



# TECHNOLOGY EXCHANGE

A Newsletter of the Minnesota Local Technical Assistance Program (LTAP)

UNIVERSITY OF MINNESOTA  
CENTER FOR TRANSPORTATION STUDIES

www.mnltap.umn.edu

Spring 2007 Vol. 15, No. 2

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## Stretching the pavement dollar

It's hard to be a pavement in Minnesota. Growing numbers of vehicles squash you and cold winters make you brittle, yet tight budgets keep you from getting all the attention you need. What's a pavement to do? Speakers at the 11<sup>th</sup> Annual Minnesota Pavement Conference offered their ideas—such as preventive maintenance, pavement management systems, and recycling methods—to stretch the transportation dollar and ease your roadway's pain.

The conference, held February 15 in St. Paul, was sponsored by Mn/DOT, Minnesota LTAP, and a number of other organizations.

Please see pages 4–5 for coverage of several presentations from the conference. Additional coverage is in the 2007 *Minnesota Pavement Conference Session Summaries*, available for download on the Minnesota LTAP Web site at [www.mnltap.umn.edu/publications.LTAP](http://www.mnltap.umn.edu/publications.LTAP)



This year's recipient of the Gerald Rohrbach Annual Pavement Conference Award is Duane Blanck of Crow Wing County. Blanck has served as county engineer in Crow Wing County since 1975 and is a past president of the Minnesota County Engineers Association. Last year's recipient, Patrick Hughes (in back), presented the award.

Pavement continued on page 4

## Association awards

### Minnesota County Engineers Association

#### 2006 County Engineer of the Year

MCEA recognized Otter Tail County Engineer Richard West as the County Engineer of the Year for 2006. West, with more than 30 years of experience in engineering, has been the county engineer in Otter Tail County since November 1990. He has served as president of MCEA and is active in several MCEA committees.



Richard West

#### Special Projects of the Year

Fillmore County Engineer John Grindeland and his staff were recognized for their work on the CSAH No. 40 project, a 4.5-mile stretch of the original State Highway (TH No. 30), first constructed in the 1920s. TH 30 no longer met the criteria as a state highway and was turned over to Fillmore for the challenging project, which involved replacing three bridges. One unique design involved a drainage structure utilizing a drop inlet along with a cantilevered outlet and a cable concrete reinforced plunge pool. The plunge pool acts like a bowl under a faucet, minimizing erosion. The terrain and aesthetic aspects of the adjacent land also contributed to the modification of the design speed from the standard 55 mph to 45 mph.



John Grindeland

The design team was headed by Grindeland and included Assistant County Engineer Tom Miles (project manager); inspectors Darrel Schmitt, Jim Thorson, Tom Scheevel, and Ron Means; and surveyors Gene Voight and Jarad Carolan. Special design consultant was TKDA of St. Paul, Minn.

A second Special Project of the Year Award was given to the Anoka County Highway Department for its school-zone safety project. The summer *Exchange* will have detailed coverage of this project.

#### Work Zone Safety Award

Crow Wing County (County Engineer Duane Blanck) and Hennepin County (County Engineer Jim Grube) were recognized for taking the extra steps to provide safe work zones for workers and

Awards continued on page 5

## TZD conference features local road safety measures

Several sessions at the 2006 Toward Zero Deaths (TZD) conference touched on ways to improve the safety of local and rural roads. The conference, held November 2 and 3 in Duluth, Minnesota, served as a forum for sharing information on how to reduce the number of fatalities and injuries on Minnesota roads.

In the event's keynote address, U.S. Congressman James L. Oberstar pointed out that a disproportionate number of traffic fatalities occur on rural roads.

Toward Zero Deaths is a multiagency partnership that includes representatives from Mn/DOT, the Minnesota Department of Public Safety, the

Minnesota State Patrol, the Federal Highway Administration (FHWA), and the Center for Transportation Studies (CTS). The conference was hosted by CTS and sponsored by Mn/DOT, the Department of Public Safety, and the Minnesota TZD program.

A 20-page conference proceedings is available for download at [www.cts.umn.edu/publications](http://www.cts.umn.edu/publications).

Please see page 6 for conference coverage. **LTAP**

### TECHNOLOGY EXCHANGE

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# LRRB UPDATE

The LRRB is a major supporter of Minnesota LTAP.

## LRRB, RIC to begin new round of projects

The Minnesota Local Road Research Board (LRRB) and its Research Implementation Committee (RIC) announced the following new project plans as of January 1, 2007.

Participants for Technical Advisory Panels (TAPs) for these projects are still welcome. Participation would entail directing a project, attending three to five meetings (approximately one to two hours each) over a six-month to two-year period, and reviewing and approving products.

If you are interested in any of the RIC tasks, contact Mike Marti ([marti@srfconsulting.com](mailto:marti@srfconsulting.com), phone 763-249-6779, fax 763-475-2429). If you are interested in any of the LRRB research projects, contact Alan Rindels ([alan.rindels@dot.state.mn.us](mailto:alan.rindels@dot.state.mn.us), phone 651-366-3779, fax 651-366-3789).

### RIC tasks

**Innovative Contracting Methods for Local Agencies.** This task will look at several techniques recently approved by the FHWA and evaluate their applicability to local road agencies in Minnesota. The final deliverable will be a report identifying appropriate methods, implementation strategies for local agencies, and recommendations for pilot projects.

