overview on the size of the county, population, number of municipalities located within the region, and general information on the transportation system. Also, explanations were offered on the types of transportation

safety services that are found in each of the counties. A comparison was then made between represented agencies to better identify the type of partnership to be formed as the DVRPC Task Force.

Burlington County

Burlington County is the largest county in New Jersey and covers over 820 square miles with over 432,000 residents. This area extends from the Atlantic Ocean to the Delaware River and borders metropolitan Philadelphia. Forty municipalities exist in the county, inclusive of three cities. The New Jersey Pine Barrens are located in this area, along with the blueberry and cranberry industries of the state. Over 125,000 jobs are private sector positions with an additional 189,000 jobs representing the public sector. In addition to vehicular travel on the major highways that intersect the region, the Port Authority Transit Corporation (PATCO) offers a high speed rail service to and from Philadelphia, while NJ Transit also meets daily commuter needs. This agency operates over 2,000 buses, 711 trains, and 45 light rail vehicles. The River LINE light rail train system also accommodates commuters, along with Burlink which is sponsored by Burlington County, and the Conrail local freight service. Also, the Philadelphia International Airport is located 30 miles away from Burlington County and serves as a major employer for the area. Lastly, the Burlington County Bridge Commission is responsible for the Burlington-Bristol and Tacony-Palmyra bridges, and several other single span bridges in the region.

According to the New Jersey Library (2004) roadway infrastructure is probably the greatest advantage that Burlington County offers business and industry. There are two limited-access interstate highways that run through the county, the N.J. Turnpike (toll) and Interstate 295. The N. J. Turnpike has several interchanges within Burlington County, along with Route 295. These highways also connect directly with the Pennsylvania Turnpike, the Garden State Parkway, and the Delaware Turnpike. and I-95 southbound routes. Access to the shore area and Garden State Parkway is available via the following state highways: Routes 38, 70, 72 and 73.

The Engineering department is responsible for road resurfacing programs, reconstruction, inspection, and replacement of bridges and drainage structures on county roadways. Burlington County also maintains a traffic section that addresses signals, flashing beacons, school flashers, road signs, striping of county roads, and collects data for engineering studies. The planning section handles subdivision and site plan applications, and access permits on county right of ways. This group is also responsible for transportation planning and maintaining the topographical maps.

The Burlington County Sheriff's Office sponsors several community based transportation safety programs that include defensive driving, enforcement of the NJ Child Restraint Law, and the Buckle Up!- It's the Law Campaign. This agency has also reached out to municipalities and other law enforcement agencies to offer technical support to local agencies in their jurisdiction.

Camden County

Camden County is one of the most heavily populated areas in southern New Jersey. This 222 square mile area consists of 37 municipalities that include the city of Camden, located on the Delaware River. Over 510,000 people reside in the county, where the major employers are the medical, technology, and manufacturing industries. The intermodal transportation options are similar to Burlington County with the NJ Transit and the PATCO Speedline servicing the area. The Port of Philadelphia and Camden operate the RiverLink Ferry, while SEPTA provides bus, rail, and subway transportation services into Philadelphia and the surrounding region.

The Division of Highway Traffic Safety, part of the Public Safety Department, works with local agencies in administering the following programs:

- Supports the NJ State Division of Highway Traffic Safety "Operation Buckle Down Program", along with county occupant protection programs, which are implemented to target municipalities with lower seat belt usage rates.
- Implements the Countywide CDL Drug and Alcohol testing program. Through the purchase of additional "Fatal Vision Glasses" the Division promotes DWI education in various County schools through its loaner program.
- Conducts bicycle safety rodeo events in an effort to increase the use of bicycle helmet use among the youth within the County.
- Purchases non-projectile pedestrian signs to target and improve the safety of high volume pedestrian areas within the county.
- Assists the State Division of Traffic Safety in training County officers and employees in Car Seat Training, Work Zone Safety, Defensive Driving, and Accident Investigation.
- Coordinates the Camden County Diversity Partnership Concept for Traffic Safety. This program will target minority populations in Camden County for educational programs and outreach events.

This Division also sponsors the Camden County Traffic Safety Task Force that works with the agency to develop and implement programs that are designed to educate the public on traffic safety issues. This office works closely with volunteers and representatives from local law enforcement agencies, emergency services, hospital personnel, MADD, and other federal and state agencies to reduce transportation fatalities.

Gloucester County

Gloucester County is 328 square miles located along the Delaware River and borders Camden County. This area is highly accessible to Philadelphia, Pennsylvania and the Wilmington, Delaware areas. A total of 24 municipalities are located within this region that represents a diversity of areas, with approximately one quarter of the region being considered developed. Approximately 248,000 individuals reside in this area. The

northern and eastern regions are areas of rapid growth and are now extending to the southern area of the County. The developmental pattern has followed the county's major transportation corridors to where the manufacturing industry is located. Retail trades and service industries are the major employers of this area.

Several major highways, located in Gloucester County, include the New Jersey Turnpike, New Jersey Interstate 295, and NJ Route 55. The Commodore Barry Bridge links these roads to Philadelphia, Pennsylvania. The two major providers of bus service in Gloucester County are New Jersey Transit and the Gloucester County Division of Transportation. The county operation services the rural areas as well as providing para transit services. Fifteen municipalities operate senior citizen transport services. Lastly, PATCO are viable transportation options within the region where several “park and ride” facilities are located.

The Gloucester County Highway Safety Task Force, sponsored by the Prosecutor’s Office, includes representatives from the following organizations:

- Board of Freeholders.
- Gloucester County Police Chief’s Association.
- Gloucester County Department of Health and Senior Services.
- Underwood Memorial Hospital.
- Newfield Bank.
- New Jersey Police Traffic Officers’ Association.
- Regal Entertainment Group.
- Chief of Detectives.
- Gloucester County Engineering Department.
- AAA of South Jersey.
- Walmart.
- ARC of Gloucester.
- Brain Injury Association of New Jersey.
- Gloucester County Office of Education.
- Southwest Council, Inc.
- Gloucester County MADD.
- Tri-County Safe-Kids.

Although the Gloucester County Planning Department was not directly involved in the Task Force, as posited by Meyer, a mission statement and one goal had been crafted to address safety. The mission of this organization is to reduce the number of serious and fatal crashes within the county. As determined by the membership list, this public/private partnership desires to increase public awareness of safety problems through education, training, and communication in order to make the roadways safer for all members of the community.

