

SHRP2 MILESTONES

INSIDE ISSUE 5

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Transportation Projects Powered by SHRP2

The second Strategic Highway Research Program (SHRP2) is providing transportation agencies with new and innovative ways to improve safety, rebuild aging infrastructure, and increase mobility for the traveling public. This news brief highlights significant project developments, case studies, and best practices from around the country.

SHRP2 Flourishes

More than 430 Projects Across the Country!

Implementation through SHRP2 is now at its highest level of activity. All SHRP2 Solutions – more than 60 innovations – are in use across the nation. In partnership, the Federal Highway Administration (FHWA) and the American Association of State Highway Transportation Officials (AASHTO) have launched seven rounds of the SHRP2 Implementation Assistance Program (IAP) since 2013 – providing more than \$130 million in financial support and technical assistance to transportation agencies. More than 430 SHRP2 projects are in progress in all 50 states, the District of Columbia, and Puerto Rico.

In June 2016, FHWA and AASHTO announced the recipients of the seventh and final round of the IAP, and those new projects are getting underway. Moving into 2017 and beyond, SHRP2 will continue to advance the ongoing success and deployment of SHRP2 Solutions through workshops, peer exchanges, showcases, field demonstrations, training sessions, and other activities. As an increasing number of transportation agencies adopt SHRP2 products and practices, all are encouraged to share their expertise with other agencies. New product reports, case studies, and other resources are available on the [GoSHRP2 website](#).

SHRP2 Commemorates 200,000 Responders Trained

This summer marked a major milestone for SHRP2's [National Traffic Incident Management \(TIM\) Responder Training](#). In August, the TIM training program achieved 200,000 incident responders trained in all 50 states, Puerto Rico, and the District of Columbia. In a salute to the success of the program, a [commemoration](#) was held on August 10, 2016 at the headquarters of the United States Department of Transportation. Nearly 30 organizations and associations attended the event demonstrating their continued support for the TIM training program – and the willingness to partner and effectively improve TIM operations. The TIM responder training continues to grow in numbers. As of mid-October, 216,259 responders completed training, of which 18,250 are towing professionals, thanks to an initiative by the Towing and Recovery Association of America, Inc. (View [news video](#) of August 10 commemoration.)

More than **60 SHRP2 INNOVATIONS**

More than **\$130 MILLION** in financial support and technical assistance

More than **430 SHRP2 PROJECTS**

50 STATES, the District of Columbia, and Puerto Rico

Managing risk in accelerated highway construction projects.

Managing Risk in Rapid Renewal Projects uses an Excel-based template to guide teams through a risk management process to identify, evaluate, and mitigate risks. The accompanying [R09 Guidebook](#) provides additional tools to assist with each step — from confirming project scope to the risk management plan implementation.

R09 Downloads On GoSHRP2

Visit the *Managing Risk in Rapid Renewal Projects* product page on GoSHRP2 to download:

- [Puerto Rico HTA case study.](#)
- [Oregon DOT case study.](#)
- [R09 Risk Management Template.](#)
- [R09 User's Manual.](#)



Bridge 702 on Puerto Rico Route 681 before Arecibo, Puerto Rico.



Ochoco Bridge project in Prineville, OR used in R09 demonstration workshop.

Renewal Enabling faster, minimally disruptive, and longer-lasting improvements.

Project Management: Case Studies Highlight Managing Risk; and Strategies for Complex Projects

Several case studies published in the past year illustrate the benefits of the SHRP2 Solutions, [Managing Risk in Rapid Renewal Projects](#) (R09) and [Project Management Strategies for Complex Projects](#) (R10). The case studies offer agencies insight into the value of these SHRP2 Renewal products, and demonstrate how DOTs are using solutions and strategies to improve project management.

Managing Risk in Rapid Renewal Projects (R09)

SHRP2's *Managing Risk in Rapid Renewal Projects* shows managers and project teams how to quantify risks and offers practical methods to identify, assess, mitigate, allocate, and monitor risk throughout a project. This leads to better budget management and fewer construction changes, thereby saving both project time and money. This SHRP2 Solution methodically steps teams through the risk management process and calculates the impact of both risks and associated mitigation strategies. The process could be applied to a variety of projects—both big and small—to reduce unexpected delays and costs.

Puerto Rico Highway and Transportation Authority (PRHTA)

PRHTA intends to use the solution to effectively anticipate, assess, and manage risk in a project involving the replacement of a bridge that has heavy weekend traffic. In the next year, PRHTA will begin construction on a \$3.45 million (including engineering and design) small, but complex bridge replacement.

This case study describes how PRHTA used the SHRP2's *Managing Risk in Rapid Renewal Projects* to conduct a risk analysis. During a two-day workshop, PRHTA's team of project managers, designers, subject matter experts, and consultants applied the product's iterative process and R09 Excel-based template to the bridge project. The workshop showed PRHTA a new approach for assessing risk. By meeting with the entire project team to complete the R09 process, the agency was able to develop risk mitigation strategies much earlier. This process helped the team think ahead and come up with solutions before construction. PRHTA was able to plan potential actions to mitigate the top nine risks and the highest severity opportunity. For example, the team recommended launching an early community involvement plan to mitigate their fourth most severe risk: public opposition to disturbance of wetlands.

