

Transportation Safety Resource Center (TSRC) 2007

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Abstract

The Transportation Safety Resource Center (TSRC) is the vital link in a collaborative partnership created among federal and state transportation agencies, local stakeholders, academic institutions, and the private sector to provide resources and solutions that address issues of safety on New Jersey's roads. TSRC functions as an extension of the New Jersey Department of Transportation (NJDOT) Division of Traffic Engineering and Safety. Working with federal, state, and local agencies—including the New Jersey office of the Federal Highway Administration (FHWA)—TSRC coordinates with municipalities to help them align their efforts with key safety initiatives already under way at the state, metropolitan planning organization (MPO), and county levels.

Annually in the United States, there is an average of 42,000 traffic fatalities and countless nonfatal crashes that range from fender benders to devastating injuries. TSRC is New Jersey's premier resource center for technical assistance, training, and traffic safety programs, providing invaluable support to state and local transportation and law enforcement agencies, including departments of transportation (DOTs), state police, MPOs, county engineers, municipal administrators, and others.

Vision

TSRC will be recognized as a safety resource center national model for comprehensive programs that bridge political and geographical boundaries across the state by extending safety resources to local agencies through education, technical assistance, and support.

TSRC seeks to address issues behind crashes and traffic fatalities by applying education, engineering, and enforcement solutions. Examples include the New Jersey Comprehensive Strategic Highway Safety Plan, participation in statewide and regional initiatives such as road safety audits, and others.

Executive Summary

Reducing traffic injuries and fatalities is a primary concern of safety professionals. In 2003, with nearly 700 fatal crashes on New Jersey roadways, the New Jersey Department of Transportation (NJDOT) recognized a need for more proactive, data-driven, and professionally guided expertise in assisting statewide safety agencies in improving roadway travel. In 2003, the Transportation Safety Resource Center (TSRC) was established by CAIT in response to an acute need for implementation of federally mandated traffic safety measures on local roads, which make up 67% of all roads in the state. Established to function as an extension of the NJDOT Division of Traffic Engineering and Safety, TSRC supports division efforts to provide technical assistance and outreach to local agencies.

TSRC has become a vital link in a collaborative partnership among CAIT, NJDOT, FHWA, the New Jersey Division of Highway Traffic Safety (DHTS), the National Highway Traffic Safety Administration (NHTSA), MPOs, and local governments and organizations in providing resources and solutions that address traffic and roadway safety. In line with the National Strategy for Surface Transportation Research, TSRC advances state-of-the-art knowledge and capabilities in use of crash data to make decisions—to enable data-driven policy making and implementation of projects. Improving roadway safety enhances quality of life for all road users from the standpoint of both safety and mobility.

Through efforts aimed at reducing traffic-related fatalities, injuries, and crashes, TSRC provides support for the Safety Tactical Asset Management Plan of New Jersey by providing strategies to address network deficiencies. TSRC provides technical, administrative, and general support to the Safety Management Task Force (SMTF) and all Comprehensive Strategic Highway Safety Plan (CSHSP) emphasis area team leaders. TSRC provides planning and support services for the state Safety Forum and regional conferences. And together, both NJDOT and TSRC provide the leadership and outreach necessary to establish a statewide network of safety systems.

TSRC services have paid off. Figure 1 shows the annual number of fatalities, injuries, and property damage only crashes from 2003 through 2009. As shown in the figure, all types of crashes declined. Most impressively annual fatal crashes decreased from 689 in 2003 to fewer than 550 in 2009.

Background

In 2003, crashes and fatalities on New Jersey roadways reached 324,053 and 689 (see Figure 1), respectively. Most campaigns by educators, engineers, and law enforcement to reduce these numbers were mainly reactive to crashes as they happened, rather than proactive.

New Jersey Crashes By Year and Severity



Figure 1: Data from the complete crash database housed within Plan4Safety shows a downward trend in fatal crashes from 2003 through 2009.

Objectives

The goal of TSRC is to have zero fatalities on our roadways. Through a coalescence of education and outreach, technical assistance, engineering guidance, and support, TSRC strives to communicate with, assist, and mentor multi-level roadway safety enforcement, education, and engineering/planning organizations statewide.

These efforts are met through three key objectives, as shown in Figure 2:

- **Technology** assistance is offered through Plan4Safety, a comprehensive crash data and analysis software that is free to use by any public safety professional in New Jersey. This program is constantly updated with new features to serve as a definitive, multi-angled look into traffic safety issues and potential solutions.
- **Engineering** guidance is offered in the form of design implementations and road safety audits. TSRC's three engineering professionals frequently perform site visits and coordinate engineering specialists to target and correct a multitude of issues.
- **Outreach and education** are offered from traditional media materials, as well as social and new media information. TSRC supports statewide agencies in producing media

materials and unites traffic safety professionals from all facets of expertise to work together toward zero fatalities.

