

**2007**

ANNUAL REPORT OF THE SECOND STRATEGIC HIGHWAY RESEARCH PROGRAM



**SHRP2**  
STRATEGIC HIGHWAY RESEARCH PROGRAM  
*Accelerating solutions for highway safety, renewal, reliability, and capacity*

# Asking WHY to Learn How

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OF THE NATIONAL ACADEMIES

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**SHRP 2**  
STRATEGIC HIGHWAY RESEARCH PROGRAM

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# WHY THE QUESTIONS MATTER

**T**ransportation researchers and engineers have long asked *what* we can do to make highways safer and *how* they can be built to last longer and operate more efficiently. Valuable information and life-saving improvements have resulted from the search for answers to those questions.

Because of this continual advancement, the system of highways that supports the nation's economy has served well beyond its design life in many areas. Improved pavements and maintenance techniques, improved roadway design and roadside hardware, and new safety technologies have all contributed to saving lives, time, and money. Continuing to deepen and broaden our knowledge in these areas is essential to sustaining the roadways we depend on as individuals and as a nation.

As demands increase, however, simply sustaining this resource may not be enough. Estimates project that vehicle miles traveled will increase 60% from 2005 to 2030.<sup>1</sup> Growing congestion increases risks to safety and can result in unreliable travel times and attendant economic costs. As eroding transportation benefits increasingly affect our quality of life, we need to develop new strategies for planning, designing, building, and operating the highway system. To effect strategic change, the most fundamental questions must be answered. We must understand 'why' to learn 'how.'

*Net Urban Congestion Costs in 2005 nearly \$80 billion*

- ▶ *4.2 billion hours of travel delay*
- ▶ *2.9 billion gallons wasted fuel*

Source: Texas Transportation Institute 2007 report

<sup>1</sup> Energy Information Administration, *Annual Energy Outlook 2007*. Report DOE/EIA-0383 (2007) Table 7.

The second Strategic Highway Research Program (SHRP 2) was developed to gather and deploy the intellectual, experiential, and financial resources necessary to answer the *why* questions about highway safety, renewal, travel time reliability, and capacity and to use that knowledge to develop our best options for implementing fundamental change.

This report describes the plans for finding the answers to those questions and summarizes the progress made during 2007. Section 1 is an overview of the program. Sections 2 through 5 describe the goals of the four research focus areas and include information on current projects; the complete research plan for each focus area is available on the SHRP 2 Website: [www.TRB.org/SHRP2](http://www.TRB.org/SHRP2). Section 6 summarizes outreach activities, Section 7 provides administrative and financial information, and Section 8 gratefully acknowledges the people who served SHRP 2 in 2007.

# Program Overview

## *Background*

In August 2005 the United States Congress authorized the second Strategic Highway Research Program to pursue applied research strategically targeted to achieve ambitious goals—fewer crashes, renewed and long-lasting highway infrastructure, increased highway capacity, and reliable travel times. SHRP 2 is being conducted under a memorandum of understanding among the American Association of State Highway and Transportation Officials (AASHTO), the Federal Highway Administration (FHWA), and the National Academy of Sciences, parent organization of the Transportation Research Board (TRB). The memorandum requires an annual report of progress, which is the basis for this document.

In late March 2006, funding for the program's first year became available through an agreement with FHWA, initiating a fast-paced schedule of actions to staff the program, establish committees, and refine research plans. By January 2007, membership was confirmed for the oversight committee, four technical committees, and a number of smaller expert task groups; research plans were developed in each of the focus areas; a work plan for the year was approved; and five research contracts were under way. As of January 2008, 26 research projects are active, with a total contract value exceeding \$36 million.

*...and the Academy shall, whenever called upon by any department of the Government, investigate, examine, experiment, and report upon any subject of science or art....*

March 3, 1863  
Abraham Lincoln, President

The goal for SHRP 2 as defined in *TRB Special Report 260: Strategic Highway Research: Saving Lives, Reducing Congestion, Improving Quality of Life* is to provide the information that transportation agencies need to deliver excellent customer service. Excellent service means that highway users can safely and reliably arrive at their destination on long-lasting roadways that enhance communities and are environmentally responsible. The four objectives described as critical to achieving that goal have become the focus areas for research in SHRP 2.

### ***What's New in SHRP 2***

SHRP 2 is guided by the policies of the National Research Council, the principal operating agency of the National Academy of Sciences and the National Academy of Engineering, which promote sound and robust science and rigorous, independent review. SHRP 2 is administered in much the same way as the other contract research programs managed by TRB, but the nature of the inquiries it pursues makes it distinct in some important ways.

Answering *why* questions requires integrating information across all the factors that influence the issues under study, so SHRP 2 projects are often of longer duration and higher cost than is typical in a program of applied contract research. Many are conducted by research teams that combine areas of expertise and are staged in phases to define what is known about the various influencing factors, to establish a baseline of best practices, and to identify the gaps in knowledge that must be filled to reach the ultimate project goal.

