TRB Seeking Expert Task Group Nominations for 2009 SHRP 2 Projects

2009 SHRP 2 Research Projects

Across the four focus areas of SHRP 2 research, requests for proposals for 15 projects will be released in March and another 13 are expected in July. Project descriptions are attached.

Nominating ETG Members

Nominations are needed by December 17, 2008, for the first-round projects and by May 15, 2009, for second-round projects. Selection criteria are intended to achieve balance in expertise, geography, gender, ethnicity, and other factors. Please provide each nominee's affiliation, title, address, approximate age, gender, ethnicity, and most importantly, professional qualifications related to the specific project. The information can be sent by email to the SHRP 2 senior program officer indicated in the project description. Interested and qualified individuals may nominate themselves. While all nominations are appreciated, only those selected will be notified by the SHRP 2 office.

Service on SHRP 2 ETGs

In the SHRP 2 structure, Expert Task Groups develop requests for proposals, review research proposals, and recommend project awardees to the SHRP 2 Oversight Committee. The term of an ETG member is typically less than one year. During that time, there will be two meetings in Washington, one to develop the RFP and one to select the winning proposal. Between the two meetings, the ETG members will review all the proposals received and rank each according to criteria established in the RFP.

ETG members are selected for their knowledge and experience in specific areas of inquiry, but because SHRP 2 integrates research topics across traditionally distinct areas, ETG members may find it useful to refer to background materials during the RFP development process, which also adds to the demands on their time.

Additionally, the National Academies has a formal process for establishing the credentials and examining the biases and possible conflicts of interest of those who agree to serve on committees of various kinds. ETG members are required to complete a few forms and to provide a resume and a brief biography as conditions of service.

Caution

To guard against conflict of interest, please do not nominate anyone for whom the following is true:

- candidate might be named as a member of a proposing team
- candidate's employer might submit a proposal although the candidate is not personally involved

- candidate has a financial relationship with others who might submit a proposal
- candidate's immediate family members or others with close personal ties might submit a proposal.

If anyone who is selected for membership on an ETG and who helps develop an RFP meets any of the above conditions, all proposals responding to that RFP will be rejected without consideration and the member in conflict will be asked to recuse him- or herself from any further service on the ETG. Please address any questions on this topic early to the SHRP 2 program officer who is managing the project.

Thank You
We appreciate your support in nominating ETG members who play a fundamental role in accomplishing the goals of SHRP 2 research.

2009 Projects
Please click on each project for full project descriptions.
ETGs for Safety projects have already been selected.

March

Reliability

- L14: Effectiveness of Different Approaches to Disseminating Traveler Information on Travel Time Reliability

Capacity

- C10: ETG already selected
- C19: Add Expedited-Schedule Case Studies to the Collaborative Decision-Making Framework Data Base
- C20: Freight Demand modeling and Data improvement Strategic Plan

Renewal

- R06-G: NDT for Tunnels
- R01-A: Technologies to Support Storage, Retrieval, and Utilization of 3-D Utility Location Data
- R01-B: Multisensor Platforms for Locating Underground Utilities
- R01-C: Innovation in Location of Deep Utilities
- R03: Identifying and Reducing Worker, Inspector, and Manager Fatigue in Rapid Renewal Environments
- R10: Project Management Strategies for Complex Projects
- R11: Strategic Approaches at the Corridor and Network

July

Reliability

- L05: Incorporating Reliability Performance Measures into the Transportation Planning and Programming Processes
- L08: Incorporating Non-recurrent Congestion Factors into the Highway Capacity Manual Methods
- L09: Incorporating Non-recurrent Congestion Factors into the AASHTO Policy on Geometric Design
- L15: Reliability Innovations Deserving Exploratory Analysis

Capacity

- C18: Pilot Test the Collaborative Decision-Making Framework Including a Self Assessment Method

L14: Effectiveness of Different Approaches to Disseminating Traveler Information on Travel Time Reliability

Release Date: March 2009
Funds: $1 Million
Staff: William Hyman, whyman@nas.edu

Objective:
To address the accessibility and utility of traveler information, communication channels, and technologies and quantify the system performance effects (total delay and travel time reliability) of providing traveler information for person and freight transport through a variety of means under different circumstances.

