SHRP Joins the National Research Council

In recent months, the 5-year, $150 million Strategic Highway Research Program (SHRP), which will be one of the most comprehensive highway research programs undertaken in the United States, has moved into a new phase with the publication of detailed research plans, the signing of a formal Memorandum of Understanding by the cooperating agencies, the appointment of a SHRP Executive Committee, and the appointment of an executive director.

SHRP is a highly targeted, specially funded program focusing on six critical highway research areas: asphalt characteristics, long-term pavement performance, maintenance cost-effectiveness, protection of concrete bridge components, cement and concrete, and snow and ice control. (See articles in *TRNews 113* and *TRNews 116* for additional information.) SHRP will concentrate highly innovative research approaches on a few specific areas of highway technology that cannot be meaningfully addressed through incremental, separate projects. It is intended to supplement, not supplant, existing highway research programs. (See Table 1.)

This approach was recommended in a study completed 2 years ago by the TRB Study Committee for a Strategic Transportation Research Study (STRS), which investigated potential research efforts that could fill existing technological gaps and yield major innovations to increase the productivity and safety of the nation's highway system. In its report, *TRB Special Report 202, America's Highways: Accelerating the Search for Innovation*, the committee estimated that the payoff from such a research program could exceed $600 million a year. A provision to set aside one-quarter of one percent of federal-aid highway funds to implement SHRP is included in legislation pending before Congress that would reauthorize the federal highway program.

Detailed Research Plans Published

The technical research plans for SHRP are the product of an intensive 16-month pre-implementation study conducted by seven research contractors in cooperation with the office of the SHRP interim director, the American Association of State Highway and Transportation Officials' SHRP Task Force, seven SHRP advisory committees, staff of TRB's National Cooperative Highway Research Program, and Federal Highway Administration staff. The research design report, entitled *Strategic Highway Research Program Research Plans*, identifies the goals and objectives for SHRP as well as recommended paths to achieving those goals; it will allow the program to get fully under way as soon as funds are available.

TABLE 1 Overview of the Strategic Highway Research Program

Research Area	Problem	Objective
Asphalt Characteristics	With growing demands on pavement durability, some of the physical specifications and tests used to classify asphalt and ensure quality control need to be reassessed in terms of today's requirements and technology.	• To improve pavement performance through increased understanding of the chemical and physical properties of asphalt, and how these relate to performance. • To develop performance specifications for significantly improved asphalt and asphalt-aggregate mixtures.
Long-Term Pavement Performance	No comprehensive research on long-term pavement performance has been conducted since the AASHO Road Test 25 years ago.	• To cover the full range of pavement information needs. • To evaluate existing design methods, develop improved design methodologies and strategies for rehabilitation of existing pavements, and improved design equations for new and reconstructed pavements. • To determine the effects of specific design features on pavement performance, and determine the effects on pavement distress and performance of loading, environment, material properties and variability, construction quality, and maintenance levels. • To establish a national long-term pavement data base to support SHRP objectives and future needs.
Maintenance Cost-Effectiveness	Research plan addresses highway maintenance improvements by developing better information with which to manage resources and by applying technological innovations to enhance productivity.	• To develop elements of pavement management systems, which establish budgets, administer programs, and allocate resources more efficiently. • To develop equipment, materials, and processes that will increase productivity and reduce service life costs of pavement maintenance.
Concrete Bridge Protection	Serious corrosion problems, caused mainly by the use of salt in winter maintenance operations, are resulting in the rapid and premature deterioration of many bridge decks and concrete bridge components.	• To provide methods for protecting chloride-contaminated concrete components against deterioration and for rehabilitating and protecting those components already exhibiting corrosion-induced distress. • To develop a decision model applicable at the project level that will lead to the most appropriate protective treatment for structures under an agency's jurisdiction.
Cement and Concrete	Despite the long and widespread use of portland cement, its nature and the hydration process are not fully understood. The gains in durability from various additives need to be explored, as does the extent to which residual moisture weakens the structure of hardened cement.	• To increase the service life of cement and concrete through an improved understanding of the chemistry of cement hydration, the properties of concrete, and the performance of concrete in the highway environment. • To improve the production, placement, quality control, durability, and nondestructive testing of concrete.
Snow and Ice Control	Widespread use of salt for snow and ice control has aggravated the deterioration of highways and bridges, especially those containing steel reinforcement. It is also costly, causes motor vehicles to rust, and may pose an environmental hazard where concentrations are extremely high.	• To provide more cost-effective ways of preventing or removing buildup of snow and ice on highways and bridges. • To reduce the deterioration of bridges, pavements, and vehicles, and to mitigate adverse environmental impacts from the use of snow and ice control chemicals.