The goals, too, are different in the scope of their intended impact. The safety research, for example, will result in the largest and most inclusive data set on driver behavior ever collected, which will be a rich resource for years to come. One of the most challenging and promising endeavors of SHRP 2 involves tools for integrating some of the priorities and practices of transportation agencies and all the other public agencies whose missions intersect. These tools are important because improving transportation services requires fluid processes that effect and support institutional changes, and more than a few SHRP 2 projects have this aim. Other program objectives that set SHRP 2 research apart include:

- ▶ Adapting advances in human factors research, organizational theory, environmental science, data management, telecommunications technologies, and other sciences to benefit transportation
- ▶ Strategically linking projects across focus areas to leverage technical expertise and enable information networks

- ▶ Developing the basis for broad application of innovative technologies and procedures.

## Program Facts

SHRP 2 was created under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) legislation. With input from hundreds of knowledgeable people, four areas of focused research and 65 projects have been defined and budgeted to fit within the \$150 million, 7-year program framework. SHRP 2 is guided by an Oversight Committee, which has responsibility for all aspects of the program's research activities, and by a technical coordinating committee in each of the four focus areas, which recommends the research plan and monitors the conduct of research. Small expert task groups are convened as needed to draft requests for proposals, review proposals, and provide additional technical expertise.

Program staff currently includes 17 people who work closely with liaisons from FHWA and AASHTO and with volunteer experts from across North America. International exchange is promoted through the efforts of loaned staff from Canada and in the coming year from the Netherlands to establish regular contact with the global transportation community, and to encourage joint initiatives.

Some outreach highlights in 2007—

- ▶ Representatives of the world's major automobile manufacturers attended a special meeting in May to discuss technical aspects of safety research in SHRP 2.
- ▶ More than 100 members of the international safety data community participated in the second SHRP 2 Safety Symposium held in July.
- ▶ SHRP 2 staff assisted the European Joint Transport Research Committee in organizing a round table held in Boston in October where leading international economists and US policy practitioners debated the economic impact of transportation investment.
- ▶ SHRP 2 director presented at a November workshop of the Federation of European Highway Research Laboratories held in Brussels.
- ▶ Researchers for two SHRP 2 capacity projects held a joint working session to strengthen collaboration among the two teams.



International participants Jean-Pierre Médevielle and Guy Bourgeois at the 2007 TRB Annual Meeting



# Safety Research in SHRP 2

## *Why do crashes happen?*

Experts and highway users generally agree that driver behavior is a factor in most highway crashes. But studying how drivers behave to understand why they have—and don't have—crashes has been limited by the type and amount of data available. Now, techniques for assessing risk that have proven successful in medical studies and advanced technologies envisioned for intelligent transportation systems can provide objective, exposure-based risk estimates and detailed information on driving performance—and driving errors—that could not be measured before. About 40 percent of the total SHRP 2 investment, \$43.2 million, is focused on developing a more rigorous and detailed understanding of the relationship of the many factors responsible for collisions and casualties so that ways can be found to significantly reduce the number of people killed and injured on our highways.

In the largest coordinated safety program ever undertaken in the United States, thousands of volunteer drivers will be monitored over approximately two years. On-board sensors and video recording systems will collect extensive data on vehicle status, such as speed and direction; on driver inputs, such as braking, steering, accelerating, and specific behaviors, such as cell phone use, that lead to driver distraction; and also on the roadway, surrounding traffic, and environmental conditions.

*In 2006, a traffic crash occurred every 5 seconds, someone sustained a traffic related injury every 12 seconds, and someone died in a traffic crash every 12 minutes.*

Source: US DOT/Research and Innovative Technology Administration

A great deal of work must precede that massive data collection effort and it is under way in current Safety projects. The research plan for Safety includes nine projects; the four projects active in 2007 are listed in Table 1.

**TABLE 1****Active Safety Projects**Kenneth Campbell: [kcampbell@nas.edu](mailto:kcampbell@nas.edu)

<b>No.</b>	<b>Project Title</b>	<b>Contractor</b>	<b>\$ Millions</b>	<b>Start</b>	<b>End</b>	<b>Status</b>
S01	Development of Analysis Methods Using Recent Data (multiple awards)	S01(A) University of Minnesota	\$1.5	02/05/07	07/04/09	Phase I report under review.
		S01(B) The Pennsylvania State University		03/19/07	06/18/09	Phase I report under review.
		S01(C) University of Michigan		02/05/07	07/04/09	Phase I report under review.
		S01(D) University of North Carolina		03/01/07	06/30/09	Phase I report under review.
		S01(E) Iowa State University		03/02/07	06/01/09	Phase I report under review.
S03	Roadway Measurement System Evaluation	Applied Research Associates	\$0.5	12/19/07	3/18/09	Contract recently signed; work under way.
S05	Design of the In-Vehicle Driving Behavior and Crash Risk Study	Virginia Tech Transportation Institute	\$3.0	06/01/07	05/31/09	Sample design interim report under review
S09	Site-Based Video System Design and Development	University of Michigan	\$1.0	02/28/07	11/27/08	Work is under way; no deliverables received yet.



## Project Highlights

### S01: Development of Analysis Plans Using Recent Data

A field study of driving behavior is the major activity of safety research in SHRP 2, collecting data on thousands of drivers in differing regions of the country as they use the roadways in the course of their everyday activities. Technologies provide the opportunity to acquire a vast array of data, but to be sure that the critical types of data are gathered, it helps to know what methods future researchers will use to analyze the SHRP 2 data to develop lifesaving countermeasures.

Safety project S01 addresses this issue. Five research teams under separate contracts are devising plans for analyzing complex data sets, specifying risk measures (including traffic conflicts and other crash surrogates), response and control variables, and analysis methods, and then using data from previous studies to implement the plan and test the methods. These five sample plans will inform the design of the field study, providing critical information about the data types that will be most valuable.