Oregon Department of Transportation (ODOT)

DOTs understand that risk assessments can save their projects from schedule delays and cost overruns, but full probabilistic assessments are not always practical for small or medium sized projects. Risk assessment could be applied more universally if there was a simplified approach that was customizable to the unique attributes of each project and could be done in-house. The R09 Risk Management process provides this option to agencies.

During a two-day training workshop, ODOT staff applied the product's iterative process and template using a hypothetical case study. The training was for risk workshop facilitators within ODOT. This case study includes recommendations to institute and adopt the R09 Risk Management process into a DOT's project delivery and management procedures. ODOT is now training its project delivery staff to apply this SHRP2 Solution to projects in a variety of sizes and levels of complexity.

A more comprehensive approach to managing complex projects.

Project Management Strategies for Complex Projects provides a systematic and collaborative approach that goes beyond traditional project management methods, accelerates decision making, addresses complex issues, and expedites project delivery.



The I-95 Northbound Viaduct in Providence, RI.



The Seattle Multimodal Ferry Terminal at Colman Dock.

R10 Downloads on GoSHRP2

Visit the *Project Management Strategies for Complex Projects* product page on GoSHRP2 to download:

- [RIDOT case study.](#)
- [WSDOT case study.](#)
- [WisDOT case study.](#)
- [Peer exchange report.](#)
- [R10 Train the Facilitator Workbook.](#)
- [R10 Self-Assessment Survey.](#)

Project Management Strategies for Complex Projects (R10)

Project management has long focused on three elements – cost, schedule, and technical requirements (quality). While these are essential, complex projects – particularly those in the rapid renewal area, require better strategic planning and execution from conception through construction. SHRP2's *Project Management Strategies for Complex Projects* guides project teams through five dimensions of project management (5DPM): cost, schedule, technical requirements, finance, and context, expanding on the traditional three-dimensional process. With 5DPM, project managers become innovative problem solvers able to anticipate and prepare for challenges associated with complex transportation projects.

Rhode Island Department of Transportation (RIDOT)

This case study outlines RIDOT's use of *Project Management Strategies for Complex Projects* on its I-95 Northbound Viaduct Replacement project in Providence. RIDOT is using this SHRP2 Solution to help deliver the project on time, within budget, and with minimal traffic disruption. The RIDOT team developed action plans to manage identified areas of complexity. The team considered each of the 13 R10 project execution tools—then selected 8 for specific action plans including "Establish Flexible Design Criteria."

The RIDOT project team benefited from the product by conducting an in-depth self-assessment to determine opportunities to improve the agency's complex project management maturity and capability in all phases of project development. In addition, RIDOT identified potential alternative sources of project funding, developed an action plan to receive contractor constructability input earlier in the design process, and leveraged existing stakeholder relationships established.

Washington State Department of Transportation (WSDOT)

WSDOT is applying *Project Management Strategies for Complex Projects* on the Seattle Multimodal Ferry Terminal at Colman Dock project. For this project, WSDOT is working with a diverse set of partners and stakeholders as it replaces and reconfigures the aging multimodal ferry terminal while the terminal remains operational. This multimodal ferry terminal is the largest in the system, providing two service routes to over 8.5 million people annually. Pedestrians and bicyclists, as well as several types of vehicles use the terminal, including cars, high occupancy vehicles, and transit. This case study highlights how WSDOT used R10's planning methods and execution tools to quantify the level of complexity in each of the five dimensions of the Seattle Multimodal Ferry Terminal project. Then, WSDOT applied the planning methods to the most complex areas—developing action plans and selecting potential execution tools to address these complexities. One of the selected execution tools was: "Establish Public Involvement Plan."

Wisconsin State Department of Transportation (WisDOT)

WisDOT is training its staff to use the 5DPM approach that incorporates the dimensions of context and finance. Complex projects require a more comprehensive approach that encourages team collaboration and communication, and adds formality to the consideration of external factors, such as the environment or public involvement, and financial issues that may impact project funding. During a Train the Facilitator Training, WisDOT staff applied SHRP2's *Project Management Strategies for Complex Projects*. The WisDOT participants learned about 5DPM strategies and how to begin integrating them into their organization. Then they applied 5DPM tools and methods to existing complex projects. Participants split up into three groups, and each focused on an individual WisDOT project. One group explored the Madison Beltline project. This case study uses the Madison Beltline project to explain the 5DPM application and their implementation benefits.



Screenshot of the *GeoTechTools* website.



GeoTechTools offers geotechnology selection guidance and engineering tools for embankment, ground improvement, and pavement support applications.

(Photo courtesy Ryan Berg.)

Integrating Geotechnical Solutions into Project Planning and Program Delivery

A significant number of all construction claims on highway projects in the United States are related to geotechnical issues. SHRP2 developed [GeoTechTools](#) (R02) to assist planners and engineers involved in project development, scoping and the design and construction of highway projects make better informed decisions that address risk without surprise.

