Fall Expo: keeping motorists safe on winter roads

Snowy, slushy, or icy pavement: more than 1,300 people are killed and more than 116,800 people are injured on it each year in vehicle crashes, according to Federal Highway Administration (FHWA) reports. These numbers would be even higher without effective snow removal and road deicing operations. But as vital as these functions are, they can eat up a big chunk of state and local agency maintenance budgets. Researchers at Minnesota State University, Mankato (MSU Mankato) are studying various types and blends of deicing chemicals, which are typically used in combination with plowing, to see which ones offer the best performance for the money.

Stephen J. Druschel, P.E., assistant professor of environmental engineering, is leading this effort and was on hand at the 2011 Minnesota Fall Maintenance Expo to discuss some preliminary findings. "Essentially, we’re looking at how much snow and ice a particular chemical or blend melts and how much it costs...we...

Minnesota LTAP understands that your training budgets are tight, so we’re launching our first online distance-learning course: Gravel Road Maintenance and Design. The course, developed in partnership with Minnesota’s Local Road Research Board, will provide a high-quality training option at a low cost to students and employers.

Online training is perfect for students who are unable to travel or prefer a ‘work at your own pace’ environment. It is particularly valuable for older students who may find it challenging to return to a traditional classroom setting.

Students will be able to access the new training anytime, anywhere, within a three-month time-frame. All that’s needed is access to a web-enabled computer and an e-mail address.

The course is made up of 10 lessons. Each lesson contains narrated presentations, video clips, reading assignments, a quiz, time to reflect on what has been learned, and time to develop an action plan. All reading assignments are available online within the course, so no additional books or materials need to be purchased.

The course includes content similar to the in-person LTAP workshop. Students who have already taken the classroom version can test and refresh their knowledge—and earn an additional Roads Scholar credit—by taking the online version. Taking the online course also lets students become familiar and comfortable with computer-based learning.

The workshop will be open for registration soon. Please see www.mnltap.umn.edu/gravelroadonline for course details and status updates. We’ll also share updates in future publications and announcements. We hope you enjoy this new training option!

Spring expo has new name, format, location

The Spring Maintenance Training Expo is being replaced by a new one-day event—the Minnesota Roadway Maintenance Training and Demo Day, on April 10 in St. Paul. The new event will focus exclusively on education and technology exchange through classroom sessions and outdoor demonstrations. Topics this year include pavement, load securement/rigging, and tree maintenance with chainsaw safety. It will not offer the big equipment displays as it has in the past, but it will have about 25 indoor vendors providing information on their products and services. And it will still have time for the Roads Scholar graduation ceremony, and attendees will earn a Road Scholars credit. Keep an eye out for more information at www.mnltap.umn.edu/expo.
The sound of silence: noise complaints and rumble stripes

At this year’s Toward Zero Deaths (TZD) Conference, three experts discussed the public relations challenges of rumble strips and stripes and some of the strategies used to address citizen complaints.

Rumble strips have been widely installed on highways to prevent lane-departure crashes, which are responsible for 50 percent of traffic fatalities in Minnesota. The devices have been proven to reduce lane-departure crashes by one-third. However, some community members complain about them—particularly, about the noise and the danger to bicyclists.

Brad Estochen from the Office of Traffic, Safety and Technology (OTST) at the Minnesota Department of Transportation (MnDOT) discussed a study MnDOT conducted to quantify the noise from rumble stripes. Researchers measured noise from four highways (US 52, MN 3, US 169, and MN 7). The study found that at 50 feet from the edge of the highway, the noise was similar to heavy truck traffic; at 100 feet, it was slightly higher than the noise amount in a business office or busy restaurant; and at 300 feet, it was equivalent to conversational speech. Estochen explained that while rumble stripes serve a great purpose in preventing crashes, “we need to balance that with the needs of the people who live with that noise.”