Memorandum of Understanding Signed

In May 1986, a formal Memorandum of Understanding was executed by the three cooperating organizations—the American Association of State Highway and Transportation Officials, the Federal Highway Administration, and the National Academy of Sciences. Representatives of these three organizations, along with members of the newly appointed SHRP Executive Committee (which will oversee the research program), attended a signing ceremony at the National Academy of Sciences building in Washington, D.C. Commenting on the historic nature of this enterprise were Francis B. Francois, executive director of AASHTO; Ray A. Barnhart, FHWA administrator; and Frank Press, president of the National Academy of Sciences and chairman of the National Research Council (NRC), the principal operating agency of NAS.

The Memorandum of Understanding, which provides an administrative framework for the conduct of the research program, was signed by Francis B. Francois, Frank Press, and FHWA Executive Director Richard D. Morgan. Under the terms of the agreement, SHRP will be housed under the NRC as a sister agency to TRB.

SHRP will operate on a budget of $30 million a year, with total 5-year support for each of the six research areas planned as follows: asphalt characteristics, $50 million; long-term pavement performance, $50 million; maintenance cost-effectiveness, $20 million; concrete bridge component protection, $10 million; cement and concrete, $12 million; and snow and ice control, $8 million. Projects in five of the six research areas are to be completed within the 5-year span of the program, with long-term pavement performance monitoring expected to continue (with other sources of funding) for an additional 15 years.

As currently planned, the program is divided into 34 major research projects, with an average cost of about $4 million and an average duration of about 4 years. This research will be carried out by research institutes, consultants, universities, government research laboratories, and private firms under contract with the National Academy of Sciences. The majority of the research studies are directed toward evaluation, testing (both laboratory and field), or development of equipment and instrumentation. A smaller number of research efforts will concentrate on state-of-the-art reviews and analytical studies. Overall, SHRP research activities have as end products the development of new or improved materials or processes, the development of new or improved equipment and instrumentation, and advances in communication–computer systems. The program will require an estimated 700 professional years of research effort to complete.

Larson Heads SHRP Executive Committee

Thomas D. Larson, who has had a long and distinguished career in transportation, is chairman of the SHRP Executive Committee. A native of central Pennsylvania, Larson received B.S., M.S., and Ph.D. degrees in civil engineering from Pennsylvania State University. Early in his career, he worked as a plant engineer focusing on construction management, as a civil engineering designer, and as a project engineer for a highway construction firm.

Larson also taught civil engineering courses in materials, transportation engineering, and planning at Penn State, beginning as an instructor in 1957 and becoming a full professor in 1968. While at Penn State, Larson was instrumental in the establishment of the Pennsylvania Transportation Institute in 1967 in order to bridge the gap between academe and the transportation research community. He was appointed director of the institute in 1968.

After his many years as civil engineering professor and transportation researcher at Penn State, Larson was appointed secretary of the Pennsylvania Department of Transportation in 1979, the position he currently holds. The recipient of numerous awards and honors for his work in research, management, and administration, Larson was named International Road Federation Man of the Year in 1985. Currently he is president of the American Association of State Highway and Transportation Officials and chairman of AASHTO's Select Committee on Research.

Active in the Transportation Research Board since 1966 as a member of numerous committees and panels, Larson served on the TRB Executive Committee from 1980 to 1984, including a term as chairman in 1981. During this time, he chaired the TRB Study Committee for a Strategic Transportation Research Study: Highways, which led to the development of SHRP.

Executive Committee and Executive Director Appointed

The SHRP Executive Committee, appointed in April by the NRC in consultation with AASHTO and FHWA, is responsible for developing and approving SHRP's organizational structure, policies, and administrative procedures, including contract management. The committee met for the first time in May to begin its work of defining policies and procedures to implement the SHRP research program. The committee, chaired by Thomas D. Larson, Secretary of the Pennsylvania Department of Transportation, consists of 15 members appointed by the chairman of the NRC and 5 ex officio members.

