

# Transportation Safety Resource Center (TSRC) 2012

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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. One year later, the Transportation Safety Resource Center (TSRC) was established by the Rutgers' Center for Advanced Infrastructure and Transportation (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.

Functioning as an extension of NJDOT's engineering and traffic safety initiatives, TSRC supports FHWA's national "moving toward zero traffic deaths" program by providing technical assistance, guidance, and educational outreach to local agencies. Since its inception, TSRC has become a vital link in a collaborative partnership between CAIT, NJDOT, FHWA, DHTS, NHTSA, MPOs, and local governments and organizations in providing resources and solutions that address traffic and roadway safety. Guided by FHWA's "moving towards zero traffic deaths" mission, TSRC has vigorously supported these federal, state, and local agencies with low- and no-cost traffic safety crash data analyses, on-site road safety audits, a solutions-based crash analysis software, engineering guidance and recommended countermeasures, educational training to improve the professional workforce, and marketing and outreach materials—providing these agencies with optimized, financially responsible solutions to traffic safety issues.

Upholding a diligent commitment to traffic safety, TSRC maintains healthy partnerships with local, county and state-level traffic safety agencies; attends and coordinates trade show and conference presentations; develops and presents traffic engineering courses to certified engineers; creates and disseminates promotional safety materials; and continually enhances Plan4Safety, an online crash analysis software developed by TSRC and available for site field engineers who recommend and suggest best practice improvements to New Jersey safety professionals. TSRC products and services have helped "drive down traffic deaths" to come closer and closer to zero—from 2005 to 2012, fatal crashes decreased from 689 to fewer than 545.

## Background

TSRC was established by CAIT in 2004 in response to an acute need for implementation of federally mandated traffic safety measures on local roads, which comprise 67% of all roads in the state.

Established to function as an extension of the NJDOT Division of Traffic Engineering and Safety, TSRC supports the Division efforts in service provision of technical assistance and outreach to local agencies. 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, the Center 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 SMTF and all CSHSP State Emphasis Area team leaders. TSRC provides planning and support services for the state Safety Forum and regional conferences. And together, both NJDOT and TSRC are providing the leadership and outreach necessary to establish a statewide network of safety systems.

## Objectives

The TSRC is part of Rutgers' CAIT, and is a partnership between federal and state transportation agencies, local stakeholders, and Rutgers.

The purpose of this program is to support the Safety Tactical Asset Management Plan of New Jersey by providing optimal strategies to address network deficiencies by reducing traffic related fatalities, with an emphasis on providing services at the local/municipal level. Specifically, network deficiencies include (geometrics, sight distance, cross slopes, rutting, skid resistance, etc.) that can cross cut several/all asset categories. The TSRC will also provide support to other established programs such as the CSHSP, STMF, Statewide Traffic Records Coordinating Committee (STRCC), Safety Conscious Planning (SCP), the Police Technical Assistance Program (PTAP), Senior Safety, the Delaware Valley Regional Planning Commission (DVRPC) Regional Safety Task Force (RSTF), and participation in statewide and regional safety initiatives. The activities associated with the TSRC are efforts to maximize the opportunity to advance safety at all levels throughout New Jersey with the goal to conduct analytical work which can be used to facilitate DOT management response to safety problem statements submitted from local governments and the specific needs of the motoring public.

### *Objectives are to:*

- Support the Safety Tactical Asset Management Plan of New Jersey by providing (optimal) strategies to address network deficiencies by reducing traffic related fatalities;
- Assist NJDOT in their efforts to improve roadway safety, reduce crash severity, and reduce fatalities particularly on local roadways;
- Assist agencies with assignment funding when developing safety solutions through the use of available crash data and developing low cost quick fix solutions;
- Support NJDOT in the development/management of a statewide strategic safety management system through the implementation of the CSHSP; (SAFETEA-LU)
- Develop/maintain statistical crash analysis software, *Plan4Safety*, to assist in the identification and development of safety countermeasures. For example, the value of countermeasure "A" versus "B" in the assignment of priority and funding to attain a quantifiable or qualifiedly performance measures; enhance capabilities of *Plan4Safety* to provide a decision support framework for the development of benefit/cost analyses and proactive improvements to safety locations;
- Provide support to DOT decision making process by selecting the most cost-effective policies, programs, and projects, benefiting from keeping good infrastructure safety planning;
- Conduct analytical work which can be used to facilitate DOT management response to safety problem statements submitted from local governments and the specific needs of the motoring public.
- Provide technical services to the NJDOT Division of Traffic Engineering and Safety to support the integration of specialized data sources with the Crash Records Database (CRD);
- Provide reciprocal support to the adjoining safety programs named in the NJ Asset Management Plan, namely Intersection Improvement Program, Accident Reduction Program, Safe Corridor Program, Safety Management System, Median Crossover Prevention Program and the Pedestrian Program;