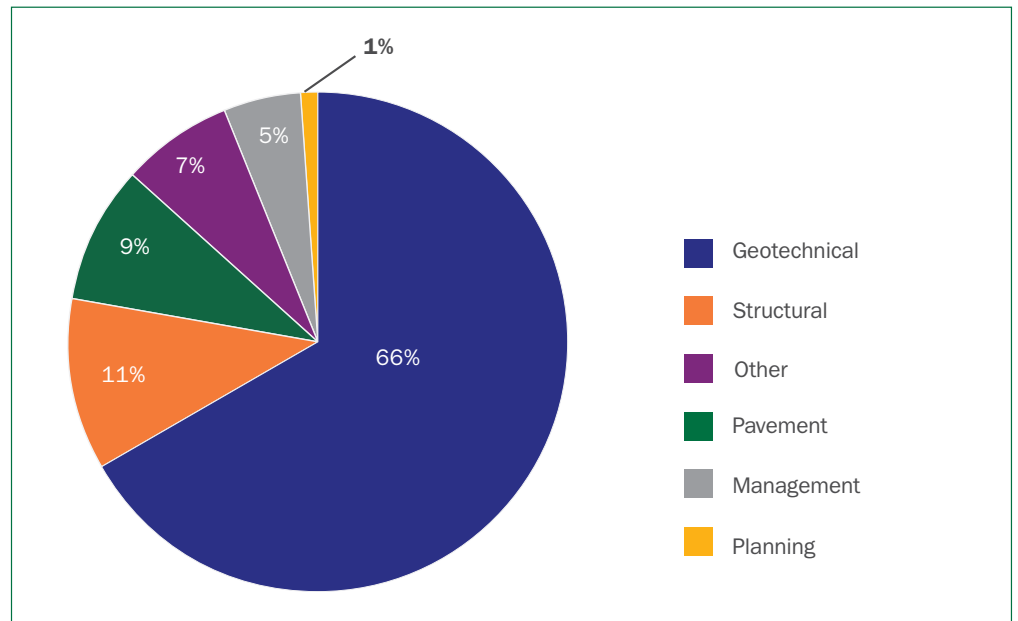
GeoTechTools is a web-based technology catalog with detailed information on more than 50 geoconstruction and ground modification techniques. The web-based system also contains a Technology Selection System to help users identify potential solutions to project delivery issues, factoring constraints and addressing risk. *GeoTechTools* can be effectively used for communication during project planning and scoping, solution identification during preliminary engineering, and better informed solution selection during final design and quality assurance.

The true value of *GeoTechTools* is that researchers collected, synthesized, integrated, and organized a vast amount of critically important information on the geoconstruction and ground modification techniques — and incorporated that information into a living website. This saves the user from having to do extensive and time-consuming research to track down and vet necessary information, prior to addressing project issues. This includes determining applicability of a solution, design guidance, specification preparation, quality assurance requirements, and detailed cost estimating.

For the subject matter expert, *GeoTechTools* is a comprehensive guide for design and quality assurance. For the non-geotechnical engineer, the system provides a user friendly method for identifying potential solutions to both common and complex problems. For all users, *GeoTechTools* provides a unique resource for more efficient and cost-effective program and project delivery.

Currently, there are more than 6,000 registered users of the [GeoTechTools.org](#) website. These users represent a wide range of practices from all 52 DOTs, 9 Canadian Provinces, and more than 80 countries around the world.

GeoTechTools Website Visitors by Field of Practice



The majority of users of *GeoTechTools* are in the geotechnical discipline. The site also offers valuable and extensive information to other professions. (Note: Figures do not add up to 100% due to rounding.)



Vehicle-mounted NDT technology on display at the PennDOT SHRP2 Showcase. (Photo courtesy Olson Engineering.)



More than 65 participants from state DOTs, vendors, and others attended the PennDOT SHRP2 Showcase. (Photo courtesy Olson Engineering.)

SHRP2 Showcase Highlights NDT for Tunnel Linings

On September 14, 2016, the Pennsylvania Department of Transportation (PennDOT), hosted a SHRP2 showcase event to highlight the results of high speed *Nondestructive Testing for Tunnel Linings* (R06G). More than 65 participants from state DOTs, vendors, and others attended. The morning presentations covered tunnel evaluation and the specific results of PennDOT's tests conducted in tunnels. After the morning presentations the attendees visited the Liberty Tunnel for demonstrations of various NDT technologies in the tunnel. The afternoon featured additional presentations, including a summary of Colorado DOT's new Asset Management System for tunnels. Pennsylvania is one of five states using the *Nondestructive Testing for Tunnel Linings* through the FHWA/AASHTO Implementation Assistance Program.

Inspecting Tunnel Linings – Challenging but Necessary

Concrete tunnel linings are routinely tested for maintenance concerns or deficiencies such as leaks, concrete liner cracking, concrete spalling, or delamination. Tunnels typically service high-volume traffic and operate in aggressive environments, which can hinder or make inspections difficult for road crews. Due to the confinement, heavy use, and often long detours when tunnels are closed to traffic, these structures pose a unique operational challenge.

Solution: NDT Keeps Tunnels Open while Minimizing Delays

Keeping tunnels open during maintenance and minimizing tunnel closures or user delays must be carefully balanced with the need to conduct detailed inspections that ensure the safety of the traveling public. Of concern also is the safety of roadway workers conducting inspections. Nondestructive testing (NDT) technologies have the potential to achieve this balance. NDT methods are quantitative and rapid, offering substantially more complete coverage than conventional visual inspections.

By enabling inspectors to drive through tunnels and conduct inspections without closing lanes, promising NDT methods identified in [Nondestructive Testing for Tunnel Linings](#) (R06G) provide a safer work environment and capture 100 percent coverage of the tunnel walls. Using NDT methods for inspecting tunnels linings can add life to the structure, and reduce disruptive detours, lane closures, or tunnel shutdowns.