To reduce concerns about noise and bicyclist usability, MnDOT has developed new standards for rumble strips and stripes. Ken Johnson from OTST described some of them. To reduce noise, rumble strips/stripes should be placed where they are least likely to be incidentally driven over. The standards stipulate that the devices should be placed at the centerline and shoulder, but no longer on the edge-line where they are more likely to be driven over. To allow enough space for bicyclists on rural roads, the standards allow for some flexibility in placement and innovation. “We’re trying to make it as good for bicyclists and still have a rumble there for people leaving the road,” Johnson said. The standards also include recommendations about deicing materials and standardized terminology to reduce confusion among practitioners. (To view the standards, see Technical Memorandum No. 11-02-T-02, Rumble Strips and StripEs on Rural Trunk Highways, at http://techmemos.dot.state.mn.us/techmemos.aspx.)

Citizens often had concerns after the installation of rumble stripes in St. Louis County, said Victor Lund, the county engineer who personally received many of those complaints. “Sometimes it is a humbling experience,” he said.

Lund offered some lessons learned. After an initial uptick in comments after the installation, the engineers in St. Louis County went on a public relations campaign, advertising in local newspapers, doing interviews for TV news and newspapers about the purpose of rumble stripes, and soliciting comments from the public. Based on complaints, the county formulated a mitigation strategy and filled in rumble stripes in the inside of curves and along highways in areas sensitive to noise. The county learned several things from this experience: citizens should be encouraged to interact with officials, the public will be concerned about and may incorrectly perceive the purpose of the rumble stripes, any mitigation strategy should include a focus on the inside of curves, and often those people who are most negatively affected by the rumble stripes are not the people most likely to benefit from their installation.

—Jean Mullins, LTAP intern

Welcome, new steering committee members

Minnesota LTAP welcomes two new members to the steering committee. Rick West is the county engineer of Otter Tail County. He is the current chair of the Minnesota Local Road Research Board (LRRB) and will represent the LRRB on our steering committee. Tim Anderson is the local programs engineer with the Federal Highway Administration in Minnesota office.

New online game teaches risks of distracted driving

The Intelligent Transportation Systems (ITS) Institute, a part of the Center for Transportation Studies, has launched Distraction Dodger, a new online game designed to help teens and young adults understand the risks of distracted driving. Such “serious games” engage learners through entertainment while providing training and education.

In Distraction Dodger, players get behind the wheel of a pizza delivery van and have to avoid obstacles and obey traffic laws. As they progress through the game’s levels, they receive feedback on their driving—and how it is affected by their level of distraction. The game awarded an entry at the 2011 International Serious Play Conference.

Distraction Dodger builds on the success of Gridlock Buster, another online game from the ITS Institute. Gridlock Buster provides a fun way to teach students about traffic grid management and make transportation interesting and relevant. Since its original posting online, Gridlock Buster has received more than 3 million game plays.

Try your hand at both games on the ITS Institute website: www.its.umn.edu/ltap.
Report offers tips for public engagement

Public engagement—gathering public input to inform decision making by government agencies, political leaders, or nonprofits involved in administering public policies and programs—has become a fundamental feature of government’s relationship with the public. However, public engagement is less common in transportation than in other areas of public policy.

Assistant professors Zhirong “Jerry” Zhao and Kathryn Quick of the U of M’s Humphrey School of Public Affairs recently completed a study aimed at increasing and improving public engagement in transportation policymaking. The study, funded by the Center for Transportation Studies, included the development of a four-step framework for managing the public engagement process.

The steps are designed to help public works professionals understand the public engagement process as well as methods for making the process as collaborative and inclusive as possible. They can also assist in outlining the most appropriate strategies to facilitate the engagement and methods to assess the effectiveness of a specific effort.

A final report on the project, Suggested Design and Management Techniques for Enhancing Public Engagement in Transportation Policymaking (CTS 11-24), is available on the CTS research web page: www.cts.umn.edu/research

Implementation of a Scale-Tec Calibration Scale

Procedure: The county used the Scale-Tec Calibrator on each of its Force America 5100 spreaders. The spreader was set to scale mode, and the calibrator was placed under the spreader discharge. The dump body of the vehicle was raised, the auger filled, and the spreader turned on to allow the salt and sand material to fall into the scale. By measuring the weight of the material, the calibrator helped the county determine the appropriate settings for each spreader to ensure the correct and consistent application of salt and sand.

Results: Since the completion of calibration on all 17 vehicles, the county has saved money by using less salt during the past two winters. The correct calibration has also allowed the county to save fuel, labor, and materials by avoiding a second trip on the same road because of an insufficient first application. The county now knows that its trucks are applying at an identical rate and not spreading too much or too little material.