- Provide continued support of the NJDOT and MPOs with the goal of reducing crash severity by fostering the successful Safety Conscious Planning efforts previously begun;
- Utilize information that has been gathered regarding existing data collection systems or databases that would be of use to enhancing or supporting the existing CRD;

TSRC consists of three project units: Planning, Implementation, and Evaluation.

### Tier 1 - Planning

Services include technical assistance for safety related requests and traffic safety engineering support to local agencies in implementing low-cost, quick-fix countermeasures to reduce crash frequency and severity; providing support to the DOT decision making process with the aim of crash severity reduction; technical support of local agencies in the effective use of *Plan4Safety* crash analysis software and crash data to identify primary locations in need of safety programs; creation of a comprehensive training and outreach service, based on the Local Technical Assistance Program (LTAP) model and coordinated with New Jersey LTAP and centered on crash data analysis, safety programs, crash data completeness and improvements, and workforce development; support of safety initiatives at the state, county, and local levels to promote system-wide crash reductions through Road Safety Audits (RSAs); support of the Safety Tactical Asset Management Plan of New Jersey through identification of network deficiencies in collaboration with the state.

### Tier 2 – Implementation

Services include reciprocal ongoing support to the adjoining safety programs named in the New Jersey Asset Management Plan and collaborating closely with metropolitan planning organizations (MPOs) in providing traffic and safety engineering services to assist agencies in developing and implementing safety improvements. TSRC enhances safety awareness and education of the general public through programs like the Safety and Traffic Engineering Program (STEP) and the New Jersey Annual Safety Forum where professionals are shown best practices and methodologies in safety.

### Tier 3 - Evaluation

Ongoing evaluations of the services and training provided by the Center will help determine effectiveness of programs; develop and deliver training programs and technical assistance to agencies as warranted through discussions and recommendations of the customers; develop and maintain a tracking system to support the strategies and actions of the CSHSP.

## Tier 1: Planning

### Plan4Safety: Crash Analysis and Decision Support Software

Developed by the Transportation Safety Resource Center (TSRC) at Rutgers' Center for Advanced Infrastructure and Transportation (CAIT) and funded by the New Jersey Department of Transportation (NJDOT), Plan4Safety is a web-based, comprehensive crash analysis software application that provides decision support for New Jersey safety engineers, police officers, planners, researchers, and educators.

Implementing methodologies used by federal, state, and MPO-level professionals, Plan4Safety can rank high-risk crash locations, apply frequency analyses to crash data, dynamically produce cross-tabulation tables, and display interactive maps of crashes. New Jersey has dedicated its resources to data-driven decisions; Plan4Safety has provided the means to adhere to that policy while providing valuable assistance to the local communities that need it the most.

A tool for conducting traffic safety programs, Plan4Safety offers 144 distinct pieces of data about any given crash including crash type, injury level, cell phone use, alcohol impairment, occupant restraints, age, gender and much more from the NJTR-1 official crash report form; however, no personal information is divulged. Plan4Safety provides users with a plethora of anonymous yet multi-layered data to create cost-effective, well-informed and well-encompassing safety programs. The time required to address concerns such as who, what, where, when, and why has been reduced significantly, leaving professionals the rest of the time to work on addressing issues rather than finding them.

New Jersey has an average of 300,000 reportable crashes annually that are available to the users via the interactive user interface. The program sifts through these many reports by way of criteria specification (data elements from the NJTR-1) or map location (for crashes with an [x, y] coordinate). Once the desired crashes are found, all the tools housed within the program are available.

