Sustainable pavements: the journey ahead

At the February 5 TERRA Pavement Conference, Kurt Smith, program director at Applied Pavement Technology, Inc., updated attendees on sustainable pavements. Smith leads an FHWA program working to increase knowledge and use of sustainable pavement technologies and practices.

Smith used a definition of sustainability proposed in 1987 by the World Commission on Environment and Development: “Sustainability means meeting the needs of the present without compromising the ability of future generations to meet their own needs.” This definition, he said, implies that “We have to live within our means.” This definition, he said, implies that “We have to live within our means.”

Earth’s resources are limited, and nothing we do regarding pavements exists in a vacuum. We need to find a balance among economic, environmental, and societal needs. So it’s really about trade-offs, picking strategies that best meet the needs of the specific project and the goals of the owner agency.

Smith quoted from old engineering manuals to demonstrate that striving for sustainability in pavements is nothing new. “But now we’re trying to formalize the process,” he said. “We’re quantifying and measuring sustainability so we can see where we are and use that as a baseline for improvement.”

He cited greenhouse gas emissions as an example. “It’s something we can measure. In the short term, we should work to be less bad by reducing emissions and energy use and by being more efficient. In the long term, which may be a generation away, we can actually produce good outcomes from our pavements. For example, could we embed technology in pavements that actually produces energy?”

A long way to go

“Currently,” Smith conceded, “we are not very sustainable. We use a lot of natural resources, and a lot of our activity damages the environment. We produce a lot of waste, and a lot of it is not handled sustainable pavements continued on page 4

Culvert repair: best practices guide

To help engineers identify and apply the best repair techniques for specific problems, MnDOT recently produced a best practices guide for culvert repair. “We wanted to develop a state-of-the-practice and put it into one place so engineers could easily find the information they need,” said Lisa Sayler, MnDOT assistant state hydraulic engineer.

Culvert repair practices have evolved significantly in recent years, so it can be difficult for individual engineers to keep abreast of new practices that come from a wide variety of sources. The guidebook draws from a wide range of sources, including the Federal Highway Administration (FHWA), the National Cooperative Highway Research Program, AASHTO, and numerous state DOTs. In addition to providing detailed explanations of rehabilitation and repair methods, the guide includes a table that compares most methods of repair.

To download the guidebook (the final report) and the technical summary, please go to dot.state.mn.us/research/LTAP.
Roadway Safety Institute focuses on solutions for multiple modes

The new Roadway Safety Institute, a $10.4 million regional University Transportation Center (UTC) established in late 2013, will conduct a range of research, education, and technology transfer initiatives related to transportation safety. Led by the University of Minnesota, the two-year consortium will work with project partners to improve user-centered safety solutions across multiple modes. The Institute will be a focal point for safety-related work in the region, which includes Minnesota, Illinois, Indiana, Michigan, Ohio, and Wisconsin. Other consortium members include the University of Akron, University of Illinois at Urbana-Champaign, Southern Illinois University Edwardsville, and the University of Windsor.

Max Donath, professor of mechanical engineering at the University of M, serves as the new Institute’s director. He shares his vision for the Institute below.

What topics will the Institute’s research investigate?

The people using our region’s roadways aren’t as safe as they should be. It’s a tragedy that more than 4,800 people died on Minnesota roads in 2012, while thousands more suffered life-changing injuries. The Institute’s research will work to prevent the crashes that lead to these fatalities and injuries.

Specifically, we will focus on two key areas: high-risk road users and traffic safety system approaches. Within these areas, our projects will address issues related to rail-grade crossings, roadway departures, vehicle automation technologies, signalized intersections, wrong-way crashes, automated speed enforcement, bicyclists, pedestrians, commercial truck drivers, and impaired drivers. Although this is a very broad array of topics, we hope to bring added attention to areas that have either not received much attention in the past or have significant unsolved issues.

How will the Institute’s work address regional safety priorities?

Most of our research topics resulted from conversations with state safety engineers in Region 5 departments of transportation. Their input, as well as insights gained from reviewing the state’s strategic highway safety plans, helped us determine priorities.

Although some projects may be influenced by individual states, they are all relevant across our region. We are working on them all. For example, safety at rail-grade crossings was a priority for Minnesota, but this is becoming a more significant issue across our region and the United States, especially with the increased transportation of crude oil by rail.

What educational initiatives will be conducted?

We’ll focus on educating the public and attracting more professionals to the safety workforce. We want to communicate with students and get them excited about the things that are happening in this field and about the opportunities available to them.

One effort we’re planning is a safety-related museum exhibit. It will help explain concepts and technologies to a younger audience. We’ll also work to connect students to employers and offer continuing education to professionals in the safety field.

What makes the Institute unique?