Nondestructive Evaluation Web Manual

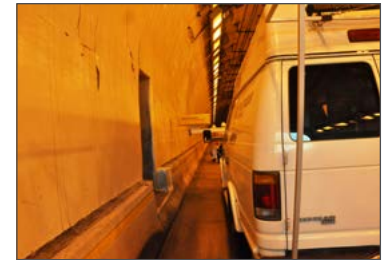
Ground-penetrating radar, infrared thermography analysis, and impact echo technology were determined to be the most appropriate NDT technologies for tunnel inspections. The Nondestructive Evaluation Web Manual is a tool that can help owners and practitioners select the appropriate testing methods. Through a simple interface, users can search for technologies relevant to specific materials, types of deterioration, or infrastructure elements. Users can also obtain definitions and descriptions of unfamiliar terms through the comprehensive glossary. Find this web manual at <https://fhwaapps.fhwa.dot.gov/ndep/>.

Nondestructive Testing Technologies

Ground-Penetrating Radar (GPR) – transmits high-frequency electro-magnetic waves into the structure and detects the reflected signals, which can be used to identify and map areas with a high likelihood of corrosion-based deterioration such as corroded rebar, vertical cracking, delamination, and spalling. Notably, GPR can be ground-coupled (i.e., cart-mounted) or air-coupled (i.e., vehicle-mounted), meaning data collection can be conducted at walking speed or at highway speeds, respectively.

Infrared (IR) Thermography Analysis – uses infrared imaging to detect temperature variations on the surface resulting from differences in the temperature of sub-surface materials when delamination, and cracking are present.

Impact Echo (IE) – a seismic or stress-wave-based method used to detect defects in concrete, primarily delamination, due to variations in the vibrations reflected from subsurface materials.



NDT technology in Pennsylvania's Liberty Tunnel. (Photo courtesy Olson Engineering.)

In [SHRP2 Milestones issue #2](#), we highlighted six state departments of transportation (DOTs) that held assessment workshops, which were developed to improve and expedite project development and delivery. Vermont Agency of Transportation was one of those state DOTs.

VTrans Focuses on Five Strategies for Expediting Project Delivery

Expediting Project Delivery is a vast resource of 24 strategies agencies can use to improve project delivery processes and times. The following are the five strategies VTrans decided to focus on putting into practice in its Accelerated Bridge Program.

1. Strategy 3: Context Sensitive Design/Solutions
Objective: Improve public involvement and support
2. Strategy 8: Expediting Internal Review and Decision-Making
Objective: Streamline decision-making
3. Strategy 10: Highly Responsive Public Engagement
Objective: Improve public involvement and support
4. Strategy 21: Strategic Oversight and Readiness Assessment
Objective: Improve internal communication and coordination
5. Strategy 22: Team Co-Location
Objective: Improve internal communication and coordination

Capacity Bringing greater collaboration to road building.

Powered by SHRP2: Vermont Fast Tracks Cultural Change and Bridge Replacement

From coast to coast, transportation agencies strive to find ways to complete projects faster. The SHRP2 Solution, [Expediting Project Delivery](#) (C19), provides strategies for addressing or avoiding common constraints, which may hinder transportation planning and project development. The Vermont Agency of Transportation (VTrans) demonstrates the benefits of this SHRP2 product, as applied to the agency's accelerated bridge program.

In 2012, the Structures Section of VTrans reorganized to create two new teams dedicated to expediting project delivery, the Project Initiation and Innovation Team (PIIT) and the Accelerated Bridge Program (ABP). The PIIT, a dedicated scoping team, and ABP work in tandem to accelerate the project development process by minimizing impacts through the use of short-term road closures, and prefabricated bridge elements and systems (PBES).

Using lessons learned from Tropical Storm Irene in 2011 and endorsement from the highest levels within VTrans — including former VTrans Secretary Brian Searles — members of the ABP set a goal to drastically cut project development times from 60 months down to just 24 months. Amidst skepticism from the public when road closures were proposed — and concerns of greater strain on budgets and internal team members and resource groups — VTrans Structures Program Manager Wayne Symonds, led his team on what he calls its “laboratory of innovation.”

In August 2013, not long after the reorganization, Symonds saw an opportunity to support the PIIT's and ABP's goals and objectives by leveraging and becoming a lead adopter of the SHRP2 product, *Expediting Project Delivery* in Round 2 of the SHRP2 Implementation Assistance Program. *Expediting Project Delivery* is a guidebook that identifies 24 strategies for addressing or avoiding 16 common constraints to project delivery. “Twenty-four strategies is a lot to cover in a short amount of time, so we picked five to focus on to increase the likelihood of success and adoption,” said Jennifer Fitch, structures project manager. Fitch was uniquely positioned to lead the C19 effort as a member of both the PIIT and ABP.

Putting the Strategies into Action

Fitch noted that 5 of the 24 strategies were particularly applicable to the PIIT and ABP project delivery in Vermont. Following are project examples for three of these five strategies: 10, 21, and 22.