Approximate cost: $3,000

MnDOT publishes ‘Hear Every Voice’ case studies

MnDOT has published 24 case studies under its “Hear Every Voice” public participation program. The department is using the case studies to study the tools, techniques, and lessons learned from other public engagement and outreach efforts.

Several of the case studies are of Minnesota projects, such as the Bloomington Xcel Energy Corridor Trail and Dakota County Greenway Collaborative North Creek Greenway.

The case studies were developed by researchers at the University of Minnesota in partnership with CTS.

Download PDFs of the case studies and read more about MnDOT’s public participation initiative at www.dot.state.mn.us/publicinvolvement/tools.html

Asset management packages: more options

The Fall 2011 issue of the Exchange included an article about asset management software and a list of some packages currently in use. The list was not meant to be comprehensive, and several readers contacted us to share other options.

For example, Cartegraph Systems offers technology to manage work, assets, infrastructure, and more. Sign Logic is a sign inventory management software that was designed specifically for small- to medium-sized municipalities. The article and updated list of packages are online at www.mnltap.umn.edu/publications/exchange/2011/fall/assetmanagement.html.

Pre- and post-trip inspections: Why go through the hassle?

Vehicle inspections are an important part of the overall safe operation of commercial motor vehicles (CMVs). MnDOT training specialist Brian Barott explained in his opening remarks at the Minnesota Fall 2011 Maintenance Expo. While drivers and employers both have a duty to make sure their vehicles are inspected daily, the driver is ultimately responsible for making certain that the vehicle being driven is in a safe operating condition. “Legally, [drivers] have to perform pre-trip inspections as stated in the Federal Motor Carrier Safety Regulations (FMCSR) part 396.13 as well as post-trip inspections as stated in part 396.11,” Barott said.

Since worn, broken, or incorrectly adjusted components can cause or contribute to crashes, pre- and post-trip vehicle inspections can help identify defective equipment before it fails. In case of a crash, inspection reports can be pulled as part of the crash investigation, especially in serious incidents, he added. “If you are involved in a crash that results in fatalities, injuries requiring treatment at a hospital, or vehicles being towed from the scene, the incident must be reported, according to the federal statutes,” Barott said. “Minnesota’s regulations require that any crash involving a MnDOT vehicle and the motoring public be reported…It is a misdemeanor to drive a [CMV] after a crash until the vehicle has been inspected by a state trooper and determined safe to drive or the trooper grants an inspection waiver.”

Deicers

want to find out what [product] gives us the most bang for the buck,” Druschel explained. Deicers are expensive, so knowing which products to use, how much to use, and when to use them is crucial to controlling winter road maintenance costs, he continued.

One of the chemical deicers they are studying is sodium chloride, more commonly known as rock salt. Rock salt is currently the most popular chemical deicer because it is reliable, relatively inexpensive, and easy to store and apply. But because salt has been linked to causing vehicle and infrastructure corrosion as well as environmental damage, Druschel’s group is also evaluating some of the alternative deicers that have cropped up in response to concerns around salt use. These options include calcium magnesium acetate, calcium chloride, magnesium chloride, and carbohydrate solutions like beet juice and corn molasses that are generated as byproducts of agricultural operations.

While these deicer alternatives are generally less corrosive and less harmful to the environment than salt, they tend to be significantly more expensive. Corrosion and environmental benefits aside, one question researchers hope to answer is whether or not the performance benefits of alternative deicers are worth the added cost. “We have evaluated more than 1,200 samples including 20 or more base products and 30 different product blends. One of the main things we’ve looked at is the ice melt capacity of each product, that is, how much ice melts compared to how much material is used,” Druschel said.

In one set of experiments, for example, they tested a salt brine base mixed first with 10 percent magnesium chloride, then 20 percent, and finally 30 percent to find out what, if any, benefit there is to using more of the magnesium additive. They conducted the same test using calcium chloride and carbohydrate solutions, again mixed into salt brine at 10, 20, and 30 percent. “These [chemicals] were tested all at once so we could get a good stable temperature for comparison,” he explained. “We tested generally in the 15 to 25 degree Fahrenheit range…and while we see some benefit [to adding alternative deicers to salt brine], we found that doubling the amount doesn’t get you more for the money. Basically, a little [additive] helps, but more is a waste and does not provide additional performance benefit.”