One of the committee's most important initial tasks was to make recommendations to the NRC on the selection of an executive director. Accordingly, one of the six subcommittees estab-

SHRP Executive Director Appointed

Frank Press, president of the National Academy of Sciences, has appointed Damian J. Kulash, TRB's director of special projects since 1982, to be executive director of the 5-year, $150 million Strategic Highway Research Program (SHRP). Kulash will be responsible for the overall management and administration of the program.

As SHRP moves from the preimplementation phase to the research phase, Kulash believes that it is essential that highway management stay actively involved in the research as it progresses in order to ensure that the results of the research can be applied. Kulash says, "Some tasks will proceed well and some will not, owing to researcher skill and technological good fortune. . . . Hard-nosed management will be continually needed to keep the winners advancing, to redirect those that falter, and to curtail the losers. As the program proceeds, highway management must continue to focus attention on its successful execution."

Kulash brings considerable experience to his new position. As director of special projects, he managed all aspects of TRB's policy studies, including financial management, committee structure and relations, preparation of contracts and subcontracts, and report review. Among the TRB projects completed under his direction are: a strategic assessment of highway research needs that resulted in the creation of SHRP; evaluation of the costs and benefits of the 55 mph speed limit; assessment of future professional needs in transportation; and analysis of the impacts of twin trailer trucks on highway safety, pavement wear, and trucking industry productivity.

Before joining TRB, Kulash was deputy assistant director for natural resources and commerce at the Congressional Budget Office (CBO), where he evaluated proposals for congressional committees, performing such diverse tasks as assessing the impacts of user fees on inland waterways, estimating the increases in highway user taxes needed to support relaxation of truck-weight regulations, and evaluating the benefits of federal programs to support public transportation and Amtrak. He directed major CBO reports on highway and rail policy, waterways, trucking, transportation financing, urban transit, and airport finance.

A native of North Carolina, Kulash received a B.S. degree in industrial management from the Sloan School of Management, Massachusetts Institute of Technology, in 1966 and a Ph.D. in civil engineering from MIT in 1970.

Kulash says that he was attracted to the executive director's position because "it offers a rare, once-in-a-lifetime opportunity to make a meaningful contribution in some difficult areas." He looks forward to a close working relationship with the SHRP Executive Committee, which has begun to wrestle with the tough questions of how to shape the appropriate roles for advisory groups, contractors, and SHRP staff. Kulash notes that "SHRP involves a single project of a scale and complexity that is unprecedented in highway research. This requires new approaches. Finding ways to tap the best professional guidance and advice while keeping the project focused and productive is our first order of business." He is optimistic about SHRP's chances of developing significant cost-saving approaches, but he does not underestimate "the immense test that lies ahead—sorting out the contractual processes, getting industry involved, refining organizational roles, and keeping technical progress on target."

Shared Research Priorities Spark Canadian Interest in SHRP

Because Canadian highway research priorities parallel the six critical areas of research that comprise SHRP, a five-point program has been proposed by that country for Canadian–U.S. cooperation on SHRP.

SHRP's progress has been monitored in Canada since it was first proposed; the Roads and Transportation Association of Canada (RTAC) and the 10 provincial highway agencies are the Canadian agencies that will participate in SHRP.

The first part of Canada's five-point program was the appointment of a full-time project manager to coordinate Canadian efforts in SHRP-related activities, disseminating information about SHRP to the 10 provincial coordinators and disseminating information to SHRP from these 10 coordinators. Since April 1986, John Hill of RTAC has been serving as project manager.

Second, the Canadians are interested in loaning staff to SHRP, in a manner similar to that in which the states or the FHWA might loan staff. It is anticipated that one or two full-time Canadian staff will be loaned to SHRP. The SHRP Executive Committee developed policies on loaned staff and international cooperation at its meeting in Washington, D.C., in early September.

Third, technology transfer mechanisms are being set up internally for monitoring SHRP and collecting and disseminating information. In making information available to the 10 provincial agency coordinators, these mechanisms might also include technical interpretation, for example, converting units to metric equivalents.

Fourth, an integrated program has been initiated in which the Canadians will identify test sites suitable for the long-term pavement performance program and propose them to SHRP. For example, because of the colder Canadian climate, some sites might be more suitable for testing low-temperature susceptibility of pavements. So far, 9 of the 10 provincial agencies have identified and proposed test sites in their jurisdictions to be used for research.