Project Summary:
There are many types of traveler information systems. These include normal commercial radio and TV rush hour reports, 511 services, dynamic message signs, highway advisory radio, and traveler-based devices (hand-held, in-vehicle) including satellite-based radio services, personalized cellular service, GM OnStar, and wireless internet such as BlackBerry.

This project proceeds in two phases. Phase 1 involves an assessment of the ability of road users to access traveler information relevant to travel time reliability and disseminated using different communication channels, technologies, and formats. A related research issue is whether traveler information, particularly content related to reliability, reaches road users in a manner and format this is useful to them. The scoop of work in Phase 1 includes a literature review, a determination of the desires/needs of road user regarding traveler information about travel time reliability, an examination of the availability and perceived usefulness of such information, and a an analysis of the gap between the desires/needs of road users and the accessibility and usefulness travel time reliability information that can be acquired from existing systems.

The second phase involves assessing how changes in the accessibility, presentation format, and utility of traveler information systems would affect road users' ability to take travel time reliability into account when making travel choices. This phase would also address the implications on system performance, especially travel time reliability. Phase II would require the development of an experimental plan, a data collection plan, and an analysis plan. These plans would address four different types of road networks: a state system, a major corridor, and two metropolitan networks. Once the data is collected and analyzed in accordance with these plans, an assessment would be made regarding the most effective ways to improve the reliability content of traveler information. In addition there would be an assessment of the effect of the improved traveler information on total delay and travel time reliability. This assessment would preferably be quantitative (simulation) but it could be qualitative or both. The research would conclude with a final report that includes conclusions and recommendations for improving the accessibility, presentation format, and usefulness of traveler information.

C19. Add Expedited-Schedule Case Studies to the Collaborative Decision-Making Framework Data Base

Release Date: March 2009
Funds: $0.3 Million
Staff: Steve Andrle, sandrle@nas.edu

SHRP 2 Project C01 assembled case studies focused on collaborative decision making and related decision- support tools. Collaborative decision making is intended to engage the right people at the right time with the right information to make better decisions regarding expansion of highway capacity and reduce delays in project delivery. SHRP 2 wishes to assemble additional cases of expedited project delivery to document collaborative decision making in this environment. The case studies and lessons learned from them will be incorporated into the web-based Collaborative Decision-Making Framework being developed under the SHRP 2 Capacity focus Area.

C20: Develop a Freight Demand Modeling and Data Improvement Road Map

Release Date: March 2009
Funds: $0.55 Million
Staff: Steve Andrle, sandrle@nas.edu

Problem Statement

Freight demand makes up a growing proportion of total travel demand; freight VMT is outpacing passenger VMT. SHRP 2 Project C04 is aimed at improving our understanding of highway travelers and how factors such as congestion and pricing impact travel demand. The freight side of travel demand is not being examined at all by C04 because of the fundamental differences between passenger travel demand and freight demand. Logistics costs now make up around 10 percent of the overall US economy. One of thee fundamental differences is that passenger travel decisions ultimately rest with the driver while freight transport decisions are usually made to meet the specific needs of a shipper or receiver and will often be subject to controls of carrier company policy. An individual passenger car driver may quickly decide on his or her own to re-route around an incident or recurrent traffic jam, to forgo or postpone a trip, to shift modes, or to pay a variable congestion toll; in the freight realm, such decisions are much more complex in that customers may have tight delivery time windows or carriers may have negotiated fixed cost agreements. Further, there are distinct differences within the highway freight transportation marketplace (e.g. between low value commodities and high value commodities and between short-haul urban freight and intercity trucking. In general, our understanding of freight demand and how it can be effectively modeled at a detailed level is in a primitive state.

This project will develop the "Road Map" for dramatically improving the state of freight demand modeling by identifying gaps and needs and preparing the future research agenda. This research should be considered a close companion piece to projects C04 and C10.

