



HSIP Noteworthy Practice Series

Safety Data Collection, Analysis, and Sharing

About the HSIP Noteworthy Practice Series

The Highway Safety Improvement Program (HSIP) is a core Federal-aid highway program with the primary purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. Many states and local agencies are successfully implementing innovative approaches to HSIP planning, implementation, and evaluation. The HSIP Noteworthy Practices Series presents case studies of these successful practices organized by specific HSIP topics. The individual case studies provide summaries of each practice, key accomplishments, results, and contact information for those interested in learning more.

Safety Data Collection, Analysis, and Sharing

The Strategic Highway Safety Plan (SHSP) provides a data-driven framework for highway safety stakeholders to identify key safety needs, guide investment decisions, and align and leverage collective resources. The purpose of a data-driven process is to direct resources to projects and programs with the greatest potential for reducing fatalities and serious injuries. The strength of the SHSP and other safety plans lies in a state's ability to collect, analyze, and share safety data as appropriate.

A variety of strategies can be employed to collect quality data, perform analysis, and ensure safety stakeholders can access the data and the analysis. National Highway Traffic Safety Administration (NHTSA) section 408 grants provide funding to improve timeliness, accuracy, uniformity, completeness, integration, and accessibility of safety data. Projects to improve data collection and analysis may also be eligible for Federal HSIP funding. In some states, multiple agencies provide funding for data collection and management through interagency agreements.

Data are analyzed to identify and prioritize safety problems, establish goals and objectives, select strategies and countermeasures, and develop action plans. They are also analyzed to monitor and evaluate results, and provide feedback into the planning process. Analysis can involve

simple statistical investigations of crash trends, types, and contributing factors, or sophisticated tools such as SafetyAnalyst and the Highway Safety Manual.

In many cases, safety data are unavailable or unknown. Information in police crash reports may vary among localities. Medical records, insurance records, and licensing information may not be available or linked to the crash data; and roadway inventory information may be limited and difficult to link to the crash data system. These and other data quality problems inhibit the effectiveness of efforts to improve transportation safety. However, access to timely and accurate safety data is critical for successful SHSP implementation.

A variety of programs and departments receive safety data from the state agency or department maintaining the data. Local governments, Metropolitan Planning Organizations (MPO), advocacy groups, and private consultants generally request crash data to conduct various planning activities and projects. The agency maintaining the data may provide raw or filtered datasets that can be readily used by local agencies. Access to reliable data for all stakeholders enables them to more effectively address safety in their transportation and safety plans, and helps foster collaboration among stakeholders.

Noteworthy Practices

The following cases demonstrate noteworthy practices several states are using to share SHSP data with stakeholders:

- The Louisiana Department of Transportation and Development (LDOTD) is among the first DOTs to hire a Law Enforcement Expert (LEE) dedicated to working with law enforcement agencies on improving crash data collection. The LEE works statewide and reviews crash reports to identify and resolve potential issues with crash report completion in the various jurisdictions. Louisiana's crash data accuracy and completeness has improved through the use of the LEE and has led to better informed decision-making in the State's efforts to improve safety. The LEE is also involved with SHSP implementation and helps keep regional teams focused on the data driven approach for focusing on the emphasis areas and potential countermeasures and strategies. ([read more](#))
- The Minnesota DOT (MnDOT) recently embarked on a statewide initiative to create a roadway safety plan for each of the State's 87 counties. These plans build on the foundation established by Minnesota's SHSP, but utilize a data analysis approach geared toward identifying a specific set of safety projects directly linked to the causation factors associated with the most severe crashes on each county's highway system. The data driven process established for county safety plans has helped position counties to more effectively compete for safety funds and make improvements on local roadways with greater potential to reduce the number of fatal and serious injury crashes. ([read more](#))
- The New Jersey DOT (NJDOT) contracted with the Rutgers University Transportation Safety Resource Center (TSRC) to develop a roadway safety decision support tool for safety stakeholders. The web-based software tool supporting collection, analysis, and distribution of transportation safety data has been instrumental in the development and implementation of the SHSP. The approximately 500 agencies using the analysis software enjoy easy access to transportation safety data and can perform analyses to support their local safety initiatives as well as those at the state level. ([read more](#))

To access these full case studies, click on the individual links above or visit the FHWA Office of Safety on-line at: <http://safety.fhwa.dot.gov/hsip>.



