



NCHRP

**National Cooperative Highway
Research Program**

Leveraging Resources for Better Transportation

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

Leveraging Resources for Better Transportation



Keys to NCHRP Success

- **State DOTs leverage their funds** through NCHRP to work on problems common to many states.
- Because they are the intended users of NCHRP research results, **practitioners identify the research needs.**
- High-level **state DOT representatives make the decisions** regarding NCHRP programming.
- **NCHRP panels guide the projects** and are composed of technical specialists and expert practitioners.
- NCHRP **panels select contractors competitively** on the basis of technical merit.
- National Research Council **processes ensure the objectivity** and credibility of NCHRP research findings.
- **NCHRP delivers practical products** that have a direct impact on practice, e.g., manuals, guidelines, and specifications.
- NCHRP **contractors develop implementation plans** for the products anticipated in each project.
- **TRB publishes and widely disseminates findings** of NCHRP research; findings are published on paper and electronically in a format designed for use by both transportation administrators and expert practitioners.



How do state departments of transportation solve their most pressing problems? How do American Association of State Highway and Transportation Officials (AASHTO) committees get the information they need for the Association's standards, guides, and specifications? For more than 40 years, the National Cooperative Highway Research Program has been an important part of the answer.

Because of the dynamic nature of U.S. transportation systems, state departments of transportation (DOTs) are always facing new, usually complex challenges. In response, the states turn to the National Cooperative Highway Research Program (NCHRP) to focus some of the best minds in transportation on collaborative research that leads to far-reaching solutions. NCHRP concentrates on the nation's critical transportation issues, producing research findings that guide practice in U.S. transportation and that result in safer roads, easier travel, and substantial savings of taxpayer dollars.

Since its inception in 1962, NCHRP has delivered research findings and recommendations that make a difference. NCHRP plays a key role in developing essential tools of the trade—for example, the *Highway Capacity Manual*, AASHTO's bridge specifications, and AASHTO's pavement design guide—that continue to provide the United States with the world's best transportation system.

The ideas for NCHRP research projects are developed by individual states, AASHTO committees, or the Federal Highway Administration (FHWA). These research ideas must compete for selection and be approved by the states before they qualify for project status. This process ensures that priorities are set by those closest to the action and that results will be relevant and immediately useful to state transportation officials and travelers alike.

Problems chosen for study are assigned to project panels. At any given time, about 250 panels and 2,000 volunteer members—leading experts in their fields—work with NCHRP staff and researchers to solve problems for the states.

Research findings are published by NCHRP, frequently in the form of manuals, recommended standards, or guidelines that serve policy makers and practitioners. AASHTO, state DOTs, and other organizations (both national and international) adopt many NCHRP recommendations that enhance the safety, mobility, and productivity of transportation in the United States and abroad.

A Tradition of Research Collaboration



When construction began on the Interstate Highway System in the 1950s, new challenges arose for state highway departments. State officials saw a growing need for information on transportation-related topics. The new highway system increased mobility, but it also raised new

thus operates under a three-way agreement among the organizations instrumental in its creation—AASHTO, FHWA, and NAS.

TRB administers NCHRP, while state DOTs sponsor the

program through AASHTO and in cooperation with FHWA. States provide funding each year based on a percentage of their federal-aid highway apportionments; in 2002, contributions totaled \$31.5 million. In effect, individual state investments are leveraged to maximize research synergy and avoid duplication of efforts.

Since 1962, approximately 1,300 different research organizations have submitted more than 5,700 proposals to NCHRP, resulting in the awarding of almost 1,000 contracts to more than

and sometimes unforeseen issues in highway planning, design, construction, operations, and maintenance.

By the late 1950s, many states were researching similar highway problems in uncoordinated efforts, a situation noted with concern by the predecessor organizations to AASHTO and FHWA. Together, these organizations developed the idea of funding highway research by pooling state funds in a cooperative effort to address critical highway problems common to many states. The National Academy of Sciences (NAS) was approached to administer the new National Cooperative Highway Research Program within its Highway Research Board, now the Transportation Research Board (TRB). NCHRP

320 different agencies. Competitive proposals evaluated by expert panels ensure the selection of the best available talent to work on NCHRP research. Year after year, a significant percentage of projects—typically 25 to 30 percent—is awarded to agencies that have not previously won an NCHRP contract.