Project R06-G: Mapping Voids, Bonding, and Moisture Behind or Within Tunnel Linings

Release Date: March 2009
Funds: $1.65 Million
Staff: Monica Starnes, mstarnes@nas.edu

Project Description

Periodic inspection of tunnels to assess changes in structural condition over time is critical to timely detection and remediation of problems to ensure road user safety. Tunnel structural problems that are considered widespread and potentially serious are tunnel leaks, concrete cracking, concrete spalling, concrete delamination, steel corrosion, and drainage. Monitoring of tunnel condition is key to determining the appropriate schedule of maintenance and/or rehabilitation activities to remedy structural problems that might lead to accelerated deterioration and sudden tunnel failures that could cause serious injury and even fatalities.

Tunnel inspection is a challenging problem. Tunnels typically service high-volume traffic and operate in aggressive environments. Keeping tunnels open during inspection and minimizing tunnel closures and user delays must be carefully balanced with the need to conduct detailed inspections to ensure the safety of tunnel users. Consequently, nondestructive test methods that are more automated, quantitative, and rapid, and that provide continuous coverage compared to conventional visual inspections need to be identified and evaluated. However, there does not appear to be any high-speed nondestructive testing method for locating voids or moisture behind or within tunnel linings or to assess the bonding between tunnel linings and the outlying material. This technology is also needed for retaining walls, so it is expected that any technology developed for tunnels can apply to retaining walls as well.

Objective

The objective of the proposed research is to establish high-speed nondestructive test methods for locating voids or moisture behind or within tunnel linings and retaining walls and to assess the bonding between tunnel linings or retaining walls and the outlying material.

Anticipated Products

- Technologies that effectively characterize voids, bonding, and moisture behind tunnel linings
- Recommendations on equipment availability, costs, reliability, capabilities, etc.
- Results from verification testing
- Draft test procedures for any new methods developed, with guidance on equipment needed for the tests.

Project R01-A: Innovation in Technologies to Support the Storage, Retrieval, and Utilization of Three-dimensional Utility Location Data

Release Date: March 2009
Funds: $1 Million
Staff: Chuck Taylor, ctaylor@nas.edu

Project Background

It is commonly held among transportation officials that the accurate location and characterization of underground utilities and other similar facilities, especially deeply buried ones, and their timely protection or relocation is a major factor in preventing delays in highway renewal projects. Such delays can extend the period of project development and impede construction initiation. Inaccurate location of utilities contributes to traffic and community disruption when service lines are encountered unexpectedly or access by utility repair crews is blocked by construction activities. Inadvertent damage to underground utilities can lead to environmental damage or even put the health and safety of construction workers and the public at risk. Because of the frequency with which utilities are co-located on highway rights of way, renewal projects are vulnerable to utility related delay and disruption. It is important to develop accurate plans that fully consider underground utilities and, by knowing this information early in the project development process, develop effective and cost-efficient strategies to protect or relocate the utility or provide alternative service to utility customers if service must be interrupted temporarily. Currently, many underground utilities that are difficult to locate and characterize might impede progress of transportation projects. Utilities can become “lost” as construction alters the landscape and pre-existing benchmarks are removed. In the worst cases, no information exists until the utility is encountered during construction. That often results in significant delays to construction progress because work is suspended while utilities are relocated or the facility is redesigned. Unplanned service interruptions have even wider impact on communities served by the utility. The importance of this topic has led to an increased focus by project and utility owners in recent years as the current capabilities are taxed by renewal projects of increasing complexity.

Objective

This project is intended to support the development of software and hardware that would take advantage of recent advances in Global Positioning System (GPS) and Geographical Information System (GIS) technologies that would increase the quality and efficiency of storing, retrieving and utilizing utility records with three-dimensional positional information. The project is also intended to demonstrate the collection and use of such information in a multi-utility environment. The overall objective is to reduce the time spent on repeatedly “refinding” known utilities so that the attention can be focused on unknown or previously misrecorded utilities and so that an increasingly comprehensive record of utility information beneath public rights-of-way can be created.

