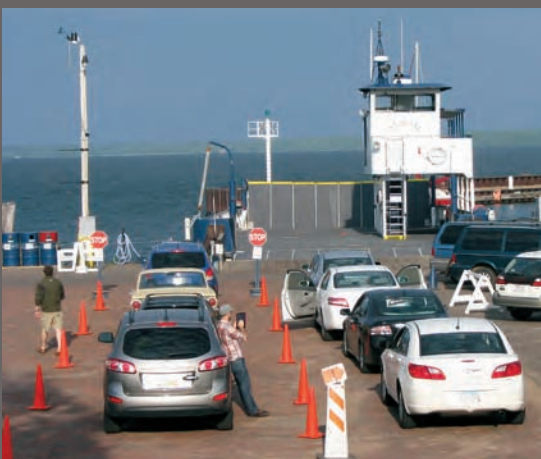
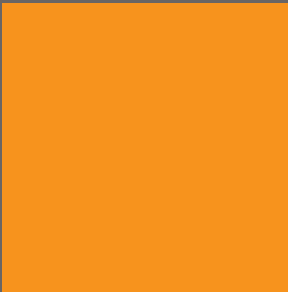


WisDOT  
**RESEARCH**  
· PROGRAM ·

2011  
ANNUAL REPORT



This is a report of research and technology transfer activities carried out by the Wisconsin Department of Transportation through the Part II research portion of the State Planning and Research Program of the Federal Highway Administration, U.S. Department of Transportation. The report describes activities during Federal Fiscal Year 2011, covering October 1, 2010, through September 30, 2011.

## ACRONYMS

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<b>AASHTO</b>	American Association of State Highway and Transportation Officials
<b>CFIRE</b>	National Center for Freight & Infrastructure Research & Education
<b>CPT</b>	Cone Penetration Test
<b>DOT</b>	Department of Transportation
<b>FFY</b>	Federal Fiscal Year
<b>FHWA</b>	Federal Highway Administration
<b>HMA</b>	Hot Mix Asphalt
<b>IC</b>	Intelligent Compaction
<b>LRFD</b>	Load and Resistance Factor Design
<b>LTE</b>	Load Transfer Efficiency
<b>MRUTC</b>	Midwest Regional University Transportation Center
<b>NCHRP</b>	National Cooperative Highway Research Program
<b>R&amp;L Unit</b>	Research & Library Unit
<b>SCOR</b>	Standing Committee on Research
<b>SPR</b>	State Planning and Research Program
<b>TOPS</b>	Traffic Operations and Safety Laboratory
<b>TPF</b>	Transportation Pooled Fund
<b>TRB</b>	Transportation Research Board
<b>UTC</b>	University Transportation Center
<b>UW</b>	University of Wisconsin
<b>WHRP</b>	Wisconsin Highway Research Program
<b>WIS 131</b>	Wisconsin Highway 131
<b>WisDOT</b>	Wisconsin Department of Transportation

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WisDOT  
**RESEARCH**  
· **PROGRAM** ·  
**2011**  
ANNUAL REPORT



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# From the Research Administrator



## **To the transportation research community:**

I am pleased to present to you the Wisconsin Department of Transportation's 2011 Annual Report on research activities. This report focuses on the programs and activities managed by the Research & Communication Services Section as well as research performed through partnerships across the department, state and nation.

Much of the past year has been spent getting to know new faces in the department and the program. WisDOT welcomed Secretary Mark Gottlieb and his administration at the start of this year. Secretary Gottlieb is already active in the research community, having been appointed to the AASHTO Standing Committee on Research. Many other new faces (or familiar faces in new places) have taken positions throughout the department.

We are also pleased to have three new employees contributing to WisDOT's Research & Library Unit in the past year through an interagency agreement with the University of Wisconsin–Madison. Carrie Doyle served a portion of the year in the WisDOT Library, while Jacqueline Kamin and Sarah Payne offer their talents to the Research Program. We appreciate the ideas and energy that new staff bring to the unit.

Amidst these changes, it is fitting to note that while the R&L Unit strives to have relevant research, well-honed procedures and effective programs, in the end it all comes down to the support of our staff and partners. I am continually grateful for the dedication, professionalism and expertise provided by staff, partners, consultants, research institutions and others who contribute to our program. While this report displays the raw information about our programs and projects, the data really represents the efforts of many different people who understand the value of research.

I encourage you to review this report, share its findings with your colleagues and continue your involvement with WisDOT's research activities. The department welcomes feedback and collaboration as we seek to remain accountable to the public and our partners. I look forward to another great year of research activities to improve transportation in Wisconsin.

Sincerely,

Daniel Yeh  
Chief, Research & Communication Services Section







# Research Program Administration

The Research & Library Unit manages a multifaceted research program and a top-notch DOT library. Key to supporting this mission is the R&L Unit's management of the \$5 million State Planning and Research Program, which is focused on applied research—developing usable solutions to specific problems across all modes, from planning to project delivery to operations.

The unit responds to requests for research from WisDOT staff by funding research projects or gathering and synthesizing available information from existing research findings, best practices and national guidance. Partnerships with the Federal Highway Administration, industry, academic institutions and other agencies help the R&L Unit carry out its mission.

This annual report is one of many efforts the R&L Unit engages in each year to measure the value of research activities and describe the impact of both the research program and individual projects on WisDOT operations in terms of safety, efficiency and longer-lasting roads and bridges.

## Driving Innovation through Research

Federal Fiscal Year 2011 funding awards were directed to the program areas shown in the pie chart at right, addressing a range of department needs and supporting national programs that directly benefit WisDOT. The line chart below shows the number of active research projects in each of the past five years for each of the major program areas.

### State Research Projects

The R&L Unit oversaw 50 active state research projects this year, with 12 new projects funded and 10 completed. Refer to pages 9 to 13 for summaries of completed projects for the Wisconsin Highway Research Program and the Policy Research Program.