The NCHRP process ensures a high degree of acceptance of research findings. In recent years, NCHRP has been asked to develop more than 300 specific products for 27 different AASHTO committees. Much of this work is still in progress, but more than 85 of these products have been completed and put to use by AASHTO. When research results make their way into AASHTO specifications, guidelines, and other documents, the results are

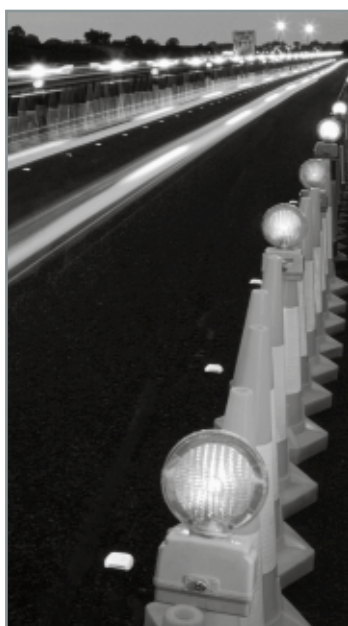




used by transportation practitioners. More than 40 AASHTO documents produced in the past 10 years were based on findings and recommendations from NCHRP research.

In total, the program's research findings have formed the basis for more than 1,100 reports, syntheses, digests, web documents, and CD-ROMs that are used by transportation officials and engineers across the nation.

NCHRP has helped to improve U.S. transportation by addressing a broad range of significant problems faced by



state DOTs. Program findings have led to better highway designs; new construction techniques; more structurally sound, longer-lasting roads and bridges; safer roadside hardware; enhanced safety for motorists, cyclists, and pedestrians; more efficient maintenance and rehabilitation; productive environmental stewardship; and new methods for asset management. NCHRP helps the states to leverage

resources and take on the transportation challenges of a growing society and an economy that is increasingly dependent on transportation.

In the decade from 1993 to 2002, NCHRP research formed the basis for more than 40 AASHTO specifications, guides, and other documents.

1993-2002

Guidelines for Bridge Management Systems
 Standard for Crash Testing Roadside Features
 LRFD Bridge Design Specifications
 Specification Provisions for Bridge Rail Selection
 Pavement Overlay Design Procedures
 Revisions to Guide Specifications for Highway Construction
 Specification Provisions for Seismic Design of Bridges
 Green Book: Stopping Sight Distance Model
 Guide to Metric Conversion
 Toughness Criteria for Steel
 Test Method for Cracking Tendency of Concrete
 LRFD Bridge Construction Specifications
 Green Book: Median Width Parameters
 Green Book: Design Criteria for Intersections
 Specifications for Bridge Bearings
 Specifications for Splices in Reinforcing Steel
 Green Book: Intersection Sight Distance Model
 Barrier Hardware Guide
 Maintenance Manual for Movable Bridges
 Standard for Corrosion Evaluation of Steel Pile Structures
 Revisions to Pavement Design Guide
 Specifications for Polyethylene Pipe
 Guidance on Sharing Rights-of-Way for Telecommunications
 Guidelines for Subsurface Drainage of Pavements
 Specifications for Sign, Luminaire, and Traffic Signal Supports
 Specifications for Design of Curved Steel Bridges
 Maintenance Manual for Roadways and Bridges
 Specifications for Design of Movable Bridges
 Green Book: Superelevation Design
 Guide for Snow and Ice Control
 Guidelines for Pavement Management Systems
 Procedure for Split Mastic Asphalt Mix Design
 LRFD Specification Provisions for Plastic Pipe
 Test Method for Superpave Compatibility
 Product Evaluation Database
 Effective Acquisition Practices for ITS Software
 Pavement Management Guide
 Test Methods for Reclaimed Asphalt in Superpave
 Superpave Aggregate Specifications
 Guide Specification for LRFR Evaluation of Bridges
 LRFD Specifications for Retaining Walls
 Emergency Response Guide
 Vulnerability Assessment Guide
 Guides for Strategic Highway Safety Plans

States Cooperating to Advance Highway Transportation



U.S. highways have never been more essential to our economy and quality of life. More than 191 million licensed drivers use U.S. roads, a number that has risen by 63 percent during the past 30 years. Our roads accommodate 140 million cars, 92 million trucks—including 1.6 million tractor-trailers—and 750,000 buses. Nearly all of the \$4 trillion in goods shipped in the United States each year move on roads at some point.