In other tests, Druschel’s team found rock salt to have the best ice melt capacity at 28 and 20 degrees Fahrenheit, with some of the alternative deicers blended with a rock salt base to be nearly as good—some even a little better. At around 12 degrees Fahrenheit, magnesium chloride actually has a 50 percent better ice melt capacity than rock salt, but most other deicers perform worse than salt at the colder temperatures. However, these alternative deicers may provide other advantages not related to ice melt capacity. For instance, many of the carbohydrate solutions are sticky, which prevents the deicing treatment from blowing off the road before it has a chance to work. Some deicing blends, because of their color, are more visible on the road than salt alone, allowing deicing truck drivers to see where treatment already has been laid down. This helps avoid reapplying chemicals too soon—and that can produce savings anywhere from 10 to 20 percent a year. Still, Druschel explained, ice melt capacity is the cornerstone factor that influences everything else when deciding which deicing chemicals to use. “Considering that ice melt capacity is the most important aspect when all is said and done, when we hold the temperature even, when the ice is consistent—the amount of difference we’re seeing [in ice melt capacity] between rock salt and other treatments is minimal—10 percent, maybe 40 percent at the very best,” he said. So even though many salt alternatives promise to “burn up the road,” this research suggests that’s not quite the case. In fact, Druschel said, “Even with all these other cool products available, rock salt probably offers the best performance for the money and is generally still the most favorable choice.”

The details of this research will be presented in a final report due out in spring 2012. Coinciding with this project, Druschel’s team is developing a cost performance model that can be used to calculate the base cost of deicing chemicals from the loading terminal. Users can then factor in mileage and fuel costs and calculate performance variables as well.

Photo courtesy Fortin Consulting

Drivers are responsible for making sure their vehicles are in safe operating conditions.

Deicers from page 1

Deicers from page 1

Deicers from page 1

In addition, post-trip driver vehicle inspection reports must be completed after each trip. Specifically, the federal regulations state that drivers must prepare a written report at the completion of each day’s work on each vehicle operated. “If you drive more than one vehicle in a day, you need to complete a report for each vehicle,” Fredrickson said. “This [post-trip] inspection report covers pretty much everything on the truck—breaks, lights, tires, wipers, mirrors, and steering, for example—because the regulations state that everything is working properly. So although [the regulations] do not require a waiver. “Considering that ice melt capacity is the most important aspect when all is said and done, when we hold the temperature even, when the ice is consistent—the amount of difference we’re seeing [in ice melt capacity] between rock salt and other treatments is minimal—10 percent, maybe 40 percent at the very best,” he said. So even though many salt alternatives promise to “burn up the road,” this research suggests that’s not quite the case. In fact, Druschel said, “Even with all these other cool products available, rock salt probably offers the best performance for the money and is generally still the most favorable choice.”

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This tool is currently in testing and is scheduled for release in the spring.

—Nancy Strege, LTAP freelancer
Snow & ice control manual: update on the way

Minnesota LTAP is in the process of updating the Minnesota Snow and Ice Control: Field Handbook for Snowplow Operators. The new version will include updates from Kathy Schaefer, the CTAP instructor and one of the project members who created the first edition of the handbook, which was published in 2005. The new version will posted on our handbooks page: www.mnltap.umn.edu/publications/handbooks. LTAP

Congratulations, roadeo winners!

One of the highlights of the annual Minnesota Fall Maintenance Expo is the snowplow "roadeo," which allows drivers to compete on a closed course. The course challenges drivers’ abilities to perform maneuvers such as backing and making tight turns while avoiding obstacles. The top four drivers in 2011 are shown below.

1st place—Terry Thorsten (Benton County); 2nd place—Tim Wainio (City of Minnetonka); 3rd place—Carrie McDougall (Hennepin County); 4th place—Brent Aase (Anoka County)

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Preventive maintenance for recreational trails

“If we build it, they will come” is a truism that leads to the construction of Minnesota’s extensive trail system. Hundreds of miles of recreational trails have been built in city, county, state, and regional parks systems over the last 20 years to accommodate an increasing number of trail users. But building trails is only one thing—maintaining them over the long run is another challenge.