One distinctive thing we’ll be working on is transportation safety in American Indian lands, where there is an unusually high number of motor vehicle crash fatalities. Half of the states in our region contain tribal lands, and our research will work to better understand why this is happening and to develop more effective solutions. To my knowledge, no other UTCs are working on this issue.

Working with American Indian communities, we plan to gather information from a variety of stakeholders and use it to develop a more comprehensive solution for understanding safety risks and deploying countermeasures. Secondly, we would like to work with tribal transportation leaders to support the implementation and evaluation of management and policy options that could help improve safety.

How will members’ expertise help the Institute accomplish its goals?

It is important for us to address significant traffic safety issues. We want the work we do to make a difference to the people using our roadways. We want to make sure we’re putting something out there that practitioners can use to make that happen.

In order to do that within our two-year time frame, we’ll take advantage of the related expertise of all our members. Each member has unique capabilities that help contribute to the overall strength of our team and our ability to address regional issues. We’ll take advantage of this extensive expertise to expand our reach and work on yet-unsolved safety problems.

—Christine Anderson, LTAP editor

To learn more or subscribe to the Institute’s e-newsletter, please see roadwaysafety.umn.edu.

Initiative creates tools for counting bicyclists and pedestrians

People love to walk and bike—for relaxation, for exercise, to get places like school, work, and stores. U of M researchers have partnered with the Minnesota Department of Transportation, the Minnesota Department of Health, and several other state and local agencies to develop general guidance and consistent methods for counting all these road users. The project, which will conclude in 2015, uses automated technologies for counting bicyclists and pedestrians on trails, bike lanes, sidewalks, and shoulders in various urban and rural locations in Minnesota.

MnDOT also is considering how to incorporate this nonmotorized traffic data into its existing traffic database. The researchers recommended that MnDOT coordinate statewide counts and work with local agencies to establish a network of automated monitoring sites across the state.

Such data already are used in cities like Minneapolis and Duluth for planning bike and pedestrian facilities. “Having those numbers to show the investments are justified, are being used, is really valuable for talking to council members, the mayor’s office, and other decision makers,” says Simon Blenski, bicycle planner with the City of Minneapolis.

—LTAP editors

Technology Exchange

The Minnesota Local Technical Assistance Program (LTAP) of the Federal Highway Administration’s Local Technical Assistance Program (LTAP) is a state-wide, often-depicted as a road map to improve exchange of information among local practitioners and state and national policy makers. LTAP is administered by the Center for Transportation Studies at the University of Minnesota and cooperatively by the Minnesota Local Road Research Board and the Minnesota Department of Transportation.

The LTAP is one of 57 LTAP programs across the country. LTAP is a unique program that provides free technical assistance to local road agencies. It is funded through a combination of federal and state grant and loan funds and private contributions.

The publication is available in digital format upon request.

Any product mentioned within should not be considered a product endorsement from MnDOT and does not necessarily reflect the views of Minnesota DOT.

Contact us

Technology Exchange is published quarterly. For free subscriptions, mailing list changes, or other inquiries, contact us at the address or phone number below.

Technology Exchange welcomes contributions and suggestions from readers. Editorials, columns, news items, featured topics, and other comments to Pamela Stempel, managing editor.

Minnesota LTAP

Center for Transportation Studies
University of Minnesota
111 Washington Avenue SE
Minneapolis, MN 55455
Phone: 612-625-1077
E-mail: interconnect@umn.edu
Web: interconnect.umn.edu

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Minnesota LTAP Office Staff
Director: Jim Garibay, (612) 625-8715, jim.garibay@umn.edu
Program Manager: Mindy Carlisle, (612) 625-9155, carlisle@umn.edu
CTP Coordinator: Kathy Schaeffer, (612) 625-3627, kathy.schaeffer@umn.edu
Webmaster/Editor: Pamela Stempel, (612) 624-0354

MnDOT

Director: Jim Grothaus, 612-624-3745, jgrothaus@umn.edu
Freelance Writers: Richard Sanders, Polk County; Minnesota County Engineers Association Sarah Pedersen, Minnesota County Engineers Association Lee Gustafson, City of Minnetonka; City Engineers Association of Minnesota Jeanne Johnson, City of Bloomington; Public Health North

MnDOT

Chair: Julie Skallman, State Aid for Local Transportation Division, MnDOT Tim Anderson, Federal Highway Administration Lee Gustafson, City of Minnetonka; City Engineers Association of Minnesota Louis Hubbard; Inver Grove County, Chair; Minnesota AAB http://www.palmcity.tn.gov; City of Palm Springs, CA; Palm Desert Metropolitan Planning Organization · Matt Erickson, City of Brainerd; Minnesota LRRB Research Implementation Center Greg Nasker, Goodhue County, Minnesota County Highway Engineers Association Dane Udellberg, City of Brooklyn Center; City Engineers Association of Minnesota Laura Ripp, City of Stillwater; Minnesota AAB · Mickey Stumpf, City of Stillwater; Minnesota LRRB Research Implementation Center

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—Christine Anderson, LTAP editor

To learn more or subscribe to the Institute’s e-newsletter, please see roadwaysafety.umn.edu.
**OPERATION Spotlight: Versatile spraying unit**

**Project leader:** Mike Suska  
**Agency:** Nicollet County Public Works  
**Problem:** Nicollet County’s existing method of spraying noxious weeds and brush sites was slow, unsafe, and inefficient. Sites required multiple spraying applications and often required applying different chemicals simultaneously. In addition, the county did not have a reliable method for precisely documenting spot application areas.