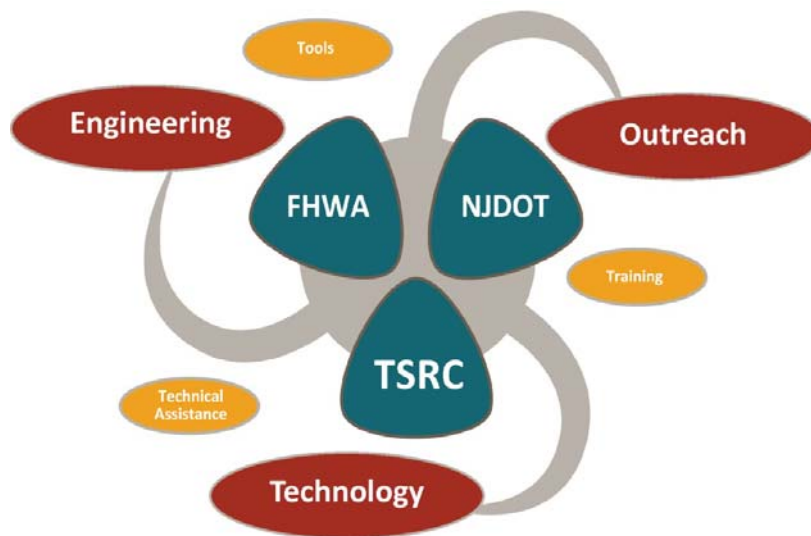


Figure 2: TSRC's Objective Areas

Technology: Plan4Safety

TSRC collaborated with the NJDOT Division of Traffic Engineering and Safety to mine data for Plan4Safety, the ambitious software program that allows users to search for crash incidents, analyze crash sites, and see crashes plotted on a geographic information system (GIS) map. The goal to conceptualize a statewide crash database was based upon an objective need for local, county, and state agencies to have access to the same data as NJDOT does.

Plan4Safety encompasses a partnered effort with NJDOT, which collects crash records, inputs them into a central database, and provides TSRC with access to the database for calculation of statistical analysis from the data. Between 2007 and 2009, Plan4Safety has evolved from a desktop CD-ROM application to an online, easily accessible and comprehensive crash analysis software application that supports safety professionals throughout New Jersey in making data-driven decisions.

NJDOT straight-line and census data serve to provide spatial and geographical data for the interactive GIS map in Plan4Safety. Cross-referencing crash data to exact plot points on the map will help users to easily identify problem areas.

Multi-disciplinary Approach

Strengthened partnerships between TSRC and crash record agencies have solidified efforts to provide the most up-to-date and comprehensive crash records to statewide agencies for proactive decision making. With more than 1 million crash records in Plan4Safety, the software's effectiveness depends on accuracy. The NJDOT Bureau of Safety Programs (BSP)

team is assigned solely to data collection, entry work, and “scrubbing” of data with multiple fact-checking resources and state-of-the-art comparison software.

Because of the known reliability of the data, a multitude of New Jersey organizations use Plan4Safety to access various aspects of traffic and crash data. In particular, the Brain Injury Association of New Jersey (BIANJ) hosts a static Plan4Safety map to visually display the many different types of teenage crashes as a resource for parents of teen drivers.

Receiving an average of 300,000 crash records per year and integrating them into Plan4Safety eliminates margin of error and hours of time that would otherwise be spent manually sifting through piles of paper crash records. A “must-have” tool for anyone determining traffic safety procedures, Plan4Safety offers 144 distinct pieces of data about any given crash, including crash type, injury level, cell phone use, alcohol impairment, seatbelt use, property damage, injuries sustained, and driver age and gender. Plan4Safety does not contain names, addresses, or any other identifiable information from the drivers or occupants involved.

Using common methodologies, Plan4Safety ranks high-risk areas so that traffic safety professionals can prioritize limited funding for improvements in areas where the need is greatest. Users can view analyses of incident frequency, compare crash types against other areas or other types, find clusters of crashes on roads, and view all 144 data elements. Additionally, interactive GIS tools plot filter data onto an ESRI World Street or aerial view map to help traffic professionals visualize the issues at stake to help plan for future projects and improve road safety. Plan4Safety’s GIS feature is linked to Google Street View for the user’s convenience.

Improving Safety: 2007-2009

By 2009, TSRC had assisted more than 500 New Jersey safety professionals in using Plan4Safety for their day-to-day safety planning procedures, reports, and briefings. Currently, the New Jersey State Police (NJSP), MPOs, NJDOT, BIANJ, and several county- and local-level engineering, planning, and enforcement agencies actively use Plan4Safety to retool their safety efforts with a better understanding of problem sites.

A number of large-scale safety programs have benefitted from the use of Plan4Safety:

- As a testament to Plan4Safety’s growing user base, NJSP recently released a memorandum naming Plan4Safety the “primary resource” for crash data collection and analysis. As part of its upcoming safety initiatives, NJSP plans to use Plan4Safety “as the main resource for obtaining and analyzing crash data within the Field Operations Section” of the state police. The software will allow NJSP to more effectively pinpoint high-crash areas and analyze contributing circumstances to determine safety solutions.
- The Red Light Running Automated Enforcement initiative, an operational New Jersey pilot program designed to test the effectiveness of traffic light cameras, uses Plan4Safety as its primary data resource in 8 of the 12 pilot municipalities.

- Other Plan4Safety user organizations include MPOs, NJDOT, and many other state, county, and local enforcement and planning agencies.

Plan4Safety Functionality: Growth and Expansion

Since its conception in 2005, Plan4Safety has evolved from a crash data search engine to a vital online resource and analytical campaign software from 2007 through 2009. Functions that have been added and are in production include the following:

