

Summary of Benefits of SHRP2 Products in Three-Year Implementation Plan

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2012 Starts

1. **L12 Training for Traffic Incident Responders:** This training product is aimed at reducing the amount of time and the effectiveness of incident response by better coordinating the key parties that contribute to incident response. Use of this training will enable jurisdictions to reduce the traffic impacts of incidents, improve readiness and response time, and eliminate duplication of effort. Faster clearing of incidents results in safer roads for travelers, less exposure for emergency responders and reduced traffic impacts. Non-recurring incidents cause 50-60% of delays in urban areas. Use of this product can result in significantly reducing incident clearing time, resulting in significant reductions in delay and a reduced number of crashes.
2. **R26 Pavement Preservation of High Traffic Volume Roads:** This SHRP2 Solution is aimed at providing owner agencies with tools to enable more focus on and technical understanding of preserving the pavements on high volume roadways. While many states have pavement preservation operations aimed at extending the life of lower volume roads, typically the higher volume roads receive less investment in preservation because of the cost and traffic impacts related to maintenance work. This product is aimed at providing more information for states who are interested in investing in preservation to extend the life of expensive assets and to reduce the life cycle costs. Experience has shown that with a targeted preservation strategy, pavement life on high volume roads can be extended by up to 50 percent (e.g. from 10-12 years to 15-18 years). Reduced frequency in total pavement reconstruction means less traffic impacts, improved safety, and cost savings from less need for major infrastructure reconstruction.
3. **R04 Bridge Designs for Rapid Renewal:** Prefabrication and other accelerated bridge construction techniques have become more utilized over the past 15 years in the US. However, most owner agencies have focused on big, complex projects that have substantial impact to mobility and required specialty contractors. This product focuses instead on implementing the same techniques on smaller, more routine bridge replacements to reduce the overall design and construction cost. Using standardized design techniques and details could greatly reduce the cost and increase the speed with which the more common, every day bridge replacements can be accomplished. Standardized detailing will make designs less complicated and faster. Smaller local construction contractors could establish construction

methods that would enable faster, more efficient construction and increase the competition for this type of work by requiring less specialization. One example of the benefits that can be derived with this product is the construction of the Keg Creek Bridge in Iowa. The 13-mile detour for this bridge necessitated an accelerated construction method. Use of this product allowed the replacement to be completed in 2 weeks, rather than the 6 months that would normally have been required for replacement of a bridge of this size and type.

4. **R09 Managing Risk in Rapid Renewal Contracts:** Many owner agencies who have used rapid renewal techniques have found that the shift in risk from the owner to the construction contractor can greatly increase the cost of any job. Better tools to assess risk and assign the risk to the party who can best control it, can reduce the cost and eliminate expensive changes or claims down the road. Optimization of risk sharing promises substantial cost savings for owners. Use of this product can reduce the project schedule, potential for delays and result in fewer surprises and ultimately fewer delay claims and cost increases.
5. **R10 Complex Projects:** management of complex projects is an art that many owner agencies are learning by trial and error. This product provides lessons learned and best practices to shorten the learning curve for states who take on complex projects that are outside of their normal practices. By introducing financial planning earlier into project development, the project can be better designed to meet the funds available, reducing delays related to lack of financial resources. Also, projects tend to be more complex within sensitive contexts. Early consideration and incorporating context issues into the design earlier can reduce delays and get the project to construction faster.
6. **L01/06/31 Reliability Bundle:** Increasing the understanding and awareness of the benefits of operational improvements to transportation systems will result in projects that better leverage the infrastructure already in place. Many state DOT's would benefit from a structured review of organizational and business process issues related to traffic operations. These tools provide a structured means to do that, including developing strategies for organizing for operations. Studies have shown that investments in reliability improvements result in benefit cost ratios of 5:1 to 30:1.
7. **C06B Integrating Ecosystem & Highway Planning:** . Mitigation is a big cost to transportation agencies. The Environmental Law Institute estimates that \$2.9 billion is spent annually on compensatory wetland mitigation alone. By better coordinating transportation planning with natural resource planning through an Integrated Ecological Framework (IEF), opportunities for avoidance and minimization of environmental impacts can be identified at the planning stage, potentially reducing mitigation requirements or reducing delays during project-level environmental review and permitting. The IEF process can also identify opportunities for advance mitigation when mitigation is needed so that a plan is in place when the project is built. The Integrated Ecological Framework provides a structure so that transportation and natural resource agencies can systematically establish more collaborative working relationships to achieve transportation goals, mutual environmental goals, and reduced cost.