Project R01-B: Utility Locating Technology Development Utilizing Multi-Sensor Platforms

Release Date: March 2009
Funds: $2 Million
Staff: Chuck Taylor, ctaylor@nas.edu

Project Background
It is commonly held among transportation officials that the accurate location and characterization of underground utilities and other similar facilities, especially deeply buried ones, and their timely protection or relocation is a major factor in preventing delays in highway renewal projects. Such delays can extend the period of project development and impede construction initiation. Inaccurate location of utilities contributes to traffic and community disruption when service lines are encountered unexpectedly or access by utility repair crews is blocked by construction activities. Inadvertent damage to underground utilities can lead to environmental damage or even put the health and safety of construction workers and the public at risk. Because of the frequency with which utilities are co-located on highway rights of way, renewal projects are vulnerable to utility related delay and disruption. It is important to develop accurate plans that fully consider underground utilities and, by knowing this information early in the project development process, develop effective and cost-efficient strategies to protect or relocate the utility or provide alternative service to utility customers if service must be interrupted temporarily. Currently, many underground utilities that are difficult to locate and characterize might impede progress of transportation projects. Utilities can become "lost" as construction alters the landscape and preexisting benchmarks are removed. In the worst cases, no information exists until the utility is encountered during construction. That often results in significant delays to construction progress because work is suspended while utilities are relocated or the facility is redesigned. Unplanned service interruptions have even wider impact on communities served by the utility. The importance of this topic has led to an increased focus by project and utility owners in recent years as the current capabilities are taxed by renewal projects of increasing complexity.

Deployment of multiple sensing techniques is currently necessary in many instances to image the various utilities composed of differing materials, depths, conductivity, ground conditions, surface obstacles, and so forth. Covering the same ground more than once with different instruments/techniques is inefficient if one pass with multiple equipment capabilities will suffice. Time constraints, cost of equipment, understanding of equipment capabilities, and operator training may be factors that discourage necessary multiple passes by different equipment. Enhanced data interpretation may be gained through a single pass with a multisensor platform due to simultaneous signal processing. Combined with improved coupling techniques, a multisensor platform may lead to enhanced interpretation (better quality) and better production (less cost). The goal of this research is not to just place two or more existing separate instruments on a single platform, but to improve the detection ability or production, or lower equipment and training costs by doing so.

Objective

This project will support the technological development of multi-sensor approaches to improving the detection and accurate determination of position for buried utilities. The combinations of sensor technologies proposed should be shown to have the potential to offer significant advances in terms of utility detection performance across a wide range of soil types and site conditions. Enhanced utility detection is the primary objective but productivity issues in commercial use also are important. Preference will be given to the integration and data fusion of sensors using at least two different geophysical phenomena. The agency will consider the development of new platforms as well as the enhancement of existing concepts/designs. Improved coupling methods to assist in identifying known utilities may also be used to improve detection performance.

Project R01-C: Innovation in the Location of Deep Utility Pipes and Tunnels

Release Date: March 2009
Funds: $1.61 Million
Staff: Chuck Taylor, ctaylor@nas.edu

Project Background

Deep utilities are a particularly difficult problem area for detection. Utilities are increasingly placed deeper as the near-surface space becomes crowded, and utility construction techniques become more capable. Existing surface techniques for utility detection become ineffective due to signal-to-noise ratio factors, masking of deeper utilities by shallow ones, and the presence of groundwater and other geologic issues. Deep utilities, when encountered during construction are generally costly to relocate or repair.

Objectives

This project will support research and development for the development of the following:

- Locating technologies that target deep utilities that currently cannot be detected by surface-based approaches as currently employed. Such technologies may include (but are not limited to) alternative or novel surface-based approaches, direct-path detection methods deployed from inside an existing deep utility or cross-bore techniques based on adjacent boreholes.
- Hardware and software that supports the "smart tagging" of buried utility systems during the initial installation of new pipelines or during times when a utility is exposed during excavations for various purposes. Smart tagging refers to systems that provide either active or passive electromagnetic "tags" that can be attached to pipes, placed beside pipes or incorporated into the manufacture of new pipes.