Several transportation safety resources are featured on the County website for local municipalities to utilize. They include a chart of the crash types (pedestrian, bicycles,

and vehicles) and number of fatalities, analysis of crash causes, and location of crashes. Additional information is available for municipalities on programs that are sponsored by this group (e.g. high school video production contest, Safe Kids activities) public education on alcohol use among under age drinking, a chronology of the organization's events, and links to law enforcement training programs.

Mercer County

Mercer County is 226 square miles and sixteenth in size of the twenty-one counties in New Jersey. Approximately 351,000 people live in the thirteen municipalities that include Trenton, the State Capital and County Seat. Nearly 11,000 businesses are established in this area, while public sector jobs are held by over 60,000 individuals. Intermodal transportation consists of Suburban Transit Bus Lines, New Jersey Transit Bus and Rail Systems, SEPTA Rail Service, in addition to the Trenton-Mercer and Trenton-Robbinsville Airports.

The Regional Planning Partnership, subcontracted by Mercer County to produce their Master Plan, has organized transportation projects in the region that include:

- Managing the community involvement process for NJDOT's Route 1 Corridor Study in the early 1980s.
- Establishing the Greater Mercer TMA,
- Conducting a federally-funded land use/transportation study of center-based growth reduction of traffic congestion.
- Management of Routes 1 and 130 corridor studies that involved nearly half of the elected officials from the municipalities in the county.
- Development and Implementation of the GOZ model that calculates zoning yields for the region.

Mercer County is the first County in New Jersey to prepare an access management code for County roads. A state Smart Growth Planning Grant was received for implementation of the new access management code. The County will then coordinate roadway improvements with sound municipal land use decision-making practices.

Observation

The profiles, outlined in Table 29, revealed that Comprehensive Traffic Safety Programs (CTSPs) exist in all of the counties under the jurisdiction of DVRPC, except for Mercer County. Some county organizations are more involved than others in providing local support in the form of coordinating safety campaigns, checkpoints, identification of hot spots, and other safety activities. Also recommended by Meyer, potential partners for the Regional Task Force may include the Burlington County Bridge Commission, NJ Transit, PATCO, SEPTA, River Line, hospitals, school districts, senior citizen groups, MADD, and Safe Kids.

Camden County is the most heavily populated region, while Gloucester County remains predominantly rural with only one quarter of the land being developed. The transportation network for this entire area is impacted by Philadelphia traffic and Wilmington, Delaware, traffic further affects Gloucester County residents. Intermodal transportation issues are important to all counties, however, Mercer County addresses air traffic and Camden County is involved with the ferry system as an additional means of transportation for residents.

The profiles identified 114 municipalities existing in this four county area, which may limit the ability of the DVRPC to create a partnership involving local transportation agencies. Alternatively, the focus was redirected toward the creation of a county-based Regional Safety Task Force that would be better suited for working productively with the DVRPC in adopting Safety Conscious Planning as a comprehensive, data driven, and collaborative safety network. Before that could happen, a county-wide safety system needed to be organized in Mercer County, which included local transportation agencies. The next section provides an explanation of the process for adopting Safety Conscious Planning locally.

CASE STUDY

Following the procedures for implementing Safety Conscious Planning Network, an interview was conducted with the Mercer County Engineering Department to assess their existing safety needs. The SCP Checklist was also completed by the Traffic Engineer consulting the Planning Division staff, to determine pre-existing levels of safety implementation within their organization. This interview revealed important information about the level of involvement that Mercer County has with the NJDOT and the DVRPC. The Planning Director is a voting member of the DVRPC committees so their organization has a strongly established relationship within the region. The DVRPC has provided traffic counts for approximately 50 locations in their jurisdiction. Additionally, NJDOT has proactively approved three projects for funding along with providing technical support for one particular high crash location.

The County uses the following data to address roadway improvements based on the road Inventory: GIS data (funded through DVRPC), traffic flow patterns, traffic counts, roadway geometry, speed, crash records, time of day, and weather conditions. Signal timing data is available electronically, as well. The County Engineer also reaches out to the local police departments for the previous three years crash data for the location in consideration. An inventory is needed for congestion safety, and would be helpful for gaining support from the Freeholders. The MUTCD and AASHTO Standards are tools used in the design of the project.

Some of the problems that have been identified on county roads are stopping site distances, need for traffic calming measures, and the impact attributed to opening large discount "big box" stores in the region. Recommendations were also made for educating local municipalities on the effectiveness of lowering speed limits, which is often done arbitrarily. Another request was made for best practices to be shared between municipalities on traffic calming, signal time, and reduction of speed limit issues.

Table 29. Overview of county safety issues, services, and programs

County	Square Miles	Pop.	# Mun.	Transportation Concerns	Safety Services & Network
Burlington	820	432,000	40	Philadelphia commuter congestion (bus, car, rail, light rail)	• Traffic Engineer • Traffic Safety Committee • Sheriff's Campaigns (child restraint seats, buckle up, and defensive driving)
Camden	222	510,000	37	Philadelphia commuter congestion (ferry, bus, car, rail, light rail)	• Camden County Traffic Safety Task Force • Division of Highway Traffic Safety (occupant protection programs, CDL drug & alcohol tests, bicycle safety, training, non-projectile sign campaign for pedestrians, diversity training)
Gloucester	328	248,000	24	Philadelphia & Delaware commuter congestion (bus, car, rail)	• Gloucester County Highway Safety Task Force – private/public representatives (fatal crash analysis report, public awareness information, education, training, teen contest and community outreach program)
Mercer	226	351,000	13	Trenton & Philadelphia commuter congestion (airplane, bus, car, rail, light rail)	• Smart Growth and Access Management Codes include municipal support of elected officials • Engineering Department offers milling service on inter-municipal roadways

Overall, the County works closely with the local police in helping to solve problems that occur on their roadways. Municipal assistance is provided on projects of intercommunity travel (i.e. milling) when one agency will pay for the materials and the other perform the milling process required on a resurfacing project. All bridge inventories are part of the county jurisdiction. Cost benefit analysis is used for prioritizing projects, instead of spending large amounts funding studies. A yearly meeting is held to make the determination on which projects will be funded for the upcoming year.