### S03: Roadway Measurement System Evaluation

The driving behavior field study will observe how drivers interact with aspects of the roadway itself—its geometry, geography, and roadside features—to study the relationship of road characteristics to the risk of road departure. Project S03 will evaluate mobile systems that SHRP 2 might use to collect these data types. Transportation agencies also use mobile data collection systems in their asset management programs, and the evaluation procedure developed in project S03 may provide a standard that will be useful to public agencies.





Widening Routes I-238/880 and rehabilitation near San Leandro to reduce congestion

Photo by John Huseby, Caltrans

# Renewal Research in SHRP 2

*Why is there a work zone on this road again?*

To understand why there are so many work zones that can result in congestion and delay, we need only remember that the nation recently noted the 50<sup>th</sup> anniversary of the Interstate Highway System. We have approached the limits of the engineering and construction successes of earlier decades. The challenge now is to rebuild the aging infrastructure while we are using it and living next to it. In accomplishing this massive undertaking, we must find ways to rapidly rebuild the system with long-lasting facilities and minimal disruption: to get in, get out, and stay out.

To minimize the time that motorists are delayed, renewal research is seeking better and faster methods for nondestructive testing for materials and structures; for high-speed construction inspection; and for prefabricated, modular, standardized, and roll-in components. To build facilities that last and can be more efficiently maintained, renewal research is developing the means to integrate materials selection with construction techniques, enabling the best options for specific conditions.

During highway construction projects, people solve problems with ingenuity as a matter of course. Occasionally, truly innovative techniques and materials that could be applied successfully across the industry are devised but not captured. To identify and validate such innovations and develop model specifications for their implementation is another renewal objective. A related goal is to find ways to transform the contracting environment to encourage innovation by both owners and builders.

The research plan for Renewal includes 13 projects with a total contract value of \$28.9 million; the nine projects active in 2007 are listed in Table 2.

TABLE 2

## Active Renewal Projects

A Robert Raab: rraab@nas.edu

No.	Project Title	Contractor	\$ Millions	Start	End	Status
R01	Encouraging Innovation in Locating and Characterizing Underground Utilities	Louisiana Tech University	\$0.3	02/12/07	10/11/08	Work is under way; draft deliverables have been reviewed but final Phase 1 report has not been delivered yet.
R02	Geotechnical Solutions for Soil Improvement, Rapid Embankment Construction, and Stabilization of the Pavement Working Platform	Iowa State University	\$3.0	9/25/07	9/24/11	Work is under way; no deliverables received yet.
R04	Innovative Bridge Designs for Rapid Renewal	HNTB Corporation	\$2.0	10/8/07	10/7/11	Work is under way; no deliverables received yet.
R06	High-Speed, Nondestructive Testing Procedures for Both Design Evaluation and Construction Inspection	Texas A&M Research Foundation	\$0.35	3/16/07	3/15/08	Work is under way; draft deliverables have been reviewed but final report has not been delivered yet.
R07	Performance Specifications for Rapid Highway Renewal	Trauner Consulting Services, Inc.	\$3.0	02/27/07	02/26/12	Work is under way; Phase 1 report is current under review.
R09	Risk Manual for Rapid Renewal Contracts	Golder Associates	\$0.25	12/21/07	12/20/09	Contract recently signed; work under way.
R15	Strategies for Integrating Utility and Transportation Agency Priorities in Renewal Projects	ICF International	\$0.25	02/05/07	07/04/08	Work is under way; no deliverables due yet.
R19A	Bridges for Services Life beyond 100 Years: Innovative Systems, Subsystems, and Components	University of Nebraska-Lincoln	\$2.0	12/21/07	12/20/11	Contract recently signed; work under way.
R21	Composite Pavement Systems	Applied Research Associates	\$4.0	9/4/07	9/3/11	Work is under way; no deliverables received yet.