At the same time, the nation's highways are aging. Parts of the highway system have reached or surpassed their design life. The numbers of drivers, vehicles, and miles driven have increased significantly; highway capacity has not. As a result, congestion is on the rise—a study of 75 U.S. urban areas estimated productivity losses caused by congestion to be about \$70 billion annually. Safety is also critically important: 6 million motor vehicle crashes each year claim more than 42,000 lives and cost the nation \$230 billion.

State DOTs feel the pressure of these challenges, but with limited budgets, individual states cannot fund all of the research needed to address the many specific problems confronting them. NCHRP provides a mechanism for the states to pool some of their resources and together fund research on shared problems.

The states voluntarily contribute 5.5 percent of their federal-aid State Planning and Research (SP&R) funds to support the work of NCHRP. The program's funding level increased to more than \$31 million in 2002 from \$2 million in 1962. The states express their willingness to participate in the program each year by executing individual written agreements processed by AASHTO. Since the inception of the program, all states have consistently contributed, with the exception of a few states in a few years; for nearly two decades, no state has declined to participate in NCHRP. The states affirm the value of the program's research, findings, and products through their continued voluntary support.

In return for their contributions, the states receive benefits far exceeding costs, as each state's contribution is leveraged by the combined contributions of all 50 states, the District of Columbia, and Puerto Rico.





The American Association of State Highway and Transportation Officials

AASHTO is the keystone, sponsor, and primary customer of NCHRP. The American Association of State Highway Officials (AASHO, now AASHTO) was founded in 1914 to give the states a common voice with which to advocate national programs for road improvement. It was natural for AASHO, as an alliance of the states, to create NCHRP and thus reduce the duplication in state research efforts spurred by development of the Interstate Highway System (in one instance in the 1950s, 32 states were found to be researching the same problem). Today, AASHTO selects the annual program of NCHRP projects, monitors progress, and helps many of the program's findings to become accepted highway practice. Staff experts in AASHTO member departments volunteer their time to participate on NCHRP project panels.

AASHTO is a preeminent source of technical information on highways and other transportation facilities. NCHRP research informs and supports the work of AASHTO committees, which are responsible for more than 100 guidelines and specifications covering the full range of highway issues.

The Federal Highway Administration

NCHRP has always benefited from strong cooperation and support from FHWA, which began its life in 1893 as the Office of Road Inquiry (ORI) and became the Federal Highway Administration within the U.S. Department of Transportation in 1967. FHWA administers the highway system through two main programs: the Federal-Aid Highway Program, which funds highway projects, and the Federal Lands Highway Program, which provides access to and within public lands. FHWA also pursues highway innovations through its own research and technology programs; AASHTO and the states rely on FHWA as a vital source of information.

The Transportation Research Board of the National Academies

TRB is a division of the National Academies, a private, nonprofit institution that includes the National Academy of Sciences, the National Academy of Engineering, the Institute of Medicine, and the National Research Council.

Created as the Highway Research Board in 1920, TRB promotes innovation and progress in transportation through research. TRB fulfills this mission through the work of standing technical committees, the publication of reports and peer-reviewed technical papers, the administration of contract research programs (such as NCHRP and the Transit Cooperative Research Program), the conduct of special studies at the request of the U.S. Congress and federal government agencies, the operation of a bibliographic database (Transportation Research Information Services), and an annual meeting that attracts more than 9,000 transportation professionals from around the world.

The NCHRP Research Process



The NCHRP process is designed to ensure that resources are invested in the most important areas and that projects are executed in the most effective way possible.