Survey Results

Results of the SCP survey were obtained from the Mercer County Traffic Engineer, who conferred with the Mercer County Planner on the presented responses (Table 30.) They identified the County Growth Management Plan as not currently including safety in the vision statement. This master plan has been updated incrementally since first approved in 1986. A thorough revision of the Growth Management Plan is well underway, and will incorporate county roadway access management codes. Safety is a fundamental concern in adopting an access management coding system, so the final product will incorporate safety into the document. Safety should also be included in the goals and objectives of the new master plan.

Table 30. Assessment of Mercer County SCP elements

Yes/No	Questions
No	Does the vision statement for the planning process include safety?
No	Are there at least one planning goal and at least two objectives related to safety?
No	Are safety-related performance measures part of the set being used by the agency?
Yes	Are safety-related data used in problem identification and for identifying potential solutions?
No	Are safety analysis tools used regularly to analyze the potential impacts of prospective strategies and actions?
No	Does the evaluation criteria used for assessing the relative merits of different strategies and projects include safety issues?
No	Do the products of the planning process include at least some actions that focus on transportation safety?
Yes	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?
No	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?
Yes	Are all of the key safety stakeholders involved in the planning process?

There are currently no comprehensive county-wide safety performance measures. However, when the county is seeking to implement intersection and roadway improvement projects, crash records are examined to attempt to identify specific safety deficiencies. While there are no specific safety criteria, the goal is to eliminate vehicle and pedestrian

crashes. The most relevant safety-related data are vehicle crash records, while national standards and guidelines are used for all roadway projects. Speed survey data and traffic counts are other resources that are used to maintain safety on the county roadways. Recently, DVRPC has initiated a county-wide traffic data collection program. This information will be provided in electronic format and will be capable of mapping in GIS.

The planning process implicitly includes actions that focus on transportation safety (Table 31.) For example, improvement initiatives would consider reducing the occurrence of vehicle crashes as the potential selection criteria for action. Again, Mercer County analyzes safety data, which generally consists of local police crash reports, when a modification is being contemplated at a particular location.

Table 31. Safety data used for Mercer County roadways

Inventory	Type of Data Collected	Use of Inventory
Speed survey data	Radar speed counts at various locations throughout the county.	Determine whether changes in speed limit are warranted. Primarily performed when a change in speed limit is requested.
Traffic counts	Manual turning movement count data for various intersections throughout the county.	Counts are performed where changes to intersection control is being contemplated. Counts are obtained on an as-needed basis.

Internally, the Planning Division, the County Engineer, and the Traffic Engineer work together on transportation projects. Mercer County has an appointed liaison, which is responsible for the day-to-day interaction with DVRPC staff. The liaison also disseminates pertinent information to the appropriate planning and engineering staff and serves as the principal coordinator with the county and DVRPC staff. Additionally, Mercer County works closely with the NJDOT Traffic Engineering Division on signal and crash issues. The County Engineer and Traffic Engineer are members of the County Road Supervisor's Association and the County and Municipal Traffic Engineers' Association (CAMTEA) respectively.

The Mercer County Planning Division uses ArcView 8.3 to manage and host a NJGIN node server. Internally, the County manages a variety of data layers, including, among others, road centerlines, property parcels indicating ROW, land use, zoning, streams, wetlands and environmentally sensitive areas, open space, and orthogonal and oblique aerial photos. The County is working with a consultant in cooperation with the NJ DOT and the DVRPC to develop a set of layers specifically related to transportation. This process will be advanced considerably when NJ DOT releases its GIS-based data system in spring 2005. Since NJ DOT currently aggregates and manages crash data, it will

probably be available at least to qualified administrative users, making its systematic incorporation into County problem identification much easier.

Other resources of the Mercer County Engineering Department include embarking on a GPS survey of signage and drainage that will be integrated into its CAD system. Policy and procedures have not been set for migrating CAD data into ArcView. Mercer County maintains 160 traffic signals, 14 school flashers, 6 fire signals, and 9 flashing signals. Loop detection systems are employed at the majority of the traffic signals with a few operating in fixed time modes.

Development of the Mercer County Partnership

Several assumptions were then made from the results of the interview and survey. The County Engineer maintains an integral role in working with the state, regional, and local transportation agencies. During the past several years, the County Engineer has depended upon local police departments to provide crash records for specific locations. More recently the NJDOT has networked with the department to offer technical assistance and funding support for crash locations. The DVRPC has supported the Mercer County Planning and Engineering Departments through assistance with their GIS based data system and traffic counts for many locations. Lastly, the County Engineering Department, including the Traffic Engineer, has knowledge of and maintains additional data resources (e.g. traffic counts, GIS, signal inventories, crash records) that would further enhance local decision making processes.

Instead of creating yet another bureaucratic organization, the Mercer County Engineer and Traffic Engineer, have agreed to serve as liaisons between the Police Traffic Officers Association and the DVRPC Transportation Safety Task Force. The County Engineers' involvement with the Mercer County Police Traffic Officers' Association enabled law enforcement personnel to receive engineering support, while they became connected directly to the DVRPC where additional safety funding and resources were available. Additionally, new training resources were expanded through the efforts of the DVRPC, Rutgers, and the Mercer County Engineering Department.

SCP was then adopted by the Mercer County Police Traffic Officers' Association and focused on reducing transportation crashes and fatalities throughout the county by:

- Collectively sponsoring several of the activities that were developed by the Alliance
- Obtaining funding and technical support to accomplish safety projects
    - Identify high crash locations for all of the municipalities,
    - Applying appropriate engineering and enforcement countermeasures,
- Sponsoring appropriate community based activities to promote transportation safety.

Adjustments had to be made to the Safety Conscious Planning Model, since the Association membership was not permitted to include civilian representatives and their by-laws were regulated by the statewide New Jersey Police Traffic Officers' Association. Therefore, a working committee was formed where Safety Conscious Planning had

been integrated into the system without difficulty and civilians had been assigned to the role of committee members rather than formal partners. The Mercer County Engineer serves as both, a committee member and liaison to the DVRPC; so that the Police Traffic Officers are kept informed about funding issues, best practices, and engineering related issues that affect their areas.

Additionally, it is important to gain a better understanding of the current safety status of local agencies. A determination was made based on survey responses received by the municipalities on the existence of transportation safety committees, whether or not the agency supports a specialized traffic unit or a dedicated Police Traffic Officer. According to the NJDHTS, another indicator of a proactive safety community is if an agency had recently received 402 safety funding, especially since grant administrators often hold key leadership roles in their community safety programs.