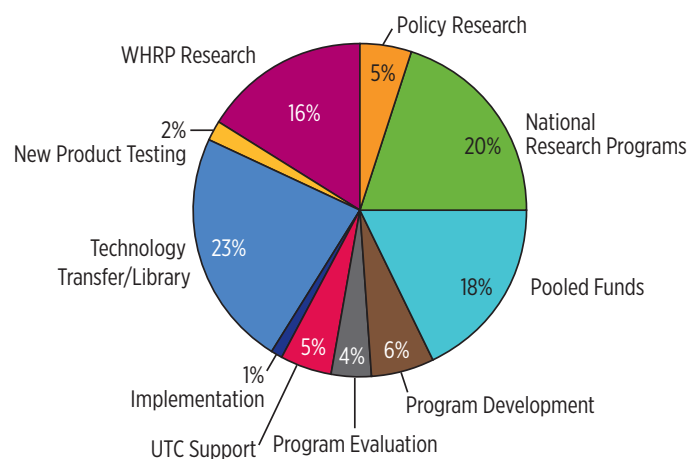
### Pooled Fund Projects

WisDOT funded 38 pooled fund studies in FFY11, with another 18 continuing from previous years. These projects address a range of priority issues across the agency, including traffic safety and mobility, pavement and bridge design, and winter highway operations. Highlights and benefits of selected pooled fund studies are provided on pages 14 and 15.

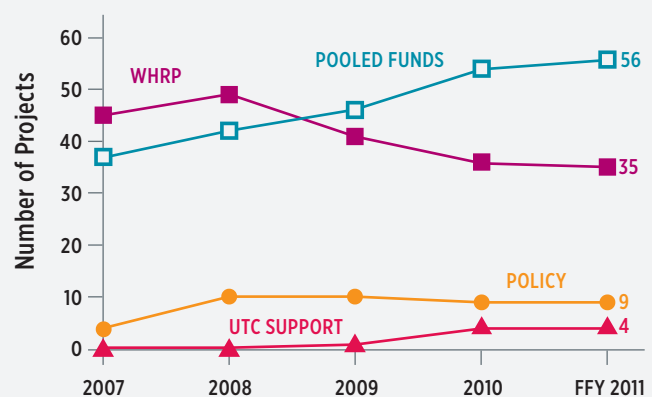
### Technology Transfer

The R&L Unit considers technology transfer an integral part of services offered to the department. The unit provides an extensive on-site and online library collection, quick turnaround synthesis reports and literature searches on requested topics, support for participation in national transportation research activities and peer exchange conferences to address priority information needs. Refer to pages 16 to 20 for details about the impacts of these services.

FFY 2011 Funding Awards



Active Wisconsin Research Projects



# Research Program Impacts

The measure of success of WisDOT's research efforts is ultimately in their beneficial effect on the department and the Wisconsin transportation system. The following pages highlight impacts of projects and activities completed by the R&L Unit in the six research areas below.

## Wisconsin Highway Research Program

Formed in 1998, WHRP performs materials and construction research for the department in four major areas: flexible pavements, rigid pavements, structures and geotechnics.

## Policy Research Program

The Policy Research Program funds policy-related projects across a range of topics. The projects evaluate the technical merit of current policies as well as the impacts of those policies on issues such as the economy, safety and operations.

## Transportation Pooled Fund Program

Through the national Transportation Pooled Fund research program, WisDOT is able to pool its financial resources with other states to fund research projects of common interest.

## Technology Transfer – Research and Library

The R&L Unit provides a range of technology transfer services to the department, including quick turnaround synthesis reports and literature searches, research briefs of completed research, peer exchanges and access to a wealth of print and electronic transportation resources.

## University Transportation Center

WisDOT partners with the National Center for Freight & Infrastructure Research & Education to fund research projects addressing the planning, design, construction and operation of sustainable freight transportation infrastructure.

## National Programs

WisDOT makes significant contributions to research activities coordinated by TRB's cooperative research programs—and gets a significant return on the investment.



WisDOT 2011 Annual Report



# Wisconsin Highway Research Program

[wisdotresearch.wi.gov/whrp](http://wisdotresearch.wi.gov/whrp)

WHRP's mission—to improve the return on investment in Wisconsin roads by delivering timely and implementable research products—is accomplished through a unique collaboration of DOT staff, academia, industry, consulting engineers and contractors, and FHWA. A multipartnered steering committee and technical oversight committees guide the direction of research and oversee the implementation of results. Managed by the UW–Madison, WHRP uses the expertise of university professors and students and consulting engineers throughout the state and nationally to carry out applied research for WisDOT.

## WHRP Steering Committee

Daniel Yeh, Chair  
WisDOT Research & Communication  
Services Section

Jack Arseneau  
Wisconsin Earthmovers Association

Scot Becker  
WisDOT Bureau of Structures

Dave Brose  
American Council of Engineering Companies  
of Wisconsin

Rebecca Burkel  
WisDOT Bureau of Technical Services

Beth Cannestra  
WisDOT Bureau of Project Development

Bruce Enke  
WisDOT Northeast Region

Matt Grove  
Wisconsin Transportation Builders  
Association

Dwight McComb  
FHWA–Wisconsin Division

Kevin McMullen  
Wisconsin Concrete Pavement Association

Mike Oliva  
National Center for Freight & Infrastructure  
Research & Education

Rory Rhinesmith  
WisDOT Statewide Bureaus

Scot Schwandt  
Wisconsin Asphalt Pavement Association

Hani Titi  
UW–Milwaukee (academic representative:  
rotates biannually)

William Jason Weiss  
NEXTRANS Center at Purdue University

## WHRP Steering Committee



## Technical Oversight Committee Chairs

### Flexible Pavements

Judie Ryan  
WisDOT Bureau of Technical Services  
[judith.ryan@dot.wi.gov](mailto:judith.ryan@dot.wi.gov)

### Rigid Pavements

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### Structures

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### Geotechnics

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UW–Madison  
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Andrew Hanz, Program Manager  
UW–Madison  
[ajhanz@wisc.edu](mailto:ajhanz@wisc.edu)





# Impacts of WHRP Projects

WHRP aims to have its research implemented in the field. Completed projects are closely reviewed for opportunities to implement findings as new or modified specifications, pilot projects or other technology transfer activities. Technical Oversight Committees complete implementation plans for moving research results into practice. Below are the projects completed through WHRP in FFY 2011 and the impacts they are already having on transportation in Wisconsin.