**Solution:** The county designed and fabricated a versatile spraying unit. The unit consists of a mountable platform that contains tanks, hoses, and a pump, which can be easily installed on and removed from an existing flatbed one-ton county pickup truck. The unit can spray multiple chemicals at once while keeping the chemicals away from the applicator. It can also be tracked by GPS to assist in year-to-year documentation and in any crop damage claims.

**Procedure:** The unit includes four tanks, a hose reel with a hand sprayer, and a 5 horsepower motor with a Hypro pump. The spraying head contains three nozzles: the first treats the area from zero to 10 feet from the unit, the second from zero to 20 feet, and the third can spot spray for brush as far out as 40 feet. If the second and third nozzles are used together, the unit can provide a continuous spray from zero to 40 feet. The arm and head both have independent electronic cylinders for spray application.

**Results:** The unit is easy to operate and only requires a driver and operator. Visibility is excellent with the spray head on the front of the vehicle, and enough chemicals can be stored on the unit to last for a half day of spraying. The instructions are simple, the preparation work is fast, and everyone who has used the unit has been satisfied with the results. One of the biggest advantages is that the unit allowed the county to reduce its spraying crew from six people operating three units to just two crew members operating the versatile spraying unit.

The unit’s GPS device initially failed at locating the actual chemical application location. Instead, it identified the vehicle’s location. The county is continuing to refine this GPS device so it will better track the spraying location and time for the 2014 season.

**Approximate cost:** $10,767  
**OPERA funding:** $10,000  
**Implementation:** The county plans on changing the 500-gallon main tank from a premix system to a direct injection system in the future. This will allow the county to have just water in the main tank when leaving the shop, with a separate smaller tank for the chemical. The direct injection system will then automatically mix the chemicals at the time of field application.

**Status:** Complete LTAP

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**Video: “Why Aren’t They Working on My Road?”**

A new video from the LRRB—“Why Aren’t They Working on My Road?”—helps the public understand why some bad roads aren’t always fixed first. The seven-minute video explains what causes road pavements to deteriorate and why it may be more cost-effective to put maintenance dollars into roads that still have life left in them versus roads that are in the worst condition.

In it, city and county engineers discuss how they use a pavement management program to decide which roads to fix when, in order to stretch limited resources in the most effective way possible. “We’ve learned that if we wait for things to break and fall apart, they’re much more costly to replace than if we put a little bit into it during its life cycle,” says Mark Maloney, City of Shoreview public works director.

You can link to the video from the LTAP videos page: [mnltap.umn.edu/publications/videos. LTAP](http://mnltap.umn.edu/publications/videos. LTAP) (From MnDOT’s Crossroads blog)

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**Sidewalk replacement contributes to Minneapolis tree loss**

Last June a windstorm toppled about 1,800 trees in Minneapolis. Many of the fallen trees were in boulevards (the areas between sidewalks and streets) rather than in yards. This raised concerns that recent sidewalk replacement—and resulting severed tree roots—had been a factor.

To better understand the higher-than-normal losses, the Minneapolis Park and Recreation Board turned to the U’s Urban Forestry Outreach, Research and Extension lab.

Led by forestry department professor Gary Johnson, the team studied damaged and undamaged trees along the storm’s path. The data set included 3,076 trees, of which 367 were total failures (tipped or partially tipped) due to the storm.

“The major finding is that replacing the sidewalk increased the odds of root failure by 2.24 times,” Johnson says. For example, when no replacement work was done, the average linden had a 10.6 percent chance of root failure; with sidewalk replacement—and resulting severed tree roots—had been a factor.

Likewise, increases in soil compaction were significantly related to tree failures only when sidewalk replacement work was involved.

Trees with larger diameters were more likely to fail regardless of whether sidewalk replacement work had been done, Johnson adds. LTAP —Pam Snopik, LTAP managing editor

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**Concrete flatwork specs updated**

An update of the Minnesota Concrete Flatwork Specifications is now available. First published in 2012, the document provides specs for local agencies and the concrete industry to follow as they move through the life of a local concrete project.

