



# ACCELERATOR

*Putting your ideas in motion*

## State, National Research Projects Take Shape

**F**all is a busy time for transportation researchers as they gear up for next year's round of state and national research projects. MnDOT Research Services & Library has released its annual request for proposals, which provides a sneak preview of what projects might be selected.



Of nearly 100 ideas submitted in Minnesota, researchers can bid on 24 possible projects from seven research areas. They include a roadside tool to assess snowplow driver fatigue, an educational video to help cities and counties invest more in pothole prevention and an assessment of different pedestrian crossing systems. The RFP solicitation is open to faculty from universities with MnDOT master contracts as well as MnDOT's own Office of Materials and Road Research.

Research ideas were submitted by MnDOT staff and city and county engineers. They were then reviewed and ranked by the Local Road Research Board and MnDOT's Transportation Research Innovation Group, which represents MnDOT districts and specialty

offices. "We reach out to the specialty offices and help them develop ideas and prioritize current needs," said Hafiz Munir, MnDOT research management engineer. "They're in the driver's seat. We are guiding them through the process."

The National Cooperative Highway Research Program has also **announced its 2015 projects**; RFPs are already being released. The program is expected to include 12 continuations, 46 new projects and three projects contingent on additional funds becoming available.

Minnesota's research funding awards will be announced in December. Read more about the potential state and national projects at our Crossroads blog, [mntransportationresearch.org](http://mntransportationresearch.org).

### High-Volume Chip-Sealing Project Part of September Workshop



The Midwestern Pavement Partnership SHRP2 R26 preservation workshop for high-volume roads will be held Sept. 2-5 in Minneapolis. During a tour at the MnROAD pavement testing facility, members will view a recent application of chip sealing. This key preventive maintenance technique was previously used chiefly on low-volume roads, but newly developed methods make it possible to be used on most highways. Chip sealing greatly reduces the chance of cracking by protecting asphalt from oxidation due to weather and deicing chemicals.

View MnDOT's research video on chip sealing at [mndot.gov/research/videos.html](http://mndot.gov/research/videos.html) or request a hard copy.

## Research Highlights



*“This work provides information for agencies to use in their sign maintenance policies about how old a sign can be before its retroreflectivity drops below a threshold. Those policies are what offer protection against liability.”*

—Tim Plath, Transportation Engineer, City of Eagan

### Figuring Out How Long Our Traffic Signs Will Last

**Traffic & Safety** — All traffic signs are required to maintain a certain level of retroreflectivity, which amounts to how well drivers can see a sign when their headlights illuminate it. New Federal Highway Administration rules require all local agencies to have a sign management program, and the Local Road Research Board funded a study to generate guidance for them.

Researchers reviewed literature on sign life, analyzed retroreflectivity data provided by local agencies and built a test deck of signs at the MnROAD pavement testing facility that included several colors and sign materials. A panel of engineers and risk management specialists created best sign maintenance practices.

The study determined that signs maintain adequate retroreflectivity longer than manufacturers’ warranties would imply, and knowing this will save resources. Testing revealed that signs should be expected to last 15 to 30 years; more data will be collected from the MnROAD test deck and elsewhere over the coming years to help narrow that range. Watch a video about this project at our Crossroads blog, [mntransportationresearch.org](http://mntransportationresearch.org).

[Technical Summary 2014-20](#)

## Stormwater Control Research

### Can Flocculants Reduce Construction Pollution?

**Environmental** — Flocculants cause sediment to clump and settle out of water. They have been used to treat drinking water for more than 70 years, so why not try to use them in treating construction runoff? When highway or bridge construction disturbs soil, storms can wash pollutants into rivers and lakes, so the goal is to clean the runoff in a holding pond before it leaves the construction site.

Researchers tested 21 chemicals to see how well they could remove 57 types of soil from water. While no chemical was effective for the entire range of Minnesota’s soils, three chemicals were broadly effective on a range of samples. Future research will be needed to automate adding the right flocculant at the right concentration for a given construction site.

[Technical Summary 2014-25](#)

### How Cloudy Can the Water Be Before We Worry?

**Environmental** — Turbidity is the measure of water’s cloudiness, which increases as the amount of suspended sediment increases, and can be used to indicate sediment concentration in stormwater runoff. Researchers needed to determine how best to monitor turbidity.