In accordance with USDOT excellence, this application serves to nominate TSRC for the conception, development and continued enhancement of the Plan4Safety software program.

#### *Plan4Safety: Expansion, Updates and Applications for Improving Safety in 2012*

The development of ongoing updates to improve and expand Plan4Safety's functionality started in 2008. Throughout 2009, there have been several enhancements, updates as well as applications of use that are noted below:

- Prepared integration with the OIT data warehouse will allow Plan4Safety to receive crash data reports as soon as they are processed and entered into the NJ DOT database.
- To support the users in large parametric analysis Plan4Safety is now capable of allowing users to make large data downloads from Plan4Safety. This will allow more than 100,000 crash reports to be obtained at one time.
- In order to further integrate Plan4Safety and NJ DOT, Plan4Safety now has the capability to report the DLN numbers used internally by the NJ DOT.
- Making Plan4Safety as assessable to our users has been one of our main priorities. Through feedback from NJDOT, FHWA, NJTPA, SJTPO, DVRPCA, various counties and municipalities Plan4Safety has developed a new interface with a focus on ease of use. This interface allows users to more easily login and obtain the data that they are looking for.
- Plan4Safety strives to use the latest technologies. On the back end SQL Server has been updated to Microsoft SQL Server 2008 and the GIS engine has been upgraded to ArcServer 10. This will allow integrating the newest technologies to better serve our users.

Plan4Safety has continually been used in applications like the NJDOT Red Light Running (RLR) campaign. The program has helped countless municipalities, counties and enforcement officers to pinpoint problem areas, apply for safety grants and be more effective in enforcement. Plan4Safety has helped over 90 municipalities to date and at least 18 different counties.

Plan4Safety has been integral in providing assistance to programs like Safe Routes to School (SRTS), STEP, the Ocean County Older Adult Traffic Safety Task Force, Voorhees Transportation Center (VTC), Highway Traffic Safety Policy Advisory Council (HTSPAC), the New Jersey State Safety Council, the Center for Alcohol and Drug Resources, Transalt, the Tri-State Transportation Campaign and the Puerto Rican Action Board (PRAB), to name a few. In all instances, TSRC has provided pertinent data that guided the program or safety grant to data-driven success.

#### *Plan4Safety Statewide Results*

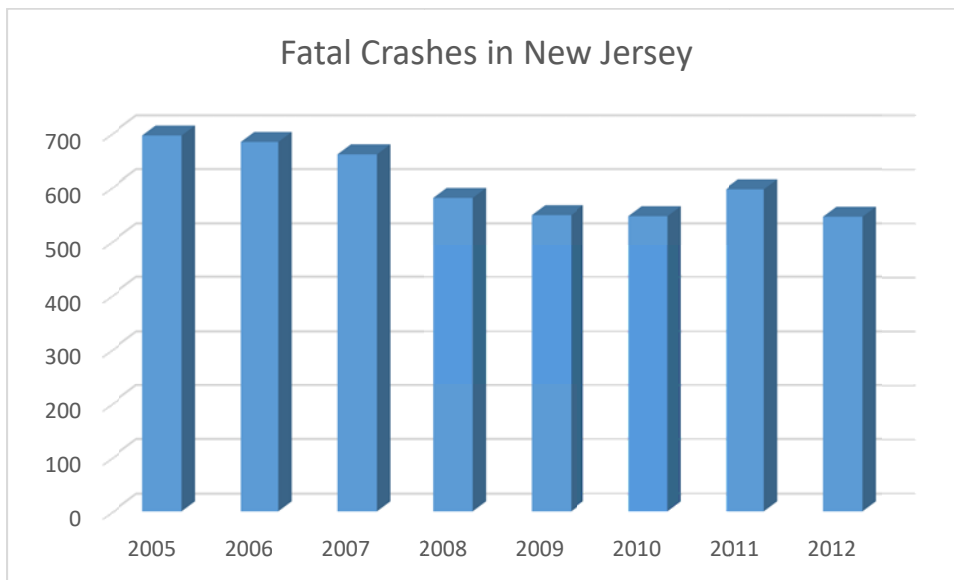


Figure 1: Fatal Crashes in New Jersey decreasing

Since 2005, fatal crashes on New Jersey’s roadways have declined from an average of almost 700 per year to fewer than 550. TSRC encourages 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 600 people using Plan4Safety by December 31, 2012, TSRC is optimistic that the number of crashes and roadway fatalities will continue to decline.