Project R03: Identifying and Reducing Worker, Inspector, and Manager Fatigue in Rapid Renewal Environments

Release Date: March 2009
Funds: $1 Million
Staff: James Bryant, jbryant@nas.edu

Objectives:

- Determine the impact of human fatigue on work activities commonly associated with highway construction projects, including the impact on quality, cost, and schedule.
- Quantify the fatigue element in hourly, weekly, and monthly scenarios for workers, inspectors, and the management team.
- Develop a range of techniques that reduce fatigue for the workforce.
- Develop strategies for organizing, structuring, and executing rapid renewal projects that incorporate fatigue reduction into the project planning process.
- Develop strategies for educating the community and its leaders on the importance of mitigating fatigue on rapid renewal projects.

Project Background:
The impact of fatigue on the quality of work and the safety of workers, inspectors, and managers, especially on rapid renewal highway projects, is considered serious and in need of further investigation and solutions. "We put our best people on the most difficult projects and work them long and hard in difficult situations at night and on weekends. And when they do a good job, we reward them with more of the same" (Graff, 2002). Many contractors report that employee family life is negatively impacted the longer the rapid renewal project lasts.

Worker, inspector, and manager fatigue on rapid renewal projects could eventually contribute to more on-site accidents, lower overall productivity rates, and lower quality of work. This in turn could lead to lower morale and less teamwork. Ultimately, fatigue could lead to higher costs to the construction work, delays, and higher employee turnover rates.

This project will investigate fatigue as it relates to rapid renewal projects, providing an overview of sleep, fatigue, and alertness and how they impact performance, teamwork, and the potential for accidents and injury. The project will then discuss ways to mitigate fatigue by identifying safe limits for workers and supervisors.

The project will also identify different rapid renewal scenarios (night work, continuous extended hours, monthly, and yearly) and how fatigue may be minimized within each of them. The researcher will prepare reduced-fatigue work-hour scenarios and relate the scenarios to the size of the workforce needed to accomplish a targeted level of renewal activity. The researcher will also identify bidding strategies for rapid renewal projects that support reducing worker fatigue and allow additional flexibility to the contractor while not compromising overall project cost, quality, or schedule. All of these will be put into the context of an overall fatigue management program document.

Finally, the project will develop a range of techniques that could be used by both DOTs and contractors to help educate and condition the workforce about fatigue issues, to improve alertness, and to identify ways that fatigue can be mitigated during work time and between work shifts. While ample information on fatigue and its impact on safety and teamwork are available in non-highway environments, this information is not well documented in the highway construction environment.

There appear to be three discrete responses to fatigue issues on a rapid renewal project:

1. Individual workers, inspectors, and managers need to know more about fatigue, its relationship to work hours, stress conditions, rest periods, and diet, and ultimately to overall performance and safety.
2. Owners and contractors need to analyze the construction schedule set for rapid renewal projects to determine the potential for fatigue on the overall workforce. This will include some analysis of the number of shifts required along with the time allotted for potential rest periods.
3. Finally, it is important that DOTs and contractors understand the impact of how fatigue in individuals collectively causes stress and deterioration in team working relationships.

Anticipated Research Products:

- Recommendations for reducing worker fatigue and improving safety
- Fatigue management plans
- Toolbox of best practices
- Estimate of impacts on future workforce
- Tools, including those for management, that address team fatigue and increased stress
- Different types of organizational structures that promote worker fatigue reduction

Related Projects:

None

Project R10: Effective Project Management Strategies for Rapid Renewal Projects

Release Date: March 2009
Funds: $1.25 Million
Staff: James Bryant, jbryant@nas.edu

Objectives:
To develop for rapid-renewal projects:

- A guidebook for innovative project management with case examples of successful strategies;
- Workshop and training packages to support adoption of these management strategies by all stakeholders. Training packages shall include CD-based or web-based training modules

Statement of the Problem:

This project will address the managerial, engineering, overall coordination, and workforce challenges associated with rapid renewal projects. Rapid or accelerated projects typically involve complex logistical requirements, contractual procedures, and restrictive regulatory requirements that need careful planning and execution from inception to construction completion. Rapid renewal projects may range in size from moderately small to very large, complex megaprojects– each requiring a unique set of skills and approaches to ensure success. Larger projects may require multiple contracts, which further complicate these efforts.