The specs help reduce the confusion or misunderstandings commonly found during the bidding process of construction projects. Additionally, the document gives construction and maintenance inspectors a clear set of guidelines to use during a project. The update addresses questions that came up since the original’s publication.

The document is published by the Minnesota LRRB and Minnesota LTAP. A link to it is on the LTAP publications page: [mnltap.umn.edu/publications/videos. LTAP](http://mnltap.umn.edu/publications/videos. LTAP)

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**Gary Johnson is the author of The Road to a Thoughtful Street Tree Master Plan (2008-32), published by the Minnesota LRRB ([lrrb.org](http://lrrb.org)). The manual helps communities and planners select the best trees for their available planting sites using specific principles of street tree design.**

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Gravel road management: the most important issues

At the Road Dust Best Management Practices Conference on February 3, South Dakota LTAP program manager and gravel road expert Ken Skorseth outlined an effective gravel road management strategy. First, he recommended three publications:

- Special Report, 1992-96; Unsurfaced Road Maintenance Management (U.S. Army Corps of Engineers)
- Pavement Surface Evaluation and Rating (PASER) (University of Wisconsin)
- Rural Road Condition Survey Guide (South Dakota DOT)

Then he discussed the most important issues for gravel road maintenance.

Loose aggregate

“If you have as much as two to four inches of loose aggregate,” Skorseth said, “it can cause drivers to lose control of their vehicles. It also leads to corrugation, more dust—and maybe potholes if there are also geometric problems. What may look like a rutting problem is probably a loose aggregate problem. If you shovel off the loose aggregate, you’ll find that the underlying surface is almost a perfect A-shaped crown. And you can’t tell gravel depth through the windshield! You have to dig. You can do it with an auger and a skid loader. But you need to auger quite a few holes because the gravel depth will vary—and that means the regraveling operation should not always be a uniform layer.”

Incorrect motor grader operation

Geometric problems, usually caused by incorrect motor grader operation, are another fundamental issue. “If we don’t get the basic geometry correct—particularly a 4 percent crown—nothing else will work. To really know, place an electronic level on your vehicle’s dashboard and drive the road.”

Poor gravel quality

“We get a lot of complaints about roughness,” Skorseth said, “and that usually means corrugation, too much loose aggregate, or sometimes potholes, all of which can be caused by poor gravel quality. To determine gravel quality, the first challenge is to get representative samples. You can get surface samples with a spade bit on an impact hammer. Put a mark on the bit at 3 inches and carefully chop out a test pit. You need to gather several samples because quality will vary. If an auger is used, remove the pilot bit. If you get just a little bit of the subgrade soil in your sample, it changes the plasticity and the overall gradation.”

Testing gravel quality at three sites

Skorseth described a test conducted in South Dakota: “In 2011, we built three sections in different parts of the state, all 21½ feet wide. In each place, we built sections with three types of gravel:

- Substandard—meets no spec except top size
- Barely meets SDDOT Gravel Surfacing Spec—percent passing #200 sieve is low and/or plasticity index (PI) at bottom of range at 4

Testing at three sites gave results from tests conducted in 2013 at one of the three locations, near Brookings, SD, which has annualized ADT of 100. Skorseth said the most interesting fact so far is that the Modified SDDOT Spec needed only one blading in 2013 while the substandard sections needed up to four bladings. LTAP —Richard L. Kronick, LTAP freelancer

Table 1: Results from tests sections near Brookings, South Dakota

<table>
<thead>
<tr>
<th></th>
<th>Substandard Uncompacted</th>
<th>Substandard Compacted</th>
<th>Barely Meets SDDOT Spec Uncompacted</th>
<th>Barely Meets SDDOT Spec Compacted</th>
<th>Modified SDDOT Spec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loose gravel (tons/mile)</td>
<td>185</td>
<td>150</td>
<td>100</td>
<td>110</td>
<td>16</td>
</tr>
<tr>
<td>Corrugation (inches in height)</td>
<td>≤1 (2 days after blading and 3 inches of rain)</td>
<td>≤1 (2 days after blading and 3 inches of rain)</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Roadway surface width (feet; all built 21½ feet)</td>
<td>26</td>
<td>26</td>
<td>24</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td>Rutting</td>
<td>≤1</td>
<td>≤1</td>
<td>None</td>
<td>None</td>
<td>None</td>
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Sustainable pavements from page 1

well by nature!” But he said there is much agencies can do right now. “Pick the low-hanging fruit. Can we increase recycling? Can we use materials or processes that have a lower environmental impact? What sustainable practices fit within your agency’s goals?”