## Road Safety Audits and Technical Assistance Program

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:

### *Technical Assistance:*

- NJ 35 & Warren Ave, Wall Township, Monmouth County
- As-built for signature
- NJ 35 & Allaire Rd, Wall Township, Monmouth County
- As-built for signature
- NJ 35 & Shrewsbury Firehouse, Monmouth County
- Timing Revisions

### *Completed Field Safety Investigations with Other NJDOT Engineers:*

- US 9 & Taylor Lane, Lacey Township, Ocean County
  - New Signal Design
- NJ 208 & Summit Ave, Franklin Lakes, Bergen County
  - Signage Revisions
- Rt. 37 & Oak Ridge Parkway, Toms River Twp., Ocean County
  - As- Built
- Rt. 37 & Cardinal Road, Toms River Twp., Ocean County
  - As- Built
- US 202 & Pleasant Run Rd, Readington Township, Hunterdon County
  - Review: Guide and Wayfinding Signage
- I-280 (Ramp) & Williams / Wittingham / Kingslet, City of West Orange, Essex County
  - Review: As-built
- US 1 and Perry Street, City of Trenton, Mercer County
  - Review: As-Built for Signature
- Rt. 37 & St. Catherine Blvd., Toms River Twp., Ocean County
  - As- Built
- US 9 & Wells Mills, Ocean Township, Ocean County
  - Pending: Pedestrian Upgrades (Form B)
- Rt 46 & Baldwin Road in Parsippany Troy Hills, Morris County
  - Timing Revision
- 

### *Results for RSA's*

Six RSAs were hosted by Rutgers in 2012. The RSAs and changes in design, timing phase changes, updating and reinstalling traffic control devices and crosswalk installations allows for a general improvement to traffic and transportation safety. The construction projects have been implemented as a result of design guidance and engineering expertise from TSRC professionals. TSRC was able to complete the reports for three RSAs and two RSAs received funding grants to implement improvements based on recommendations in the reports. TSRC also held workshop to teach other safety professionals how to conduct a RSA within their own jurisdiction.

## NJTR-1 Motor Carrier Refresher Training

TSRC participated on a team that designed a presentation to be used as a refresher class for traffic officers. Worked with a vendor to make appropriate changes to the interactive online training program and made corresponding updates to the NJTR-1 instruction manuals and Police Guide. TSRC attended four training sessions and produced a spreadsheet of questions from the audience, along with answers given by trainers, and noted items that required further research. A total of 103 police officers registered for these sessions.

## 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. TSRC developed marketing material as part of the STRCC Electronic Data Transfer Subcommittee to encourage electronic data transfer of crash records for police departments.

## Connecting Needs to Funding Programs

Headed by TSRC, the aim of this program is change the way funding programs target projects such that those projects with highest safety needs are the projects that are funded first. In conjunction with NJTPA, SJTPO and DVRPC new methodology that will allow the organizations to target the highest crash locations. With additional input from FHWA and NJDOT methodologies for intersections, pedestrian crashes and run-off-the-road road crashes were developed.

## Tier II: Implementation

### High Risk Rural Roads (HRRR)

TSRC supports NJDOT and the MPOs in administering the state's HRRR program. This includes administrative support, including data-drive analysis of HRRR segments/intersections, in addition to engineering support of programmatic preferred counter-measures. HRRR support additionally keys into the RSA program for concept development of countermeasures at identified locations. Additionally, in its recent High-Risk Rural Road Project document, FHWA presented Plan4Safety's role in identifying high-risk road segments statewide for metropolitan planning use.

TSRC provided the calculations of MPO-specific, HRRR segment lists so that each MPO can move forward on identifying and improving segments through collaborative projects with their regions' counties.