- **Filter Wizard** is a user-friendly interface that allows any safety professional to build a query based on 15 of the most commonly used criteria points in the a standardized crash report form (NJTR-1). A great tool for novices, the Filter Wizard allows the user to avoid the creation of logic statements—instead answering 15 very simple questions that generate a filter. The Filter Wizard addresses location, pedestrian- or bicyclist-specific crashes, crash type, severity, and more.
- **Frequency Analysis** evaluates crash data and returns the frequency or distribution of a single data element, such as crash type, crash year, cell phone in use, or alcohol involvement. The analyzed results are displayed on a comparative bar graph. Frequency analyses are mainly used for different geographical areas, age groups, genders, and other side-by-side comparisons.
- **Cluster Finder** determines crash “hot spots” based on user-defined criteria. Crash clusters can be defined by highway or roadway State Route Identifier (SRI) number, a cluster (i.e., roadway) length, number of crashes defined to be a cluster, or crash type. The output displays a list of crash clusters with associated SRI and milepost ranges, number of crashes, and crash severity (if applicable). This particular tool is extremely useful for systematic scanning of any roadway system to find locations with above-average occurrence of crashes.
- **Cross-Tab Analysis** organizes several pieces of data elements into a cross-section table. Because users can choose any combination of the 144 data elements, Cross-Tab Analysis offers users a virtually limitless tool for comparing correlating data between two or more points from the data categories (vehicle, driver, occupant, crash type, and pedestrian). For example, users can find correlations between alcohol-related crashes with men between 18 and 30 at specific times or dates to find solutions to reducing these issues.
- **Crash Rates and High-Risk Roads** allow safety professionals to screen high-risk areas and view crash rates for rural and urban, local and state roads. Output graphs distribute information regarding mileposts and crash rates in specific corridors of the user-specified roadway to identify high-risk areas needing special attention. This helpful tool allows professionals to immediately identify areas that have experienced above-average crash incidents over a period of time. Additionally, the tool finds high-risk areas based on a number of contributing geographical, societal, engineering, and crash history factors.
- **GIS Mapping** (see Figure 3) creates a dynamic visual of filtered crashes. Users can zoom in, zoom out, view roadway details, measure distances, and select areas for crash

analysis. Useful for visualizing safety planning initiatives, the GIS Mapping feature proves that a picture really is worth a thousand words. Identifying crash “hot spots” and exact crash locations compiled over years of rigorous data collection takes little more than a mouse click. Additionally, users can choose to display physical features, including rivers, surrounding roads, schools, bus stops, and more to gain even more insight into contributing factors. In 2008, a partnership with BIANJ allowed TSRC to create a comprehensive, publicly accessible teen crash map available at njteendriving.com.

The development of ongoing updates to Plan4Safety’s functionality started in 2008, including the hiring an additional staff member to preside over research, development, and coordination of Plan4Safety outreach, development, and user support in July 2008. In July 2009, a testing phase of these updates was launched to implement in 2010. Some of these updates include the following:

- **A diagnosis and countermeasure analysis for intersections.** More advanced users will have the ability to target an intersection, create a diagnosis, and be offered a series of federally approved countermeasures with the costs and benefits included.
- **A direct link in GIS to Google Street View.** Planners and engineers will be able to look at the specifics around a particular intersection or road to decipher the best option in mitigating the crashes in the area.
- **User-defined density maps.** Users will gain the ability to create a density map based on the user’s filter criteria.



Figure 3: Plan4Safety’s GIS Mapping offers visual insight into crash hot spots in specific areas.

Results

Since 2003, fatal crashes on New Jersey's roadways have declined from an average of almost 700 per year to fewer than 600. TSRC is enthusiastically encouraging a proactive, data-driven approach among statewide agencies on all levels to continue this downward trend.

Collaborative efforts, professional development, outreach programs, and organizational partnerships described within this document will promote this forward-thinking approach to traffic safety. With more than 500 people using Plan4Safety by December 31, 2009, TSRC is optimistic that the number of crashes and roadway fatalities will continue to decline.

Engineering

Engineering and technical support is part of the critical mission of TSRC. Currently, TSRC employs three engineers (one mid-level, two entry-level) who support stakeholders statewide through research and technical assistance. Through assisted grant applications and road safety audits, the team is dedicated to a hands-on approach to proactive traffic safety, assessment, and improvement.

Traffic Engineering Design Projects and Road Safety Audits (RSAs)

TSRC commits its in-house staff and dedicated network of engineering professionals to provide valuable, insightful, and expert advice on road improvements to requesting towns and counties. Through the RSA peer-to-peer network, TSRC and its affiliates will select a specialized expert to improve roadways in specific areas of need:

- Improvements Constructed/Implemented:
 - o NJ 440 & Pulaski Street (Bayonne, Hudson)
 - Temporary timing plan implemented to increase vehicle extension due to a detour route stemming from the closure of an NJ Turnpike Bridge with heavy-truck movements
 - Upgrade and replacement of missing railroad and traffic control signs to meet current standards
 - o NJ 37 & Fischer Boulevard (Toms River, Ocean)
 - Installation of a yield control on a jug-handle and other various missing traffic control signs
 - o NJ 37 & Hooper Avenue (Toms River, Ocean)
 - Installation of missing traffic control signs
 - o US 206 & Hutchinson Drive (Princeton, Mercer)
 - Installation of a crosswalk across US 206 at the request of the town in response to safety concerns
 - o NJ 93 & ramps to/from US 46 & Maple Avenue (Ridgefield/Palisades Park, Bergen)
 - Timing revision and a new phasing scheme to address:
 - Long-term detour route from the closure of a county bridge
 - Safety concerns along US 46 due to queuing on the ramp