## 0092-06-04 Construction Vibration Attenuation with Distance and Its Effect on the Quality of Early-Age Concrete

Final report and brief:

<http://wisdotresearch.wi.gov/project?id=73>

The vibration effect of pile-driving hammers on the curing of newly poured concrete had not been studied extensively. This research gap led to conservative limits on pile driving near curing concrete that draw upon blast-based vibration research and practice. These limits, with regard to the proximity of pile driving to early-age concrete and how soon it may be conducted after concrete pouring, can cause construction delays and additional cost.

**Impact:** Investigators measured vibrations at a major Milwaukee construction site, testing 60 concrete beams and almost 170 cylinders in the lab and in the field. Findings indicated that WisDOT specifications are overly conservative. Researchers recommended that pile driving be allowed after only five days from the time the concrete is poured, not seven, and at a distance of 10 or more feet, not 15. Changing the specification will save time and money without harming the curing or ultimate quality of the concrete.



## 0092-07-02 Detecting Deleterious Fine Particles in Concrete Aggregates and Defining Their Impact

Final report and brief:

<http://wisdotresearch.wi.gov/project?id=59>

The aggregate materials used in concrete mixes are typically coated with a dust of microfines, or small particles, consisting of various minerals. This dust can absorb water, increasing the amount of water required to hydrate concrete to the point of workability but weakening the final product. While WisDOT specifications limit microfines in aggregates, inconsistent field performance suggested that these specifications might need to be updated.

**Impact:** Researchers analyzed the effects of microfines on the workability, strength, air entrainment and other properties of concrete samples created using various aggregates processed to meet existing WisDOT microfine specifications. They found that while dolomitic microfines had little effect on samples, igneous microfines—especially those with clay minerals—had significant negative effects, leading to a recommendation that microfine specifications be changed to include more rigorous tests.





### 0092-07-06 Development of Full Scale Testing of an Alternate Foundation System for Post and Panel Retaining Walls

Final report and brief:

<http://wisdotresearch.wi.gov/project?id=84>

To support ground slopes and prevent soil from shifting, engineers use retaining walls. A common type of retaining wall is the post-and-panel system, consisting of wall panels joined by steel posts anchored in concrete columns beneath the ground. Contractors approached WisDOT with an alternative post-and-panel design that replaces concrete column foundations with steel plates of the same width and length.

**Impact:** Using computer modeling and field testing, researchers evaluated the strength, durability and ease of construction for the proposed system. For certain applications, they found it a good alternative to concrete foundations. Because this system doesn't require excavation and concrete mixing, it is also less expensive and easier to construct than the traditional method. As a result, WisDOT is considering its inclusion in the Wisconsin Bridge Manual.



### 0092-07-08 Rapid Bridge Construction Technology: Precast Elements for Substructures

Final report and brief:

<http://wisdotresearch.wi.gov/project?id=780>

Bridges take months to rebuild, which slows or diverts traffic and extends the time crews must work around traffic and in challenging positions on columns high above the construction site. Precast bridge elements such as abutment panels and pier caps can dramatically reduce construction time, improve worker safety and reduce driver inconvenience.

**Impact:** Researchers evaluated the use of precast abutment panels and pier caps at Wisconsin bridge construction sites. Modular systems developed in the study shortened work time for four men from two weeks to 10.5 hours in one case. Time savings will continue to grow as WisDOT uses the technology to the benefit of work crews and the traveling public.



### 0092-07-09 Monitoring and Load Distribution Study for the Land Bridge

Final report and brief:

<http://wisdotresearch.wi.gov/project?id=112>

In 2002, Wisconsin constructed the Land Bridge on WIS 131, the first bridge in the state to use high-performance steel, which is lighter, easier to weld and more durable than regular steels. Because bridge design specifications assumed the use of non-HPS steels, a pilot project was initiated to monitor the performance of this bridge and the effect of HPS on bridge design.

**Impact:** Researchers monitored the bridge from 2004 to 2008 to evaluate stresses caused by traffic and the expansion and contraction of steel due to temperature changes as well as the distribution of traffic loads among bridge components. While stresses caused by live traffic loads were small and infrequent, thermal stresses could be substantial, although all stresses were small enough to imply an infinite design life.



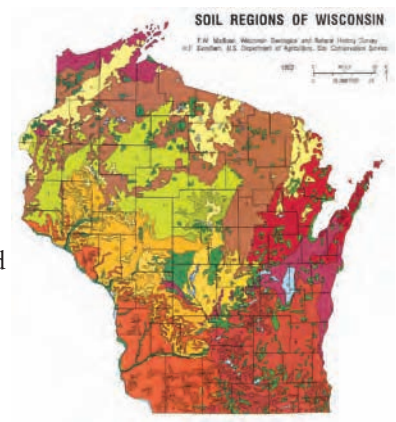
## 0092-08-12 Determination of Resilient Modulus Values for Typical Plastic Soils in Wisconsin

Final report and brief:

<http://wisdotresearch.wi.gov/project?id=75>

As WisDOT continues to implement mechanistic-empirical pavement design techniques, design engineers require soil resilient modulus—a value indicating subgrade stiffness—among other inputs. Previous WHRP research to establish resilient modulus values for Wisconsin soils revealed the need for further investigation into fine-grained soils. Such silt and clay soils typically provide the weakest pavement subbases and present the greatest challenge for designers.