Among the myriad of approaches for ongoing and preventive trail maintenance, some systematic and effective for the long term, and some not. Many cities and counties have built extensive trail systems but lack an effective plan for long-term maintenance. Trail maintenance programs often consist of highway and street treatments that have been modified for use on trails. To address these needs, a recent collaboration of the Minnesota Local Road Research Board (LRRB), MnDOT research staff, and maintenance operations representatives from across the state developed a comprehensive plan for effective trail maintenance treatments and methods. At the 2011 American Public Works Association-Minnesota Chapter Fall Conference, Mike Marti from SRF Consulting Group provided an overview of the resulting LRRB synthesis of best preventive maintenance treatments for recreational trails.

Save maintenance dollars—avoid trial and error
The key to an effective maintenance program, Marti said, is understanding the differences between road and trail issues. Maintaining trails entails different challenges than maintaining roads. For example, trails are narrow and may have been constructed with less sub-base support, so when heavy road maintenance equipment is used, that equipment may cause more damage than the repairs, Marti said. Another complication is that many construction and road maintenance contractors won’t work on trails because their equipment is too heavy for trails or may be too narrow for narrow trail corridors. The LRRB looked at all aspects of trail corridors and maintenance including surface, sub-surface, signage, multiple use, vegetation, structures, amenities, drainage, and seasonal maintenance needs. The goal was to develop a resource and template for an inspection, maintenance, and prevention program that will help all trail-managing agencies do a good job with long-term maintenance.

A template to maintain designed trails
Why is trail management so important? Stewart Crosby, also from SRF Consulting Group, suggested that safety, preservation, long-term cost-effective maintenance, public expectations, and requirements for federally funded trails demand that agencies take a broad view of managing trails after the initial construction phases are complete. But what exactly is a trail? Crosby referred to a “designed trail” as one that includes specifications for materials, subbase, sign clearance, shoulder and vertical clearance, and boulevard width. Trails require a host of operational maintenance activities that, if done on a regular schedule, can keep trails in good repair and extend their lifespans. Marti shared a trail maintenance schedule that shows maintenance activities and optimal frequency to perform these activities (this form is available at www.lrb.org). He also reviewed the Trail Inspection Template; it includes a list of items requiring inspection, a series of questions that lead to information-gathering on issues that need to be addressed, and a place to record maintenance completion, as well as space for follow-up comments and photos.

ADA-Accessibility—what responsibilities do you have to comply?
Approximately 19 percent of the U.S. population has a disability of one sort or another, such as difficulty seeing and hearing, or mobility issues requiring use of a wheelchair or other aids like canes, crutches, and walkers. This means some 54 million people over the age of five have a disability that requires accommodations of various kinds. In response, guidelines have been developed so all can participate in daily living activities.

New areas covered by 2010 standards
What is often referred to as the “new Americans with Disabilities Act” is not that new, according to Julee Quarve-Peterson of Julee Quarve-Peterson, Inc., in her comments at the 2011 American Public Works Association-Minnesota Chapter Fall Conference. Title I of the ADA was enacted in 1990 by the U.S. Congress and prohibits employment discrimination against qualified individuals with disabilities. Title II prohibits disability discrimination by all public entities at the local and state level, which covers access to all programs and services offered by the entity. Access means both physical and programmatic, including public transportation provided by public entities. The 2010 ADA accessibility requirements are revised regulations to Title II and Title III guidelines and include an update of nondiscrimination policies and adoption of updated accessibility standards. The 2010 Standards for Accessible Design (ADAAG) include design guidelines and updates to the 1991 ADAAG standards. According to Quarve-Peterson, the 2010 standards cover some areas that were not previously covered by the 1991 standards and include amusement rides, boating facilities, fishing piers, sports facilities, play areas, golf courses, and swimming and wading pools and spas.

Awareness and understanding of updated guidelines will enable public works departments to provide adequate accessibility in their communities, Quarve-Peterson said. Information to help with ADA compliance can be found at www.ada.gov and www.access-board.gov.