Law Enforcement Expert for Improved Data Collection

Louisiana

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The Louisiana Department of Transportation and Development (LDOTD) is responsible for collecting motor vehicle crash data for the entire State of Louisiana, as well as maintaining the state crash database. This equates to about 165,000 crash reports a year from state, parish, and local law enforcement agencies. The accuracy and timeliness of this data are critical in prioritizing safety improvements for roadways and intersections. LDOTD has the responsibility to ensure prioritization of limited highway safety funds is based on the ability to reduce the most crashes, injuries, and fatalities relative to the initial construction cost and any associated increase in maintenance costs. LDOTD analyzes the entire state roadway system on a yearly basis and compiles a list of locations exceeding a threshold for crashes, injuries, and fatalities to allocate highway safety funds where the greatest safety benefit can be achieved.

LDOTD found incorrect and incomplete coding of the crash reports by law enforcement officers affected the quality and accuracy of the crash data. In addition, the Legislature designated LDOTD as the agency responsible for implementing and coordinating a Statewide Incident Management Program, which requires widespread statewide coordination between LDOTD, law enforcement agencies, and emergency response personnel. In 2008, the agency hired a Law Enforcement Expert (LEE) to help address data deficiencies and meet the new Legislative requirement. Given the responsibilities of the position and because the LEE would reach out to a wide variety of law enforcement officers, a decision was made to hire a person with significant leadership experience with the state police, i.e., a Captain or above.

The LEE works statewide and reviews crash reports to identify trends or potential issues with crash report completion by the various jurisdictions. For example, the LEE might identify a disproportionately high number of crashes with the contributing factor marked as “failure to control” within a particular agency. When this type of situation arises, the LEE meets with the agency to identify any underlying reasons for the trend in reporting (e.g., training, edit checks, etc.). If there are issues, the LEE

Key Accomplishments

- LDOTD is among the first DOTs to hire a Law Enforcement Expert (LEE) dedicated to working with law enforcement agencies on improving crash data collection.
- Instituted a direct link between LDOTD (both headquarters and District offices) and law enforcement agencies around the State.
- Utilizing a former law enforcement officer has facilitated communication and outreach to local law enforcement agencies.

helps train the officers on proper procedures. Additional LEE responsibilities directly related to improving the quality and accuracy of crash data include:

- Develop a student and train-the-trainer course in crash investigation to familiarize law enforcement personnel with the concepts and techniques of crash reconstruction.
- Schedule classes and train law enforcement academy instructors in crash investigation and reconstruction concepts and techniques (train-the-trainer course).
- Schedule classes and train students in crash investigation and in reconstruction concepts and techniques.
- Provide crash investigation and reconstruction services to the Highway Safety Section for the LDOTD Tort Reduction Program.
- Provide crash investigation and reconstruction expertise to the nine LDOTD Districts during their investigation of crash locations.
- Serve as a member on the statewide Traffic Records Coordinating Committee (TRCC) and the Subcommittee responsible for revising the State crash report to adhere to required Model Uniform Crash Criteria (MUCC).

The LEE also assists with Strategic Highway Safety Plan (SHSP) implementation at both the local and regional level. Working with LDOTD and Louisiana State University, the LEE provides the SHSP regional coalitions with the data they need to develop and implement regional action plans, strategies, and performance measures.

Results

Louisiana's crash data accuracy and completeness have been enhanced through the use of the LEE, which has led to better informed decision-making in the State's efforts to improve safety. Training law enforcement agencies has greatly improved location data through better application of Global Positioning System (GPS) technology. Educating local law enforcement officers on the electronic crash report form and increasing their awareness and understanding of the importance of accurate, complete data has resulted in more regular reporting of data elements previously often omitted, such as the manner of collision. Outreach to local law enforcement has also raised awareness of the availability of data from the state to guide local crash reduction programs.

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Highway Safety Improvement Program
Data Driven Decisions

Data Analysis for County Highway Safety Plans

Minnesota

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The Minnesota Department of Transportation (MnDOT) has made \$3.5 million available to develop Highway Safety Plans for each of the State's 87 counties. The concept is to build on the foundation established by Minnesota's Strategic Highway Safety Plan (SHSP), with the primary objective of identifying a specific set of safety projects directly linked to the causation factors associated with the most severe crashes on each county's highway system.

The first step in developing each county plan has been to conduct a comprehensive crash analysis to disaggregate crashes by system (state or local), severity (serious injury, fatal), location type (urban or rural), and crash type. Through comprehensive crash analysis, MnDOT assisted counties with identifying whether the majority of the severe crashes are occurring on the state or local system and in urban or rural areas. This helps identify where the greatest proportion of crashes are occurring, as well as the primary crash types.