The data presented, in Table 32, provides a broad indicator of the readiness for adoption of Safety Conscious Planning within the agency. First, the most positive observation is that the Police Traffic Officers Association has been successful in a region where limited resources were available to them through the County. However, support was offered through an active statewide network of Police Traffic Officers. Next, Mercer County is fortunate in that each municipality does have a dedicated traffic unit or officer, with the exception of one agency that uses State Police for patrolling local roadways. Thirdly, six local citizen's safety committees had already been established within the county; while two mayors were serving on task forces to help reduce local truck traffic in their communities. This information validates the need for a second and third tier of the New Jersey SCP Model where outreach is targeted toward elected officials as well as safety professionals. Lastly, one municipality had even acknowledged involvement with the DVRPC in the Central Jersey Transportation Forum, which further confirmed that DVRPC had already been posited as a credible resource for local transportation agencies.

Table 32. Status of local transportation safety organizations in Mercer County

Municipality	Safety Organizations	Citizen	Police	Prof.
East Windsor Township	Mercer County Traffic Officers Association Police Traffic Unit		 X	X
Ewing Township	Traffic Unit		X	
Hamilton Township	Traffic Unit		X	
Hightstown Borough	No Local Network Traffic Unit		X	
Hopewell Borough	DVRPC Transportation Forum Mayor's Task Force on Trucks * Covered by Hopewell Township	 X	 *	
Hopewell Township	Mayor's Task Force on Trucks Traffic Unit	X	X	
Lawrence Township	Public Safety Advisory Committee	X	X	
Pennington Borough	No Local Network No Traffic Unit			
Princeton Borough	Traffic & Transportation Committee Public Works Committee Environmental Committee Public Safety	X X X X	X	
Princeton Township	No Local Unit (Police Traffic Officer) Ad-Hoc Traffic Safety Committee (Government & Citizen Representation)	 X	X	
Trenton City	Bureau of Traffic & Transportation		X	
Washington Township	Traffic Safety Unit		X	
West Windsor Township	Citizen Ped/Bike Group Traffic Unit	X	X	

An important outcome, related to the expansion of the Police Traffic Officers Association's role in Mercer County, is the DVRPC's formation of a represented partnership for locals to support regional safety efforts and gain desperately needed resources to help reduce crashes on the local transportation system.

A final comparison of the Mercer County local network to the entire region and determine potential safety readiness tendencies between counties and within the municipalities (Table 33.) This comparison reveals that Mercer County municipalities maintain more police traffic units than elsewhere and that a greater number of local safety committees have been established there as well. Further research needs to be done to determine whether or not community wealth influences the importance of community safety.

Table 33. Comparison of safety ratings between counties

Safety Status	Burlington	Camden	Gloucester	Mercer
Police Departments	26	28	23	3
Police Departments with Traffic Units	6	2	1	8
No Police/Other Police Patrol	2	2	0	2
Unknown	6	5	0	0
Community & Internal Safety Groups	5	6	5	9
Sponsored Professional Organizations	2*	2	2	1
* Reported from the Forum.				

Tier 3: Outreach to Local Elected Officials

The final stage of the Safety Conscious Planning Implementation is Tier 3 that directly targets local elected officials. Most local elected officials are not full-time mayors so they depend on their staff to represent them at important meetings. In New Jersey, municipal safety professionals are usually the police traffic officers who had predominantly attended these SCP forums and have been educated about the importance of establishing proactive approaches to local safety issues. Police Traffic Officers are responsible for completion of all NJTR-1 crash reports, required by the NJDOT, on traffic incidents that net over $500 in damage. However, these safety specialists do not have the power to affect visions and goals of the organization that drives the emphasis on safety in their represented communities. Frequently the new information learned at seminars will likely stay within the department and not be addressed at the next highest level for further action.

When mail is received by the mayor of a municipality, it is formally recorded and addressed as protocol for further action, which is why a copy of the Forum Report, Meyer's Checklist, and website location for obtaining a downloadable copy of the Local SCP Kit was sent to each mayor and their local safety professional. Also, an enclosed cover letter addressed the need for these officials to support the reduction of roadway crashes on local roads. Technical contact information was provided for obtaining resources from DVRPC and the New Jersey CAIT-LTAP agencies.

The purpose of targeting elected officials is to educate them on the following matters:

- DVRPC is forming a safety network where county and local agencies may obtain additional support of funding and resources.
- Elected officials play a major role in driving safety through policy and planning.
- Distribution of tools for adopting a local safety network.

Expected outcomes are for local professionals will gain greater internal support as proactive safety leaders; while also becoming connected to the regional network where resources, support, and guidance are obtained. Lastly, elected officials will become aware of the Safety Conscious Planning concept and possibly use the assessment tool

(SCP Checklist) and manual to integrate safety internally and reach out to their community for support in the development of a community based safety network.

The benefits of the newly formed SCP network, in Mercer County, was further confirmed when the officers obtained advance copies of the DVRPC Forum Report and other publications at their meeting, received information on use of the manual. They were able to instruct their elected officials on the important role that Safety Conscious Planning provides in reducing transportation fatalities at all levels of government, and especially on county and local roadways where most of the deaths are occurring.

SUMMARY

In New Jersey, the Safety Conscious Planning Partnership Network was successfully formed on the state level with the MPOs, and the NJDOT working together, along with the support from the FHWA of New Jersey, NHTSA, NJDHTS, NJSP, NJ Transit, Rutgers University, and several other agencies. The NJTPA had partnered with NJDOT and national consultants to analyze data for all the local agencies within their region and plan to reach out to the locals through their county agencies; while the SJTPO was functioning as a fully integrated safety planning system since 1998. Although the DVRPC had networked with local agencies in the past (i.e. access management codes, emergency response programs), they did not maintain a formalized program for transportation safety.

The DVRPC, SJTPO, and New Jersey CAIT-LTAP representatives teamed together to schedule a series of regional forums. The program was adjusted to address the needs of these local populations, which included highlighting the role of the DVRPC, highlighting the South Jersey Traffic Safety Alliance Model as a best practice, and presenting additional information on safety funding and resources that are available for local agencies. Valuable recommendations were also obtained for the DVRPC to use in organizing their Regional Transportation Safety Task Force that was formed as a unified county-based network. Since elected officials were not available to participate in the county programs, outreach was accomplished through the distribution of a formal report that was sent to each mayor in the region, along with a request for these elected officials to organize a local SCP partnership. Therefore, both the decision makers and the safety professional were being empowered with support for moving their organization to the proactive level.