Trade-offs in concrete texturing

Smith used concrete texturing as an example of trade-offs driven by sustainability concerns. “FHWA recommended transverse texturing in the 1960s to increase friction, and most agencies adopted the practice. But in the 1990s, there was concern about noise associated with transverse texturing—so most agencies switched to longitudinal texturing. It was quieter, though it had slightly lower frictional qualities. Then the industry came up with ‘Next Generation Concrete Surfacing,’ which produces very low noise levels but is 50 to 100 percent more expensive than conventional texturing. So what do we want for a given roadway? If it’s a low-volume road without high speeds, maybe we don’t need a high-friction surface. Or if it’s where noise isn’t an issue, perhaps transverse texturing could be acceptable. The idea is to match the technology with the needs of the facility.”

Who’s already doing it?

Smith discussed agencies that are moving significantly toward sustainability. “The Illinois Tollway uses WMA for all asphalt and is using recycled shingles. They allow you up to 35 percent RAP in surface courses and up to 50 percent in bases and subbases. They also have used two-lift concrete on a number of recent projects, and they also use prestressed concrete repairs fabricated off-site in a plant. That allows them to do repairs overnight and open a road to traffic almost immediately after the repair.” He also acknowledged MnROAD for its investigations into many of the same technologies as well as full-depth reclamation, porous asphalt, and pervious concrete.

In 2012, transportation represented approximately 28% OF TOTAL U.S. GHG EMISSIONS, making it the 2nd largest after the electricity sector (32%).

Source: U.S. EPA

Measuring sustainability

Smith listed several ways to measure and assess sustainability:

- Life-cycle cost analysis to measure the economic impacts.
- Life-cycle assessment to document environmental effects of the entire process.
- Sustainability rating systems (such as GreenRoads and INVEST) to assess environmental and social impacts.

FHWA Sustainable Pavements Program

In conclusion, Smith discussed the FHWA Sustainable Pavements Program. “We’re making a major effort to advance and share information on sustainable pavement practices. A technical reference document, which will provide interim guidance on sustainability, and a web page will be available in the summer of 2014.”

—Richard L. Kronick, LTAP freelancer

<table>
<thead>
<tr>
<th>Design</th>
<th>Opportunities for increasing sustainability in every phase of construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEPDG</td>
<td>Production</td>
</tr>
<tr>
<td>Transport</td>
<td>Rail and barge transport use less energy than truck transport</td>
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<tr>
<td>Material Production</td>
<td>RAP, RAS, and SCMs help reduce virgin binder and cement volumes</td>
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<tr>
<td>Asphalt</td>
<td>Perpetual pavements—thick underlying structure that requires only surface rehab for long life cycles</td>
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<tr>
<td>Concrete</td>
<td>Two-lift pavement with lower quality materials in the lower lift and higher quality materials in the upper lift</td>
</tr>
<tr>
<td>Use</td>
<td>Smooth pavements for safety, fuel savings, and reduced greenhouse gas emissions</td>
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</table>
Testing asphalt pavements with infrared and GPR

MnDOT engineers Greg Johnson and Shongtao Dai co-presented at the TERRA Pavement Conference in February on the use of infrared and ground-penetrating radar (GPR) for testing asphalt pavements. Shongtao and Johnson used both of these test modalities to assess the uniformity of initial compaction density in asphalt pavements. Shongtao pointed out that coring only measures conditions in a few locations whereas infrared and GPR provide full-coverage density measurements.

What is GPR?
Shongtao explained that GPR directly measures differences in the dielectric constants between materials and can be used to determine both the thicknesses of pavement layers and their densities. He discussed a single-channel GPR system used in their research. “To cover the whole pavement width with a single-channel GPR, we had to make multiple passes in two-foot widths.” He showed several examples, such as Figure 1, which was full-width testing of a section of MN TH13. The scale at the bottom of Figure 1 shows how color equates to relative density. Red in the pavement centerline indicates lower density along the longitudinal joint. They also took four cores from this section and found that densities measured in the lab confirmed the GPR readings. They also tested a section of a stabilized reclaim, which had not been rolled with IC.

Johnson said researchers in Texas have come up with general metrics: “They say if the difference between maximum and minimum temperature in a 150-foot segment is less than 25°F, it’s in the ‘good’ category. If the difference is between 25° and 50°, it’s ‘moderate’ thermal segregation. And if it’s more than 50°, it’s severe. In 2014, MnDOT will include incentives and disincentives on selected projects for thermal segregation. We will reduce payment by $20 for each segment in the severe range and add $20 for each segment in the good range.”

Density and compaction
Continuing the presentation, Johnson addressed the fundamental question of why density is important by citing a 1989 WashDOT study: “Their summary statement was that every 1 percent increase in air voids above 7 percent tends to produce a 10 percent loss in pavement life, which is about equivalent to a one-year reduction in pavement life. So the question becomes: What can we do to achieve better compaction?”

To answer the question, Johnson tested a system that takes a pavement’s surface temperature profile behind the screed as the pavement is being laid. The system takes readings every 6 inches longitudinally and at 12 points across the pavement. This information is displayed in real-time on the paver. “This system shows us the effect of factors such as auger height and truck exchanges, and it allows us to respond in real-time to improve temperature uniformity,” Johnson said. He showed a typical display from the device (Figure 2).