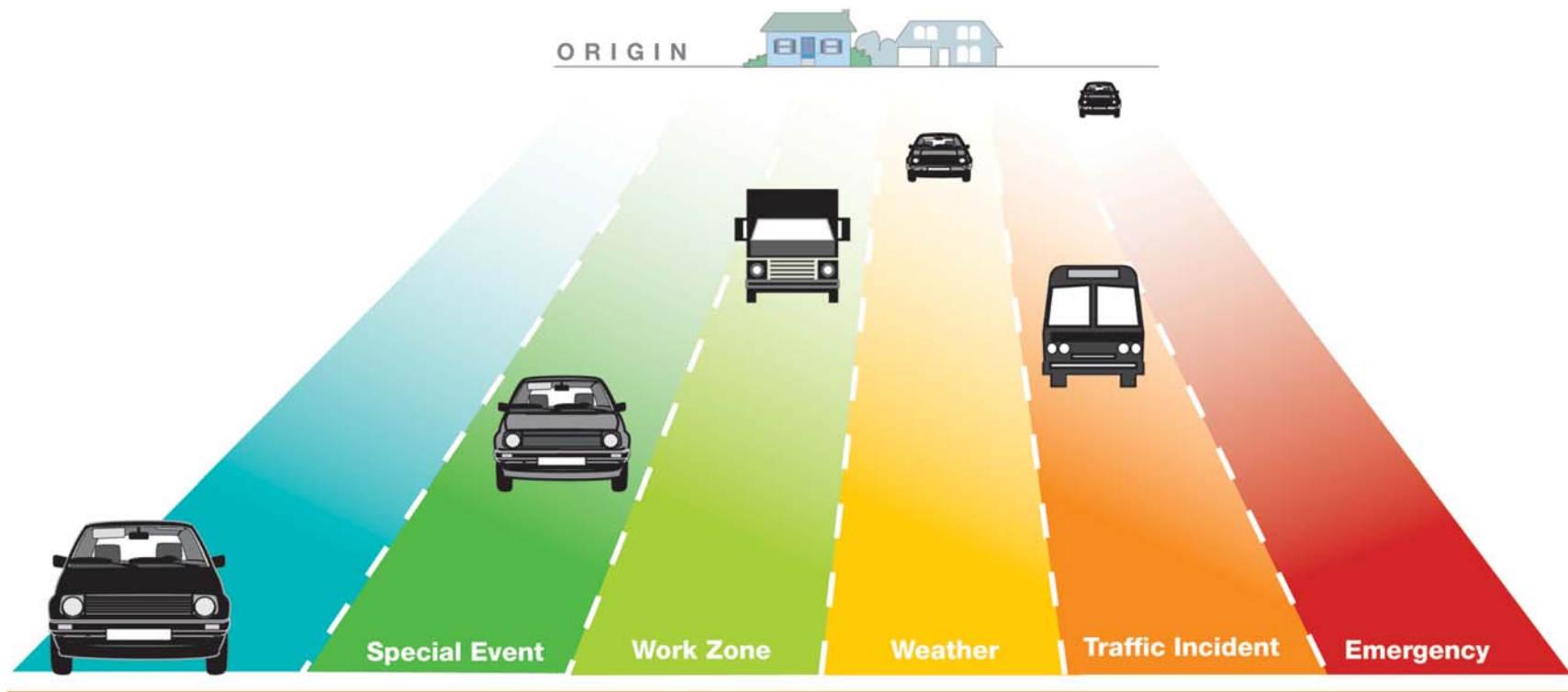
## Project Highlight

### Renewal Project R06: A Plan for Developing High Speed, Nondestructive Testing Procedures for both Design Evaluation and Construction Inspection

Where rapid renewal is the goal, the impetus to develop accelerated methods for testing materials and inspecting construction is strong. This Renewal project addresses the need for technologies that reduce traffic disruption and provide more rapid and reliable information during highway renewal projects. The research objective is to develop a process to identify existing or develop new and quickly implementable technologies for rapid, nondestructive testing of in situ conditions for design, construction inspection, and performance monitoring.

A symposium sponsored jointly by the Forum of European Highway Research Laboratories (FEHRL) and SHRP 2 was held at the TRB Annual Meeting to further the research on project R06. Presentations included current and emerging technologies in nondestructive testing as well as unmet needs and plans for new methods. A final report on the project is expected in 2008.





Factors affecting travel time reliability

# Travel Time Reliability Research in SHRP 2

*Why is travel time so unpredictable?*

When planning their commute or the drive to their holiday destination, most people add extra time to their schedule to allow for possible delays on the way. Truckers faced with just-in-time delivery do likewise. Sometimes, the built-in extra time is not needed and sometimes it is. Reliability research in SHRP 2 addresses unpredictable interruptions to traffic flow because reducing travel time variation can help reduce congestion.

Some of the Reliability research will develop metrics to help transportation agencies directly compare results from improvements in highway operations with the benefits of new construction. Without ways to measure the benefits of new techniques for managing traffic, they will not likely be included in planning and programming models or receive funding support.

There is evidence that further improvements in managing highway operations would yield real benefits, especially on urban freeways. SHRP 2 investigators are gathering that evidence to determine how the techniques can be replicated when weather, emergencies, or work zones interrupt the flow of traffic.

The Reliability research plan includes 15 projects with a total value of \$17.95 million. The two projects listed in Table 3 were active in 2007. The screenshot on page 16 illustrates how travel time data can be used to predict reliable arrival times.



TABLE 3

## Active Reliability Projects

William Hyman: whyman@nas.edu

No.	Project Title	Contractor	\$ Millions	Start	End	Status
L03	Analytic Procedures for Determining the Effects of Mitigation Measures	Cambridge Systematics, Inc.	\$1.75	02/27/07	02/26/09	Draft Experimental, Analysis, and Data Collection Plans under review.
L06	Institutional Architectures for Advanced Operations Strategies	PB Consult, Inc.	\$1.0	02/28/07	02/27/09	Working session conducted to obtain guidance from stakeholders.

### 95% Reliable Travel Times from the Washington State DOT Web site

[www.wsdot.wa.gov/traffic/seattle/traveltimes/reliability](http://www.wsdot.wa.gov/traffic/seattle/traveltimes/reliability)

Where are you starting from ?

SeaTac

Where are you going ?

Seattle

What time do you need to get there?