In particular, reducing delay means real savings: For every \$100 million, a one-year delay costs roughly \$5 million

2013 Starts

8. **R15B Integrating Utility/Transportation:** By better coordinating and working collaboratively with utilities early in project development, owner agencies and reduce repeated street cuts, plan construction more strategically, and in some cases greatly accelerate construction. Delays due to utility conflicts is one of the most common and costly sources of construction claims on highway projects in the United States. Reduction in utility delays and the claims that result means significant cost savings and reduced exposure to the hazards of construction zones for the travelling public and construction workers.
9. **C01/02/19 TCAPP:** Better stakeholder involvement, better early coordination, and more collaboration results in better projects with fewer delays. In addition to building better projects for all stakeholders, this tool will reduce the delay in getting projects to construction. Experience on pilot projects that have used these tools have resolved issues that had prevented projects from moving forward. For every \$100 million, a one-year delay costs roughly \$5 million.
10. **R07 Performance Specs for Rapid Renewal:** Many owner agencies have employed performance specifications as a means to accelerate construction, enable greater control and ingenuity by the construction contractors in deciding how to build, and to reduce costly construction oversight and use construction management resources more effectively. Performance specs have evolved in many directions, some more effective than others. This product provides the tools to owner agencies to reduce claims, reduce inspection costs, and accelerate construction.
11. **R16 Model Railroad Agreements:** One of the greatest risks to construction projects can be coordination of conflicts with railroads. The stakes are high in delays to advertising construction and the owners have little leverage. The model railroad agreements capture clauses and conditions that have been used successfully on railroad agreements on real projects. Iowa used these tools, enabling them to reduce the backlog of work with railroad conflicts by 75%.
12. **R23 Long Life Pavements:** This design enables the design of pavements that will last 30-50 years, thus resulting in substantial savings to the agency that owns the roadway and to users in reduced delays during pavement reconstruction. Use of this method by Washington DOT resulted in a 30% cost savings to the agency and 50% reduction in user delay cost.
13. **R06 Web tool for Non-destructive Testing:** This SHRP2 Solution provides technical assistance and tools for owner agencies to enable more effective and sophisticated NDT for a variety of infrastructure. More effective inspection of concrete bridge decks enables more timely and

more targeted preventive maintenance to ensure the lowest life-cycle cost. Use of the PAVE-IR tool during asphalt placement can identify thermal differential, which indicates inadequate pavement density and segregation. On one sample project, the problems that were not identified and fixed on the spot, resulted in failure of the asphalt pavement 5 years prematurely. This translated into \$2.4 million of additional cost that could have been saved with use of the tool. The tool for NDT of tunnel linings allowed complete inspection of the Chesapeake Bay Tunnel in 2 hours, compared to 3 months to conduct hammer testing of the entire tunnel.

2014 Starts

14. **C03/11 Economic Impact Tools:** The tools in this product will enable owner agencies to develop better estimates and analysis of the economic benefits of infrastructure improvements. This will help agencies to more effectively inform constituents and political leaders regarding the benefits of needed projects and improvements. Case studies of other successful economic analysis will capture best practices and inspire new ways of conveying the story to the right audience.
15. **C10 Travel Demand and Network Models:** More precise traffic modeling enables better decisions and more targeted expenditure to address more specific problems. Projects are often challenged based on the results of travel demand modeling. This tool enables more defensible NEPA documents resulting in reduced delays related to legal challenges and the inflationary cost of these delays.
16. **C15 Freight Planning Guide:** New funding programs in MAP-21 facilitate a stronger focus on planning for freight needs and including those needs earlier in planning and programming. This tool enables better planning and project development for freight, which is often a major component of the economic justification for infrastructure investment.
17. **L02/05/08 Reliability Analysis Tools:** This suite of tools will enable better analyses of strategies to address causes of non-recurrent congestion and to improve travel time reliability. Studies have shown that investments in reliability improvements result in cost benefit of 5:1 to 30:1 due to reduced user delay and improved safety.
18. **L36 Regional Operations Forum:** The tools developed in the SHRP 2 Reliability program will be incorporated into a curriculum for a multi-day workshop that is designed to immerse managers at state DOTs and other agencies involved in state of the art practices for addressing traffic operations issues. Application of these methods will significantly reduce delays due to non-recurrent congestion. Studies have shown that investments in reliability improvements result in benefit cost ratios from 5:1 to 30:1.
19. **R19A 100-year Service Life Bridges:** Design methodology to build longer-lasting bridges that require less maintenance could result in significant cost savings in bridge replacements. This

product includes long life design of decks, deck joints, and bearings. The product is being used in the design of the Tappan Zee Bridge replacement in New York State.

20. **R05 Modular Pavement Solutions:** Use of modular pavements to allow for more flexibility in construction phasing and to carry traffic while the facility is still under construction. This product has wide application on urban and other high traffic volume routes, or in rural applications where detours are unacceptably long. Use of this product on the Illinois Tollway resulted in cost savings of \$350,000 compared to conventional repair methods
21. **R21 Composite Pavement Systems:** Use of a composite pavement design in initial construction can result in significant long-term cost savings, due to use of more cost effective materials in lower levels of the pavement during initial construction and lower life-cycle costs over the life of the pavement.