- Safety concerns along NJ 93 due to “shadowed” turning vehicle crashes
- o NJ 17 at driveway to Home Depot (Mawah, Bergen)
 - Instillation of a deceleration lane to a substandard driveway to address high-crash frequency, as requested by the town
- o NJ 17 & acceleration lane from Spring Street (Ramsey, Bergen)
 - Correction of pavement markings and signage of acceleration lane merge
- o NJ 35 ramp—Broadway & 4th Street (Keyport, Monmouth)
 - Revision of deteriorated guide signage
- o NJ 93 & Van Nostrand Avenue & NJ 4 ramps (Englewood, Bergen)
 - Revision of a lane drop within a signalized intersection
- o US 206 & Sid Taylor Road (Hampton, Sussex)
 - Instillation of a pedestrian, bicycle, and equestrienne crossing for a rail train
- Improvements Designed Pending Construction:
 - o US 206 & Leigh Avenue (Princeton, Mercer)
 - Installation of a crosswalk across US 206 at the request of town in response to safety concerns
 - o US 206 & North Stanworth Drive (Princeton, Mercer)
 - Installation of a crosswalk across US 206 at the request of the town in response to safety concerns
 - o US 206 & Cleveland Lane (Princeton, Mercer)
 - Installation of a crosswalk across US 206 at the request of the town in response to safety concerns
 - o US 206 & Boudinot Street (Princeton, Mercer)
 - Installation of a crosswalk across US 206 at the request of the town in response to safety concerns
 - o US 206 & Wescott Road (Princeton, Mercer)
 - Installation of a crosswalk across US 206 at the request of the town in response to safety concerns
 - o US 206 & Mansgrove Road (Princeton, Mercer)
 - Installation of a crosswalk across US 206 at the request of the town in response to safety concerns
 - o US 206 & Herontown Road (Princeton, Mercer)
 - Relocation of a crosswalk across US 206 at the request of the town in response to safety concerns
 - o NJ 82 & Davis/Salem Road (Union, Union)
 - Removal of a painted crosswalk not accommodated by existing signal equipment
 - o US 22 & Mountain Avenue (North Plainfield/Watchung, Somerset)
 - Installation of a crosswalk, pedestrian signage, and other pavement markings and signage along ramps/jug handles
 - o US 22 & Wilson Avenue (North Plainfield, Somerset)

- Installation of a crosswalk, pedestrian signage, and other pavement markings and signage along ramps/jug handles
- o US 22 & West End Avenue (North Plainfield, Somerset)
 - Dual left-turn enhancements and truck signage
- o US 22 & Watchung Square Mall (Watchung, Somerset)
 - Installation of pedestrian prohibition signage
- o US 22 & Rock Avenue (North Plainfield/Green Brook, Somerset)
 - Dual left-turn enhancements and truck signage
- o US 22 & Gray Street (North Plainfield/Watchung, Somerset)
 - Installation of pedestrian prohibition signage
- o US 22 & Warrensville Road (Green Brook, Somerset)
 - Rotation of mast arms due to overhead utility conflicts
- o US 22 & Blue Star Drive (Watchung, Somerset)
 - Installation of pedestrian prohibition signage
- o US 22 & North Drive (North Plainfield, Somerset)
 - Installation of a crosswalk, pedestrian signage, and other pavement markings and signage along ramps/jug handles
- o NJ 17 & Forrest Avenue (Lyndhurst, Bergen)
 - Installation of a crosswalk across NJ 17 at the request of the police department in response to safety concerns
- o NJ 37 & Hooper Avenue (Toms River, Ocean)
 - Timing revisions to improve pedestrian safety
- o Installation at NJ 82 & Stuyvesant Avenue (Union, Union)
 - Revise lane-use markings and signage, and turn prohibition signage
- o NJ 37 & Colonial Drive (Manchester, Ocean)
 - Timing revision to implement a dynamic max to accommodate entering and exiting traffic at the Manchester High School
- o NJ 82 & Colonial Avenue (Union, Union)
 - Installation of turn prohibition and missing signs
- o US 1& 9 (Broad Avenue) & Ramp to/from US 46 (Palisades Park, Bergen)
 - Signal modification to provide additional time
- o NJ 35 NB & Strickland Boulevard (Toms River, Ocean)
 - Signal revision to better accommodate pedestrian concerns
- o NJ 35 NB & Strickland Boulevard (Toms River, Ocean)
 - Signal revision to better accommodate pedestrian concerns and correct visibility issues
- o NJ 72 & CR 539 (Baranaget, Ocean)
 - Replacement of missing signs
- o NJ 45 & Main Street (Mantua, Gloucester)
 - Timing revisions to put signals into progression
- o NJ 17 & nine signalized intersections (North Arlington, Bergen)
 - Timing revision to better accommodate pedestrians, including progression analysis