Transportation agencies (TAs), contractors, consulting engineers, and other stakeholders will have to ensure that strong partnerships are in place that may be very different from traditional approaches. For example, the roles of the TA in the design-build process, implementation and execution of project warranties, implementation of full road closures, and other unique approaches, are very different from how the traditional organization approaches highway construction The decision-making practices and commitments of each of these entities must be harmonized to promote cooperation and efficiency.

A systematic research effort is required to study the unique requirements of rapid renewal projects. The research should describe how TAs, contractors, consulting engineers and other stakeholders work together on such projects including how they:

1. Configure lines of communication and authority
2. Organize to promote harmonization
3. Utilize decision-making mechanisms to promote efficiency and ensure that appropriate project decisions are made at appropriate times
4. Establish streamlined processes to minimize the impact of state and federal requirements.
5. Develop common goals and approaches to meet those goals

Based on the results of this study, TAs should be able to develop innovative and effective project management strategies that will accelerate sound decision-making during rapid renewal projects.

Anticipated Research Products:
Products will include training materials, pilot workshops, and subsequent workshop templates for use by TAs. An additional product will be guide contract language that promotes the most promising concepts.

Related Projects:
R09: Risk Manual for Rapid Renewal Contracts

Project R11: Strategic Approaches at the Corridor and Network Level to Minimize Disruption from the Renewal Process

Release Date: March 2009
Funds: $1.5 Million
Staff: Monica Starnes, mstarnes@nas.edu

Objectives:
The objective of this project is to (1) develop and implement a more structured definition of "corridor" as it relates to the selection of construction improvements and disruptions to the traveling public, (2) integrate constructability alternatives and construction packaging strategies early in the planning process, (3) address the impact of multiple corridor and project work on regional network flow, (4) establish the limits or work to minimize disruption during construction, (5) minimize downstream construction requirements that will cause disruption, and (6) improve timelines and optimize budget considerations from both an initial and life-cycle analysis.

Statement of the Problem:
Over the last several years, the transportation planning community has begun using the concept of corridor improvements to describe the current status and future needs for transportation improvements. However, the planner's transportation corridor analysis may not consider the entirety of infrastructure needs within that corridor. The analysis may not consider the impact that significantly different construction strategies may have on the overall budget, disruption to traveling public, disruption to commerce, and impacts on the local community during the actual construction operations.

Many transportation corridors are increasingly congested, limiting construction during traditional work times. DOTs are now recognizing the need to examine various construction alternatives within that corridor to determine the potential disruption these alternatives may have over time. In addition, many DOTs are seeing the need to examine regional networks with multiple corridors in order to examine the impact of constructing multiple corridors concurrently. Without examination of the constructability options early in the planning process, the impact on the traveling public and the local communities may increase dramatically.

Future corridor improvement analyses should address several important constructability factors, such as the following:

- What is the optimal selection of renewal activities—roadway, bridge, soils, drainage, safety improvements, signing, and other upgrades—that should be packaged into discreet construction contracts?
- How should DOTs address those components within the corridor that have significantly different remaining service lives?

- How should construction limits be set to minimize disruption to the traveling public and businesses while considering DOTs staffing limitations?
- What is the impact on the regional network when multiple corridors are being considered for reconstruction?
- What is the best way to calculate the benefits gained from various strategies as they relate to work accomplished, budget flow, and traffic mitigation?

One major consideration in packaging of construction work is the impact to the private sector highway construction industry. In most states, the industry consists of small to medium-sized companies that have limitations as to the amount and type of work they are qualified to perform. Experience to date shows that establishing longer project limits to accommodate traffic flow (10–15 miles, for example, rather than 4–6 miles) and to increase the amount of work done within the construction limits to minimize future disruptions might negatively impact the existing industry structure. This project should also consider the effectiveness of construction activities while managing risk.

