

WESTERN BUILDER



**Minnesota DOT Offers Pavement
Research to Local Governments**

THE SCIENCE OF ROAD CONSTRUCTION

Minnesota DOT's Office of Materials and Road Research Urges Counties and Municipalities to Take Advantage of This New Initiative

By Paul Fournier

Key personnel of several municipal, county and park district departments responsible for public works operations had an up-close look at pavement research application in action, when they recently participated in field demonstrations under a new initiative launched by the Minnesota Department of Transportation (MnDOT). The agency's initiative offers its pavement research capabilities as a resource to local governments, and also invites them to take a proactive part in product and equipment trials.

The initiative is being implemented through the agency's Office of Materials and Road Research, based in Maplewood, with Project Supervisor Paul Nolan serving as resource representative. Nolan focuses on new product and equipment technologies for pavement construction and main-

tenance, and freely shares the information he acquires with Minnesota counties and municipalities. He also manages applied research demonstrations such as the recent field trial, which focused on an asphalt rejuvenator for possible use with the state's pavement preservation program.

Preservation Toolbox

"A big part of pavement preservation is doing the right repair at the right time on the right road," he said. "Knowing all the tools in the preservation toolbox is much like mechanics knowing the tools in their toolbox. If they don't know they have a specific tool for a particular repair, the pavement could suffer from needless damage that might have been averted."

Nolan pointed out that the purpose of a pavement preservation program is to main-

tain or restore the surface characteristics of a pavement and to extend its service life, but cautioned that preservation does not generally increase structural value or add load capacity to the pavement.

Among the treatments used in MnDOT's "toolbox" for pavement preservation are crack filling, crack seal, chip seal, fog seals, microsurfacing, and thin asphalt overlays

"In Minnesota we have been working with several different bio-based nontraditional asphalt sealers in an effort to determine the limits of another potential tool for our preservation toolbox," said Nolan. "One of these is Delta Mist from Collaborative Aggregates. This is a 100 percent bio-based product that can be applied topically to asphalt pavements and placed right over the top of in-place traffic markings."

Spray-Applied Rejuvenator

Supervisor Nolan, assisted by Materials Research Engineer Eddie Johnson, coordinated the multi-location product demonstration, which was held in May for MnDOT professional staff and other interested parties. Among the non-MnDOT professional participants in the demonstration were Katie Warner, P.E., Project Manager and Adam Burns, Jr., Senior Engineering Technician, from the Three Rivers Park District; Angie Ellison, City of Eagan Street Maintenance Engineering Technician; and Trudy Elsner, P.E., Hennepin County Department of Public Works.

The field demonstration involved the application of Delta Mist, an emulsified version of Delta S, a non-toxic plant-based, liquid chemistry designed to help prevent cracking of asphalt pavement.

Rejuvenator is initially white but becomes clear between 60 and 90 minutes after application, allowing traffic to resume.



"A big part of pavement preservation is doing the right repair at the right time on the right road."

—Paul Nolan, Project Supervisor, Minnesota DOT Office of Materials and Road Research



MNDOT RESEARCH CAPABILITIES

MnDOT oversees policies, plans and programs for all state transportation modes. This includes about 12,000-centerline miles of the state's trunk highway system (913 miles of Interstate, 3,226 miles of U.S. Highway, and 7,609 miles of Minnesota Highway). Trunk system highways have bituminous concrete, cement concrete, or composite pavement with a wide range of conditions, ages, and performance.

Each year, MnDOT's Pavement Management Unit collects pavement roughness and digital image data on the entire trunk highway system, and relates these to pavement performance. Such condition data has been collected on the trunk highway network since the late 1960s, so the agency has accumulated and studied vast amounts of information – and in doing so, has developed sophisticated research capabilities. One manifestation of these capabilities is MnDOT's MnROAD, one of the world's two largest full-scale pavement testing facilities (the other being Auburn University's NCAT Test Track facility).

Extensive pavement research is undertaken by MnDOT's Materials and Road Research section. This section provides the agency with expertise in geotechnical, materials, pavement and research engineering aimed at improving pavement performance and cost effectiveness. It also provides tools for producing optimum pavement designs, maintenance and construction procedures, and manages technical training for transportation partners.

The rejuvenator is supplied by Collaborative Aggregates LLC, an affiliate of Wilmington, Massachusetts-based Warner Babcock Institute for Green Chemistry (WBI), whose scientists invented the product.

While Delta S is blended with asphalt mix, Delta Mist is spray-applied by a conventional asphalt distributor truck to an existing roadway wearing surface. Depending on pavement condition, the application rate usually varies between 0.05 and 0.135 gallons per square yard. The company says the product is designed to increase pavement service life by penetrating and softening an oxidized asphalt pavement surface up to 3/8-inch in depth, reducing the loss of fine aggregate and retarding the propagation of pavement surface cracks.

Looking for Answers

Nolan said he hoped the demonstration will address some concerns he has about rejuvenators.

“One of the major issues we are evaluating is friction – does the rejuvenator cause the pavement to initially have friction loss? If so, how long does it take to restore original friction? Does it lose additional friction when wet? How does the rejuvenator perform when applied over other road surface products, like crack sealants? And what happens to the reflectivity of in-place traffic markings when sprayed with rejuvenator?”

The applied research demonstration took place in one 10-hour day at seven different locations chosen by participants. Six of the application targets were existing asphalt pavements of differing thickness, contrasting use, and disparate age – the latter varying from less than a year to 12 years old. The seventh application site involved gravel road surfaces mixed with different percentages of RAP. (See Applications Table.)

The contractor who applied the Delta Mist for this field demonstration was ASTEC (Asphalt Surface Technologies Corporation) of St. Cloud, Minnesota. The Delta Mist took between 60 and 90 minutes to dry after application. Nolan said he will monitor the effect of the asphalt rejuvenator over time at all of the application sites.



MnDOT Research Project Supervisor, Paul Nolan, center, observes product application with Katie Warner, P.E., Project Manager and Adam Burns, Jr., Senior Engineering Technician, from the Three Rivers Park District.



Location	Site Description	Existing Surface	Application Ga/SY
Three River Park Districts	Lake Rebecca Horse Trail Parking Lot	Four year old pavement	0.085
Hennepin County Road 19	Mainline and Shoulder	11 year old pavement	0.085
Hennepin County Road 30	Shoulder with crack sealing	Six year old pavement	0.10
City of Eagan Maintenance Shop Lot	Three differing aged pavements	From four to 12 years	0.085
City of Eagan Recreational Trail	***	New, less than a year old	0.082
Trunk Highway 95 near Afton, Minnesota	Shoulder	New pavement less than a year old	0.10
Goodhue County Road 44	Gravel Road	Three 500-foot sections RAP and gravel mix; 60/40; 70/30; and 80/20	0.146