- Upgrading 76 pedestrian heads to countdown pedestrian heads
 - o NJ 17 & Polito Avenue—NJ 3 ramp (Lyndhurst, Bergen)
 - Interim signal timing revision to better accommodate pedestrians
 - Instillation of lane line extensions for a dual left turn
 - Instillation of additional pedestrian push buttons and pedestrian heads, and upgrade to countdown pedestrian signal heads
 - o US 46 & US 1-9 (Palisades Park, Bergen)
 - Signal revision to improve visibility of signal heads
 - o NJ 82 & Davis/Salem Road (Union, Union)
 - Improve signal signage and remove a non-accommodated crosswalk
 - o NJ 94 & Sid Taylor Road (Hampton, Sussex)
 - Instillation of a pedestrian, bicycle, and equestrienne crossing for a rail train
- Signed signal plans generated in NJDOT CADD system
 - o US 9 & Wells Mills/Bryant Road (Ocean, Ocean)
 - o NJ 35 & Osborne Avenue (Bay Head, Ocean)
 - o NJ 37 & Fischer Boulevard (Toms River, Hudson)
 - o NJ 37 & Colonial Drive (Manchester, Ocean)
 - o NJ 82 & Colonial Avenue (Union, Union)
 - o NJ 166 & Old Freehold Road (Toms River, Ocean)
 - o NJ 17 & Polito Avenue—NJ 3 ramp (Lyndhurst, Bergen)
 - o NJ 17 & Garden Terrace—Harding Avenue (North Arlington, Bergen)
 - o NJ 17 & Arlington Boulevard (North Arlington, Bergen)
 - o NJ 72 & CR 539—Warren Grove—Whiting Road (Barnegat, Ocean)
- Field safety investigations with other NJDOT engineers (RSAs)
 - o US 30 & Haddon Avenue (Absecon, Atlantic)
 - o US 30 & Elwood Road/Richard Avenue (Mullica, Atlantic)
 - o NJ 15 & Sussex 517—Yellow Time (Sparta, Sussex)
 - o NJ 23 & Oak Street/Gingerbread Castle Road (Hamburg, Sussex)
 - o Removal of signal at US 9 & Inverness Drive (Old Bridge, Middlesex)
 - o US 9 & New Brunswick Avenue (Woodbridge, Middlesex)
 - o NJ 27 & GSP SB ramp (Woodbridge, Middlesex)
 - o Investigated effectiveness of rapid flashing beacon at NJ 27 & Magnolia Road (Woodbridge, Middlesex)
 - o NJ 28 & Springfield Avenue (Cranford, Union)
 - o NJ 27 & Parsonage Road/James Street (Edison, Middlesex)
 - o NJ 28 & Warrensville Road (Middlesex, Middlesex)
 - o NJ 28 & Greenbrook Road (Middlesex, Middlesex)
 - o I-80 (Woodlawn Park, Bergen)
 - o NJ 17 & East Century Road (Paramus, Bergen)
 - o I-80 ramps & Green Pond Road (Rockaway, Morris)
 - o US 46 & Savage Road (Denville, Morris)
 - o NJ 440 under NJTP extension (I-78) (Bayonne, Hudson)

- o I-280 at NJ 21 & Broad Street ramps in the vicinity of the William A. Stickel Memorial Bridge (Newark, Essex)
- o US 30 & Baird Boulevard (Ramp C) (Camden, Camden)
- o US 9 (MP 70- MP 82) (Stafford Barnegat, Ocean & Lacey, Ocean)

Results

Twenty-one RSAs have been completed up to December 31, 2009. The results of the RSAs have been up to a 60% crash reduction in high-risk rural areas, with an average of a 40% crash reduction in areas where assessed improvements have been implemented.

Ten completed construction projects have been implemented as a result of design guidance and engineering expertise from TSRC professionals. These improvements include timing phase changes, updating and reinstalling traffic control devices, and crosswalk installation.

In 2009, these implementations were especially crucial in the wake of a 30% spike in pedestrian fatalities and conflicts that year. In 2010, there has been a dramatic reduction in pedestrian incidents. Design projects pending in 2009 include many improvements to pedestrian safety. Coupled with recent laws, TSRC and its partners expect to see a continued decline in pedestrian deaths.

Outreach and Education

TSRC has created and coordinated a number of materials and events to help spread a message of safety and to promote the valuable tools offered by the department. The materials include traditional and new media (e.g., print brochures for various partners, online presence, and online materials), and events are local, statewide, and international. From 2007 through 2009, TSRC organized and hosted three annual Safety Forums that united engineers, educators, enforcement professionals, and emergency medical services (EMS) professional to collaborate and learn about safety initiatives in the state. More than 700 people have attended these forums to date.

Throughout the same period (i.e., 2007 through 2009), TSRC representatives attended and exhibited at three League of Municipalities conferences—an annual public government conference in Atlantic City, New Jersey—to network with local agencies.

Partnerships with outside organizations and associations help TSRC pursue a mission of safety through specific targeted grassroots efforts. Through 2009, TSRC hosted eight-plus County and Municipal Traffic Engineers Association (CAMTEA) meetings and developed multiple newsletters and seminars on current topics of interest each trimester. Additionally, TSRC created a quarterly newsletter for dispersion among CAMTEA members, informing readers of upcoming laws, certification requirements, and future traffic safety events.

From 2007 through 2009, TSRC staff served as members of multiple safety committees, councils, and groups. A partial list of these groups includes the Comprehensive Strategic Highway Safety Plan Committee and Executive Working Group, the Safe Passages Committee, the Bicycle and Pedestrian Advisory Committee (BPAC), the Statewide Traffic Records Coordinating Committee (STRCC), NJ County Engineers, and various traffic officers groups. With the hiring of five additional staff members in 2008 and 2009—two traffic engineers, a program coordinator, an engineering researcher, and a marketing coordinator—TSRC is expanding its presence and influence at various functions on a multidisciplinary level.

Part of improving traffic safety is influencing the driving public directly. On April 25, 2009, TSRC participated in the first annual Rutgers Day program to educate the public on what Rutgers does for the state, including what the TSRC does with safety. TSRC plans to continue participating in each successive program with public-friendly tools and programs to improve driver behavior.

Additionally, TSRC produces promotional materials and participates in implementing the DOT-created Safety, Traffic and Education Program (STEP)—an in-house, no-cost school program for children ages 3 to 8. NHTSA data show that of all age groups, 3- to 8-year-olds are most at risk for being involved in traffic-related incidents.

Conferences

League of Municipalities (November 2007, November 2008, November 2009)

TSRC—alongside its parent center, CAIT—attends and exhibits at the League of Municipalities. TSRC enhanced the appearance of CAIT, TSRC, and the New Jersey Local Technical Assistance Program (NJ LTAP) this year with a brand new trade-show display system. This display was unveiled this year at the 94th Annual League of Municipalities conference, a congregation of nearly every public official, including those in safety, planning, and political offices throughout New Jersey. The conference offered opportunities to promote Plan4Safety as a viable safety tool, as well as the training courses and workshops hosted by TSRC.

