Newly Funded Projects Will Explore Innovations

MnDOT’s Transportation Research Innovation Group has approved funding on a number of new implementation and research projects, including:

- Initiate three winter maintenance projects: live-stream images of traffic conditions from MnDOT snowplows, expand the use of blowing snow control measures such as living snow fences and develop a road condition recovery time estimation system.
- Systematically evaluate existing and potential sites for railroad crossings to improve safety.
- Perform hydraulic pipe inspections using video and laser ring technology.
- Monitor iron-enhanced stormwater infiltration basins.
- Develop an on-site test for suspended solids in stormwater near construction sites, and develop procedures for treating flocculants inexpensively and effectively.
- Institute a knowledge retention program.
- Develop a procedure for determining whether an existing asphalt roadway is a good candidate for whitetopping.
- Develop a tool to determine the optimal spacing for access to MnPASS high-occupancy lanes.
- Pilot a community-level publicity campaign for the need for traffic safety.

MnDOT Research Services & Library is always accepting ideas for new research and implementation projects. To submit an idea, visit mndot.gov/research.

MnROAD, NCAT Form National Pavement Testing Partnership

MnROAD is partnering with the National Center for Asphalt Technology (NCAT) to enhance pavement preservation research. MnDOT’s renowned cold-weather research facility and NCAT, located at Auburn University in Auburn, Ala., will share resources and expertise to validate promising technologies through accelerated pavement testing.

For more information, visit mndot.gov/mnroad/NCATpartnership.html.
More Consistent Risk-Based Cost Estimates Mean Lower Overall Project Costs

Policy & Planning — As a transportation project progresses, costs can rise unexpectedly for several reasons such as unplanned utility relocations, environmental mitigation, traffic control, and external financial and economic circumstances. Minnesota districts have lacked a standard for factoring these risks into initial cost estimates.

To create needed guidelines, investigators conducted a state-of-the-practice review of MnDOT districts, other states and construction organizations. Using the information gathered in this review along with input from a workshop with MnDOT staff, investigators crafted draft guidance for risk assessment, which will ultimately enable all districts to optimize budgeting and deliver projects more cost-effectively. Technical Summary 2015-10

Wave-Shaped Rumble Strips Reduce Nuisance Noise

Traffic & Safety — Centerline rumble strips are among the cheapest and most effective crash prevention tools in our arsenal. But a few landowners have complained about the noise created when vehicles cross the strips, which can sometimes be heard up to 3,000 feet away. Good rumble strip design should maximize the sound for those inside the vehicle, while minimizing it elsewhere.

Researchers compared the current Minnesota design, which uses square edges (pictured left), with wave-shaped edge designs used in Pennsylvania and California (pictured right) by measuring the volume and tonal quality of sounds produced when vehicles drive over the strips at various speeds. Although more expensive, the wave-shaped edge design was more effective. After additional testing on variations of the California design, MnDOT will implement a new design in the state. However, because of the added cost of the wave-shaped design, the new standard will not completely replace the old design, but will likely be installed in more noise-sensitive areas. Technical Summary 2015-07

Transportation Research Syntheses

Transportation Research Syntheses are short-turnaround research projects that summarize research activity and practices among state departments of transportation. If you need answers to a transportation topic, request a TRS from MnDOT Research Services & Library today.

How Do States Report on Summer Maintenance Operations?

Maintenance & Operations — Once all the snow has melted, MnDOT kicks into gear with a wide range of activities designed to maintain our transportation system. In the interest of transparency, the Office of Maintenance is planning to expand its quantitative reporting on these summer maintenance activities and needed a quick appraisal of what other states do: the kind of activities they monitor, data management practices, the reports produced and the target audiences. After surveying several agencies, investigators discovered that few states issue reports specific to summer maintenance, and only a few states use maintenance management systems to manage data and monitor maintenance activities. Transportation Research Synthesis 1504

“This information put us in an excellent position to design our new summer maintenance report, which we plan to do later this year.”

—Sue Lodahl, MnDOT Assistant State Maintenance Engineer

Access technical summaries and research reports at mndot.gov/research.
The Twin Cities Metro Hybrid Simulation model was first used to model the impact of the new Green Line light rail on traffic.

New Travel Simulation Model Forecasts the Effects of Transit

Multimodal — How will investing in transit affect traffic? The Metropolitan Council already maintains a regional planning model to guide its investment decisions, but this kind of model is macroscopic, providing forecasts of changing traffic patterns in the region as a whole. The model is unable to incorporate the likely effects of specific traffic controls, specific lane configurations or drivers who reroute to avoid congestion.

The Twin Cities Metro Hybrid Simulation computer model incorporates more of these microscopic factors while still covering a large enough area to be useful in simulating a project like the Green Line light rail. The model’s predictions matched observed real-world impacts, creating a stepping stone toward broader implementation of this type of planning and simulation modeling. Technical Summary 2015-09

Can Light Surface Treatments Offer a Cost-Effective Middle Ground for Maintaining Low-Volume Roads?

Materials & Construction — When a local road wears out, it can be repaved for as much as $400,000 per mile. Or if the road is seldom used, it can be reverted to gravel, which means lower ride quality and lots of dust. But applying a light asphalt emulsion to a thicker than usual base is a less expensive alternative to hot-mix asphalt and can restore the road’s serviceability. The same technique can be used to upgrade gravel roads.

Researchers explored Minnesota’s experiences with these treatments, visited case study sites and reviewed various design methods to recommend next steps for testing this potentially useful rehabilitation technique. Technical Summary 2015-06

How Much Do Road Projects Help the Economy?

Policy & Planning — When proposing new transportation projects, it helps to be able to quantify expected economic benefits. Researchers analyzed county-level data and created a statistical model to factor nontransportation effects, such as changing population, personal income and level of urbanization. They found that, on average, trunk highway investments produce about $3 in economic benefits in the region for every $1 invested. Local road investments have a positive economic impact primarily for the county where they are built. Technical Summary 2015-12

Confirmed: Streetlights Reduce Nighttime Crash Rates at Rural Intersections

Traffic & Safety — Crashes at rural intersections account for 16 percent of all traffic fatalities nationwide, and nearly 30 percent of those fatalities occur at night. Researchers looked at the connection between lighting levels and nighttime safety at rural intersections and confirmed that increased lighting levels were associated with reduced nighttime crash rates. These findings reinforce Minnesota’s current practice of adding lighting as a safety enhancement at rural intersections. Technical Summary 2015-05

While all rural intersections benefited from increased lighting levels, installing even a single overhead light at otherwise unlighted intersections appears to have the most potential to improve safety.
5/13  Minnesota Roadway Maintenance Training and Demo Day, Rosemount
5/20–21  CTS Transportation Research Conference, St. Paul
5/29  Research ideas due (see www.mndot-lrrb.ideascale.com)
6/2  MnDOT Library and Employee Resource Groups Open House, St. Paul
6/15  Transit Cooperative Research Program problem statements due
6/16  LRRB Outreach Meeting, Walker
6/17–18  LRRB and Research Implementation Committee Meetings, Walker