Selecting Areas to Be Researched

The AASHTO Standing Committee on Research (SCOR) is responsible for guiding NCHRP. Each year, SCOR—which includes top officials and research directors representing 20 member departments—solicits candidate problems for NCHRP research from AASHTO members in the states, chairs of AASHTO committees, and FHWA. NCHRP and FHWA staff then evaluate the problem statements to determine whether the proposed problem:

- Represents an immediate research need of interest to many states.
- Can be handled best in a cooperative program rather than by a single state.
- Has not already been adequately addressed through research.
- Can likely be solved or sufficiently addressed through research.

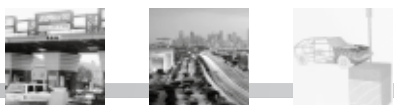
Working on a parallel path, NCHRP panels develop recommendations for continuation of projects begun in earlier years. Each December, a compilation of recommended continuation projects and new problem candidates goes to SCOR and AASHTO's Research Advisory Committee—a committee of state DOT research managers—with a ballot for rating each candidate.

At its annual March meeting, SCOR uses the ballot results to determine final research priorities and to formulate the program for the year. SCOR sends a summary report to the AASHTO Board of Directors for final balloting to ensure that each project selected by SCOR is approved by two-thirds of the states. AASHTO then forwards the approved program to TRB for administration. This action ends AASHTO's program-development stage and begins TRB's management of the new program.

While the NCHRP process is designed to ensure careful management of public resources, NCHRP does initiate selected quick-response projects that expedite some steps in the process, thereby moving solutions to the states faster than usual.

The Research Gets Rolling

As the program kicks off, NCHRP staff assemble an oversight panel for each project. Typically, for every four individuals nominated to serve on an NCHRP panel, only



one will be selected. Panel members serve without compensation and are specialists in particular disciplines within the transportation field. Their responsibilities include:

- Refining the scope of the problem assigned by AASHTO and drafting a project statement requesting research proposals; this statement is posted, along with the amount of funding available, on the TRB website.
- Evaluating proposals and selecting the best available organization to conduct the research.
- Monitoring research progress.
- Providing guidance on technical aspects of the research.
- Evaluating project reports for publication.
- Determining whether a project should be continued to conduct follow-on research.

Any organization may respond to a project statement, following the instructions in the NCHRP brochure, *Information and Instructions for Preparing Proposals* (available on TRB's website: www.TRB.org). Panel members and NCHRP staff evaluate all proposals in a uniform manner, with consideration given to the proposer's stated understanding of the problem, the proposed research plan, the qualifications of the principal investigator and team members, and the resources and facilities available.

Each panel selects an agency to conduct its project and then is available to resolve questions and clarify technical issues. Soon after a contract is executed, the contractor submits a detailed working plan that builds on the research plan. NCHRP staff and the project panel use the working plan to monitor the progress of the project.

Tracking Progress

NCHRP staff members manage each project to ensure the best possible outcome. Project management involves:

- Reviewing monthly and quarterly progress reports.
- Staying in contact with the research contractor by telephone and e-mail.
- Visiting the contractor.
- Keeping the panel informed of project status.
- Helping to keep researchers focused on producing findings that will be useful to transportation professionals.

At the conclusion of the project, a final report is published in a form that makes it easy for practitioners to access and use the results.



Research that Makes a Difference

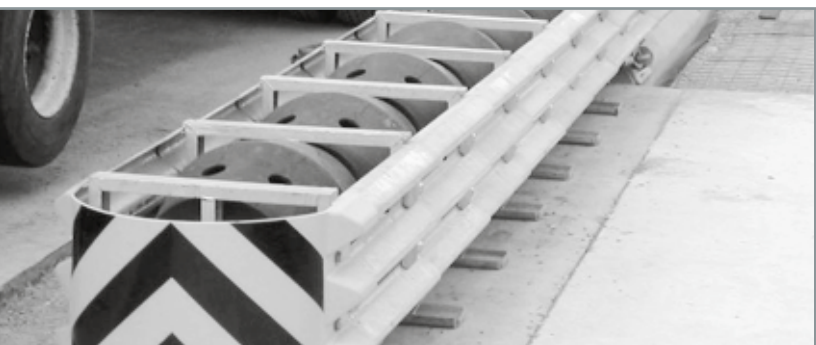


Photo courtesy of Barrier Systems Inc.