The top image in Figure 2 shows where the plant changed the mix from 270°F (yellow/green) to 320°F (red). The graph at the bottom shows paver speed. Johnson showed other examples that clearly illustrated temperature segregation caused by not overlapping truckloads and by paver stops. “The roller operator and the inspector may look at the pavement, and they won’t see the difference,” he added. “It just looks black to them! This is a tool that will show you what’s really happening.”

To improve the effectiveness and accuracy of these tests, a team of researchers led by Labuz created a new software tool for field engineers called GopherCalc. This new software package combines the analysis of both FWD and GPR data into a single tool. By integrating the two tests, calculations and results from one test can be used to inform the other. This reduces the number of assumptions needed to analyze the data, thereby increasing their accuracy. Their work was funded by MnDOT. GopherCalc uses simple menu-driven navigation and makes it easy for users to switch back and forth between the two programs.

Read more in the final report, online at cts.umn.edu/research. LTAP

GopherCalc to improve diagnosis of pavement problems

Engineers use the falling weight deflectometer (FWD) and ground penetrating radar (GPR) to pinpoint what’s going on beneath a pavement’s surface and diagnose pavement problems. GPR generates a cross-sectional image of the pavement’s subsurface, while FWD measures stiffness of the pavement layer. The tests are non-invasive and can be performed quickly with minimal traffic disruption.

Though FWD and GPR are widely used, both have room for improvement, says U of M civil engineering professor Joe Labuz. The data interpretation needed for these tests can be overly simplistic, and inherent assumptions can reduce each test’s accuracy when they are used in standalone fashion, he says.

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Conference materials online
Presentation slides and selected videos are available from the Transportation Engineering and Road Research Alliance (TERRA) Pavement Conference at terraroadalliance.org. TERRA sponsored the conference in cooperation with CTS, the U of M Department of Civil Engineering, the Minnesota Local Road Research Board, the City Engineers Association of Minnesota, the Minnesota County Engineers Association, MnDOT, Minnesota LTAP, the Minnesota chapter of the American Public Works Association, and the Minnesota Street Superintendents Association. LTAP

Fig. 1: Full-width testing of a section of MN TH13

Fig. 2: Readouts from a system that takes a pavement’s surface temperature profile behind the screed

Images courtesy MnDOT
Asphalt pavement maintenance was one of the topics at Demo Day. In classroom sessions and outdoor demonstrations, students learned about cargo securement requirements, changes in CDL driving rules, gravel road maintenance, roadside vegetation management, and asphalt pavement maintenance and preservation.

The Minnesota Department of Transportation, the Minnesota Local Road Research Board, and the Federal Highway Administration, along with Minnesota LTAP, sponsored the training in partnership with the Minnesota Chapter of the American Public Works Association and the Minnesota Street Superintendents Association. The University of Minnesota College of Continuing Education facilitated the event. LTAP

Comments from some of our new Roads Scholars:

“I liked the variety of classes and locations, and networking with peers. The knowledge gained from attending these classes has helped with daily job performance. Learning how to use newer equipment and technology [helps me] to perform more efficiently.”
—Todd Berg, City of Brooklyn Center

“I gained more knowledge to bring back to share with employees.”
—Thomas Erchull, St. Louis County Public Works

“I enjoyed the wide scope of courses offered and best practices covered by speakers who are knowledgeable and passionate about these topics. The program will help by keeping me informed of best practices used and help me get them implemented in my city.”
—Josh Opheim, City of Robbinsdale

“The program will help me in the future to save money by using better practices.”
—Tom Robertus, City of Robbinsdale

“The program helped me get a better understanding of our roads and goals. It also helps with projecting future needs, and having the ability to explain our processes to our customers and the public better.”
—Lynn Tschida, Metro Maintenance, MnDOT

The Roads Scholar Program

The Roads Scholar Program combines a range of training options into a structured curriculum. To become a Roads Scholar, participants must earn eight credits within five years from a combination of required and elective courses. Training options include LTAP workshops, Circuit Training and Assistance Program workshops, and other events. For more information, contact Mindy Carlson, Minnesota LTAP program manager, at 612-625-1813, mnltap@umn.edu, or visit mnltap.umn.edu/RoadsScholar.

ROADS SCHOLAR GRADUATES FROM 2005 TO 2013:

95

NUMBER OF STUDENTS NOW ENROLLED:

2,505

*Students who completed their coursework by December 31, 2013, are considered the Class of 2013

CONGRATS GRADS!