Strategy 10: Highly Responsive Public Engagement

Objective: Improve public involvement and support

Historically, the notion of asking the public to weigh in on projects has been deemed risky, but VTrans faced the challenge head-on. At scoping presentations, VTrans used clicker technology to engage all audience members on such important information as, “What time of the year would be best for a road closure?” or even, “What is an acceptable length of time to have a road closure?” Fitch said, “Asking the questions isn't risky. People want to have a voice, to be heard, to partner with and be a part of something successful.” In turn, VTrans created 1-page project fact sheets for the public describing each project, its timeline, detour routes, and information on the project manager. The fact sheets were shared throughout the life of the project well before the closures occurred. Project information officers were also brought onboard to provide real-time information to public stakeholders and customers during road closures. The result? The public's response to engagement and outreach was so positive that many of these approaches, including the fact sheets, have been adopted as routine practice across the agency.



Middlebury Sand Hill Bridge, VT 125, recreating a historic arch structure with precast components. (Photo courtesy VTrans.)



Rochester Fast 4, Bridge 16, setting abutments during weekend bridge closure. (Photo courtesy VTrans.)

Vermont: Powered by SHRP2 (continued)

Strategy 21: Strategic Oversight and Readiness Assessment

Objective: Improve internal communication and coordination

Most transportation projects occur in a “first things first”-inspired fashion. This linear, sequential progression is orderly, intuitive, and time consuming. *Expediting Project Delivery* encourages more processes to be completed concurrently, such as design and environmental reviews. The only way to maintain order is with a high level of communication and coordination across many stakeholder groups and project teams who might not have worked together in the past.

Strategy 22: Team Co-location

Objective: Improve internal communication and coordination

To foster an environment of heightened communication and coordination, VTrans added a dedicated utility specialist to the Structures Section in 2012. This effort was so successful, that the Hydraulics Unit was subsequently reassigned to Structures in 2014. Co-locating structural and hydraulic engineers together encouraged greater knowledge transfer; heightened collaboration; and expedited internal review and decision making. In some cases, co-location was not practical or feasible. To address this hurdle, Structures created a new concept: “team co-organization.” In this team-based approach, meetings are held at key milestones throughout the life of the project including collaboration meetings to garner support for the recommended alternative during the project definition stage and two constructability review meetings following preliminary and final plans. “These meetings have gone a long way to creating valuable partnerships ultimately removing impediments to project delivery,” said Fitch.

VTrans' use of *Expediting Project Delivery* has resulted in considerable cost and time savings as well as increased satisfaction of customers and stakeholders inside and outside of VTrans. By incorporating standardized drawings and specifications in addition to design details, VTrans has realized a 35-percent savings in average preliminary engineering costs for the 30 bridges that have been replaced as part of the ABP from 2012 through 2016. At the same time, with short-term road closures of only 21 to 28 days, public satisfaction surveys reveal that 95 percent of customers were satisfied or somewhat satisfied with projects communications and outcomes.

Fitch concludes, “*Expediting Project Delivery* is a continuing evolution. Our C19 journey has just begun. We will continue to explore innovative ideas and transform innovative concepts into standard practice. Striving for continuous improvement helps to reinvent services, products, and process. There are always ways to improve.”



Hartford lateral slide bridge on I-91. (Photo courtesy VTrans.)

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success by emailing GoSHRP2@dot.gov

The five products in the *Planning Process Bundle* have been integrated throughout *PlanWorks* to improve collaboration with stakeholders. *PlanWorks* is a SHRP2 transportation planning web resource to enhance collaboration and to expedite project delivery.

- *Performance Measures for Highway Capacity Decision Making* (C02) provides a framework and web-based tool for selecting performance measures for evaluating major transportation projects.
- *Transportation Visioning for Communities* (C08) consists of a model approach, a step-by-step process, case studies, a guide, and a website intended to generate consensus and shared outcomes for transportation projects.
- *Incorporating Greenhouse Gas Emissions into the Collaborative Decision-Making Framework* (C09) includes a guidebook, website, and step-by-step procedures for considering, estimating, and reducing greenhouse gas emissions.
- *Guide to Public-Private Partnerships and Non-Standard Procurements* (C12) provides a business process for determining when and how to consider private-sector participation in the project planning.
- *Integrating Freight Considerations into the Highway Capacity Planning Process* (C15) is a transportation practitioner's guide that provides a blueprint for appropriate consideration of freight transportation in highway capacity planning and project development.

KYOVA Addresses Issues in Transportation Planning

The *Planning Process Bundle* (C02/C08/C09/C12/C15) is a complementary group of SHRP2 products that addresses elements of transportation planning, programming, and project development. Transportation planning is a complicated business, and decision makers require reliable and accurate information to achieve successful outcomes. Transportation planning agencies must collaborate with other agencies, organizations and local communities to obtain data, collect feedback, and coordinate projects that meet the needs of all transportation stakeholders. The five SHRP2 Solutions in this bundle provide information, which helps agencies collaborate to consider performance measures; visioning; greenhouse gas emissions; public-private partnerships; and freight during transportation planning, programming, and decision making.

Twelve agencies received SHRP2 Lead Adopter and User Incentive opportunities through SHRP2's Implementation Assistance Program. One recipient, the Kentucky, Ohio, West Virginia (KYOVA) Interstate Planning Commission, is an association of local governments serving Huntington, West Virginia; Ashland, Kentucky; and Ironton, Ohio. KYOVA received \$50,000 in assistance to improve the project prioritization process for all the major planning efforts in the metropolitan planning organization (MPO). KYOVA must begin to consider the performance measurement processes for the states of West Virginia, Ohio, and the Commonwealth of Kentucky – within the metropolitan project prioritization process. To improve their processes, KYOVA's objective was to identify the data of greatest benefit to the performance measurement effort, and then obtain that data in a form that is usable for the entire tri-state region.