8 :  
00 AM



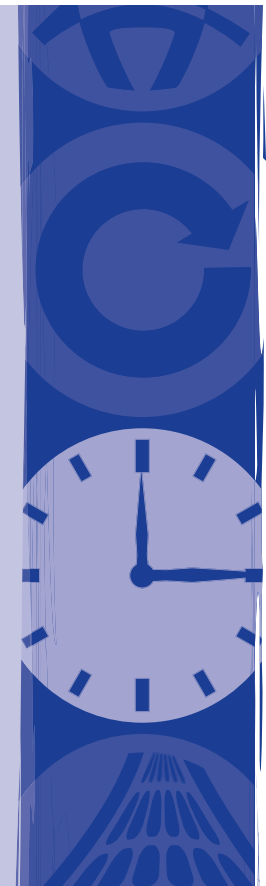
SeaTac - Seattle

Your 95% Reliable Travel Time is **35** minutes.

95% of the time you would need to leave at **7:25 AM** to arrive by 8:00 AM.

Calculate Your Commute - This feature uses travel time data to provide a reasonable approximation of the "worst case" travel time scenario. By allowing for the calculated travel time, commuters can expect to arrive at the end of the route, on time, 19 out of 20 working days a month (95 percent of trips). These travel times are based on weekday travel time data from the hours of 6:00 AM to 7:00 PM for 2006. You may also want to view the chart displaying current travel times.

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## Project Highlight

### Reliability Project L06: Institutional Architectures to Advance Operational Strategies

Non-recurring congestion caused by unanticipated incidents and by planned events is believed to be the principal cause of unreliable highway travel times and a major source of travel delay. Effective strategies to reduce the impact of non-recurring congestion are known, but are not widely applied. Research conducted early in this project suggests that a common set of preconditions must exist in transportation and other agencies so that these effective operational strategies can be carried out.

The research team conducted a workshop in November 2007 at which leading practitioners began to develop a range of institutional architectures—both evolutionary and revolutionary—that support interagency implementation of strategies for managing non-recurring congestion. The workshop included representatives of transportation agencies, construction contractors, traveler information providers, police, fire, emergency medical services, and traffic media who are responsible for the actions taken to mitigate travel time unreliability and who have key management, operations, legal, administrative, and related responsibilities. A series of executive forums to refine and test the architectures will be held in the coming months.





# Capacity Research in SHRP 2

*Why can't we fix congestion?*

That our transportation network is strained to capacity in some areas is no secret. When adding highway capacity is the chosen solution to specific transportation issues, new opportunities open for communities to help shape their future. However, concerns about the environment, economic impacts, land use, cost, and the effects of new roads on communities make it difficult to reach a consensus solution. The goal of Capacity research in SHRP 2 is to create a system that can be adapted anywhere for reaching decisions collaboratively. This may lead to better transportation solutions designed to address local and regional concerns, reducing the likelihood of community opposition and delay.

More than half of the Capacity projects directly support developing a framework of processes to help balance competing priorities and to consistently lead groups to collaboratively reach the best decision at each of many key decision points.

The remaining projects focus on ecological approaches to surface environmental protection, estimating the economic impacts of highways in a more satisfying, transparent manner, and revolutionizing travel demand forecasting.

The Capacity research plan includes 16 projects and totals \$18 million. The three projects active in 2007 are listed in Table 4.



S-curve project in Grand Rapids, Michigan, includes a streetside park and parking lots under the bridge

TABLE 4

## Active Capacity Projects

Stephen Andrie: sandrie@nas.edu

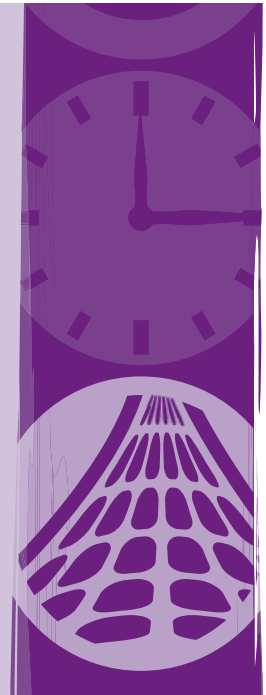
No.	Project Title	Contractor	\$ Millions	Start	End	Status
C01	A Framework for Collaborative Decision Making on Additions to Highway Capacity	ICF International	\$2.6	02/09/07	02/08/10	Phase I and II Case studies completed December 2007.
C02	System-Based performance Measurement Framework for Highway Capacity Decision Making	Cambridge Systematics, Inc.	\$0.825	02/28/07	02/27/09	Final deliverable due March 2008
C04	Improving our Understanding of Highway Users and the Factors Affecting Travel Demand	PB Americas	\$1.0	9/21/07	1/21/10	Work is under way; no deliverables due yet.

## Project Highlight

### C01: A Framework for Collaborative Decision Making on Additions to Highway Capacity

About 50 key decision points are encountered in the process of planning a project to increase highway capacity, according to researchers for Capacity project C01. Each of these points requires a process for gathering, balancing, and integrating input from stakeholders who are in some way affected by the project.

A draft framework for consistently achieving collaborative decisions at each of these critical points is being developed from 25 detailed case studies from around the country. The framework will be further developed in a series of national working sessions that begin in February 2008. Findings and results of nine other projects in the Capacity focus area will be incorporated into the framework, resulting in a system for overcoming obstacles to increasing highway capacity.



# Collaborations and Communications

## *International Activities*

Because safe and efficient travel is fundamental to economies all over the world, the SHRP 2 research questions echo around the globe. About 75 members of transportation organizations across Europe and in Canada, Australia, New Zealand, South Korea and the Pacific Rim, and South Africa serve as SHRP 2 representatives to their home organizations, forwarding updates they receive from the SHRP 2 International Coordinator.