The counties have then disaggregated the crashes based on the 22 emphasis areas identified by the American Association of State Highway and Transportation Officials (AASHTO) to identify the critical emphasis areas (e.g., young drivers, seat belt usage, road departure, intersections). The identified emphasis areas represent the greatest potential to significantly reduce the number of severe and fatal crashes in the corresponding county.

Once emphasis areas were identified, an initial list of potential safety countermeasures was compiled using the strategies included in the National Cooperative Highway Research Program (NCHRP) 500 Series Reports – Guidance for Implementation of AASHTO's SHSP. The county staff reviewed the initial list and eliminated strategies considered too expensive or experimental, and the remaining strategies were prioritized through a Safety Strategies Workshop, which included various safety partners in the county (e.g., public works, law enforcement, planning, public health, elected officials, MnDOT staff, etc.). During the workshop the results of the data driven analytical process were shared with the safety partners, who then discussed and prioritized the list of safety strategies.

Key Accomplishments

- Established a process for developing data-driven county safety plans.
- Provided data analysis support to counties for improved problem and project identification.
- Established a better link between crash causation and implementation of safety strategies on local roadways.

Following the prioritization of safety strategies, a detailed crash analysis was conducted to identify contributing crash factors and characteristics based on the findings of the initial crash analysis. This analysis identified high risk locations (e.g., segments, horizontal curves, intersection) based on systemwide factors such as number of severe crashes, design features, traffic volumes, curve radius, etc.

In most cases the severe and fatal crashes have been spread over many miles of roadways, resulting in a low density of crashes. To address this issue, one of the key objectives of the county safety plans is to identify low-cost safety-related projects focused on the county's identified emphasis areas to implement on a systematic basis. At this point in the process, projects were identified based on the results of the detailed crash analysis and the identified high-priority strategies. Some county lists of potential projects have included multiple years of projects – ultimately implementation will be dependent on securing HSIP funding or integration of these low cost measures into other programs such as 3R (Resurfacing, Restoring, Rehabilitation).



Results

As of December 2010, 23 counties have developed safety plans. The data analysis used to develop the plans has helped position counties to more effectively identify projects eligible for future HSIP funding cycles and to make improvements on local roadways with greater potential to reduce the number of fatal and serious injury crashes. The comprehensive data analysis has also positioned MnDOT to more subjectively quantify safety needs on the local roadways as part of the State's systemic approach to safety improvements. Furthermore, through a process similar to the development of the statewide SHSP, development of county safety plans have fostered a greater safety culture among county stakeholders.

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Data Sharing and Decision Support Tool

New Jersey

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The New Jersey Department of Transportation (NJDOT) recognized a need to provide transportation safety data in a more user-friendly format. Providing easier access to data and enhanced analytic capabilities would encourage participation by safety partners in the State's various safety programs, including its SHSP efforts.

The State contracted with the Rutgers University Transportation Safety Resource Center (TSRC) to develop a roadway safety decision support tool. This software program enables users to quickly filter, analyze, and map crash records. The tool also allows merging of specialized data sources with crash records, enabling in-depth analysis.

The TSRC developed the software as a web-based application to enable public agency personnel to quickly analyze safety data. By hosting the tool on a platform of servers, large amounts of data can be accommodated with little effect on execution speed. The application processes queries submitted on-line, produces reports mapping crash location and severity, and identifies contributing factors. Users can access the software from any Internet-enabled computer without requiring a high level of computing power. The program is secured through the use of login IDs and passwords to protect content and allows users to save filters and preferences. The program enables network screening, economic analysis, and diagnosis. The network screening layer integrates methodologies currently used by safety engineers to locate high-crash intersections or segments. Crash rates can be calculated for any filter/query. The software also includes a model to predict crash frequencies and severity for selected roadways. Future elements will incorporate the safety performance function calculations from the new Highway Safety Manual into the program for all classifications of roadways to determine which locations have the greatest potential for safety improvement.

Key Accomplishments

- Developed new system for on-line access to transportation safety data enabling safety partners to make data-driven safety decisions.
- Enhanced capabilities to analyze data and tailor reports to support safety initiatives.
- Distributed safety data broadly to encourage greater SHSP participation.



The Center also provides engineering, planning, training, and outreach services to local governments and assists with crash data analysis to support SHSP implementation. NJDOT funds work of the TSRC through the HSIP.

Results

The web-based software tool supporting collection, analysis, and distribution of transportation safety data has been instrumental in the development and implementation of the SHSP. The approximately 500 agencies using the analysis software enjoy easy access to transportation safety data and can perform analyses to support their local safety initiatives as well as those at the state level. Broad dissemination of safety data and the availability of this tool has encouraged participation in the SHSP by safety partners at all levels.

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Highway Safety Improvement Program
Data Driven Decisions