**Impact:** This research not only provided ranges of resilient modulus values for a number of fine-grained soils commonly found throughout Wisconsin, but it also established equations to correlate resilient modulus with common laboratory tests for soil plasticity, moisture content, grain size and specific gravity. Using these correlations is quicker and less costly than conducting laboratory tests for soil resilient modulus itself. At the same time, the equations provide accurate input to the new mechanistic-empirical pavement design process.



## 0092-10-10 Cone Penetrometer Comparison Testing

Final report and brief:

<http://wisdotresearch.wi.gov/project?id=80>

Before building bridges, retaining walls and other structures, engineers must determine the strength of the soils that will hold their foundations. To improve this process, WisDOT considered using the cone penetration test in which a cone-shaped probe equipped with sensors is pushed deep into the ground at a constant rate.

**Impact:** Researchers conducted 61 CPTs at 14 sites in Wisconsin. Results showed that the CPT can be used on the kinds of soils found in the state and produces more reliable data than WisDOT's current methods. However, the technology will require further refinement to be used successfully, and researchers recommended its use as a complement to WisDOT's current procedures for determining soil properties.





## Research & Library Advisory Committee

Daniel Yeh, Chair  
WisDOT Research & Communication  
Services Section

Sandy Beaupré  
WisDOT Division of Transportation  
Investment Management

Patricia Jackson-Ward  
WisDOT Division of Business  
Management

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FHWA–Wisconsin Division

Rob Miller  
WisDOT Office of Public Affairs

Rory Rhinesmith  
WisDOT Division of Transportation  
System Development

Randy Romanski  
WisDOT Division of State Patrol

Taqwanya Smith  
WisDOT Division of Motor Vehicles

# Policy Research Program

WisDOT's Policy Research Program focuses on policy issues that affect the entire department and all modes, including functions not part of most state DOTs: the Division of Motor Vehicles and the State Patrol. Research projects address all transportation modes and span planning, operations, safety, economic impacts and the environment.

The Research & Library Advisory Committee, composed of representatives from all five divisions and the executive offices, provides ongoing guidance and decision making for the program. Research projects are solicited annually, but the program remains responsive to the evolving research needs in the department at any time throughout the year.

## Impacts of Policy Research Projects

### 0092-09-11 Connections 2030 Performance Monitoring

Final report: <http://wisdotresearch.wi.gov/wp-content/uploads/09-11longrangeplan-f.pdf>

In October 2009, WisDOT officially adopted *Connections 2030*, Wisconsin's statewide, long-range multimodal transportation plan. *Connections 2030* serves as a blueprint for managing the many modes of transportation—highways, local roads, air, water, rail, bicycle, pedestrian and transit—that make up the Wisconsin transportation system. This study sought to provide WisDOT with tools to assess its performance in carrying out the plan and achieving its policy goals.

**Impact:** Investigators developed a monitoring program that uses Excel spreadsheets to track progress of the plan's 400 policy action items. Complementing the policy item tracking is a small set of system performance measures that include a specific value or target that the department hopes to achieve. WisDOT is evaluating the monitoring program and, if appropriate, expects implementation to be complete within the next 12 to 18 months.



Preserving the quality of life is among the themes that lay the foundation for *Connections 2030*, Wisconsin's long-range transportation plan.



### 0092-09-18: Costs and Benefits of Non-Automatic License Reinstatement

The Division of Motor Vehicles initiated this project to determine if there is a safety benefit to not automatically reinstating a driver's license following suspension or revocation. Specifically, WisDOT wanted to investigate whether a pre-reinstatement hearing that didn't guarantee a reinstatement result would be effective for improving driver safety. The study included a review of state license reinstatement practices and follow-up interviews with those states that reported having a non-automatic reinstatement process.

**Impact:** Although a few states are using non-automatic renewal, no data is available to evaluate whether a similar program would have the intended impact in Wisconsin. It will be useful for WisDOT to monitor the experiences of California, Illinois and Pennsylvania as those states evaluate their non-automatic license reinstatement programs.



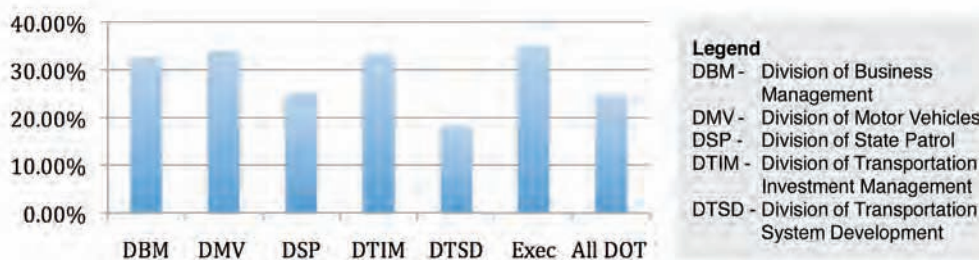
### 0092-10-15 Best Practices Guidance for Workforce Transition and Succession Planning

Final report and brief: <http://wisdotresearch.wi.gov/project?id=797>

Up to 50 percent of WisDOT employees are expected to retire within the next decade, and much of their expertise is not captured in documentation. WisDOT managers needed to better understand the strategies available for easing workforce transitions and retaining knowledge held by departing workers. They needed help developing products and procedures for capturing and organizing this knowledge to inform future decision making.