3rd-5th Annual Safety Forums (December 2007, December 2008, October 2009)

Since 2005, TSRC has hosted an annual Safety Forum, a one-of-a-kind premiere event that unites safety professionals from engineering, enforcement, education, and EMS for a 1-day workshop and speaking event. The Safety Forum hosts intensive workshops on the most pressing safety issues of the time and features an afternoon keynote speaker to discuss forward-moving initiatives in safety.

In the past, topics have included “Safety on a Shoestring Budget,” which has been tapped by FHWA as a possible national program, and a “Teen Driving Panel” hosted by DHTS Director Pam Fischer. Keynote speakers have included then NJDOT Commissioner Steven Dilts. In 2010, TSRC intends to procure a national speaker, as well as intensify the promotional campaign to increase attendance to full venue capacity. Attendance has remained steady throughout the period of 2007-2009, while peak capacity is expected to be reached in 2010.

Transportation Research Board International Conference (January 2008, January 2009)

TSRC and CAIT professionals attended a 4-day international TRB conference in Washington, DC, to participate in a number of informative sessions in data management, safety, and security. Poster sessions provided insightful research opportunities and conclusions from various academic institutions, while exhibit floor presentations provide opportunities for proposal and paper applications.

Educational and Outreach Materials

12 Months of Safety (2007)

Funded by NJDOT, the 12 Months of Safety campaign in 2007 featured 12 different two-color brochure pamphlets that recited informative data and safety tips for the general driving public on key emphasis areas like Work Zone Safety, School Bus Safety, Pedestrian/Bicyclist Safety, Rail Safety, Driving in Inclement Weather, Drunk Driving, Youth Driving, Senior Citizen Driving, Aggressive Driving, Intersection Crashes, Helmet Safety, and Motorcycle Safety. Each month, a safety area from these 12 was chosen to be the focus on the month. These brochures helped to retool safety efforts by examining reception of brochures from officers, educators, and the public. Data from Plan4Safety helped to support concerns from around the state.

The update to the Comprehensive Strategic Highway Safety Plan (CSHSP) in 2010 and the data-mining process is helping TSRC and the SMTF partners to zone in on key issues, like impaired driving and aggressive driving, for an improved 12 Months of Safety campaign.

Safe Corridors (August-December 2009)

To combat unsafe driving, TSRC, in coordination with the New Jersey State Police and NJDOT, created a Safe Corridors enforcement brochure campaign. This campaign marks the first time that road activity and crash data were actively tracked with the participation of test Safe Corridor areas. The Safe Corridors brochure identifies all of the roadways and participating communities.

The tri-fold, full-color brochure's language speaks directly to an offending driver in a Safe Corridor. Reporting officers recorded violations and presented brochures in lieu of a summons. According to these officers' reports, typical violations were speeding and changing lanes unsafely, with a few variants across the board. About 300 brochures were distributed between October and December 2009 to traffic violators in half-mile segments of Safe Corridors in Bridgewater (Route 22, NB and SB) and Sayreville (Route 9, NB and SB). In late 2010, TSRC will compare the crash data in these small test areas to see if the number of crashes has declined in the same period.

The brochure also adopts a more colloquial tone to combat a psychological phenomenon common in all drivers called an "optimism bias"—or the misdirected belief that one's abilities are better or far above average than the standard. The impact of this tone is to encourage drivers to operate vehicles more safely, through "showing them a mirror" of their actual unsafe

activities within the text of the brochure. This topic will be widely discussed at our 6th annual Safety Forum, which will broadly cover the evolving topic of transportation psychology.

Winter 2009 Course Brochure (November 2009)

This four-panel, full-color brochure helped to strengthen the TSRC/CAIT brand and offered a full listing of courses offered by TSRC and its sister CAIT department, the New Jersey LTAP. This brochure encouraged continued education among New Jersey engineers, police officers, highway construction professionals, and other traffic safety employees. Because of the distribution of this brochure, TSRC was able to inform safety professionals about informative sessions on updates to industry and safety standards, thereby helping them perform their jobs to the best of their abilities. Attendance at TSRC courses increased after the dissemination of this brochure.

TSRC plans on creating a summer 2010 brochure for these same reasons and anticipates similar results.

Website Materials

To inform the public of the updated traffic safety laws around New Jersey, TSRC has committed a portion of its website to news and events. Several articles have been published on TSRC's website. A new article is featured about once per month, and each article is archived on TSRC's main server for a lifetime. Online tracking suggests that an average of 50 users visit the TSRC site daily, with this average increasing.

Annual Safety Forum Materials

Promotional materials for the annual Safety Forum helped to promote the event to traffic safety professionals in education, engineering, enforcement, and EMS. The 130 attendees to the 5th annual Safety Forum participated in an invaluable town hall session with then DOT Commissioner Stephen Dilts to address across-the-board issues and work toward lasting solutions.

Annual Safety Forum Exhibit Announcement, Awards, and Booths (2007-2009)

The safety awards given in each of the 4E categories (education, engineering, enforcement, and EMS) reward creative safety campaigns and inform other participants about innovative programs across the region. Attendance from multiple facets of the safety community helps participants to get inspired, create new partnerships, and work locally with a global perspective.