Several considerations had to be made when implementing a formal safety partnership to accommodate the needs of county and local agencies. First, the number of municipalities had a direct impact on the MPO effectively establishing such a network, especially when there are 114 representatives with needs to be considered. Therefore, the Task Force was handled at the county level, in order to be manageable for the DVRPC.

County profiles provided guidance on future actions, as well as the feedback that was obtained during the forums. Regional profiles revealed that three of the four counties had already established area wide safety networks, while none existed in Mercer County. The Police Traffic Officers Association filled the void by offering law enforcement safety support through the sponsoring agency. Representatives of the Mercer County Engineering Department offered support to this organization by serving as the liaison between the membership and the DVRPC.

Additionally, municipal safety assessments offer a basic indicator of the readiness that an organization possesses for integrated Safety Conscious Planning into practice. Of course other conditions like resources, partnerships, funding must be taken into consideration but basic information enables sponsors to effectively prepare for the successful integration of Safety Conscious Planning. Interestingly, two local officials were already proactively involved in soliciting support for reducing truck traffic on their streets. Lastly, the DVRPC Forum Report reached the elected officials as a promotional tool for moving safety to the next level, which is Safety Conscious Planning.

The future direction of adopting Safety Conscious Planning is for CAIT-LTAP to continue working with the MPOs to develop a curriculum for county personnel. This proposed product will complete the final stages of Technology Transfer, identified as the Innovation Adoption Process (Table 34.) The first stage of awareness has transpired through the statewide and county forums. The next stage, Attitude Formation, involves the user becoming proactive in seeking additional information and forming attitudes that are shared with fellow network members. At this level, training becomes available to reinforce the attitudes. A specialized Safety Conscious Planning Professional (SCPP) will be made available for county employees to work directly with the municipalities on safety programs. Lastly, the Confirmation stage enables SCP to be measured by the accomplishments of this stratified network.

Table 34. Technology transfer innovation adoption process

Stages	Actions
Awareness	• Series of Forums to complete the regional network
Attitude Formation	• Establishment of the MPO Task Force and participation in the county-based network • Safety Conscious Planning Professional (SCPP) training program and seminars for elected officials
Trial/Decision	• Offering technical support for local adoption of SCP
Confirmation	• Evaluation of improved transportation systems (e.g. additional funded projects, lower transportation crashes) as a result of the Safety Network • Use of municipal status profiles to document the progress on local adoption of SCP

CONCLUSIONS

It is important to maintain Safety Conscious Planning (SCP) as the trademark for this comprehensive, data driven, and collaborative effort at all levels of government because it connotes a new way of thinking, instead of the “safety business” as usual. This is especially important when empowering local elected officials, who frequently defer such issues to the safety professionals that do not have the authority to affect change within local organizations.

Fortunately, the SCP Model has provided the local elected officials with the leadership opportunity for championing transportation safety causes on the administrative level; while at the same time there is enough flexibility in the model to address the needs of safety professionals, thus producing a unified safety system that reaches local public sector agencies in New Jersey. The most important outcome of this project is to direct additional safety resources to local communities where they are needed to reduce local roadway, crashes, injuries, and fatalities.

Lastly, SCP has proven to be a unified safety support network that reaches local agencies in New Jersey. Minimal enhancements have enabled this model to be implemented in counties, and extended to the local level through a technology transfer approach that educates elected officials to internally drive the program, while “traditional” safety professionals build partnerships that advocate for community safety. More research needs to be done as the Innovation Adoption Process is completed to determine the true value of this safety lifeline, one of the first in the country to be implemented.

REFERENCES

AASHTO, "AASHTO Security Task Force," Washington D.C., 2003, pp. 1-2.

Beatty, T., R. Carmichael, G. Henderson, C. Johnson,.D. Reagan, M. Ritchie, N. Stoner, R. Umbs, "Final Recommendations of the Congestion Vital Few Goal (VFG) Team," FHWA, US Department of Transportation, 2002, pp.1-5.

Delaware Valley Regional Planning Commission, "About Us," 2004.

Delaware Valley Regional Planning Commission, "DVRPC: The Region's Resource: A Guide to the Commission's Services and Products," 2004, 34 pages.

Federal Highway Administration, "LTAP Solutions: Helping Transportation Workers Tap Into Resources and Training," U.S. Department of Transportation, Washington, D.C., 2003, 17 pages.

Federal Highway Administration, "Congestion Mitigation," Office of Operations, Washington D.C., 2003, pp. 1-3.

Federal Highway Administration, "Considering Safety in the Transportation Planning Process," 118 pages.

Federal Highway Administration, "FHWA Operations Security" Office of Operations, Washington D.C., 2003, pp.1-2.

Federal Highway Administration, "FHWA Unveils New Website," Washington, D.C., 2003, pp.1-2.

Federal Highway Administration, National Model: Statewide Application of Data Collection and Management Technology to Improve Highway Safety, No. FHWA-RD-99-140, 2003, 9 pages.

Federal Highway Administration, Public Safety and Security Program. Keep America Moving Through Emergencies and National Security Events, 2003, 4 pages.

Federal Highway Administration, "After 9/11: Making Transportation Security a Way of Life," *Focus*, U.S. Department of Transportation, Federal Highway Administration, September 2002, 4 pages.

Federal Highway Administration, "Work Zone Mobility and Safety Self-Assessment Guide" U.S. Department of Transportation, Washington D.C., October 2002, 8 pages.

Federal Highway Administration, Military Deployment Coordination Procedures Guide for State Agencies Interim Guide , Washington D.C, 2002, 80 pages.

Federal Highway Administration, Protecting Our Transportation Systems: An Information Security Awareness Overview, FHWA-JPO-98-005, Washington, D.C, 1997, 23 pages.

Federal Highway Administration, Meeting the Customer's Needs for Mobility and Safety During Construction and Maintenance Operations. HPQ –98-1, Office of Program Quality Coordination, Washington D.C., September, 1998, 71 pages.

Federal Highway Administration Highway Safety Evaluation: Procedural Guide, FHWA-TS-81-219, Washington D.C., 1981, 51 pages.