Fifth, areas of complementary research have been identified. Some peripheral areas of SHRP are being evaluated to determine potential research areas that could be completed by the Canadian effort to complement the U.S. program. Also being looked at are elements in the six SHRP research areas that might have Canadian aspects; in this way, SHRP research results can be used as a basis for Canadian research in a similar area, adapting for conditions in that country.

These five points have been proposed as a 5-year Canadian research effort in a report titled *Canadian Strategic Highway Research Program* (CSHRP). This report was prepared by the Council on Highways and Transportation Research and Development, the research arm of RTAC. The Council of Ministers will consider approval of the report and decide on funding at their meeting late in September in Toronto. Consideration of CSHRP has been timed so that approval and funding will have been received from the Council of Ministers by the time the U.S. Congress enacts legislation providing funding for SHRP, if it does so before its recess in October.

According to Boris R. Hryhorczuk, Deputy Minister of the Department of Highways and Transportation in Manitoba, Canada, and ex officio member of the SHRP Task Force, his country wants to participate in SHRP in order to complement rather than duplicate research efforts in the United States, saving money and creating efficiencies for the research programs of both countries.

Canada is 1 of 15 nations that has thus far expressed interest in SHRP. The constructive and synergistic steps that are being taken by CSHRP may provide a valuable model that other nations could adopt in the future.

lished to handle specific issues facing the Executive Committee in the program's early stages focused its efforts on screening and selecting candidates for this position. The appointment of Damian J. Kulash, TRB's director of special projects since 1982, to be executive director of SHRP was announced on September 3 during the second meeting of the Executive Committee. He will be responsible for the day-to-day operational management of SHRP, selection and management of the central program staff, development of each year's detailed research plan and budget, and preparation and publication of information necessary to ensure early and complete dissemination and adoption of SHRP research findings.

Work Under Way

Another one of the six subcommittees is conducting the search for office space

SHRP Executive Committee

The National Research Council, in coordination with AASHTO and FHWA, has named the new Executive Committee. The committee will be responsible for supervising the conduct of the research planned under the Strategic Highway Research Program, after Congress enacts legislation reauthorizing federal-aid highway funds to implement SHRP. Thomas D. Larson will serve as chairman of the new Executive Committee. Members are as follows: William G. Agnew, General Motors Research Laboratories; Richard P. Braun, Minnesota DOT; Joseph M. Clapp, Roadway Services, Inc.; Raymond F. Decker, Michigan Technological University; Tom Espy, Jr., Alabama Highway Department; William K. Hellmann, Maryland DOT; Lester P. Lamm, Highway Users Federation for Safety and Mobility; Harold L. Michael, Purdue University; Charles L. Miller, Arizona DOT; Harold W. Monroney, Illinois DOT; James D. Quin, Mississippi Highway Department; Henry A. Thomason, Jr., Texas Department of Highways and Transportation; and Roger L. Yarbrough, University Asphalt Company, Inc. Ex officio members are Ray A. Barnhart, Federal Highway Administration; Thomas B. Deen, Transportation Research Board; Francis B. Francois, AASHTO; Boris Hryhorczuk, Manitoba DOT; and Richard D. Morgan, Federal Highway Administration. Appointment of a specialist in the area of petroleum–chemical engineering is in progress.

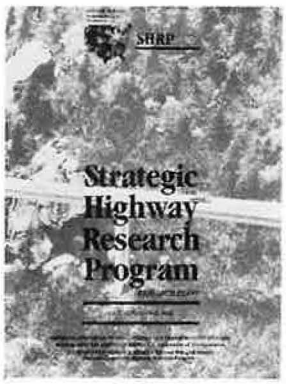
The National Academy of Sciences building in Washington, D.C.

to house the new SHRP staff; a target date of October 1986 has been set to occupy new offices.

Chairman Larson appointed a third subcommittee to define the contract planning process to be used for SHRP and to develop contracting guidelines to govern the program. The size of the program—at about $30 million a year—represents a 30 percent increase over the current $100 million spent nationally for highway research. In terms of contract research, there will be closer to a 60 percent increase with SHRP because about one-half of the current research is conducted in-house by state and federal government agencies. Planning the contract research program involves two basic tasks: selecting and packaging the work into contractable or assignable units, and structuring the contract terms to retain appropriate management control by SHRP.