Assistance and technical support from FHWA helped KYOVA conduct a two-day workshop with major local stakeholders, including one of the region's transit service providers (Tri-State Transit Authority), all three state departments of transportation, and FHWA. During the workshop, KYOVA developed an action plan to help introduce a prioritization process. This action plan builds upon previous plans, draws from ongoing statewide efforts, and borrows from techniques applied successfully elsewhere in the country. In this action plan, KYOVA also looked at available data sources and identified information available from each, providing the MPO an opportunity to leverage new tools available to the area – such as the integrated travel demand model, the Congestion Management Process, and the Spatial Decision Support System.

By implementing the *Planning Process Bundle* – and most notably, the SHRP2 product, *Performance Measures for Highway Capacity Decision Making* – KYOVA was able to develop performance measures that best respond to the needs of the tri-state metropolitan region. Performance measures focused on two-levels: programmatic and agency level, and at the project level. KYOVA's ability to assess potential projects for their progression into the financially constrained Metropolitan Transportation Plan or into the Transportation Improvement Program will enable the MPO to develop plans and programs that respond to local needs and are defensible to project stakeholders and the public. The region's commitment to project-level performance will be extended through the recommendations established in KYOVA's action plan. This focus on quantitative performance has been carried forward into the region's Congestion Management Process. KYOVA will continue to promote collaboration within the tri-state region to assist in goal-setting and once the performance measures for the states have been finalized, the measures will be incorporated into KYOVA's action plan.

Through the successful implementation of the *Planning Process Bundle*, KYOVA's transportation planners are able to improve their approach to project prioritization by using reliable data that feeds into consensus-built performance metrics. KYOVA is able to address a diverse range of issues early, within, and throughout the transportation planning, programming, and project decision-making processes. The advanced and effective collaboration of the tri-state metropolitan area positions KYOVA to quickly develop the required performance metrics in the future, in a manner that is grounded in the data management process already in place across the region.

Pooled Fund Webinars

Recordings of the first three webinars are available now.

[Webinar #1](#) – Overview of NDS and RID Data and Pooled Fund

[Webinar #2](#) – Examples of How These Data are Being Used for Highway Safety

[Webinar #3](#) – SHRP2 Implementation Assistance Projects

[Webinar #4](#) – Advancing Implementable Solutions (presentation only; audio not available)

Safety Data Webinars

The STAC has developed four introductory webinars for state DOT research managers and safety, operations, and planning staff.

November 30, 2016

1:00 PM to 2:30 PM EST

Covering the SHRP2 NDS driver and vehicle information.

December 14, 2016

1:00 PM to 2:30 PM EST

SHRP2 Roadway Information Database (RID).

January 18, 2017

1:00 PM to 2:30 PM EST

Integration of the driver, vehicle, and roadway data to support addressing research questions.

February 8, 2017

1:00 PM to 2:30 PM EST

NDS/RID research and outreach opportunities.

Registration Information

You need to register for each individual webinar in the series at <https://collaboration.fhwa.dot.gov/dot/fhwa/WC/default.aspx>. Please find the date on which the webinar(s) will be presented and click to register. There is no registration fee.

Contact:
Charles Fay at
Charles.fay@dot.gov.

Safety Identifying the behaviors that cause and avert collisions.

Pooling Funds Can Save Lives

Despite the best efforts of highway engineers, law enforcement, and highway safety advocates, traffic crashes still result in tragic loss of life and serious injuries. Driver behavior is a significant factor in the great majority of these crashes, but driver behavior has only been studied indirectly by examining crashes and attempting to reconstruct the events that produced them. Detailed and direct observational data on driver behavior are needed.

Likewise the highway Operations and Planning disciplines would benefit from a better understanding of driver behavior and how people actually drive under a variety of roadway, traffic, and weather conditions. To address these needs, SHRP2 has captured new and comprehensive data about what happens in the vehicle before and during crashes and near-crash events.

[SHRP2 safety data](#) consist of two large databases: the naturalistic driving study (NDS) database and the roadway information database (RID).

The FHWA also established the [Safety Training and Analysis Center \(STAC\)](#) to assist the research community and state departments of transportation (DOTs) when using data from the two SHRP2 safety databases. Now, the STAC has announced an opportunity for a pooled fund to conduct further research using the safety data.

STAC Seeking Commitments to Pooled Fund until March 17, 2017

When significant or widespread interest is shown in solving transportation-related problems a pooled fund study may be initiated. Just as it sounds, a [pooled fund](#) study pools the funding of transportation agencies, academic institutions, foundations, or private firms to research an issue of common interest. The STAC has announced a pooled fund to conduct research into driver behavior using the SHRP2 data from the NDS and RID. The STAC is seeking state commitments to the pooled fund until March 17, 2017.

The research will draw upon new and comprehensive data developed under the [SHRP2 Safety Program](#). The data show what happens in the vehicle before and during crashes and near-crash events, and contain one-of-a-kind exposure data (everyday driving) on over 5 million trips continuously recorded. This wealth of information extends the value beyond Safety and into the Operations and Planning disciplines.

