Transportation Agencies Share SHRP2 Reliability Solutions: Success Stories for Advancing Operations

Tracy Scriba, Aaron Jette, and John Corbin, P.E., PTOE

The second Strategic Highway Research Program (SHRP2) conducted key research designed to address critical state and local challenges, such as aging infrastructure, congestion, and safety. The research results are available in a series of innovative, practical tools to help transportation professionals plan, operate, maintain, and ensure safety on America’s roadways. The solutions developed under SHRP2 focused on four critical areas: safety, renewal, reliability, and capacity.

SHRP2 Reliability solutions came along at a pivotal time as many agencies were placing more emphasis on improving the efficiency of existing facilities to address public expectations, tight budgets, and less space for system expansion. SHRP2 Reliability solutions focus on reducing congestion and creating more predictable travel times through better operations. They provide new analytical techniques, training, and institutional approaches to address events—such as crashes, work zones, special events, and inclement weather—that result in unpredictable congestion and make travel times unreliable. Transportation agencies are employing SHRP2 solutions to leverage existing roadway capacity, improve safety, and provide more reliable traffic flows so drivers can better plan their day and travel safely.

Since 2013, the Federal Highway Administration (FHWA) has provided funding to transportation agencies to deploy a range of SHRP2 Reliability products through the Implementation Assistance Program (IAP). The American Association of State Highway and Transportation Officials (AASHTO) has been a collaborative partner in these efforts. With the technical support, tools, and resources provided, agencies have advanced Transportation Systems Management and Operations (TSMO) practices. All U.S. states, the District of Columbia, and Puerto Rico are implementing at least one SHRP2 Reliability product, and some states are implementing more than 10 products.

SHRP2 Workshop Lead Implementer Workshops

To gain a better understanding of how transportation agencies are using SHRP2 Reliability products, the FHWA Office of Operations sponsored two roundtable events in January and August of 2016 with lead implementers of the products. Lead implementers included representatives from state DOTs, MPOs, and tolling authorities from more than a dozen states. These roundtables presented a unique opportunity for peers to exchange lessons learned and discuss how to get the SHRP2 Reliability products in the hands of more users. This article summarizes the key takeaways from these roundtables.

Deployment of SHRP2 Solutions
Participants in the two workshops described how SHRP2 solutions have helped them improve TSMO outcomes, establish TSMO programs, and build support for TSMO within their agencies. Lead Implementers discussed their experiences with a wide range of SHRP2 Reliability solutions, but the most commonly discussed products were: the Organizing for Reliability bundle (L01/L06/L31/L34), Regional Operations Forums (L36), Reliability Data and Analysis Tools bundle (L02/05/07/08/C11), and the National Traffic Incident Management (TIM) Responder Training Program (L12/L32).

Organizing for Reliability

The Organizing for Reliability bundle is a set of tools that helps agencies assess their TSMO programs and implement changes to technical and business processes in order to enhance the ability to manage unexpected congestion. Lead implementers deployed the Organizing for Reliability tools to better understand their organizational needs and develop strategies to improve their capabilities. For example, using the TSMO Capability Maturity Model (CMM) tool, agencies are evaluating their strengths and weaknesses in six areas: business processes, systems and technology, performance measurement, culture, organization and workforce, and collaboration.

Maricopa County (Arizona), for instance, used the tools to analyze their business processes as they were undergoing a reorganization to integrate planning, project management, and traffic management functions into a single division. They used the tools to build regional coalitions and identify areas to focus on to improve TSMO processes including: staffing and skills, public communications, adopting innovative technologies, and enhancing multimodal planning.

The Washington State DOT (WSDOT) used the CMM tool to support their strategic planning efforts. At the Lead Implementers Workshop in August, John Nisbet, the director of WSDOT’s Traffic Operations Division explained, "The timing of SHRP2 supported our agency’s strategic planning effort and helped to ensure that TSMO concepts were reflected in all our agency goals."

Regional Operations Forums

Regional Operations Forums (ROF) are an opportunity for transportation agency leaders and key staff to convene in-person and learn about TSMO strategies and lessons learned, learn from peers, and collaborate on how to advance TSMO in the region. The ROF provides practitioners with new and innovative approaches for managing and operating the highway system, drawing from the cutting edge work being carried out under the SHRP2 program and other national programs. Representatives from 49 states, Washington, DC, and Puerto Rico have participated in ROFs.
Participants in the Lead Implementer Workshops agreed that ROFs were instrumental in strengthening TSMO programs, improving regional relationships among TSMO practitioners, and cultivating a culture of TSMO leadership at transportation agencies. Rob Clayton, the operations director at the Utah DOT explained how ROFs helped his staff forge valuable regional relationships. In February 2014, four staff from Utah DOT participated in an ROF, where they established connections with TSMO practitioners in Nevada. When flood damage forced a 50-mile section of I-15 in Nevada to be shut down later that same year, Nevada and Utah were able to leverage those relationships forged at the ROF to coordinate their response.