Annual Safety Forum Post Card (2007-2009)

The 5th annual Safety Forum marked the first Safety Forum in which a "save-the-date" postcard was disseminated. Of the 500 postcards printed, nearly all were distributed, except for 20 used for internal office distribution. After 480 postcards were distributed to public and private constituents, 130 people attended the Safety Forum, yielding a return on investment (ROI) of roughly 26%. The average industrial ROI is only 10%, which indicates that this campaign was very successful.

Annual Safety Forum Event Program (2007-2009)

The annual Safety Form event program helps attendees choose the best workshops for their educational needs. The full-color programs were attractive and helped to brand a very successful annual event, yielding trust in our product and sustainability in attendance in future years. Programs were distributed the day of the event at the time of registration.

Plan4Safety Outreach Materials

TSRC has created materials to spread a message of safety and to promote the valuable tools offered by the center. Promotional brochures are distributed at conferences, meetings, and in-house events. The reference desk guides are distributed to attendees of TSRC's free Plan4Safety training sessions.

Plan4Safety Desk Guide—Revolving (March 2009)

A folded, 8½" × 11", four-panel, full-color desk guide helps users navigate the Plan4Safety software. Widely distributed at TSRC's free Plan4Safety training sessions (offered by TSRC Engineering Researcher Mitra Neshatfar), these desk guides walk users through the primary functions of Plan4Safety with ease and encouragement. The document includes step-by-step how-to's, realistic screenshots of the software at work, and glossary terms to help even the most novice user make the most of Plan4Safety in his/her safety campaigns.

This document is printed on a revolving basis as needed, as it is a supplemental material to TSRC's ongoing class sessions.

Plan4Safety Promotional Brochure (October 2007, October 2009)

Promoting the free tools available to New Jersey safety professionals, this six-panel, full-color brochure with program screenshots is a helpful introduction to Plan4Safety. This brochure is distributed at various meetings, including the League of Municipalities, visits to police departments, meetings, Engineering Week events, and the Transportation Research Board (TRB) Annual Meeting.

Professional Development Programs (2007-2009)

- Conducting Traffic Sign Retroreflectivity Inspection
- Changes to the MUTCD—A 2009 Update
- Electrical Signal Design
- Guidelines for Guiderail and Median Barrier Design
- Introduction to Plan4Safety for Engineers, Police Officers, and DHTS Grantees
- Local Circulation Planning
- Road Safety Audits for Locals
- Roundabout Design
- Synchro I, II, and III
- Traffic Signal Design

Presentations

3rd Annual Traffic Engineering and Safety Forum, Brookdale Community College (November 28, 2007)

Geared toward the New Jersey traffic safety community, Plan4Safety's lead application developer discussed the development of Plan4Safety and its ability to contribute to more data-driven safety programs. Examples and case studies of the application were given to the well-attended conference.

NJDOT Research Showcase— Mercer County Community College (October 16, 2008)

At a statewide conference, TSRC'S engineering researcher discussed Plan4Safety as a crash analysis tool available to all public employees who needed access to the crash data for safety improvements, grants, data support for engineering projects, and more.

CAIT Information Session: Peruvian and Argentinean Diplomats Visit (November 6, 2008)

In this internationally reaching session, TSRC'S engineering researcher discussed Plan4Safety with Peruvian and Argentinean diplomats. As a testament to the success of Plan4Safety, visitors were interested in implementing a similar system in their countries, impressed with the obvious benefits. They were eager to learn the process and the time it took to create and implement the system.

CAIT Information Session: Briefing CAIT Constituents (February 26, 2009)

CAIT partners, stakeholders, and constituents attended this session about Plan4Safety's capabilities.

CAIT Information Session: Presentation to Rutgers' School of Engineering Dean Thomas Farris (October 8, 2009)

TSRC'S engineering researcher welcomed the new Dean of Engineering with a quick synopsis of the past, present, and future of TSRC, including how TSRC has impacted New Jersey as a one-stop resource center for engineers, educators, enforcement, and EMS professionals.

Education and Marketing Campaign Building (October 21, 2009)

Along with the DHTS press officer, TSRC's marketing coordinator presented a 90-minute how-to and best practices workshop for creating and tracking effective traffic safety campaigns. Attendees included engineering, education, enforcement, and EMS professionals from the public and private New Jersey traffic safety community.

Comprehensive Strategic Highway Safety Plan (CSHSP)

In 2007, TSRC took a lead in the creation, production, and distribution of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)—mandated safety plan manual. TSRC actively participates in a group of safety professionals—collectively known as the New Jersey Safety Management Task Force (SMTF)—to identify and develop the key issues of the CSHSP, a mandatory state highway plan that must be completed under SAFETEA-LU in 2005.

Under SAFETEA-LU, each state must draft, complete, and enact a comprehensive highway safety plan to actively reduce traffic fatalities and incidents. New Jersey is proud to be part of this vigorous effort to improve roadway safety since its first CHSHP was adopted in 2007. As of 2009, fewer than 600 people lost their lives on New Jersey's roadways as a result of motor vehicle crashes, a number that dramatically decreased from almost 700 fatalities in 2007. This effort will be further enhanced by our new CSHSP in 2010.

Organizational Involvement

Collaboration with Metropolitan Planning Organizations (MPOs)

Partnering with North Jersey Transportation Planning Authority (NJTPA), South Jersey Transportation Planning Office (SJTPO), and Delaware Valley Regional Planning Commission (DVRPC), TSRC alerts safety professionals of upcoming training sessions on planning and engineering and offers safety support and opinion to public enhancement projects.

Transversely, partnership with these three organizations supplies TSRC with a direct connection to the regions and local communities in New Jersey. Working with the MPOs, TSRC has been able to reach professionals at the county and local level to interact with stakeholders, provide technical outreach, continuing education, and support for safety initiatives.