They collected and classified soil samples from around the state and subjected them to a rainfall simulator to collect the runoff and eroded sediment. The samples were then analyzed to create a turbidity vs. sediment concentration curve for each sample, and five turbidity sensors were compared. Two turbidity monitoring systems were then developed and tested at two construction sites. One of these, the “turbidity box,” is ready for use on MnDOT construction projects. [Technical Summary 2014-24](#)

## Transportation Research Syntheses

*Transportation Research Syntheses are short-turnaround research projects that summarize research activity and practices among state departments of transportation. To view any of these documents or request a TRS from MnDOT Research Services & Library to answer your questions about a transportation topic, visit [mndot.gov/research/transportation-research-syntheses.html](http://mndot.gov/research/transportation-research-syntheses.html).*

### Defining and Documenting Transportation Efficiencies

**Policy & Planning** — MnDOT is committed to enabling efficient transportation; people need to get where they want to go with the least hassle possible at the least cost to taxpayers. But how do we know when we have succeeded? What does “efficient” really mean in this context? A survey of 12 state DOTs and follow-up interviews with seven of them gave MnDOT a picture of how agencies track cost savings, define efficiencies and measure success. [Transportation Research Synthesis 1410](#)

## Other Research

### Optimizing Asphalt Pavement Surfaces to be Safer, Quieter, Longer Lasting

**Materials & Construction**—How do tires really interact with pavement surfaces? To find out, researchers constructed test sections at the MnROAD pavement testing facility using various asphalt mixtures and monitored them from 2008 to 2012 for friction, ride quality, texture, sound absorption, tire pavement noise and distress. This data was analyzed to determine how different mixture properties affect surface characteristics. The results will inform future pavement design to our benefit. For example, producing quieter pavements is much less expensive than building cumbersome noise walls. [Technical Summary 2014-28](#)



Researchers used a field permeameter to measure the hydraulic conductivity of HMA cells, or how well they allowed water to pass through them. The conductivity of porous cells decreased over time, possibly because they were becoming clogged with debris.

### Picking a Design for New HOT Lanes

**Traffic & Safety**—Minnesota will be installing more high occupancy toll lanes, which encourage carpooling and raise revenue. However, our two existing HOT lanes were designed differently. Interstate 35 provides open access: Drivers can move in or out of the lane almost anywhere, which can cause traffic shockwaves. On I-394 (shown at right), a double white line or physical barrier separates the lane; cars can only merge into or out of it in specified places.

This closed access approach wouldn't work as well on I-35 where there are more freeway exits. After analyzing video footage of the two installations, the project team suggested using open access as a starting point, with access restrictions put in where there are significant speed differences between the HOT lane and other lanes. [Technical Summary 2014-23](#)

## Research Implementation

### Helping Engineers Design Pedestrian Crossings

**Traffic & Safety**—There has been plenty of research into and guidance about when and how to use crosswalks and other pedestrian crossing aids at uncontrolled intersections (intersections without a stoplight or stop sign), but this information is spread out over numerous manuals and state laws.

Investigators pored through federal resources to create a process for local engineers: instructions on collecting data at an intersection, a spreadsheet tool for calculating statistics like average pedestrian delay, and a flowchart and guidebook to help determine what crossing treatments would work best. City and county engineers, MnDOT staff and consultants who work with local governments attended a training workshop about the guidebook.

[Technical Summary 2014-21](#)



### A New, Flexible Way to Contract for Transportation Services

**Policy & Planning**—Projects like culvert repairs, overlays and seal coats are small, recurrent and often unpredictable. To handle such cases, MnDOT is expanding the use of Indefinite Delivery/Indefinite Quantity contracts rather than letting a separate contract each time the need arises. By keeping a contractor on standby to perform work when the need arises, IDIQ contracting covers multiple small projects, reduces preconstruction costs and provides flexibility in scheduling. The federal government has long used these contracts, but MnDOT needed implementation guidelines consistent with its procurement practices.

Researchers reviewed existing IDIQ practices, performed case studies, developed an IDIQ framework and solicited feedback from contractors and MnDOT staff to optimize the practice. MnDOT started awarding IDIQ contracts in April 2013 and is currently evaluating their effectiveness. [Technical Summary 2014-31](#)



Find Research Services & Library's videos at [mndot.gov/research/videos.html](http://mndot.gov/research/videos.html).



RESEARCH SERVICES & LIBRARY

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## Calendar

- 9/2–5      **Midwestern Pavement Partnership SHRP2 R26 preservation workshop**
- 9/7–11     **2014 Intelligent Transportation Systems World Congress**
- 9/10–12   **Minnesota Surveyors and Engineers Society Fall Conference**
- 9/15       **FY2016 research proposals due**
- 9/21–24   **Rail~volution 2014**
- 9/29–10/1 **European Transport Conference**
- 10/8–9     **Minnesota Maintenance Expo**
- 11/13–14   **Minnesota Toward Zero Deaths Conference**
- 11/21–24   **AASHTO 2014 Annual Meeting**

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