**Impact:** Investigators created the WisDOT Guidebook for Knowledge Management and performed a pilot implementation by creating specific products for the Railroads and Harbors Section, including a training plan, process matrices, a knowledge repository and other tools to facilitate knowledge transfer. The Office of Human Resources is rolling out this strategy to many WisDOT divisions.

Eligible for Retirement By 2015



# Transportation Pooled Fund Program

Through the national Transportation Pooled Fund Program, WisDOT is able to pool its financial resources with other states to fund larger research projects of common interest. Each year, WisDOT staff nominates the projects to fund, and senior managers make the final selection based on the highest priorities of the department.

WisDOT's investment in the Pooled Fund Program is substantial and strategic, leveraging millions of dollars contributed by other states to yield high-impact results for Wisconsin. WisDOT participated in 56 projects during FFY 2011. Five of these projects are highlighted below.

## Impacts of Pooled Fund Projects



### Accelerated Implementation of Intelligent Compaction Technology for Embankment Subgrade Soils, Aggregate Base and Asphalt Pavement Material, TPF-5(128)

Study link: <http://www.pooledfund.org/Details/Study/359>

Compaction rollers equipped with intelligent compaction capabilities may result in more uniform material density, improve the efficiency of compaction operations and provide a valuable tool for quality control and quality assurance. The goals of this study were to accelerate the development of IC quality control and quality assurance specifications for subgrade soils, aggregate base and asphalt pavement material; help develop the expertise of participating states; and identify needed improvements to IC equipment.

**Impact:** By studying compaction roller measurements, WisDOT staff and contractors gained valuable knowledge about the automated data collection process and the interpretation and use of the data. IC technology was found to be useful in modeling the consistency in stiffness of the subgrade, base and HMA pavement. The study also developed generic specifications for earthwork, bases and hot mix asphalt, and provided a large volume of data to help states develop their own specifications.



### Study of Erection Issues and Composite System Behavior of the Full-Scale Curved Girder Bridge Currently Under Construction at the Turner-Fairbank Highway Research Center, TPF-5(005)

Study link: <http://www.pooledfund.org/Details/Study/129>

The goal of this study was to improve the performance of the AASHTO curved girder bridge specifications. The new specifications will optimize curved girder bridge design practice while ensuring consistent safety. They will also provide fabrication and erection guidance to prevent constructability problems.

**Impact:** The Bureau of Structures is considering incorporating guidance from this project into chapter 24 of the Wisconsin Bridge Manual, which addresses steel bridges. The new guidance is expected to improve the design, fabrication and erection of curved girder bridges in Wisconsin.



### Long-Term Maintenance of Load and Resistance Factor Design Specifications, TPF-5(068)

Study link: <http://www.pooledfund.org/Details/Study/286>

The goal of this study was to provide timely assistance to the AASHTO Highway Subcommittee on Bridges and Structures in interpreting, implementing, revising and refining the AASHTO load and resistance factor design documents first published in 1994. With the conclusion of the pooled fund study in 2010, responsibility for maintenance of and enhancements to LRFD specifications was transferred to AASHTO as a technical assistance program.

**Impact:** The Wisconsin Bridge Manual relies heavily on the AASHTO LRFD specifications for designing state bridges. Maintaining and improving these specifications will help to assure that Wisconsin bridge designs continue to be in tune with the latest technical developments.

### PCC Surface Characteristics: Tire-Pavement Noise Program Part 3—Innovative Solutions/Current Practices, TPF-5(139)

Study link: <http://www.pooledfund.org/Details/Study/368>

This study continued the comprehensive data collection and analysis program on the surface texture of new and existing concrete pavements begun in 2005. Researchers sought to determine what common construction techniques and practices can be used to produce quieter concrete pavements, while still maintaining good friction and drainage.

**Impact:** As result of study findings, WisDOT has changed its transverse tining specification from a random spacing to a uniform spacing and also changed its diamond grinding specification. Study results were presented to 115 individuals from WisDOT, the concrete paving industry, municipalities and the consulting industry at the Wisconsin Concrete Pavement Association workshop on February 9, 2011.

### Evaluation of Fiber Reinforced Composite Dowel Bars and Stainless Steel Dowel Bars, TPF-5(188)

Study link: <http://www.pooledfund.org/Details/Study/411>

Steel dowel bars are routinely used to transfer forces from heavy trucks passing from one concrete pavement slab to the next. The dowel bars thus reduce “faulting,” or development of uneven slab edges, which can cause a rough ride and lead to premature deterioration of the pavement. However, corrosion of the dowel bars can reduce or eliminate their effectiveness. This study was aimed at completing research begun in 1998 by the Highway Innovative Technology Evaluation Center to evaluate the load transfer capability and corrosion resistance of two alternative dowel bar materials: stainless steel and fiber-reinforced polymer dowel bars.

**Impact:** The study demonstrated that 1.5-inch fiber-reinforced polymer and other resin-based dowel bars do not provide the load transfer efficiency needed at concrete joints. Hollow stainless steel and stainless steel clad dowel bars provide good LTE and a life span of more than 30 years, but the evaluation period of the current test sections is only 14 years, requiring more follow-up in the future. Epoxy-coated dowel bars provided good LTE and will perform acceptably for a 30-year pavement life span. This study confirmed WisDOT’s current standard practice of using epoxy-coated dowel bars for load transfer at concrete joints.



# Technology Transfer: Research and Library

## Impacts of Library Services and Resources

From its beginnings in 1969 as a collection of file cabinets and reports within the department's planning bureau, the WisDOT Library has grown to hold more than 42,000 items in its physical collection—one of the largest state DOT collections related to transportation research and practice. The staff of four librarians provides support and specialized services to a wide range of customers that extends beyond WisDOT to include university researchers, consultants, practitioners and the general public.