Implementing the results and findings of research that will be conducted using the SHRP2 NDS data and RID will result in a more efficient, reliable and inherently safer experience for road users. The pooled fund will:

- Advance the development of implementable solutions that address issues of high-priority to state and local transportation agencies in the broad areas of highway safety, operations, and planning.
- Create a venue for highway practitioners to share information and collaborate on research that advances their individual disciplines and addresses cross-cutting areas, including but not limited to, the advancement of a connected-automated highway system.
- Allow researchers to communicate with each other and leverage research results as they work toward the common goal of a safer and more reliable experience for the road user.

It is expected that this pooled fund will increase understanding of how drivers interact with their vehicles and the roadway, and support a wide variety of life-saving and mobility improvements.



Staff in the McConnell Public Safety Transportation Operations Center monitor roadways in northern Virginia. (Photo courtesy McConnell Public Safety Transportation Operations Center.)

Moving Toward Institutionalizing

The SHRP2 Reliability Lead Implementer Roundtable Summary Report points out opportunities for FHWA to continue supporting agencies in moving toward institutionalizing TSMO by doing the following:

- Facilitating the sharing of TSMO best practices.
- Raising awareness of SHRP2 implementation and encouraging deployment.
- Demonstrating leadership commitment to SHRP2.
- Providing additional funding to support TSMO activities.

The roundtable participants concluded that SHRP2 Reliability products are helping to advance TSMO in state and MPO agencies and to develop effective TSMO programs.

Reliability Championing predictable travel times.

Taking the Pulse of SHRP2 Reliability Products

All states, the District of Columbia, and Puerto Rico are implementing at least one Reliability SHRP2 Solution—with some states implementing more than 10. Products developed in the Reliability focus area are aimed to improve congestion and travel reliability on the nation's roadways by supporting the advancement of transportation systems management and operations (TSMO).

SHRP2 Reliability Roundtable

The FHWA Office of Operations decided to take a closer look at the impact of the SHRP2 [Reliability products](#). In January 2016, Operations convened 10 lead implementers of various products for the SHRP2 Reliability Lead Implementer Roundtable. The roundtable participants were selected from state DOTs and MPOs already implementing multiple Reliability products, along with associated federal and professional group stakeholders.

“At this point a couple of years into implementation, we wanted to bring experienced users of the Reliability products together to share about the impacts these products were having on their agencies and practices. Their successes can help other agencies see how to effectively use the products to advance TSMO,” said Tracy Scriba, FHWA' SHRP2 Reliability program manager.

The discussions focused on sharing benefits and lessons learned, discussing how to enhance and expand product delivery, understanding how to engage states that have not yet used the products, and exploring ideas for further national level support for SHRP2 product implementation.

Key Findings

Workshop participants shared how SHRP2 Solutions have been used in their respective states and regions to help them advance TSMO. The discussions confirmed the benefits of the SHRP2 Reliability products and the associated Implementation Assistance Program funding for transportation agencies seeking to improve the implementation and integration of TSMO.

Participants described ways in which Reliability products have contributed to the following outcomes at transportation agencies throughout the country:

- Served as “tipping point” for advancing TSMO in transportation agencies.
- Institutionalized TSMO in transportation agencies.
- Supported integration of operations and planning.
- Strengthened partnerships with local, state, and federal stakeholders for TSMO activities.
- Supported use of TSMO tools, data and performance measures.
- Sparked development of TSMO program plans.
- Raised awareness of the benefits of TSMO among agency staff and leadership.
- Strengthened TSMO peer networks.

“Tipping Point” for Advancing TSMO

One important point confirmed during the roundtable was the concept that the Reliability SHRP2 Solutions served as a tipping point for advancing TSMO. The Reliability products helped bring energy, attention, funding, and new tools and capabilities to precipitate a significantly higher level of awareness, capacity and support for TSMO in lead implementer states. Participants



Some of the more than 215,000 responders trained in *National Traffic Incident Management Responder Training* (L12).



Participants at a *Regional Operations Forum* (L36). (Photo courtesy FHWA)

Reliability Products (continued)

indicated that a major benefit of implementing the Reliability SHRP2 Solutions was that the products helped institutionalize TSMO within their agency's culture and structure. Some agencies underwent organizational change to better support TSMO and others bolstered TSMO in their staff training programs.

States mentioned that the products were relevant and beneficial to their efforts:

- The Colorado Department of Transportation (CDOT) used *Organizing for Reliability* (L01/L06) to conduct a capability assessment that supported a major agency reorganization, which shifted traffic, safety and operations responsibilities into a single division. CDOT's use of several SHRP2 products (L36, L12/L32, L34, and L01/L06) helped it to reach its tipping point to undergo a major culture shift, moving from a point where TSMO is emphasized to one where it is institutionalized.
- The Tennessee Department of Transportation used L01/L06 implementation assistance to ensure the success of their newly established Traffic Operations Division and develop a plan to guide its TSMO program.
- At the Minnesota Department of Transportation, use of the *Reliability Data and Analysis Tools* (L02/L05/L07/L08/C11) was a turning point for Traffic Management Center staff to realize the amount of data they have and engage in efforts to identify how they could use it better.
- The Arizona Department of Transportation (ADOT) found that the *Regional Operations Forum* (L36) exposed more of their staff to TSMO and increased momentum for TSMO activities in ADOT and its new TSMO division. The forum, along with L01/L06 and the *National Traffic Incident Management Responder Training* (L12/L32), helped to firmly establish TSMO at ADOT and strengthen leadership support.
- The Washington State Department of Transportation used L01/L06 to incorporate TSMO into a shift in project delivery methods that was already underway at the agency.