More than 1,000 products resulting from NCHRP research have provided useful information on a full range of topics important to transportation professionals. NCHRP research projects have made critical information available to administrators and practitioners, strengthened the knowledge base, and helped to promote best practices in the states and elsewhere. Through the years, research has improved transportation planning, economics, financing, pavement and bridge design, foundations, construction, materials, traffic operations, maintenance, safety,

the environment, and many other areas critical to successful surface transportation. NCHRP researchers and staff frequently are asked to appear before AASHTO committees to present findings and make recommendations to the user community.

Administration of Transportation Agencies. Chief Executive Officers (CEOs) of state DOTs work on transportation problems at the policy level. NCHRP projects designed to help CEOs and other transportation leaders have addressed themes such as strategic leadership and performance measurement, private-sector involvement in program delivery, enhancement of systems operations, DOT communications, workforce strategies, organizational development as a result of information technology, public agency partnering, and project financing. AASHTO leadership has benefited from fact-finding projects that shape association positions on state DOT business.



Highway Capacity

The 150-page inaugural edition of the *Highway Capacity Manual (HCM)* released in 1950 served as a practical guide for engineers to determine whether their designs would be sufficient to meet expected traffic needs; it went on to become TRB's best seller. The most recent edition, *HCM 2000*, includes more than 1,100 pages and an interactive CD-ROM. Working with FHWA and TRB's Committee on Highway Capacity and Quality of Service, NCHRP managed most of the research for the *HCM*, producing improved analysis methods for freeways, freeway ramps, signalized intersections, stop sign-controlled intersections, two-lane highways, and multilane highways. This research has been instrumental in establishing the *HCM* as a basic reference for the traffic engineer and the geometric designer.

Bridge Design Specifications

There are nearly 600,000 highway bridges in the United States, and annual federal and state expenditures for bridge rehabilitation and construction exceed \$7 billion. In the mid-1980s, the AASHTO Highway Subcommittee on Bridges and Structures concluded that the then-current specifications—first adopted in the 1930s—contained gaps, inconsistencies, and conflicts and that the load and resistance factor design (LRFD) philosophy used in Canada and Europe should be incorporated into U.S. practice.

At AASHTO's request, NCHRP developed and recommended entirely new LRFD bridge design specifications. The project took five years to complete and culminated in the adoption and publication of the AASHTO *LRFD Bridge Design Specifications* in 1994. The specifications represent a major advance in bridge design and result in bridges with enhanced serviceability and maintainability and with more uniform levels of safety. Since 1994, many NCHRP projects have been devoted to refining and expanding the LRFD philosophy in general and the AASHTO specifications in particular. Findings from more than 20 NCHRP studies can be found in the current edition of the specifications.

Security. Following the terrorist attacks of September 11, 2001, security has been a top agenda item for most government agencies, especially transportation agencies. In the 18 months following the attacks, some \$3.7 million was allocated for NCHRP security research on a variety of topics. Six months after the attacks, the first two products of this NCHRP research were distributed by AASHTO: *A Guide to Highway Vulnerability Assessment for Critical Asset Identification and Protection* and *A Guide to Updating Highway Emergency Response Plans for Terrorist Incidents*.



Highway Safety.

Safety research—another high NCHRP priority—includes such topics as the

protection of workers in construction and maintenance zones and the testing and evaluation of safety barriers

and roadside hardware. A primary focus involves implementation of the AASHTO Strategic Highway Safety Plan through a series of projects aimed at reducing the number of fatalities on the nation's highways; this work is producing 21 guides for dissemination by AASHTO and other safety organizations.