The success of ROFs has led some states to organize follow-on ROFs with TSMO practitioners in their own State. California has organized five ROFs to date in its Caltrans Districts and is planning additional ones in its other Districts. Missouri is partnering with the ITS Heartland coalition to conduct a multi-state ROF, with some ROF sessions done in-person and others virtually over a year. The Colorado DOT is looking at hosting an annual in-house ROF to provide TSMO training to different layers of the organization. The Tennessee DOT earlier hosted an ROF and sees the ROFs as a way to collaborate with a range of agencies and other disciplines on a regional basis throughout the state to advance TSMO and their TSMO program plan.

Reliability Data Analysis Tools

The Reliability Data Analysis Tools bundle of five products is designed to help transportation agencies better identify issues and implement strategies to reduce the variability of travel times for commuters and other travelers as well as the freight industry. Agencies used the Reliability Data Analysis Tools to improve the way they measure and track travel time reliability. Doug McLeod the Planning Manager at Florida DOT explained how they used the tools to enhance how the agency incorporates operations and travel time reliability into their planning documents and modeling processes.

Subrat Mahapatra from the Maryland State Highway Administration described how Maryland is using the Reliability by Design (L07) tool to justify operations projects during the planning and project design processes. The tool, a spreadsheet-based treatment analysis tool and design guidebook, helps agencies estimate the effectiveness and comparative benefits of design treatments at specific locations. The Washington State DOT and the Minnesota DOT have also used the Reliability tools to improve their ability to measure reliability on a corridor basis.

National Traffic Incident Management (TIM) Responder Training
On average, 100 responders die annually in the United States as they work to clear traffic crashes. SHRP2's TIM Training brings police, firefighters, towing, medical personnel, and other incident responders together to learn about response techniques, improve collaboration, and engage in interactive, hands-on incident resolution exercises. Many of the lead implementer agencies described positive experiences implementing the SHRP2 TIM Training and shared the steps they are taking to expand implementation of the training. The Maryland State Highway Administration described how they have hired a full-time TIM program manager dedicated to providing TIM training in the state. To reach law enforcement officers, the Tennessee DOT integrated the TIM Training into their law enforcement training academy. They also worked with the Department of Safety to establish a traffic control fusion center co-located with State Patrol, based on TIM concepts emphasized in the training. The Utah DOT is integrating the TIM Training into their State Fire Academy training.

Benefits of SHRP2 Reliability Solutions

The workshops made clear that SHRP2 solutions have benefits that extend beyond the immediate problems they are intended to solve. They are supporting a change in the culture and capacity of transportation agencies to systematically improve operations and travel time reliability. Themes from the workshops highlighted how SHRP2 is helping to change the state of TSMO practice in transportation agencies across the county.

SHRP2 established a coordinated research and deployment program that addressed a gap in funding for TSMO and led to major advances in TSMO capacity at the state and local level. Nearly $35 million is being spent to support implementation of the SHRP2 Reliability products. The targeted technical assistance and funding support provided by the IAP helped to ensure that the research results were implemented in the field. As a result, SHRP2 products served as a catalyst for advancing TSMO in many agencies. The tools have brought renewed energy, attention, funding and new capabilities to existing and new TSMO efforts, and this makes it easier to get buy-in for TSMO-related initiatives across agencies.

The Colorado DOT, for example, used SHRP2 assistance to support their agency's reorganization which involved combining traffic, safety, and operations into a single division. Colorado DOT used the Organizing for Reliability Tools to conduct an assessment and determine the best ways to integrate those divisions. They credited this process with a major culture shift towards understanding the importance of operations solutions at Colorado DOT. Ryan Rice, Director of CDOT's TSMO Division, noted that, "We were at a tipping point. SHRP2 helped us move from a point where TSMO was emphasized to where it was institutionalized."
SHRP2 Reliability solutions are helping to establish and strengthen formal TSMO programs. The Organizing for Reliability Tools provided a framework for establishing TSMO programs and gave staff the knowledge and tools to sustain them. Several agencies are using these tools to formalize, integrate, and evaluate their TSMO programs. The Tennessee DOT integrated concepts from the Organizing for Reliability Tools into developing a TSMO program plan that helped them better communicate TSMO strategies and priorities throughout the agency and accelerate the institutionalization of operational business processes. The Arizona DOT is using a program plan as one tool to coordinate the realignment of multiple business and operations areas into one division. The Pennsylvania Turnpike is using the CMM assessment to set goals, program areas, and performance tracking mechanisms to improve operations performance on the Turnpike.