Federal Highway Administration, New Jersey Division Office, "FY 2005 Unit Performance Plan," Ewing N.J., 2004, 36 pages.

Florey, Martha, "Highway Safety Information for State and Local Decision-Making," Lifesavers Conference, 2003, 19 pages.

Hampton Roads Planning District Commission, Incident Management System Makes Local Roads Safer, Spring, 2001, pp.1-3.

Herbel, Susan B., 2004. New Jersey Safety Conscious Planning Forum Report. Rutgers University, CAIT-LTAP, 23 pages.

Herbel, Susan B., "Planning It Safe to Prevent Traffic Deaths and Injuries," *Transition*, Vol. 12, Spring 2004, pp. 7-27.

International City/County Management Association. "Regional Transportation Operations, Collaboration, and Coordination," Washington D.C., 2003, 38 pgs.

Institute of Transportation Engineers, "Providing a Safe, Reliable and Secure Transportation System: 2004 and Beyond," 2002, 15 pages.

Intelligent Transportation Society of America, Homeland Security and ITS: Using Intelligent Transportation Systems to Improve and Support Homeland Security, United States Department of Transportation, Washington, D.C., September 2002, 30 pgs.

ITS Public Safety Program, Integrating Communications System Speed Traffic Recovery After Crashes on New York City Streets, United States Department of Transportation, Washington D.C., 2003, 9 pgs.

Knezek, C., Safety Solutions, Rutgers University, CAIT-LTAP, 2004, 24 pages.

Lomax, T., S. Turner, M. Hallenbeck, C. Boon, and R. Margiotta, Traffic Congestion and Travel Reliability: How Bad is the Situation and What is Being Done About It, USDOT, Federal Highway Administration, Washington, D.C. , September 2001, 17 pgs.

Meyer, M., Guidebook for Integrating Safety into Transportation Planning and Decision Making, 2004, 111 pgs.

National Center for Statistics and Analysis, Fatality Analysis Reporting System (FARS) Web-Based Encyclopedia, USDOT, National Highway Traffic Safety Administration, Washington D.C., 2003.

National Fire Service, Model Procedures Guidance for Highway Incidents. Washington D.C., National Fire Service IMS Consortium, Washington D.C., March 2003, 151 pgs.

National Highway Traffic Safety Administration, Safe Communities: Taking it to the Streets, USDOT, NHTSA, Safe Communities Service Center, 2004, 6 pgs.

National League of Cities, Homeland Security: Practical Tools for Local Governments, Washington D.C., November 2002, 84 pgs.

National Research Council, Making the Nation Safer: The Role of science and Technology in Countering Terrorism, National Academy Press, Washington, D.C., 2002, 237pgs.

National Safety Council, A National Agenda for the Improvement of Highway Safety Information Systems, Itasca, IL, 2002, 8 pgs.

National Transportation Safety Board, Safety Report: Transportation Safety Databases, NTSB/SR-02/02, PB2002-917004, Washington D.C., September 11, 2002, 72 pgs.

New Jersey Department of Transportation, Accident Records: Accident Detail Summary, Trenton, New Jersey, 2003.

New Jersey Division of Highway Traffic Safety and New Jersey Police Traffic Officers Association, Police Guide for Preparing Reports of Motor Vehicle Crashes, 1999, 56 pages.

North Jersey Transportation Planning Authority, Inc., “NJTPA Profile”, Newark, N.J., March 2004, 3 pgs.

Pearce, V., Securing the Roads. USDOT, Federal Highway Administration, Washington D.C., 2002, 4 pgs.

Polzin, S., Security Considerations in Transportation Planning: A White Paper. Southeastern Transportation Center, USDOT, Federal Highway Administration, 2003, 27 pgs.

Research and Technology Coordinating Committee, “Managing Technology Transfer: A Strategy for the Federal Highway Administration”, Transportation Research Board Special Report 256, National Research Council, Washington, D.C., 1999, pp. 20-48.

Roberson, R., New Jersey Interagency Emergency Management Plan, Rutgers CAIT-LTAP, New Brunswick, NJ, 2003, 28 pgs.

Robertson, H.D., J.E. Hummer, and D.C. Nelson, Manual of Transportation Engineering Studies, Institute of Transportation Engineers, Prentice Hall, Englewood Cliffs, NJ.

Rosado, E.S., The Department of Homeland Security. National Association of Counties, Washington D.C., 2003.

Sinclair, J., Congestion Buster Task Force Final Report, New Jersey Department of Transportation, Ewing, NJ, October 2002, 47 pgs.

South Jersey Transportation Planning Organization, About South Jersey Transportation Planning Organization, SJTPO, Vineland, N.J., 2004.

South Jersey Transportation Planning Organization, Highlights: SJTPO 2025 Regional Transportation Plan, SJTPO, Vineland, N.J., 2004.

South Jersey Transportation Planning Organization, South Jersey Traffic Safety Alliance, SJTPO, Vineland, N.J., 2004.

Sorenson, J., E. Terry, and D. Mathis, Maintaining the Customer Driven Highway. Public Roads, U.S. Department of Transportation, 62, 3, November/December, 1998.

State of New Jersey, Traffic Records Assessment, National Highway Traffic Safety Administration, Technical Assessment Team, March 2002,

Taylor, B.D., Rethinking Traffic Congestion, Access, Vol. 21, pp. 8-16, Fall 2002.

Texas Transportation Institute, 2002 Urban Mobility Study College Station,Tx., 9 pgs.

Turnbull, K., ITMS. Fourth Integrated Transportation Management Systems (ITMS) Conference, U.S. Department of Transportation, FHWA-OP-01-145, UDOT, Federal Highway Administration, August 2001, 59 pgs.

Turner-Fairbank Highway Research Center, HSIS Summary Report: Investigation of National Highway System Roadways in the HSIS States, USDOT, Federal Highway Administration, FHWA-RD-98-080, 2003, 4 pgs.

U.S. Conference of Mayors, A National Action Plan for Safety and Security in America's Cities. Washington, D.C., 2003,

Wilson, G., "Roadway Safety Tools for Local Agencies," Transportation Research Board, National Cooperative Highway Research Program Synthesis 321, TRB, Washington, D.C., 2003, 168 pgs.

Washington State Department of Transportation, Local Agency Safety Management System. Washington State Technology Transfer Program, September 2002, Olympia, WA.