The library's primary role is to provide WisDOT staff with access to a diverse collection of information needed to monitor technical and policy developments potentially affecting the department. The collection that has developed over the years is rich in historical resources, often incorporated from satellite collections. In addition to maintaining a diverse collection of current and historical information in core subject areas, the library boasts particularly strong collections specific to Wisconsin, including environmental impact statements, State Highway Commission history, traffic counts and motor vehicle registration file analysis.

### An Expanding Collection

The WisDOT Library has absorbed and merged several significant departmental libraries and collections during its existence. Most recently, consolidation of the Division of Transportation System Development's Southeast Region library expanded the WisDOT Library collection with more than 1,000 items, almost a third of which are unique to WisDOT. The materials cover a variety of topics—highway and airport planning, harbors, transit and environmental issues (especially wetlands)—and provide an exciting glimpse of the history of transportation in Wisconsin. Staff throughout the state can search for the materials online through WisDOT's online catalog, WisCat ([www.wiscat.net](http://www.wiscat.net)). Next up for integration into the WisDOT Library collection are materials that focus on technical pavement research from the Truax Materials Lab library.

### Digitizing to Enhance Access

WisDOT librarians are working on digitization projects that will increase access to important transportation resources.

**Information Portal.** WisDOT Library continues to add to its collection of virtual resources available to any WisDOT employee through the Library and Information Commons intranet site. Developed in response to specific user needs, the information available through the Information Portal includes links to external websites, but most of the content is historically significant information and data from internal WisDOT documents that had previously been available only in difficult-to-access formats (mostly in print and sometimes not in the library catalog). Digitizing these materials provided department staff with ready access to such documents as motor vehicle registration file statistics from the Division of Motor Vehicles dating back to 1982, historical DMV handbooks and vehicle equipment statutes that predate the 1960s.

### Minds@UW Wisconsin Transportation Center Collections.

WisDOT Library is participating in the Minds@UW project, a repository that provides permanent digital storage of and access to University of Wisconsin materials. WisDOT librarians have begun cataloging research reports produced by UW–Madison researchers for WisDOT's WHRP and depositing them in one of the repository's four Wisconsin Transportation Center collections ([minds.wisconsin.edu/handle/1793/115](http://minds.wisconsin.edu/handle/1793/115)). WisDOT-sponsored research can also be found in the other Wisconsin Transportation Center collections:

- Midwest Regional University Transportation Center (MRUTC)
- National Center for Freight & Infrastructure Research & Education (CFIRE)
- Wisconsin Traffic Operations and Safety (TOPS) Laboratory



## A New Tool to Manage the WisDOT Library Collection

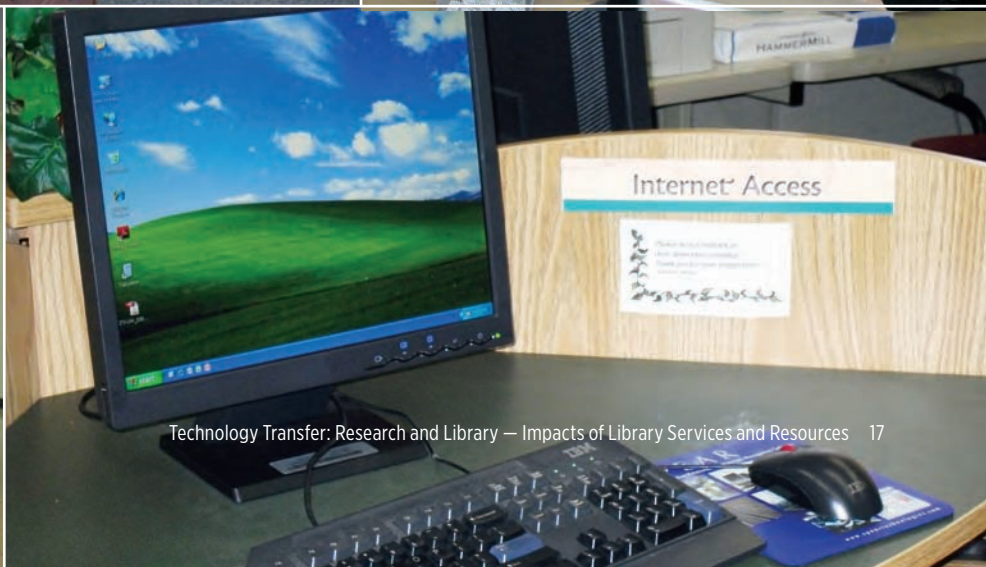
Librarians face multiple challenges when selecting materials for transportation library collections: shrinking budgets, an ever-expanding universe of information and diverse user needs. WisDOT Library has a new policy to guide selection decisions and ensure that its collection contains relevant and representative information resources that meet the unique needs of its users.

Based on a template developed by fellow transportation librarians, the collection development policy prepared by John Cherney, WisDOT head librarian, guides the library's efforts in carefully selecting, maintaining and providing access to information resources. The policy describes the types of materials collected, noting the specific subject areas that are emphasized or excluded from the WisDOT Library collection and assigning various importance levels to more than 30 subject areas. Recognizing that a library collection must evolve to meet the changing needs of its users, WisDOT Library expects to review its policy annually to ensure that collection practices continue to serve the WisDOT mission.

## Reaping the Benefits of Collaboration

WisDOT Library is an active participant in the Transportation Library Connectivity and Development pooled fund study ([libraryconnectivity.org](http://libraryconnectivity.org)), a follow-up to the Transportation Library Connectivity pooled fund study ([libraryconnectivity.org/archive/index.html](http://libraryconnectivity.org/archive/index.html)) led by WisDOT from 2005 through 2010. Like the original study, the new project brings together transportation librarians from around the country to promote library and information services, support the development of a national transportation knowledge network and provide resources that help members meet the needs of both practitioner and decision maker.