Subcommittees have also been established to identify issues and to develop policies in three important program areas: international cooperation; industry involvement, and special funds and programs; and the role of universities in SHRP. SHRP is already attracting strong international interest, as evidenced by the attendance at the SHRP International Workshop held in Alexandria, Virginia, on May 20–22, 1986. International cooperation is likely to include establishment of an information exchange process, inclusion of pavement test sections outside the United States in the long-term pavement performance program, loaning of staff members by cooperating nations to work as part of the SHRP staff in the United States, and international participation in a variety of contract arrangements to compete for SHRP research. To date, some 15 nations have expressed interest in cooperating with SHRP at various levels of activity.

To maintain the momentum established in SHRP's pre-implementation phase and to continue the preliminary work needed to complete selection of test sites for the long-term pavement performance program, the Executive



The research design report, entitled *Strategic Highway Research Program Plans*, identifies the goals of SHRP along with recommended strategies for achieving these goals. The published report is available from TRB, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418 (price $15.00).

Committee has approved the negotiation of consulting contracts for preliminary planning of the data management system for SHRP and for review and guidance of the statistical design of the SHRP experiments, with emphasis on the long-term pavement performance study. At its first meeting, the Executive Committee also approved the establishment of two small expert advisory panels—one on long-term pavement performance studies and the other on statistical design. Selection of the membership of these panels is currently under way.

Four regional workshops were held in April 1986 to instruct states on their role in providing test road sections for long-term pavement performance monitoring; the states are currently submitting candidate sites for inclusion in the experimental design for the pavement performance study. These data are being screened by SHRP staff, consultants, and an FHWA team; initial selections will be followed by field visits to each state.

The early activities of the SHRP Executive Committee and staff are being funded by an advance of NCHRP funds authorized by AASHTO until Congress enacts new federal-aid highway legislation providing for full funding of the research program.

Center for Microcomputers in Transportation Opens

The Center for Microcomputers in Transportation (McTrans Center), which opened on July 14, 1986, is sponsored by the Federal Highway Administration and is operated by the University of Florida Transportation Research Center in Gainesville.

The new center offers a variety of services to microcomputer users, including a technical assistance hotline, distribution of public-domain microcomputer software, and publication of a newsletter. The McTrans Center replaces the three previous microcomputer support centers that were operated by the Transportation Systems Center in Cambridge, Massachusetts: the Safety and Traffic Engineering Applications for Microcomputers (STEAM), Microcomputers in Transportation Planning (MTP), and Microcomputer Applications in Highway Projects (MAHP). Members of the earlier support centers will be placed on the mailing list to receive the new McTrans Center newsletter.

The previous microcomputer support centers provided support and distribution of primarily safety, traffic engineering, and urban and statewide planning software. The emphasis of the new McTrans Center has been expanded to include all areas of highway engineering so that a broader segment of the user community can benefit from the services provided.

For further information, write to the McTrans Center, 346 Weil Hall, Department of Civil Engineering, University of Florida, Gainesville, Florida 32611, or telephone the McTrans hotline at 904-392-0378.

Resnik Challenger Medal Established

The Society of Women Engineers announces the establishment of a new medal in honor of the late Dr. Judith A. Resnik, NASA Mission Specialist and a member of the society. The medal, to be known as the Resnik Challenger Medal, will be awarded to a woman engineer for "visionary contributions to space exploration."

The medal will be awarded in recognition of obvious merit and significant contributions by an individual who has expanded the horizons of space exploration through engineering breakthroughs in aeronautical, astronautical, materials, electronics, ceramics, structural, biomedical, or other space-associated engineering. The award will be made to a woman engineer who has practiced for 10 or more years and who meets the other qualifications. The entire engineering community, including technical societies, engineering industries, academia, or individual engineers, may nominate qualified candidates for the medal.

The Society of Women Engineers has chosen this method of far-reaching significance to support the continuation of the work of women engineers who echo Resnick's words: "Let's solve the problem—and get on with it!" The society is also developing a Resnik Scholarship, for which funds from around the world are now being received at the society's headquarters, 345 East 47th Street, New York, New York 10017.