SAFETY CONSCIOUS PLANNING SURVEY

APPENDIX A

Directions: Please complete the survey provided below, by November 27th, and return to Claudia Knezek at knezek@rci.rutgers.edu. This information will guide the Metropolitan Planning Organizations (MPOs) with integrating traffic safety issues in future planning activities. If there are additional problems/issues that you would like addressed by the MPO, please add them to the bottom of the list. The results of this survey will be summarized and presented for discussion at the upcoming Statewide Safety Conscious Planning Forum.

1. Please check the best designation that represents your agency.

Check Here	Type of Organization
	City Government
	County Government
	Law Enforcement
	Metropolitan Planning Organization
	State Government
	Private Sector
	University
	Other (Please list organization)

2. The primary focus of your interest in safety is: Rank order the top five priorities **with (1=LOWEST & 5 = HIGHEST)**

#	Interest in Safety	#	Interest in Safety
	Aggressive Driving		Improving the Design and Operation of Highway Intersections
	Commercial Drivers/Vehicles		Intersection Safety
	Fatigued Drivers		Keeping Vehicles on the Roadway
	Fatalities		Minimizing the Consequences of Leaving the Road
	Impaired Drivers		Reducing Head-on and Across Median Crashes
	Influencing Driver Behavior		Pedestrians, Bicycles, & Motorcycles
	Drivers: Older Driver, Young Driver		Safety Belts
	Construction of Safety Projects		Truck Travel
	Designing Safer Work Zones		Other (please list)

3. Rank order the following traffic safety issues according to **future concerns** by using numbers 1 to 10 **(1= LOWEST & 10 = HIGHEST)**

#	Interest in Safety	#	Interest in Safety
	Aggressive Driving		Improving the Design and Operation of Highway Intersections
	Commercial Drivers/Vehicles		Intersection Safety
	Fatigued Drivers		Keeping Vehicles on the Roadway
	Fatalities		Minimizing the Consequences of Leaving the Road
	Impaired Drivers		Reducing Head-on and Across Median Crashes
	Influencing Driver Behavior		Pedestrians, Bicycles, & Motorcycles
	Drivers: Older Driver, Young Driver		Safety Belts
	Construction of Safety Projects		Truck Travel
	Designing Safer Work Zones		Other (please list)

4. Does your organization currently have a safety program that addresses any of the categories in Question 2 and 3? ___ Yes ___No

If yes, please indicate which one:

_____

	Enough		Average		Not Enough
5. Indicate the level of importance that your agency places on safety in planning. **Circle Answer.**	5	4	3	2	1
6. In your opinion, is this enough emphasis? **Circle Answer**.	5	4	3	2	1

7. Is your agency currently using any of the following initiatives to address safety concerns?

Check Here	**Safety Initiatives**
	Data Collection
	Data Analysis
	Safety Plan Development
	Education
	Research
	Investment in Safety Projects
	Coordination with Traffic Safety Partners (Explain)
	Other (please list)

8. Does your agency currently engage in long range safety planning? __Yes ____No
If yes, do you have an available document? __Yes ____No

9. What major challenges does your agency face in integrating safety into your planning process (e.g. funding, personnel, equipment, etc.)?

_____

10. What is the extent of your current coordination with the MPO?
Low 1 2 3 4 5 **High**

11. Have you ever participated in the development of the State or MPO Long-Range Transportation Plan? ___ Yes ____ No Comments:_____

12. Would you, or a designated representative from your organization, be willing to attend a free workshop on adopting the Safety Conscious Planning Model? ___Yes ____No. If "Yes, please identify the best time for scheduling a program. (Fill-in the answer.)

_____ _____
Season Day of Week
_____2 days (Noon to Noon) _____1 day (all day)

_____ _____ _____
Name Title Organization
Phone #_____ Fax#_____

Email_____Address_____

Municipality_____County_____

Thank you very much for providing information that will help bring resources and support to your organization.

APPENDIX B

Transportation Safety Resource Center
Rutgers University

1. Does the vision statement for the planning process include safety? Explain.

2. Is there at least one planning goal and at least two objectives related to safety? Explain.

3. Are safety-related performance measures part of the set being used by the agency? Explain

4. Are safety-related data used in problem identification and for identifying potential solutions? Explain

5. Are safety analysis tools used regularly to analyze the potential impacts of prospective strategies and actions? Explain

6. Does the evaluation criteria used for assessing the relative merits of different strategies and projects include safety issues? Explain.

7. Do the products of the planning process include at least some actions that focus on transportation safety? Explain

8. 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?

9. 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?

10. Identify all of the key safety stakeholders are involved in the planning process.

Organization	Contact Person	Additional Information

11. Does your organization currently work with the DVRPC ? _____Yes _____No
    If yes, in what capacity?

12. Please identify the types of data inventory that your organization collects and uses for projects.

Inventory	Type of Data Collected	Use of Inventory

13. Does your organization currently have a formal relationship with the NJDOT, counties and municipalities in the exchange of traffic safety related data? In addition please identify the corresponding key persons in each organization that you cooperate with.

Organization	Contact Person	Additional Information

14. Does your organization currently have a formal relationship with the NJDOT, MPOs, counties and municipalities in the exchange of GIS data, roadway geometry data, traffic control data, and traffic flow data (Origin-Destination (OD) matrices, traffic counts, vehicle speeds/travel times)? Are these data stored in databases? Are there any reports available for studies conducted?

Organization	Contact Person(s)	Data Exchange	Additional Information
		GIS data Y_ N_ Crash data Y_ N_ OD data Y_ N_ **Traffic counts Y_ N_** Vehicle speeds Y_ N_ Travel time Y_ N_ Signal timing Y_ N_ Roadway geometry Y_ N_ Other	

15. Does your organization currently have an operational transportation-planning model? If yes please provide the main characteristics of the model, the updating procedure that is followed, the main input data and the main output data. (If you have a report on such a transportation planning model that will be sufficient for this question).

16. Does your organization currently have an operational GIS software? If yes please provide the main characteristics of the software and the main the updating procedure that is followed.