In one of several initiatives undertaken by pooled fund members, a working group is examining ways to quantify the return on investment in transportation libraries to augment qualitative measures that illustrate the overall success or impact of library services. The model the working group expects to develop could serve as a national standard and will answer a seemingly simple, but difficult-to-answer question: How much money is saved by having trained staff provide library services?



# Impacts of Research Information Services

The R&L Unit provides a suite of information products and services that respond to the immediate information needs of WisDOT staff and support the cycle of research from beginning to end. The unit identifies completed research and practices to reduce duplication and leverage existing results, and supports the transfer of new and existing information throughout the department.

“I am quite sure I would not have had time to complete this research myself. If I did have time to contact a few states, I would not have had the ability to do nearly as thorough a survey as was delivered. I am completely satisfied and very grateful for the useful data.”

TSR customer  
in WisDOT's Office of General Counsel

## Transportation Synthesis Reports

Transportation Synthesis Reports are annotated, quick-response reports requested by WisDOT technical staff and managers from every business area of the department. Based on Internet, library and telephone research, TSRs provide pertinent research and practices compiled and organized in a concise, readable format. The R&L Unit posts many of the TSRs on the program website at <http://wisdotresearch.wi.gov/projects-by-topic> according to research topic. In addition, site visitors can search by keyword for TSRs of interest using the product database on the site at <http://wisdotresearch.wi.gov/search-products>.

**Impact:** TSRs allow WisDOT staff to learn from the experiences of other state DOTs, avoid duplicating research, identify new technologies and practices that save time or money or enhance safety, make better investment decisions, and monitor federal guidelines and key transportation trends. In the 2011 R&L survey of TSR customers:

- Eighty-nine percent of respondents indicated “they would not have had the time or resources to conduct the research themselves.”
- Seventy-eight percent of respondents indicated that they had “applied or anticipated applying information in the TSR to improve processes, make decisions, implement technology or make other changes.”
- Eighty-nine percent of respondents rated the TSRs a 4 or 5 (5 = extremely well) on how well they met information needs.

## WisDOT Research Website

The R&L Unit redesigned its website in 2011 to more effectively share project and program information with internal and external transportation professionals. The new site features a searchable database of reports and briefs, project closeout webinars and videos, research project details organized by topic, Request for Proposal and project management guidance for researchers, information about library services and resources, and announcements of recent publications and activities of the research program. The new site is available at <http://wisdotresearch.wi.gov/>.

**Impact:** WisDOT has long emphasized the importance of effectively sharing research results and engaging external stakeholders in the research process. The site supports distribution of both research solicitations and research results electronically, making research results broadly available to those who can benefit—both staff within WisDOT and other researchers pursuing related topics.





## Research Briefs

The R&L Unit produced nine research briefs in 2011 on projects completed through WHRP, the Policy Research Program and the Transportation Pooled Fund Program. These two-page summaries outline research objectives, findings and recommendations, and plans for implementation. Briefs are available online with their corresponding research projects at <http://wisdotresearch.wi.gov/projects-by-topic> or by searching the product database at <http://wisdotresearch.wi.gov/search-products>.

**Impact:** Research briefs save time for WisDOT staff and investigators in reviewing completed research, provide an easy way for project managers to share results with staff in other areas and capture the views of both investigators and project managers.

## Literature Searches

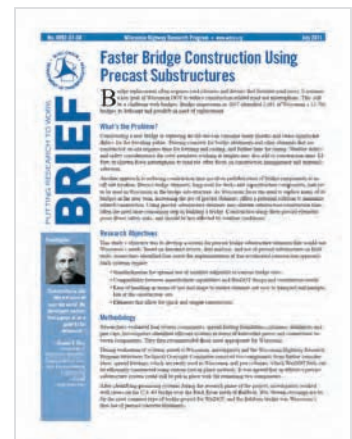
R&L Unit staff prepares literature searches on topics requested by WisDOT managers and technical staff. These targeted keyword searches identify a representative bibliography of studies available on the requested topics. The R&L Unit produced 25 literature searches in FFY 2011.

**Impact:** WisDOT staff uses literature searches to scope research proposals and work plans, avoid duplicating research and identify investigators and organizations with specialized expertise in a subject area. Each citation includes the title, author, date and source for obtaining the full document online, in the WisDOT Library or through interlibrary loan.

## Research & Library E-Newsletter

In 2011, the R&L Unit took the best features from the previously published Research & Library E-News and the WHRP E-News to create a single, new Research & Library at Work e-newsletter for quarterly publication. The newsletter features the impacts of recently completed research, highlights of implementation efforts, program updates, outreach activities, and research and library services. The newsletter also highlights WisDOT's regional and national research involvement, including participation in pooled fund studies, advisory groups and conferences. Past issues of the newsletter are available online at <http://wisdotresearch.wi.gov/news>.

**Impact:** Providing current information about WisDOT research activities promotes involvement in the research process from across the department and encourages use of research results. The projects and initiatives described in the newsletter underscore the value of WisDOT's investment in research. The first issue of Research & Library at Work (Fall 2011) featured research results on intelligent compaction and pile-bearing capacities, new resources available in the library and highlights from a regional collaboration on asphalt research.

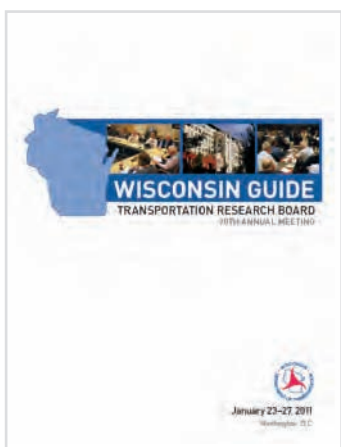




### Peer Exchanges

To help staff learn from other agencies' best practices, WisDOT Research provides planning and logistical support, travel expenses and reporting services for WisDOT-hosted peer exchanges. These two- to four-day conferences held in Madison and hosted by WisDOT bring together WisDOT staff, peers from five to seven other states and FHWA representatives to examine key transportation topics through presentations and round-table discussions. The R&L Unit supported a peer exchange on privacy issues in FFY 2011 and worked with staff to begin planning three additional peer exchanges to be held early in FFY 2012.