SHRP2 Reliability Products Discussed in Roundtable

PRODUCT	DESCRIPTIONS
<u>Organizing for Reliability (L01/L06/L31/L34)</u>	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.
<u>Reliability Data and Analysis Tools (L02/L05/L07/L08/C11)</u>	A suite of tools to help transportation planners and engineers improve monitoring and analysis of data to achieve more consistent, predictable highway travel.
<u>National Traffic Incident Management Responder Training Program (L12/L32)</u>	Brings police, firefighters, DOT, towing, medical personnel, and other incident responders together to engage in interactive, hands-on incident resolution exercises.
<u>Regional Operations Forum (L36)</u>	An in-person regional training workshop curriculum that allows managers and program leaders at public agencies to build expertise in TSMO.
<u>Guidelines for Incorporating Reliability Performance Measures into Travel Models (L04)</u>	Application guidelines for incorporating reliability into micro- and/or meso-simulation models that identify key steps for integrating demand and network models.
<u>Communicating Traveler Information and Estimating Its Value to Travelers (L14)</u>	A lexicon that describes how transportation agencies can best communicate information about travel time reliability to motorists so they can make informed decisions and better plan to arrive at their destination on time.
<u>Framework for Improving Travel-Time Reliability (L17)</u>	The National Operations Center of Excellence and a corresponding website that actively supports the TSMO community.

10 UNIVERSITIES



are recipients of an estimated total

\$100,000

in cooperative agreements to incorporate
SHRP2 Solutions into the classroom.

SHRP2 Education Connection Recipients

- Bradley University (Illinois)
- Colorado State University
- Methodist University
(North Carolina)
- North Dakota State University
– Upper Great Plains
Transportation Institute
- Rowan University (New Jersey)
- University of Missouri
- University of Idaho
- University of Nebraska –
Lincoln, Omaha
- University of North Carolina –
Charlotte
- University of Wisconsin

SHRP2 Education Connection Recipient Presents at Engineering Education Conference

In 2015, the Federal Highway Administration awarded cooperative agreements to 10 universities through the [SHRP2 Education Connection](#) initiative. The initiative is designed to introduce the academic community to the SHRP2 Solutions now taking hold in agencies across the country. SHRP2 Education Connection offers universities opportunities to incorporate SHRP2 products into transportation coursework, bringing state-of-the-practice solutions into the classroom.

Each of the 10 universities receiving awards met this challenge, integrating one or more SHRP2 Solutions from the Renewal, Reliability, and Capacity focus areas into existing curriculum. One recipient – Rowan University in Glassboro, New Jersey – took an ambitious approach involving 16 SHRP2 products from all three focus areas. A team of instructors integrated the products vertically, meaning they inserted SHRP2 lectures into seven courses that covered the full four years of Rowan’s Civil and Environmental Engineering (CEE) curriculum.

Their creative approach to merging the latest in transportation innovations with undergraduate coursework gained the attention of their peers at the American Society of Engineering Education (ASEE) – a nonprofit

organization dedicated to furthering education in engineering and engineering technology. The Rowan instructors developed a paper, which highlights the university’s approach to integrating SHRP2 products into its curriculum. At the June 2016 ASEE Annual Conference & Exposition, the three instructors presented their paper and experience in the session, Use of Technology in Civil Engineering Courses.

The paper was entitled *Integration of Strategic Highway Research Program 2 Products within the Entire Civil Engineering Curriculum*. It describes how the Rowan CEE team methodically integrates SHRP2 Solutions from the freshman year course, Introduction to Infrastructure through its senior and graduate course, Elements of Transportation Engineering.

Beyond detailed descriptions of each course included in the curriculum, the paper also explores the course evaluation techniques used to measure the impact of the courses. The Rowan CEE instructors use pre- and post-teaching surveys for each course. The general trend of the survey results suggests that the majority of students, regardless of their academic level, realized the importance of these SHRP2 products. The paper includes detailed survey data in addition to conclusions and recommendations for others considering integrating SHRP2 Solutions into higher education.

The basic philosophy of the instructors was to incorporate the SHRP2 products as next generation tools to address existing and future transportation issues. Dr. Mehta said, “It was a good experience to write a paper and present the findings. I received some good feedback at the session.”

Download the full paper, [Integration of Strategic Highway Research Program 2 within the Entire Civil Engineering Curriculum](#).

About SHRP2

SHRP2 is a partnership of the Federal Highway Administration (FHWA), American Association of State and Highway Transportation Officials (AASHTO), and the Transportation Research Board (TRB). TRB completed the research, and now FHWA and AASHTO are jointly implementing the resulting SHRP2 Solutions that will help the transportation community enhance productivity, boost efficiency, increase safety, and improve the reliability of the nation’s highway system.

If you would like additional information or have questions about SHRP2, please contact Carin Michel, FHWA SHRP2 Implementation Manager at GoSHRP2@dot.gov, 410-962-2530, or Pam Hutton, AASHTO SHRP2 Implementation Manager at phutton@aaashto.org, 303-263-1212.

Visit the GoSHRP2 website at <https://www.fhwa.dot.gov/goshrp2/> for additional SHRP2 Milestones and updates.