17. Does your organization currently operate any signalized systems? If Yes please provide the following information: YES____ NO_____

Intersection	Contact Person/ Consultant	Detectors present? (Technology used?)	Data collected/ retrieved	Additional Information
			Crash records Y_N_ Traffic counts Y_N_ Speed Studies Y_N_ Travel time Y_N_ Signal Timing Y_N_	

18. Does your organization have a central database that stores any of the following information for roadway sections between interchanges/intersections:

Roadway	Contact Person/Consultant	Detectors present? (Identify Technology)	Data collected/retrieved	Additional Information
			Crash records Y_N_ Traffic counts Y_N_ Speed Study Y_N_ Travel time Y_N_	

19. Identify the transportation related software that your organization currently utilizes. If you have a report on the implementation of the software please provide it to us.

Software	Contact Person/Consultant	Additional Information
GIS platform		
AutoCAD		
Microstation		
TRANPLAN		
MINUTP		
SYNCHRO		
HCS		
TRANSYT7F		
CORSIM		

20. Does your organization operate any closed loop systems? Identify locations and provide a brief description for each.

Closed Loop System Location	Contact Person/Consultant	Detectors present? (Identify Technology)	Data collected/retrieved	Additional Information
			Crash records Y_N_ Traffic counts Y_N_ Speed Studies Y_N_ Travel time Y_N_	

21. Does your organization currently have an active traffic calming program in place? If Yes please provide the following information:

Roadway/ Intersection	Contact Person/ Consultant	Traffic Calming Strategy	Data collected/retrieved	Additional Information
			Crash records Y_N_ Traffic counts Y_N_ Speed Studies Y_N_ Travel time Y_N_ Before/After Study? Y_N_	

APPENDIX C

Burlington County Local Safety Network

Municipality	Safety Organizations	Citizen	Police	Prof.
Bass River	Unknown			
Beverly City	No Local Network		X	
Bordentown City	No Local Network		X	
Bordentown Township	No Local Network		X	
Burlington City	No Local Network		X	
Burlington Township	Child Passenger Seatbelt No Local Committee		X	
Chesterfield Township	No Local Network		X	
Cinnaminson Township	Public Safety Committee		X	
Delanco Township	No Local Network		X	
Delran Township	No Local Network		X	
Easthampton Township	Traffic Unit		X	
Edgewater Park Twp.	No Local Network		X	
Evesham Township	No Local Network		X	
Fieldsboro Borough	No Local Network		X	
Florence Township	Traffic Safety Department		X	
Hainesport Township	NJ State Police			
Lumberton Township	Lumberton Village Assoc.	X	X	
Mansfield Township	No Local Network		X	
Maple Shade Township	No Local Network		X	
Medford Township	Police Traffic Unit		X	
Medford Lakes Borough	Safety Committee	X	X	
Moorestown Township	Traffic Division		X	
Mount Holly Township	No Local Network		X	
Mount Laurel Township	Buckle Up Campaign		X	
New Hanover Township	No Local Network		X	
North Hanover Township	No Local Network		X	
Palmyra Borough	No Local Network		X	
Pemberton Borough	No Local Network		X	
Pemberton Township	No Local Network		X	
Riverside Township	No Local Network		X	
Riverton Borough	No Local Network		X	
Shamong Township	Road Safety Committee NJ State Police	X		
Southampton Township	Unknown			
Springfield Township	No Local Network		X	
Tabernacle Township	Unknown			
Washington Township	Unknown			
Westampton Township	Township Committee Land Development Board	X X	X	
Willingboro Township	No Local Network		X	
Woodland Township	Unknown			
Wrightstown Borough	Unknown			

APPENDIX D

Camden County Local Safety Network

Municipality	Safety Organizations	Citizen	Police	Prof.
Audobon Borough	No Local Network		X	
Audobon Park Borough	Unknown			
Barrington Borough	No Local Network		X	
Bellmawr Borough	Traffic Safety Division		X	
Berlin Borough	No Local Network		X	
Berlin Township	No Local Network		X	
Brooklawn Borough	No Local Network		X	
Camden City	No Local Network		X	
Cherry Hill Township	Smart Growth	X	X	
Chesilhurst Borough	No Local Network		X	
Clementon Borough	Road Department			
Collingswood Borough	Tip of the Month	X	X	
Gibbsboro Borough	No Local Network		X	
Gloucester City	No Local Network		X	
Gloucester Township	No Local Network		X	
Haddon Township	Environ. Commission	X	X	
Haddonfield Borough	Auxiliary Police	X		
Haddon Heights Borough	No Local Network		X	
Hi-Nella Borough	Unknown			
Laurel Springs Borough	No Local Network		X	
Lawnside Borough	No Local Network		X	
Lindenwold Borough	Public Safety Committee	X	X	
Magnolia Borough	No Local Network		X	
Merchantville Borough	No Local Network		X	
Mount Ephraim Borough	Unknown			
Oaklyn Borough	Traffic Division		X	
Pennsauken Township	Public Safety Department		X	
Pine Hill Borough	No Local Network		X	
Pine Valley Borough	Unknown			
Runnemede Borough	No Local Network		X	
Somerdale Borough	No Local Network		X	
Stratford Borough	No Local Network		X	
Tavistock Borough	Unknown			
Voorhees Township	No Local Network Traffic Department State Police Traffic Officer County PTOA		 X	 X X
Waterford Township	No Local Network		X	
Winslow Township	No Local Network		X	
Woodlynne Borough	No Local Network		X	

APPENDIX E

Gloucester County Safety Network

Municipality	Safety Organizations	Citizen	Police	Prof.
Clayton Borough	JIF Coordinating Com.		X	
Deptford Township	No Local Network		X	
East Greenwich Township	No Local Network		X	
Elk Township	No Local Network		X	
Franklin Township	No Local Network		X	
Glassboro Borough	No Local Network		X	
Greenwich Township	Safe Neighborhoods	X	X	
Harrison Township	Township Committee Planning Board	X X	X	
Logan Township	No Local Network		X	
Mantua Township	No Local Network		X	
Monroe Township	No Local Network		X	
National Park Borough	No Local Network		X	
Newfield Borough	No Local Network		X	
Paulsboro Borough	No Local Network		X	
Pitman Borough	Bike Helmet Program	X	X	
South Harrison Township	No Local Network		X	
Swedesboro Borough	No Local Network		X	
Washington Township	Traffic Office Strategic Planning Group NJ Police Traffic Officers		X	 X X
Wenonah	No Local Network		X	
West Deptford Township	Click It or Ticket	X	X	
Westville Borough	No Local Network		X	
Woodbury City	No Local Network		X	
Woodbury Heights Borough	No Local Network		X	
Woolwich Township	No Local Network		X	