**Impact:** Peer exchanges help WisDOT staff address critical policy development and program implementation issues within the department by providing the opportunity to learn from the experiences of other states, federal agencies and academic institutions. Peer exchanges are available to the entire department.



### Wisconsin TRB Guide

The Wisconsin Guide to the TRB Annual Meeting highlights the contributions of WisDOT staff and Wisconsin researchers who authored technical papers and served as presenters and session leaders. TRB committee and panel members are also listed.

**Impact:** The annual TRB Guide showcases the breadth and depth of Wisconsin transportation research for state, national and international audiences. The guide helps staff attendees find Wisconsin sessions easily and facilitates dialogue among WisDOT, academic and private-sector transportation professionals about the state's growing research expertise. At the January 2011 meeting, 80 representatives of Wisconsin institutions made presentations on their latest transportation research findings.

### Making the Most of the TRB Annual Meeting

The R&L Unit works with department staff to make sure that WisDOT gets the most out of the TRB Annual Meeting. To prepare for each annual meeting, R&L Unit staff provides a session summary form for capturing key highlights to share within the agency. After the 2011 meeting, the unit compiled 86 session summaries and assisted in distributing high-impact presentations and papers noted by attendees to appropriate offices within the department.

**Impact:** The R&L Unit prepares a summary report capturing the impact of attending the TRB Annual Meeting. WisDOT attendees identified numerous opportunities to implement ideas and research results presented at the conference. Improvements in 88 areas could be made through changes to WisDOT's administrative practices, and 31 improvements could result from changes to specifications.





# University Transportation Center

Since 1987, the federal transportation authorization has called on the U.S. Department of Transportation's Research and Innovative Technology Administration (RITA) to provide special designation and funding to a select number of University Transportation Centers (UTCs) around the nation. Wisconsin is home to a number of universities that have the capability and history of conducting transportation research. Since the creation of the RITA-funded UTC program, RITA has designated two centers in the state, both of which were active in 2011:

- The Midwest Regional University Transportation Center (MRUTC) at the University of Wisconsin–Madison received its federal UTC designation from 2001 through 2006.
- The National Center for Freight & Infrastructure Research & Education (CFIRE) at the UW–Madison received its initial federal UTC designation from 2005 through 2011.

## Impacts of UTC Support

WisDOT has taken advantage of the great partnership opportunities these UTCs provide, collaborating on research of interest to both the UTC and WisDOT and supporting the training, education and development of future researchers and transportation professionals within the state.

WisDOT contributed funding to the following UTC projects that were active in FFY 2011:

- 0092-09-22: Understanding and Modeling Freight Stakeholder Behavior
- 0092-09-23: Sustainable Freight Infrastructure to Meet Climate and Air Quality Goals
- 0092-10-21: Aligning Oversize and Overweight Truck (OSOW) Permit Fees and Policies with Agency Costs
- 0092-11-09: Air Cargo in the Mississippi Valley Freight Coalition Region



# National Programs—TRB and Its Cooperative Research Programs



Headquarters building of the Transportation Research Board

TRB is one of six major divisions of the National Research Council—a private, nonprofit institution that is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering. TRB's mission is to promote innovation and progress in transportation by stimulating and conducting research, facilitating the dissemination of information and encouraging the implementation of research results.

Every business area of WisDOT benefits from TRB research and from

other activities of the TRB Core Program, which includes more than 200 standing committees and task forces that address all aspects and modes of transportation. Almost 4,000 volunteer committee members are drawn from state DOTs (including 36 from WisDOT), academia and the private sector. Committee members work with peers to identify transportation research needs, review papers and encourage implementation of research findings at state DOTs.

## Impacts of TRB

The TRB Annual Meeting in Washington, D.C., attended by more than 10,000 transportation professionals from around the world, is a unique opportunity for WisDOT staff to gain valuable firsthand knowledge about new technologies and practices. Because of WisDOT's financial contribution to TRB, department staff members receive complimentary registration

for the Annual Meeting and for the numerous TRB webinars presented throughout the year. They also receive free hard copies of TRB publications and have free online access to issues of the *Transportation Research Record*, TRB's journal of transportation research.

Of particular value to WisDOT are the research findings generated through TRB's Cooperative Research Programs Division. Ideas for cooperative research projects come from state DOTs, which have a significant role in selecting investigators and overseeing the research as it is conducted. Many WisDOT employees serve on TRB cooperative research project panels, contributing to project scoping and oversight, and benefiting from interactions with leading investigators and practitioners from around the country.

The National Cooperative Highway Research Program, the oldest and largest of TRB's cooperative programs, is sponsored solely by the state DOT members of AASHTO, which oversees NCHRP through its Standing Committee on Research. WisDOT Secretary Mark Gottlieb is one of 16 SCOR members who review NCHRP research proposals, selecting more than 50 projects for funding each year at a total annual investment level of more than \$25 million.

TRB's other cooperative programs, administered in a variety of ways, all focus on the needs of state DOT practitioners in their respective subject areas:

- Transit Cooperative Research Program
- Airport Cooperative Research Program
- National Cooperative Freight Research Program
- Hazardous Materials Cooperative Research Program
- National Cooperative Rail Research Program (early 2012)

WisDOT will be directly benefiting from an upcoming \$450,000 project of the Airport Cooperative Research Program, which was suggested by WisDOT's Scott Brummond, chief of the Aeronautical and Technical Services Section. The project, Understanding Green Energy Technologies and Their Effects on Airports, is expected to begin in 2012.



# Research & Library Unit Staff



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