Participants agreed that implementing SHRP2 Reliability products raised awareness of the benefits of TSMO among staff of other disciplines and leadership in their agencies. In some cases, this led to improved communication among staff of different disciplines and a more supportive agency-wide culture for TSMO. In Arizona, for example, state leadership has voiced their strong support for improving TSMO practices, allowing the Arizona DOT to invest in TSMO staff, training, and technologies. At the August workshop, Brent Cain, the director of Arizona DOT's TSMO Division, remarked, "A year ago most of Arizona DOT didn't know what TSMO was, but now they do."

Another outcome has been the integration of operations and planning disciplines. Lead implementers found success using SHRP2 Reliability solutions to integrate operations into the transportation planning and project selection processes. The Florida DOT employed the Reliability Data and Analysis Tools to integrate operations and travel time reliability goals into their planning documents and MPO models. The Maryland State Highway Administration is integrating TSMO into their planning process and making improvements in implementing practical design standards.

Using Reliability products helped transportation agencies form new and strengthened partnerships with local, state, and federal stakeholders. Lead Implementers credited SHRP2 products such as the TIM training and Regional Operations Forum with developing valuable relationships among transportation and first responder agencies to address operations issues. The Oregon DOT, for example, developed a joint strategic plan with their state's law enforcement agency as a result of their work together on the TIM training and their participation in a CMM assessment workshop. The Tennessee DOT is partnering with the Knoxville MPO to use the Reliability Data and Analysis Tools to help develop an automated project management system that could be used by all MPOs in the state.

Participants unanimously agreed that a key benefit of SHRP2 was the strengthening of TSMO peer networks. These roundtables are another example of how SHRP2 is connecting agencies with similar goals.

Moving Forward
Lead implementers have accomplished a lot and have plans to build off their success advancing TSMO practices. FHWA is working to sustain its support for implementers of SHRP2 products through integration in its core programs and organizations such as the National Operations Center for Excellence (NOCoE). Supported with funding from FHWA, the Center is a partnership of AASHTO, the Institute of Transportation Engineers (ITE), and the Intelligent Transportation Society of America. The Center offers an array of technical services to the TSMO community including peer exchange workshops and webinars, information on best practices in the field, discussion forums, and technical resources. Building on the success of SHRP2’s Reliability products, FHWA continues to champion TSMO and provide support for peer exchanges, training, and technical assistance.

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SHRP: A History of Success

Building on the success of the first Strategic Highway Research Program (SHRP) authorized by Congress in 1987, SHRP2 launched in 2005 to address four areas with critical transportation needs: safety, renewal, reliability, and capacity. SHRP2 sought to address pervasive highway transportation problems on a large and coordinated scale that focused both on research and deployment. The ultimate goal of SHRP2 was to save lives, save money, and save time across the nation.
SHRP2 funded more than 100 research projects that resulted in more than 60 implementable products. FHWA and AASHTO have dedicated more than $170 million to deploying these products at all levels of government. Every state, the District of Columbia, Puerto Rico, and some metropolitan planning organizations (MPOs) and tribal agencies, have received financial and technical assistance for more than 430 projects. More information is available at www.fhwa.dot.gov/goshrp2.

learn more

SHRP2 Reliability Products

Organizing for Reliability Bundle (L01/L06/L31/L34)

Reliability Data and Analysis Tools (L02/L05/L07/L08/C11)

National Traffic Incident Management Responder Training Program (L12/L32)

Regional Operations Forum (L36)

Guidelines for Incorporating Reliability Performance Measures into Travel Models (L04)

Communicating Traveler Information and Estimating Its Value to Travelers (L14)

Framework for Improving Travel-Time Reliability (L17)

resources

what people are saying

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Coming Soon from the ITE Learning Hub

Implementation Success Stories: How SHRP2 is Helping Agencies Advance Operations

February 8, 3:00–4:30 p.m. ET

While this article provides results both across the whole SHRP2 Reliability area and specific key products, with examples from specific agencies used to support the findings/points, this Learning Hub webinar will showcase a few specific deployment sites, each focused on one of the key products or product bundles.