Transportation Asset Management. The NCHRP-produced *Asset Management Guidance for Transportation Agencies* is the first guide for applying asset management principles and procedures to transportation agencies. These agencies must optimize investments in systems preservation, operations, and new construction to meet the expectations of the public and legislatures. Wise investment of limited resources requires continuous development and updating of supporting processes, data, and tools. The guide has been adopted by AASHTO and will be periodically updated; various other NCHRP projects will produce new asset management tools and improved processes for better decision making.



Hot Mix Asphalt

With the annual cost of hot mix asphalt (HMA) pavement construction totaling more than \$20 billion, NCHRP's sponsors put a high priority on improving the performance of HMA and extending its service life. In the past decade, much research about pavements has concentrated on implementing and refining the Superpave® (Superior Performing Asphalt Pavement) method for the design and analysis of HMA, which results in durable, long-lived pavements. Adoption of the Superpave mix design method and the performance-graded asphalt binder specification by the AASHTO community has proceeded steadily since their delivery by the Strategic Highway Research Program (SHRP) in 1993. The method and the

specification provide better and more consistently performing HMA at a cost comparable with the cost of materials designed with the old methods. By 2001, 48 states had adopted the Superpave asphalt binder specification, and more than half were using the Superpave method to design the HMA used on most of their pavement construction projects. In recent years, NCHRP, in coordination with FHWA, has managed 17 projects to enhance Superpave and fill gaps in the original SHRP asphalt research program.

Multimodal Transportation Planning. States and their metropolitan planning organizations use NCHRP research on transportation planning projects when weighing the consequences of transportation improvements. National transportation policy has grown more complex over time, requiring transportation decision makers to consider a wider range of potential options and impacts. As a result, planning research is designed to address such major issues as environmental implications, growth and land-use interactions, safety, freight transport, environmental justice, and advanced technologies in transportation planning. The results of NCHRP quick-response research—which accelerates investigation and dissemination of findings on issues requiring immediate action—have proven especially helpful to states and metropolitan areas. Such activity has produced guidance on transportation corridor studies and on estimating the indirect effects of proposed transportation projects.

Pavements. The U.S. highway system includes more than 4 million miles of roadway. More than \$25 billion is spent on pavement-related projects in the United States each year, with much of that amount going to rehabilitation. NCHRP research has contributed to improved pavement design procedures, construction specifications and practices, paving materials and mixtures, and evaluation methods, all of which have enhanced pavement performance and increased service life while reducing maintenance requirements and cutting pavement-related expenditures.

Chief among NCHRP's contributions to improving the nation's highway pavements is its role in developing the 1986 AASHTO *Guide for Design of Pavement Structures*, the enhanced 1993 version of the guide, and the 1998 supplement to the guide dealing with rigid pavement design. NCHRP is developing a recommended guide for the design of new and rehabilitated pavement structures that brings together the best existing knowledge in a single reference of written guidance and software products.

Scour. Of the some 600,000 highway bridges in the National Bridge Inventory, 85 percent span streams or rivers. Scour—the erosion of bridge piers and abutments by the flow of water—represents the largest single cause of bridge failures in the United States.



Photo: The Schenectady Daily Gazette/Sidney Brown/File

The AASHTO Task Force on Hydrology and Hydraulics has initiated a series of NCHRP projects to improve scour prediction and to develop effective countermeasures.

Economics. Because nearly all products, customers, and service providers travel on the nation's roads, an effective highway transportation system is essential to the health of the U.S. economy. NCHRP has produced reports that provide guidance on what practitioners and decision makers need to know to understand the economic implications of the decisions they make regarding transportation development and investments. Emphasis has also been placed on methods of planning and selecting transportation projects with higher

economic benefits. NCHRP research has developed improved cost-benefit analysis procedures and produced recommendations for updating the AASHTO *Manual on User Benefit Analysis of Highway and Bus-Transit Improvements*.

Construction. Improvements in product quality, project management, and delivery times require corresponding innovations in the contracting process. NCHRP research has examined and produced recommendations on the use of warranties, multi-parameter bidding practices, and best-value contracting methods. The practice of performing construction and maintenance during the overnight hours, increasingly used on heavily traveled roadways, presents new and different challenges.

Research has developed procedures for assessing and planning overnight work and guidelines for the design and operation of nighttime traffic control.