In 2007, both Europe and Canada began formulating proposals for research programs patterned after the SHRP 2 Safety study, in collaboration with SHRP 2 staff who provided the ongoing results of planning and study design efforts, and by promoting technical discussion at annual workshops.

Members of the Joint Transport Research Committee (JTTC), of the Organisation for Economic Co-operation and Development (OECD), and the International Transport Forum (ITF), as well as the Forum of European Highway Research Laboratories (FEHRL), have participated in SHRP 2 events and hosted SHRP 2 staff at conferences in Europe.



Bojan Leben, Slovenian National Building and Civil Engineering Institute

## Symposia

In the SHRP 2 lexicon, symposia are open gatherings where individual stakeholders and experts can interact with SHRP 2 research teams. Such events are intended to maintain transparency in the conduct of large research projects and to keep investigations fresh by exchanging information across communities of interest.

The Safety program held its second annual symposium in July 2007. During the two-day event, about 100 attendees heard presentations on the status of active Safety contracts, future activities and plans. The next symposium is scheduled for July 17–18, 2008.

The major automotive manufacturing companies were invited to a symposium to learn about the driving behavior study and to discuss opportunities for technical collaboration. More than 20 representatives from nine manufacturers attended, including senior representatives of the two sector associations who subsequently were named liaison members of the Safety Technical Coordinating Committee.



William Strawderman of Rutgers University presents at the 2007 Safety Symposium

A number of other meetings in which SHRP 2 research teams brought together leaders and experts from federal, state, local, private, and academic sectors to broaden the discussion of current investigations took place in 2007. And in other cases, research teams from different projects met to coordinate their activities.

Further opportunities for collaboration are pursued through a network of State Coordinators who stay current on SHRP 2 activities and make information available to their colleagues. TRB's Technical Activities Division has instituted a series of staff briefings so that current SHRP 2 information can be made available at their conferences and as part of the staff's field visits to state transportation departments and other organizations. The AASHTO Annual Meeting and meetings of standing committees have also been opportunities to interact with communities of practice.

## Communications

This year the SHRP 2 Website ([www.TRB.org/SHRP 2](http://www.TRB.org/SHRP2)) and the weekly TRB transportation research e-newsletter have been the major means of communicating news and information about the program. Two new Website features were added in 2007. These include a data base where research organizations can list their areas of expertise and indicate their interest in teaming with others to propose on

SHRP 2 projects. The second is a Projects Database that provides details of each research project at the same URL throughout the life of the project, from request for proposals to final report.

Four-page Program Briefs that update individual research focus areas were published three times during the year and more general program updates were published quarterly. A non-technical overview of program goals was also developed and widely distributed as an article titled “SHRP 2 Tackles the Human Side of Reducing Crashes and Congestion.”

The TRB Annual Meeting was also a communications opportunity, and SHRP 2 researchers and staff made dozens of presentations to committees and presented at four formal sessions. Visitors to the exhibit hall could meet with staff, view the display, and pick up the latest program information.

### ***Planning for Implementation***

One of the lessons learned from the first Strategic Highway Research Program was to consider how to implement research findings in parallel with the conduct of the research. Even before the research questions are answered, consideration of the knowledge and needs of those who are likely to use the research output is essential to a valid and useful result.

With this in mind, the Congress directed TRB to prepare a report on implementation strategies and an organizational structure for implementing the results of SHRP 2. Accordingly, the National Research Council appointed a committee of experts chaired by Kirk T. Steudle, Director of the Michigan Department of Transportation. The committee met for the first time in December 2007 to gather information from stakeholders as a critical step in developing the outline for the report. The SHRP 2 Technical Coordinating Committees also are beginning to address implementation issues as the individual research plans move forward.

TABLE 5

## Projects Included in the 2007 Work Plan

No.	Project Title	March Advertisement	July Advertisement	2007 Total
<b>SAFETY</b>				
S02	Integration of Analysis Methods and Development of Analysis Plans		\$500,000	
S03	Specification and Acquisition of Roadway Information Measurement Van	\$1,500,000		
	<i>Total for Safety</i>	<i>\$1,500,000</i>	<i>\$500,000</i>	<i>\$2,000,000</i>
<b>RENEWAL</b>				
R09	Risk Manual for Rapid Renewal Contracts	\$250,000		
R21	Composite Pavement Systems	\$4,000,000		
R02	Geotechnical Solutions for Soil Improvement, Rapid Embankment Construction and Stabilization of the Pavement Working Platform	\$3,000,000		
R19	Durable Bridge Subsystems	\$3,000,000		
R04	Develop Bridge Designs That Take Advantage of Innovative Construction Technology	\$2,000,000		
R16	Railroad-DOT Institutional Mitigation Strategies		\$400,000	
R26	Preservation Approaches for High Traffic Volume Roadways			\$250,000
R05	Modular Pavement Technology		\$1,000,000	
R23	Using Existing Pavement in Place and Achieving Long Life		\$1,000,000	
	<i>Total for Renewal</i>	<i>\$12,250,000</i>	<i>\$2,650,000</i>	<i>\$14,900,000</i>
<b>RELIABILITY</b>				
L02	Establishing Monitoring Programs for Mobility and Travel Time Reliability		\$1,300,000	
L07	Identification and Evaluation of the Cost-Effectiveness of Highway Design Features to Reduce Non-Recurrent Congestion	\$2,500,000		
L11	Evaluating Alternative Traffic Operation Strategies	\$4,000,000		
L12	Improving Traffic Incident Scene Management		\$1,000,000	
	<i>Total for Reliability</i>	<i>\$6,500,000</i>	<i>\$2,300,000</i>	<i>\$8,800,000</i>
<b>CAPACITY</b>				
C03/ C06	Interactions Between Transportation Capacity, Economic Systems, and Land Use merged with Integrating Economic Considerations in Project Development		\$4,000,000	
C04	Improving Our Understanding of Highway Users and the Factors Affecting Travel Demand	\$1,000,000		
C05	Understanding the Contribution of Operations, Technology, and Design to Meeting Highway Capacity Needs		\$1,000,000	
	<i>Total for Capacity</i>	<i>\$1,000,000</i>	<i>\$5,000,000</i>	<i>\$6,000,000</i>
<b>TOTAL FOR ALL FOR FOCUS AREAS</b>		<b>\$21,250,000</b>	<b>\$10,450,000</b>	<b>\$31,700,000</b>