Minnesota building code documents below may also be helpful:
• Minnesota Chapter 1341, International Building Code 2006 (scoping guidelines)—must be purchased
• ICC/ANSI A117.1-2003 (technical requirements)—must be purchased
• Minnesota Amendments 1341-2007—available online at www.mncodes.org/accessibility

These standards should be applied to new construction or alteration projects. New construction is required to be accessible based on the 2010 standards. Any portion of an existing structure that is being altered also is required to be accessible based on the 2010 standards, Quarve-Peterson said.

Existing programs, services, or activities that are not planned for alteration are subject to program access standards. These standards say that, when viewed in its entirety, the program, service, or activity must be readily accessible to and usable by individuals with disabilities, Quarve-Peterson explained. Program access standards do not require each existing facility to be accessible, do not require any action that would fundamentally alter the program, service, or activity, and do not require any action that would result in undue financial and administrative burden. Thus, the intent is to capture accessibility as changes are being made, she said.

Public rights-of-way guidelines
The most recent version of the Public Rights-of-Way Guidelines (PROWAG) was released in July 2011 and, once finalized, will apply to newly constructed and altered portions of public rights-of-way. However, existing pedestrian networks that are not being altered will not be required to meet PROWAG, Quarve-Peterson said. The types of construction PROWAG covers include pedestrian access routes and signals, detectable warning surfaces, roundabouts, transit stops and shelters, on-street parking, and loading zones as well as street furniture and other elements. The public comment period for PROWAG has been extended to February 2, 2012.

Guidelines for outdoor developed areas
Accessibility guidelines for outdoor developed areas, as written right now, apply only to federal projects but can be used as best practice guidelines by other entities. They provide scoping and design requirements for camping and picnic facilities, viewing areas, trails, beach access routes, and outdoor constructed features such as picnic tables and benches. A draft of the shared use path guidelines were published in March 2011; the guidelines are intended to complement PROWAG and Outdoor Developed Areas guidelines. Public comments are currently being reviewed.

Accessibility resources
Some helpful resources for standards include the following:
• Outdoor environment guidelines—National Center of Accessibility, www.ncaaline.org
• A publication that combines all three codes—International Code Council, www.icscave.org/safety/accessibility
• Minnesota amendments—Minnesota State Building Codes, www.mncodes.org/accessibility
• Building code issues—Minnesota Department of Labor and Industry, Construction Codes and Licensing Division, Curt Wiehle, curtis.wiehle@state.mn.us, LTAP—Jeanne Engelmann, LTAP freelancer
Trail maintenance activities must also include non-programmed challenges that sometimes come in the form of storm damage and vandalism. Vegetation is another aspect of trail maintenance. Major tasks include mowing, overhead trimming, tree removal, weed control, sweeping, and rain garden maintenance. Other tasks relate to drainage (cleaning culverts and catch basins, erosion repair, ditch maintenance), structures (bridges and boardwalks, retaining walls, tunnels), and other amenities (rest stops, trash receptacles, light fixtures, fences). Seasonal maintenance includes tasks that must be done in spring and fall (sweeping, turning on/off water) and winter (plowing, grooming winter use trails, installing winter signage and protective strips to minimize snowmobile damage).

Manage trail pavement to increase lifespan
Managing trail pavement requires “installing it right the first time to increase the probability that the trail will last up to 20 years,” Marti said. Proper surface substrate is needed as well as a 3-inch minimum asphalt thickness—typical for trail uses and standard maintenance equipment. Thicker sub-base and bituminous sections are recommended for trail segments that will carry heavy loads, such as utility trucks and large maintenance vehicles. He also said that inspection at the time of construction is important to make sure the job is done according to the agency’s specifications.

“Expect pavement to last 15 to 20 years,” Marti said. Trail pavement degrades due to oxidation, use, and environment; typical Minnesota weather extremes are very hard on pavement. Early preventive maintenance costs far less than delaying maintenance until the pavement condition is poor.

Many factors contribute to pavement distress, Marti said. Some problems include cracks, potholes, and surface deterioration, and potholes. Cracking can be avoided in initial construction by using a polymer-based asphalt, but the upfront costs are higher.