Class of ‘13

Todd Berg, City of Brooklyn Center
Mike Dreis, City of Waconia
Thomas Erchull, St. Louis County
Cory Farver, Washington County
David Johnson, City of Brainerd
Jeff LaPlante, Olmsted County
Don Molderhauer, City of Waconia
Niles Neathood, City of Coon Rapids
Josh Opheim, City of Robbinsdale
Tom Robertus, City of Robbinsdale
Pete Storms, City of Waconia
Lynn Tschida, Metro Maintenance, MnDOT

The latest graduates of the Roads Scholar program received a certificate of achievement during a ceremony at the 2014 Minnesota Roadway Maintenance Training and Demo Day in Alexandra. “Our congratulations to the new grads,” said Jim Grothaus, Minnesota LTAP’s director. “Their dedication to keeping up with new practices and processes will help them do their jobs and better serve the public.”

Demo Day from page 1!

In classroom sessions and outdoor demonstrations, students learned about cargo securement requirements, changes in CDL driving rules, gravel road maintenance, roadside vegetation management, and asphalt pavement maintenance and preservation.

The Minnesota Department of Transportation, the Minnesota Local Road Research Board, and the Federal Highway Administration, along with Minnesota LTAP, sponsored the training in partnership with the Minnesota Chapter of the American Public Works Association and the Minnesota Street Superintendents Association. The University of Minnesota College of Continuing Education facilitated the event. LTAP

Asphalt pavement maintenance was one of the topics at Demo Day.
New from MnDOT, LRRB

Implementation of Floating Weir System for Surface Skimming of Temporary Stormwater Ponds (MnDOT)

This study provides design information for temporary stormwater ponds with floating head skimmers. The design information is directed at meeting the standards in the National Pollution Discharge Elimination System general permit, which includes storing runoff from the two-year, 24-hour rainfall event in pond with floating head skimmer and compares the difference before and after edge line implementation.

evaluation of Recycled Concrete as Aggregate in New Concrete Pavements (Washington DOT)

This report evaluates the use and properties of recycled concrete as coarse aggregate—concrete produced from demolished pavers—in new concrete pavements.

A Novel Methodology for Quantifying the Performance of Constructed Bridges in Cold Regions (Upper Great Plains Transportation Institute)

This report presents a research program examining the performance of existing bridges in a cold region and the behavior of concrete members strengthened with carbon fiber-reinforced polymer composite sheets.

Use of RAP in local pavement design

Implementation of an updated vehicle classification scheme

Pavement design charts for 10-ton designs

Revision and update of the FWD Viewer Tool

Overlay design method for the FWD Viewer Tool

Implementation of the TONN 2010 analysis method for estimating spring load capacity of roads using pavement and traffic data, and results from the FWD. The resulting tool is a spreadsheet that combines the work of two other research projects, the FWD Viewer Tool and the TONN 2010 analysis.

dot.state.mn.us/research/TS/2014/2014RIC14.pdf

Traffic Data Collection Improvements (LRRB)

The LRRB, with assistance from Sibley County and MnDOT, conducted a field evaluation of traffic data collection sensors. The study explored low-cost and non-intrusive options to collect traffic data as possible alternatives to traditional methods such as tube counts. This project reviewed new developments and alternatives to conventional road tube, inductive loop, and piezo sensor data collection.

dot.state.mn.us/research/TS/2014/2014RIC51B.pdf

The SHELF

Links to these publications and many more are on the LTAP website. Questions? Contact Marilee Tuile, Minnesota LTAP librarian, 612-626-8753, ctslib@umn.edu.

Twitter 101: tweet your news to residents

Whether it’s news about a resurfacing project or a flooded road, residents increasingly expect accurate and frequent updates. Social media tools such as Twitter can help you meet their needs. Twitter is the fastest-growing social network in the U.S. (according to eMarketer.com). It allows you to send small bursts of information called tweets. Each tweet can be up to 140 characters, and can include a photo or video to show an update at a glance. Twitter is great for breaking news, keeping the public informed, and building community. It’s also an effective way to reach the media and elected officials. Here’s some advice for setting up an account:

First, ask yourself these questions:

• What do you want Twitter to do for you?
• Who is your audience or your community?
• What do you want to hear from you?
• What do they want to tell you?
• Who do you want to interact with?

How will you manage your account, and how many people will manage it?

Then, follow these steps:

1. Set up account. The hardest decision is figuring out your “handle.” Keep it clear, intuitive, and short. Also, keep in mind that an e-mail address can only be tied to one account. If you want to have multiple accounts, you’ll need to use multiple e-mail addresses. And, if you want to share administration of a single account, you’ll want to use a shared e-mail address.