# Administration and Budget

## *Administration*

SHRP 2 benefits from stakeholder governance in a structure that guards against conflicts of interest while keeping the needs of the transportation community in focus. An Oversight Committee of 15 members guides the conduct of the program and must approve research plans and contract awards before they can be finalized. Four Technical Coordinating Committees (TCCs) guide the conduct of the research for each of the four focus areas. At the project level, a short-term Expert Task Group (ETG) is appointed to develop a request for proposals, review proposals, and select contractors for approval by the Oversight Committee. Nominations for ETG members are requested from SHRP 2 State Coordinators (largely synonymous with the TRB State reps), from AASHTO and TRB Standing Committees, from existing SHRP 2 committees and task groups, from sponsor staff, within the National Academies, from technical associations, and through Web and library reference searches. These ETGs are disbanded when that process is completed, and the TCC takes over monitoring the research project.

## *Budget*

SHRP 2 program funding is transferred from the Federal Highway Administration in accordance with a Cooperative Memorandum of Agreement signed in January 2006. Table 5 lists the proj-

ects approved and funded for the 2007 work plan and Table 6 shows the program and administrative expenses for the year. Table 7 lists income and obligation projections for each year of the program. Table 8 shows how the research pursued in SHRP 2 supports national transportation goals that have been identified as the most critical needs for improving highway safety and efficiency.

**TABLE 6****Program Funds and Expenditures Summary through 2007**

<b>Total funds available to date</b>	<b>\$75,877,681</b>
Funds committed for projects through June 30, 2008	\$38,080,000
Funds expended on administration through December 31, 2007	\$5,474,506
Funds currently available for 2008	\$32,323,175

TABLE 7

## SHRP 2 Projected Income and Obligations

December 20, 2007

## Income Made Available by Congress/FHWA, by Federal Fiscal Year

	FFY 2006	FFY 2007	FFY 2008	FFY 2009
Authorized Amount	\$51,250,000	\$51,250,000	\$51,250,000	\$51,250,000
<b>Actual/Estimated Income</b>	<b>\$36,183,638</b>	<b>\$39,694,043</b>	\$37,960,363	\$37,960,363
	<i>actual</i>	<i>actual</i>	<i>calculated</i>	<i>calculated</i>

<i>Calendar Year</i>	CY 2006	CY 2007	CY 2008	CY 2009	CY 2010	CY 2011	CY 2012	Totals
<b>CUMULATIVE INCOME</b>	\$36,183,638	\$75,877,681	\$113,838,044	\$151,798,407	\$151,798,407	\$151,798,407	\$151,798,407	\$151,798,407
<b>ESTIMATED EXPENSES BY CALENDAR YEAR</b>								
Administrative Expenses <sup>1</sup>	\$1,548,397	\$3,700,000	\$5,800,000	\$7,089,000	\$6,689,000	\$4,189,000	\$1,100,000	\$30,115,397
Research Reports			\$215,000	\$911,000	\$1,011,000	\$911,000		\$3,048,000
Funds Available								\$118,635,010
Contract Research (% let per year)	14%	21%	47%	17%	1%			
<b>PROGRAMMING BUDGET</b>								
Funds Available	\$36,183,638	\$53,139,563	\$62,774,933	\$44,070,296	\$17,120,296	\$16,260,010	\$11,160,010	
Administrative Expenses <sup>1</sup>	-\$1,548,397	-\$3,700,000	-\$5,800,000	-\$7,089,000	-\$6,689,000	-\$4,189,000	-\$1,100,000	-\$30,115,397
Research Reports <sup>2</sup>	-\$215,000	-\$911,000	-\$1,011,000	-\$911,000				
Contingency Fund <sup>3</sup>	-\$5,664,721	-\$2,299,993			\$7,964,714			
Contract Obligations (Actual/Estimate)	<b>-\$15,525,000</b>	<b>-\$22,325,000</b>	-\$50,650,000	-\$18,950,000	-\$1,125,000			-\$108,575,000
Cumulative Balance (Carry Forward)	\$13,445,520	\$24,814,570	\$6,109,933	\$17,120,296	\$16,260,010	\$11,160,010	\$10,060,010	

## Notes:

<sup>1</sup>Administrative expenses include staff, travel, meetings, publications other than research reports, and all indirects. The amounts for each year are rounded from estimates included in the funding agreement.