Extending the sub-grade support by 2 feet on either side of the trail can prevent edge cracking. Cracks can be repaired by filling or sealing. If roots cause cracking, full-depth patching and placement of root barriers are more long-term approaches, he said. Potholes, too, can be patched in temporary or more permanent ways.

Surface deterioration due to aging or raveling, another pavement distress problem Marti mentioned, can be addressed by using fog seal, seal coat, slurry seal, or micro-surfacing. Each of these treatments is successively more costly but also lasts longer. Fog sealing is least expensive, yields a smooth surface, and lasts four to six years. Seal coating costs more than fog sealing but lasts 6 to 10 years. Slurry sealing is a bit more costly than seal coating and lasts a little longer. Micro-surfacing is most expensive and has an 8 to 10 year lifespan; Marti said it’s hard to find contractors to put it on trails.

An industry trend applied to trails
Asset management is a proactive approach used for roadways that can also be applied to trails. Using asset management, agencies can project current and future maintenance costs and extend the life of the trail surface, Marti said. A good asset management program provides a systematic way to evaluate the current surface condition, identify and prioritize maintenance needs, and give reliable information for budgeting and other decision making. Software programs are available that range from inexpensive spreadsheets and databases to more sophisticated systems (see page 3 for some options).

“The speakers highlighted Stearns County, Eden Prairie, and Three Rivers Park District as case studies of various trail maintenance activities and asset management tools. Three Rivers Park District has 150 miles of trails that are monitored via an in-house database and the PASER rating system software program. One of the treatments the Park District applies to its trails is a slurry seal to prolong trail life; it turned to this approach after discovering that chip sealing produced pavement that wasn’t smooth enough for users. Eden Prairie’s 128 miles of trails are managed via ICON system software. Workers use chip sealing and add smaller aggregate (1/8-inch trap rock) to provide a smoother surface. Stearns County uses an Excel spreadsheet to manage 60 miles of trails. It will soon begin using fog sealing every five years to prolong the life of the trails, Crosby said."

Future planning
When planning for trail system development, the first step is to determine priorities. Will the trails be used in all seasons? For which users? What kind of surface is needed? After initial construction, what funds will be available for long-term maintenance? What kind of maintenance will be done to extend the life of the trails?

To determine the best management tool for a trail system, Marti and Crosby advise this consider available funding, staff resources, and trail system size. In addition, factor in the cost of software as well as initial and routine data collection costs and staff requirements. A new DVD, Pavement Management: Better Data, Better Decisions, Better Roads, is available on www.lrrb.org to help, Marti said.

—Jeanne Engelmann, LTAP freelancer

Minnesota LTAP offers rec trails workshops in March
Minnesota LTAP is offering its “Best Practices: Corridor Management/Maintenance of Paved Trails” workshop in Brainerd (March 13), Medina (March 29), and Rochester (March 29). More details are online at www.mnltap.umn.edu/training. LTAP

Evaluation of Safety Needs, Crash Surrogates, and Analysis Methods to Address Lane Departure Research Questions Using Naturalistic Driving Study Data
This report examines the statistical relationship between surrogate measures of collisions (conflicts, critical incidents, near collisions, or roadway encroachment) and actual collisions.

Freight Facility Location Selection: A Guide for Public Officials
This report describes the underlying principles of sustainability as it relates to freight operations in the emergency response context, and the principles of sustainability as they relate to the routing of response vehicles and evacuees.

This report explores crash modification factors for safety strategies at signalized intersections.

This report explores how to use technology to support management agencies in their efforts to best manage their transportation projects on tribal lands.

This report describes the key criteria that the private sector considers when making decisions on where to build new logistics facilities.

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 Speaking of snow and driving, this past fall the simulation program didn’t even have snow on plowing their roads. Unfortunately I sped, hit some driving a plow would be easy, but after attempting it 5). I had an opportunity to try out the simulator of Transportation to deliver six sessions of its 1). I had an opportunity to try out the simulator of Transportation to deliver six sessions of its the simulation program didn’t even have snow on plowing their roads. Unfortunately I sped, hit some driving a plow would be easy, but after attempting it 5). I had an opportunity to try out the simulator of Transportation to deliver six sessions of its 1). I had an opportunity to try out the simulator of Transportation to deliver six sessions of its