2. Create your profile.

3. Follow, tweet, learn, interact, and experiment.

More resources:

• Discover.twitter.com/learn-more (Twitter basics; explains what a hashtag is)
• Getting started (step-by-step directions; https://support.twitter.com/articles/215585)
• Tweetdeck.com (social media dashboard application for management of Twitter accounts)
• Hootsuite.com (social media management system)
• Mashable.com (covers the top social media news on topics like Facebook, YouTube, Gmail, Twitter, Amazon, Pinterest, and more)

Traffic Data Collection Improvements (LRRB)

The LRRB, with assistance from Sibley County and MnDOT, conducted a field evaluation of traffic data collection sensors. The study explored low-cost and non-intrusive options to collect traffic data as possible alternatives to traditional methods such as tube counts. This project reviewed new developments and alternatives to conventional road tube, inductive loop, and piezo sensor data collection.

This project compared multiple traffic data collection sensors along on a rural two-lane road with low traffic volumes (Sibley County State Aid Highway 9) in both winter and spring conditions. The project gathered information on ease of deployment, accuracy, and costs associated with each technology.

dot.state.mn.us/research/TS/2014/2014RIC51B.pdf

A Comprehensive Study on Pavement Edge Line Implementation (Louisiana Transportation and Research Center/LRRI/FAHR

This report applies the Empirical Bayes method to estimate crash reduction factors due to pavement edge line implementation and compares the difference before and after edge line implementation.

Modes Less Traveled—Bicycling and Walking to Work in the United States: 2008-2012 (U.S. Census Bureau)

This report focuses on bicycling and walking to work, including strategies that can promote non-motorized commuting. The report includes tabular data and maps highlighting the percentage of workers who walked or biked to work in small, medium, and large-sized cities.

Native Vegetation Establishment for IDOT Erosion Control Best Management Practices (Illinois DOT)

This report explores the process of developing native seed mixes and practices along Illinois roadides in order to develop native roadside vegetation management practices for the Illinois DOT.

Operational Guidance for Bicycle-Specific Traffic Signals in the United States (Oregon DOT)

This report summarizes research of cyclist behavior at signalized intersections in Portland, Eugene, Corvallis, Beaverton, and Clackamas County, OR.

LA TP

LTAP

Arlene Mathison, director of digital information services. Minnesоta LTAP

A Comprehensive Study on Pavement Edge Line Implementation (Louisiana Transportation and Research Center/LRRI/FAHR

This report applies the Empirical Bayes method to estimate crash reduction factors due to pavement edge line implementation and compares the difference before and after edge line implementation.
APWA-MN offers roads training for underground utility inspectors

This fall, the Minnesota chapter of the American Public Works Association will offer its next round of training designed to provide underground utility inspection professionals with critical knowledge and skills to expertly and confidently complete their responsibilities. The Underground Utilities Inspector School (UUCIS) was created by public works professionals to provide valuable training to inspectors of underground infrastructure construction to help them ensure the quality and longevity of newly constructed utilities. Registration for the classes begins this summer.

“Classes are designed to engage both new and seasoned construction inspectors, by providing real-world examples of issues commonly encountered in the field, as well as information about new and emerging technologies in underground utility construction,” says Monica Heil, project manager.

This year, the UUCIS will be held in Richfield, MN. In addition, two web-based sessions will be offered at a reduced cost in other locations that are to be determined. There are eight monthly school sessions from October until May. Session times generally run from 7:30 a.m. until 12:00 p.m., and cover topics ranging from construction safety and preparation to pipeline inspection and installation methods.

“Metro-area participants gather at MnDOT’s centrally located Cedar Avenue Truck Station to learn first-hand from public works and engineering professionals about construction related practices, issues, and technologies,” Heil says.

Each session focuses on a different topic related to construction inspection. Some topics include field communication and documentation, contract administration, job site safety, underground pipeline construction, regulatory issues, and trenchless technologies, among others.

“One of the ways I found it useful was learning about some of the cutting-edge technologies in utility rehabilitation,” says Mitch Hoeft, a graduate engineer with the City of Golden Valley and past attendee of UUCIS. “The knowledge I gained from the class allowed me to bring that information back to the city and save a lot of money on some of our planned construction projects. With tough fiscal times like we have today, using that information to save money was really essential for our community.”

The course is geared toward municipal inspectors, consultant inspectors, graduate engineers, engineering technicians, and utility operators. Participants who complete all eight sessions will earn 3.2 CEUs. The UUCIS also qualifies for 16 contact hours toward MDH license renewal requirements and 20 direct contact hours with the Minnesota Pollution Control Agency.

According to Heil, past attendees have said the training helped them gain a better understanding of how to effectively document their work, how to communicate more efficiently with stakeholders, and how to utilize new technologies and materials.

“Trainings are held from 7:30 a.m. until 12:00 p.m. CDT. For more information or to schedule classes, call the CTAP instructor, Kathy Schaefer, at 612-625-1813, or e-mail Kathy.Schaefer@state.mn.us, LTAP.”

For more information on roads training for underground utility inspectors, visit www.apwa-mn.org/CTAP.