Anticipated Research Products:

- Recommend practices and methodologies for establishing and planning corridor improvements including construction alternatives, budget constraints and management of traffic.
- Life-cycle cost analysis manual for optimizing corridor improvements. Additionally, a concise product that a legislator could use should be developed (i.e. brochure with appropriate charts, graphs, etc.)
- Guidelines and training materials that will help to facilitate the adaptation of corridor management in the planning phase of the renewal process.
- Procedure or process that can be employed by public agencies including recommendations and adjustments to the Projects Procedure Manuals

Related Projects:

- R02: Geotechnical Solutions for Soil Improvement, Rapid Embankment Construction, and Stabilization of the Pavement Working Platform
- R03: Identifying and Reducing Worker, Inspector, and Manager Fatigue in Rapid Renewal Environments
- R04: Innovative Bridge Designs for Rapid Renewal
- R05: Modular Pavement Technology
- R09: Risk Management

L05: Incorporating Reliability Performance Measures into the Transportation Planning and Programming Processes

Release Date: July 2009
Funds: $1.5 Million
Staff: William Hyman, whyman@nas.edu

Objectives:
Currently, the technical procedures needed to incorporate mobility and reliability performance measures into the transportation investment process are not available, and as a result the effect of short- and long-term strategies addressing mobility and reliability on traditional capital expenditures cannot be determined. The objective of this project is to develop procedures for the transportation planning and programming process that demonstrate the benefits of operational strategies aimed at improving mobility and reliability.

Project Summary:
This project will have three phases and will build on the statistical relationships between countermeasures and reliability performance measures developed in Project L03. In the first phase, the contractor will develop corridor and network level strategies using countermeasures and strategies from Projects L03, L07 and L11, integrated business processes identified in Project L01, and model results from Project L04, as well as information from other sources. The contractor will develop procedures for linking changes in performance measures to specific reliability improvement strategies (e.g., traffic incident management, work zone management). The second phase will consist of analyses of the tradeoffs in capital vs. operating expenditures that result from using mobility and reliability performance measures in the programming process. Both the short-range and long-range effects on transportation agency budgets and the user costs of shifting funds from capital improvements to operations-oriented strategies will be examined. The third phase will document how using performance measures fits into the short-range programming process; identify process steps where the strategies selected via performance measures conflict with those from the traditional programming process; and assess the effects of using the performance measures on the annual budget, expenditure of funds by types of improvement, and the priority ranking of projects.

Relationship to Other Projects:
Information from Projects L01, L03, L04, L07, and L11 will be used in this project. The project should be coordinated with the SHRP 2 Capacity focus area.

Expected Research Products:
This project will produce analyses of the impacts of reliability strategies on performance, programming, and budgets, and provide guidance on how reliability performance measures can be integrated into the transportation planning and programming processes.

L08: Incorporation of Non-recurrent Congestion Factors into the Highway Capacity Manual Methods

Release Date: July 2009
Funds: $0.5 Million
Staff: William Hyman, whyman@nas.edu

Objective:
The objective of this project is to determine how data and information on the impacts of the differing causes of non-recurrent congestion on highway capacity can be incorporated into the performance measure and level of service estimation procedures contained in the Highway Capacity Manual (HCM). The HCM is the main tool of designers for determining the appropriate size of a facility to meet future demand levels, but its limited information on the impacts of weather and work zones on freeway capacity is from other countries. No information is provided for other facility types or for other causes of non-recurrent congestion. The methodologies contained in the HCM for predicting delay, speed, queuing, and other performance measures for alternative highway designs are not currently sensitive to incident management techniques and other operation/design measures for reducing non-recurrent congestion.

Project Summary:
The contractor will review the work of Reliability Projects L03 and L07 and other sources and compile information on the frequency and capacity impacts of non-recurring incidents on highway capacity and how current and potential countermeasures can reduce the impact of non-recurrent congestion on facility delay, speed, queuing, and capacity. The contractor will then develop a plan for collecting data on significant gaps at selected U.S. sites for a variety of freeway, conventional highway, and urban street facilities.

The contractor will then develop a set of methodologies to accomplish the following: (a) predicting probability of occurrence and duration of non-recurring incidents for peak seasons, peak hours, and off-peak hours during the year as a function of the facility type, area type, terrain type, and other characteristics of the facility and its environs. This methodology should be sensitive to changes in operational strategies (e.g., incident management, work zone design, etc.); be capable of estimating capacity reduction as a function of event type and duration by season of year, day of week, hour of day; (b) predicting impacts on speed and delay of each event type that incorporates the probability of occurrence and duration of each event type; (c) predicting the effectiveness of various design and management strategies for reducing non-recurrent congestion.