The HRRR support from TSRC was praised when FHWA highlighted Plan4Safety's role in identifying high-risk road segments statewide for metropolitan planning organizations to use in its planning phases.

### Safety and Traffic Engineering Program (STEP)

TSRC provides programmatic support to the NJDOT to administer the STEP Program. STEP is a program, offered for free, which promotes safe helmet safety, pedestrian safety, proper crossing techniques, sign recognition, seatbelt safety, and the dangers of distracted driving to Pre-K through Grade 3 children.

TSRC provides marketing materials, administrative support, enhanced educational materials, and guidance on utilizing crash data to increase the impact and effectiveness of the program.

A draft of the new brochure for STEP was presented and implemented with approval of NJDOT. TSRC provided assistance to STEP at 34 elementary schools, educating approximately 845 students.

## 8<sup>th</sup> Annual Safety Forum 2012

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 daylong workshop and speaking event. Each year the Forum theme reflects the most pressing issues in the traffic safety arena.

The theme of this year's forum was "Intersection and Pedestrian Safety". The forum opened with NJDOT Commissioner James Simpson and included talks from the Keynote Speaker, David Teater of the National Safety Council, MAP-21 and New Jersey's Red Light Running program. Over 249 people registered for this event which was offered at no cost. Actual attendance was 190 attendees.

## Tier III: Evaluation

### Plan4Safety Training

In order to support the HSIP, TSRC provides regular trainings in *Plan4Safety* to promote safety data collection and provide analysis. The trainings could give *Plan4Safety* users a process for establishing priorities for implementing highway safety improvement projects. TSRC has held 16 classes training 34 new users; training county engineers, officers, planners, MPOs and many other safety professionals.

### TSRC Website

To inform the public of the updated traffic safety news and laws around New Jersey, TSRC has committed a portion of its website to news and events, in addition to having a strong presence on social media sites, such as Facebook. Facebook was launched this year to provide an open forum on infrastructure and safety topics.

Site tracking software is currently used, and will continue to be used to determine the origination of user traffic. This information is utilized to increase the effectiveness of the web resources, including the introduction of search engine optimization statistics.

### 12 Months of Safety

Upgrading the original issue of safety literature in 2007, TSRC is producing full-color brochures featuring audience-specific text. While the original brochures were distributed mainly through police departments and other safety agencies, the reboot of the 12 Months of Safety campaign features a data-driven methodology based on crash rates to distribute brochures in business locations likely frequented by the intended audience. For example, bars and liquor stores in areas with high rates of impaired driving crashes will be targeted to display literature on impaired driving. Additionally, the text of the brochures will feature more colloquial, more engaging, and easier to read language with visual graphics to convey a message of safety to the appropriate audience. Using psychological studies as a basis, the language will be crafted to show the benefits of safety, not the consequences of hazardous behavior. TSRC examined

crash data and determined best locations for distribution, as well as targeted concepts for the following topic areas: aggressive driving, senior citizen driving, teen driving, motorcycle safety, inclement weather safety, intersection safety, impaired driving, and pedestrian safety. The brochures for aggressive driving, intersection safety and pedestrian safety have been completed and are awaiting approval.

## Outreach

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. TSRC organized and hosted an annual Safety Forum that united engineers, educators, enforcement professionals, and emergency medical services (EMS) professional to collaborate and learn about safety initiatives in the state. More than 1000 people have attended these forums to date.

TSRC representatives attended and exhibited at the League of Municipalities conference—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. TSRC has participated and assisted in PIPP, NJ Traffic Police Officers Association, CAMTEA and other traffic focused groups.

The TSRC staff has also 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), STRCC, New Jersey County Engineers, and various traffic officers groups.

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.

## Professional Course Development

TSRC provides numerous opportunities training for local safety professionals. These programs a targeted towards the most pressing issues in traffic safety. These efforts also include the development and printing brochures and flyers for the events. These training sessions include:

- Electrical Signal Design Class – 1 session, 25 participants
- ASCE Safety Webinars – 4 sessions, 32 participants
- Road Safety Audit Training – 2 session, 40 participants
- Intersection Safety with Dr. McFadden – 1 session, 80 participants

## 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.