Geometric Design of Highways and Streets

The “Green Book”—AASHTO’s *A Policy on Geometric Design of Highways and Streets*—guides engineers in designing the physical layout and dimensions of safe and efficient highways.

The AASHTO Subcommittee on Design and its Task Force on Geometric Design oversaw the development of the current version of the guide, which incorporates the results of extensive NCHRP and FHWA research on geometric design. Key NCHRP

projects produced recommendations on stopping-sight distance, intersection-sight distance, median intersection design, low-volume roads, highway capacity, and access management. Further NCHRP work on superelevation, roundabouts, passing-sight distance, design speed, channelized turn lanes, and context-sensitive solutions will be considered for future editions of the Green Book. Because most transportation agencies’ geometric design standards are based on the Green Book, this research will continue to have a profound effect on the U.S. transportation system.



Environmental Quality. Environmental issues in transportation planning and development are among the most important and difficult issues facing transportation decision makers. Technical complexity, laws and regulations, environmental reviews, multiple and diverse stakeholders, and the scarcity of precise data compound the tasks of planning and development. As a result, environmental issues have become significant research priorities for NCHRP, and the findings are being used by AASHTO.

Current NCHRP projects address environmental streamlining, management systems, truck emissions, wildlife crossings, and management practices for highway runoff. Recent products include guidelines for wetland replacement and construction, tools for evaluating the impact of construction and repair materials on receiving waters and for assessing the use of waste and recycled material, strategies for dealing with hazardous material on rights-of-way, air quality-related modal emission factors, and a recommended model for carbon monoxide “hot spot” evaluations.

Nonmotorized Transportation. Through the years, the expectations of travelers regarding the transportation system have changed, including an increased emphasis on the needs of pedestrians and bicyclists, and NCHRP has responded to those changes. NCHRP projects are producing methods to improve pedestrian safety, guidelines on accessible pedestrian traffic signals, innovative safety treatments at crosswalks without traffic signals, cost-benefit analyses for bicycle facilities, and bridge-rail heights for bicyclists. AASHTO



has used NCHRP research to develop the AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities* and to assess the impacts of the U.S. Access Board’s recommendations on public rights-of-way.

Winter Maintenance. Winter maintenance operations directly affect public safety and mobility—and the image of the state DOTs. Based on NCHRP research, the 1999 AASHTO *Guide for Snow and Ice Control* addresses issues pertaining to materials, equipment, operations, personnel, and management during the winter months.

Continuing Projects

NCHRP includes several continuing projects and subprograms that provide ongoing benefits to the transportation community:

- *NCHRP Synthesis Reports* document the state of practice in an array of state DOT functional areas.
- *NCHRP Legal Research Digests* and *Selected Studies in Transportation Law* summarize case law and other legal aspects of important issues affecting state DOTs.
- NCHRP-IDEA provides funds for Innovations Deserving Exploratory Analysis; the project jump-starts the development of innovative concepts and products.
- International scans and travel foster the exchange of transportation information on an international basis.
- Rapid-response studies are included in NCHRP to enable AASHTO Standing Committees (i.e., Highways, Planning, Environment, and Public Transportation) to initiate research on urgent topics.



Healthy Highways Rely on Research

For the United States, the stakes have never been higher—people and goods must be able to move safely and efficiently over the nation's highways despite the fact that those highways are aging and despite an ever-increasing number of vehicles and drivers. In the coming years, technology will probably exert a greater influence on the health of the nation's transportation system than will any other factor, and research will offer unprecedented potential for transportation innovation.

Emerging challenges facing the transportation system include more varied user needs, regional differences, a changing economy, and resource constraints. To meet these challenges, today's transportation professional is armed with an array of new computing, control, and communications technologies that create opportunities for improved products, service, safety, and mobility. If the United States is to maintain the health of its transportation system, it must continue to develop and apply new transportation technology. State transportation professionals are always seeking solutions to emerging challenges, and NCHRP will continue to be a key resource in providing these solutions.

Photos courtesy of Delaware Valley Regional Planning Commission



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