Finally, the contractor—working with the TRB Committee on Highway Capacity and Quality of Service—will prepare draft sections of the HCM on the effect of non-recurrent congestion and the effectiveness of non-recurrent congestion management strategies for the urban arterials, signalized intersections, nonsignalized intersections, freeway basic sections, freeway merge sections, freeway weaving sections, and freeway facilities chapters of the manual.

Relationship to Other Projects:
Reliability Projects L01 and L07 provide valuable input to this project by identifying potential design feature options for reducing non-recurrent congestion. The HCM then needs to address the analysis of those features.

Expected Research Products:
This project will produce suggestions for new sections for the HCM, which is the essential highway operations analysis tool for the United States.

L09: Incorporation of Non-recurrent Congestion Factors into the AASHTP Policy on Geometric Design

Release Date: July 2009
Funds: $0.5 Million
Staff: William Hyman, whyman@nas.edu

Objective:
The objective of this project is to develop guidance on roadway design features that support the reduction of delays due to the key causes of non-recurrent congestion so that such features can be included in the AASHTO Policy on Geometric Design of Highways and Streets, the primary document used by state DOTs and other public agencies for the design of freeways, conventional highways, and urban streets. Currently this design guide does not provide explicit guidance on the placement and dimensions of facilities that support incident management and reduce the impacts of work zones.

Project Summary:
The contractor will review the results of L07 and other projects within the Reliability Research Program and identify cost-effective design features for reducing non-recurrent congestion for incorporation in AASHTO Policy Guide and prepare a report to be reviewed with appropriate AASHTO panels for comments and suggestions. Based on these reviews, the contractor, in conjunction with the AASHTO Subcommittee on Design, will provide background material to guide preparation of draft sections for the AASHTO design guide on specific design features for reducing non-recurrent congestion. This background material will be submitted to appropriate AASHTO panels for their consideration.

Relationship to Other Projects:
Project L07 provides valuable input to this project. Work on the project should be coordinated with Project L08, which can provide valuable analytical tools for quantifying the cost-effectiveness of the proposed design changes.

Expected Research Products:
This research will result in suggestions for new sections of the AASHTO highway design guide for the design of facility features to enhance incident management and work zone management.

L15: Reliability Innovations Deserving Exploratory Analysis (IDEA)

Release Date: July 2009
Funds: $0.5 Million
Staff: William Hyman, whyman@nas.edu

Objective:
The objective of this project is to elicit from the research community, businesses and others innovative and practical ideas for improving travel time reliability and to provide initial funding for a portfolio of projects. The hope is to attract a range of ideas to fund with the expectation that one or two, when developed further and implemented, would eventually have a large impact and payoff.

Statement of Problem:
There is considerable value in devoting a portion of the SHPR 2 research program's resources to the development of innovative ideas. The development of a portfolio of innovative projects will be modeled after the TRB program entitled Innovations Deserving Exploratory Analysis (IDEA). The TRB IDEA program funds two types of projects. Type I projects consist of the exploration of unproven concepts to demonstrate their validity. These are usually funded in the range of $25,000 to $100,000. Type II projects develop and test prototypes of proven concepts.

C18: Pilot Test the Collaborative Decision-Making Framework Including a Self Assessment Method

Release Date: July 2009
Funds: $1.25 Million
Staff: Steve Andrle, sandrle@nas.edu

Problem Statement
The Collaborative Decision-Making Framework will be fairly mature by January 2009, and a prototype electronic version will be available by summer of 2009. At that point it would be appropriate to seek sites to conduct a pilot test of the CDMF. It will not have all of its content until all of the research is done, but there will be enough to test elements of the framework. In July of 2009 we will issue a request for expressions of interest from state DOTS and MPOs (as appropriate) to exercise the CDMF. An Expert Task Group would be formed that includes several members of the TCC to prepare the request and review the expressions of interest. The request would require submitters to address:

- Commitment from management
- A testing plan that describes the key decision points the that they would address:
- What business processes they propose to investigate and change
- How consultants would be used. Who are they?
- An evaluation method. How do they know if they are better off?
- Preferred contracting method

At least three sites would be selected.