Bicycle and Pedestrian Action Committee (BPAC)

Through 2009, TSRC participated in quarterly bicycle and pedestrian committee meetings with community leaders, active members of New Jersey's bicycling community, and associates of the Rutgers' Voorhees Transportation Center (VTC) to discuss updates to pedestrian safety, Safe Routes to School, and pending legislation to improve road user safety. TSRC regularly participates in a number of cross-agency meetings and conferences to promote and work on safety initiatives.

Safe Passages

Led by the New Jersey State Police, TSRC members participate in Safe Passages, a group of about 20 traffic safety professionals from various state enforcement, engineering, legislative, and educational agencies and organizations. TSRC has led the development of a more intensive web presence for the group, including both design and copywriting services with an emphasis on search engine optimization practices to help increase search engine rankings and, therefore, visibility.

Safety Management Task Force

TSRC members are updating and redesigning the CSHSP to be more user-friendly to the public. This year, TSRC members have devised a plan to reorganize emphasis areas in targeting driving behaviors (Aggressive Driving, Impaired/Drowsy Driving, Distracted Driving, and Other [Vehicular Failures, Medical Emergencies, Construction Incidents]).

Bicycle and Pedestrian Action Committee

TSRC members participate in informative sessions hosted by the VTC to gain insight and move forward with initiatives to improve the safety of bicyclists and pedestrians in the wake of a fatality spike in New Jersey.

Safety and Transportation Education Program

TSRC members participate in the STEP program, a traffic safety program designed to educate K-3 schoolchildren through tailored games and workshop activities. The STEP program, headed by the NJDOT, is a free in-house program available for all schools throughout New Jersey.

Delaware Valley Regional Planning Commission Regional Safety Task Force

TSRC participates in quarterly meetings hosted by the DVRPC, one of three MPOs in New Jersey. Informative meetings presented by industry professionals target educational, enforcement, planning, and engineering issues to improve safety. Recently, meetings have targeted pedestrian safety and intersection design.

New Jersey Walks and Bikes Newsletter

As part of a coordinated outreach, TSRC members have participated in the editorial and writing process of *New Jersey Walks and Bikes*, a newsletter for the pedestrian and bicyclist community. Topics include new technologies, walkable communities, notable current events impacting the walking culture, legislature, and more.

Statewide Traffic Records Coordinating Committee (STRCC)

TSRC has continued to support the STRCC by providing administrative and technical support to the committee chair and its members. Through this committee, TSRC was able to support the efforts of the state to update and improve its crash report form, the NJTR-1.

The new form incorporates many additional data elements that were determined to be necessary by the STRCC, eliminates several elements no longer necessary, and reformats the sheet into a single-page format with 2 overlays, making the new form more compact. This effort has greatly improved the state's capability to collect relevant crash data imperative to future data-mining efforts, such as Plan4Safety, research, and safety initiatives.

Media, Awards, and Mentions

FHWA 2009 National Road Safety Awards (November 2009)

TSRC accepted this award at a bi-annual DC conference for Plan4Safety's excellence in program planning, development, and evaluation.

Bergen Record and Bergen Herald Front-Page Article: "Plan4Safety Software Program Helps Groups Identify Dangerous Roads, Driving Trends" (November 2009)

Plan4Safety was praised in a front-page article of two popular northern Jersey newspapers for its ability to provide extraordinary support for safety plans. The article featured quotes and testimonials from actual current users about Plan4Safety's effectiveness.

FHWA Safety Compass (2009)

Plan4Safety was featured in an article in the FHWA quarterly newsletter, *Safety Compass*.

University Transportation Research Center 2 Research News (Spring-Summer 2008)

This online newsletter featured an article on the benefits of incorporating Plan4Safety into traffic safety plans. The article centered on its capabilities in a concise piece. As a University Transportation Center (UTC), CAIT, its program sites, and their products can be featured in this quarterly electronic newsletter.

Highway Safety Plan (FY 2008)

The state's highway safety plan update in 2008 premiered Plan4Safety as a major resource for its data-mining and safety development plan.

Highway Traffic Safety—Annual Report (2007)

DHTS's annual traffic safety report featured an item on Plan4Safety and its ability to provide data-driven support for safety plans. DHTS uses Plan4Safety regularly.

NHTSA—NJ Crash Analysis Program

Plan4Safety was featured in a public piece by NHTSA.

Results

From 2007 through 2009, the increase in Plan4Safety promotion; increased presence of TSRC at various statewide organizational events; the attendance of TSRC members at state, national, and international conferences; a healthy catalog of traffic engineering and safety training; and more resourceful safety materials for law enforcement and other safety agencies have helped to realize TSRC's mission and expand its notoriety as a premiere resource center throughout the state. Moving forward, TSRC aims to extend its reach to a regional and national audience by replicating programs for countrywide exposure through organizations such as FHWA and NHTSA.

Conclusion

TSRC is a growing program that plans to expand its reach and resources to better serve the state of New Jersey and its safety professionals. TSRC will continue to vigorously support various state and local agencies with their traffic safety initiatives.

Upholding a diligent commitment to traffic safety, the goal of TSRC will always be to exist as the premiere one-stop resource center with a major focus on the traffic safety concerns of local agencies. With the enhancement of Plan4Safety and the acquisition of state and federal grant research projects, TSRC will branch out with conclusive research evidence, provide white paper research reports on approved countermeasures and media programs, create and disseminate promotional supplementary safety materials, attend and coordinate trade show and conference presentations, and continually enhance Plan4Safety to provide intensive support to all traffic safety professionals.