<sup>2</sup>Research reports include all contractor final reports and implementation report to Congress

<sup>3</sup>A contingency fund equal to 5% of the total authorized funds available for research plus any RABA funds allocated post-authorization. If not otherwise committed by CY2010, it will be committed to research contracts.

TABLE 8

## Relationship Between SHRP 2 Focus Areas and US DOT and FHWA Strategic Goals

US DOT Strategic Goals	FHWA Vital Few (VF) and Selected Strategic Goals (in italics)	SHRP 2 Research Focus Areas			
		Safety	Renewal	Reliability	Capacity
<b>Safety:</b> <i>Enhance public health and safety by working toward the elimination of transportation-related deaths and injuries.</i>	<b>VF: Safety</b> <ul style="list-style-type: none"> <li>▪ <i>Reduce roadway departure fatalities.</i></li> </ul>	Goal: to prevent or reduce the severity of highway crashes by understanding driver behavior.  SHRP 2 Safety research is aimed at reducing crashes and fatalities from various sources. Road departure crashes will be a particular focus of the research.	Goal: to renew aging infrastructure through rapid design and construction methods that cause minimal disruption and produce lasting facilities.	Goal: to reduce congestion through incident reduction, management, response, and mitigation.	Goal: to integrate mobility, economic, environmental, and community needs into the planning and design of new highway capacity.
<b>Reduced Congestion:</b> <i>Reduce congestion and other impediments to using the Nation's transportation system.</i>	<b>VF: Congestion Mitigation</b> <ul style="list-style-type: none"> <li>▪ <i>Sustain improvements to system operating practices.</i></li> <li>▪ <i>Mitigate impacts of congestion through local partnerships.</i></li> <li>▪ <i>Reduce work zone and incident delay through anticipation and mitigation.</i></li> </ul>			SHRP 2 Reliability research will focus on data, performance measures, design improvements, operational strategies, and institutional approaches to anticipate and mitigate the effects of non-recurring incidents on travel time and congestion.	
<b>Global Connectivity:</b> <i>Facilitate an international transportation system that promotes economic growth and development.</i>		Although SHRP 2 research does not focus on an international transportation system, per se, the program does involve international representation on stakeholder committees, international loaned staff, and coordination and cooperation with international highway research organizations and programs. Renewal, Reliability, and Capacity research will enable a more efficient and reliable system, thereby improving global access and American competitiveness.			
<b>Environmental Stewardship:</b> <i>Promote transportation solutions that enhance communities and protect the natural and built environment.</i>	<b>VF: Environmental Stewardship &amp; Streamlining</b>				SHRP 2 Capacity research addresses environmental and community aspects of highways and improved decision making.
<b>Security, Preparedness and Response:</b> <i>Balance transportation security requirements with the safety, mobility and economic needs of the Nation and be prepared to respond to emergencies that affect the viability of the transportation sector.</i>	<ul style="list-style-type: none"> <li>▪ <i>Ensure preparedness for response to, and recovery from, malevolent attacks on highway infrastructure.</i></li> <li>▪ <i>Facilitate military deployment from forts to ports.</i></li> </ul>			SHRP 2 does not explicitly focus on security, but results from Reliability research to plan for and respond to transportation incidents (technologies, institutional coordination, etc.) are applicable to security-related incidents	

SHRP 2 is a short-term program with ambitious goals. The result is an aura of urgency among the volunteer experts, contractors, and staff to bring clarity to complex issues in a compressed schedule. One volunteer captured the sentiment shared by many when he said that he had been “worked like a rented mule” but appreciated the opportunity. Although members of the 13 short-term expert task groups formed in 2007 are not listed here, the value of their contributions cannot be overstated and SHRP 2 gratefully acknowledges their service. Similarly, we express our great appreciation to members of the Oversight and Technical Coordinating Committees whose insight and expertise guide the entire program and to members of the Implementation Committee who bring both wisdom and enthusiasm to their task. Members of these long-term committees are listed below.

### **Oversight Committee for the Second Strategic Highway Research Program**

**Chair:** Allen D. Biehler, *Secretary of Transportation, Pennsylvania Department of Transportation*

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and Transportation Officials (AASHTO)*

#### **Liaison**

John Pearson, *Council of Deputy Ministers Responsible for Transportation*

*and Highway Safety*

## **Technical Coordinating Committee for Safety Research in SHRP 2**

**Chair:** Forrest M. Council, *University of North Carolina*

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Richard K. Deering, *General Motors Corporation*

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Infrastructure Renewal*

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## Technical Coordinating Committee for Renewal Research in SHRP 2

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### Members

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 Thomas E. Baker, *Washington State Department of Transportation*  
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 Regina McElroy, Raj Ghaman, *FHWA Liaisons*  
 Gordon Troughton, *Ontario Ministry of Transportation*  
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## Technical Coordinating Committee for Capacity Research in SHRP 2

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## Committee to Prepare the Second Strategic Highway Research Program Implementation Plan

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### **Members**

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Rachael Shiflett, *Senior Program Assistant*



The Technical Coordinating Committee for safety research in SHRP 2 at its March 2007 meeting at the Beckman Center in Irvine, California. Photo courtesy of committee member David Shinar.







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