**Rural Safety Synthesis and Workshop.** Several reports recently completed by the LRRB focused on improving rural safety. This task will synthesize information from these sources and develop a workshop and a PowerPoint presentation.

**Training Module for Pavement Rehabilitation Selection.** The FHWA and the LRRB have developed many products relating to selecting the most effective pavement rehabilitation strategies. This task will develop a one-day workshop, including instructor's notes and participant materials, for use by Minnesota LTAP.

**Street Sweeping Best Practices.** In the last few years, Washington County and the Metropolitan Council have produced several reports dealing with street sweeping and its environmental impacts. The objective of this task is to

### Check out what the RIC produced for you!

The LRRB Research Implementation Committee (RIC) 2005–2006 program delivered a bumper crop of valuable products. Some highlights are below; for a complete list of projects and products, please see [www.lrrb.org](http://www.lrrb.org).

- **Training module for designing and constructing with geosynthetics.** A pilot class was held in December 2006, and Minnesota LTAP will hold additional classes in October 2007.
- **Seal coat handbook, training.** The *Minnesota Seal Coat Handbook*, first published in December 1998, was revised. Minnesota LTAP offered a new workshop on seal coating in April 2007.
- **Updated video: loads and roads.** This 20-minute educational/training DVD, *Loads and Roads: Finding a Balance*, can be shown in its entirety for a comprehensive look at the subject, or it can be divided into about five-minute segments for viewing by different audiences.
- **New manual: concrete pavement rehabilitation.** The *State Aid Concrete Pavement Rehabilitation Best Practices Manual* was published by Mn/DOT State Aid in 2005. Minnesota LTAP produced an easy-to-use, 5-inch by 8-inch tabbed version in 2006.
- **To Pave or Not to Pave PowerPoint, research synthesis.** These training materials can help you decide when to upgrade a gravel road. They are used in CTAP and LTAP gravel road workshops.
- **Minnesota Crash Data Analysis Tool.** MN-CMAT—the Crash Mapping and Analysis Tool—allows users to easily access, comprehend, and display data about automobile, bicycle, and pedestrian crashes. Minnesota LTAP helped coordinate 10 free training sessions in May and June 2006 for county engineers and other county engineering staff around the state.
- **New roundabout DVD:** This new DVD—*How About a Roundabout? The Minnesota Experience*—introduces the concepts behind roundabouts and explains how and why to use them. (See page 3 for more.) **LTAP**

synthesize these reports in an easy-to-read technical document and develop a one- to two-hour PowerPoint training presentation.

### LRRB research projects

**Assessment of Underground Stormwater Management Devices under High Flow Conditions\*** (Phase II of a current LRRB project). This project involves further tests on four devices to determine whether they resuspend removed sediments under severe storm events (less frequent storms) and to develop maintenance schedules.

**Statistical Methods for Materials Testing.\*** This project will evaluate current testing methodology to determine if it ensures high quality. (If it does not, cities and counties could stop unnecessary testing and save money.) The project will also test the feasibility of using dynamic testing protocols.

**MnROAD Data Mining, Evaluation, and Qualification Phase I.\*** The objective of this project is to improve

the effectiveness and quality of the MnROAD database.

**Use of Foamed Asphalt Base Reclamation in Urban Areas of Minnesota.** This project will look at jobs outside Minnesota in which foamed asphalt was used to determine the best mixture design and construction procedures for successful projects.

**Best Preventive Maintenance Treatments for Recreational Trails.** This project will determine strengths and weaknesses of current recreational trail treatments, create standardized special provisions and innovative treatments, and produce a draft manual on how to maintain recreational trails.

**Development and Field Test of Advanced Dynamic LED Warning Signals for Unsignalized High-Speed Rural Blind Intersections Powered by Renewable Energy.** This research proposes to develop and evaluate a new system that actively detects vehicles in the proximity of the intersection and notifies the approaching and crossing vehicles.

**Porous Asphalt Pavement Performance in Cold Regions.** The purpose of this research is to study the durability and hydrologic benefits of a porous asphalt roadway in a cold climate and quantify environmental effects.

**Impact of Stream Geomorphology and Fish Passage Requirements on Construction Costs of Culvert Structures in Minnesota.** This research will address alternative culvert designs and their construction cost and effectiveness.

(\* 50% funded by the LRRB, 50% by Mn/DOT) **LTAP**



### Technology Exchange

The **Minnesota Local Technical Assistance** Program is part of the Federal Highway Administration's Local Technical Assistance Program (LTAP). LTAP is a nationwide effort designed to foster and improve information exchange among local practitioners and state and national transportation agencies. Minnesota LTAP is administered by the Center for Transportation Studies at the University of Minnesota, and cosponsored by the Minnesota Local Road Research Board and the Minnesota Department of Transportation.

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation. This publication is available in alternative formats upon request.

Any product mentioned within should not be considered a product endorsement. Authors' opinions/findings do not necessarily reflect the views of Minnesota LTAP.

### Contact us

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

**Technology Exchange** welcomes contributions and suggestions from its readers. Submit articles, news items, potential topics, and other comments to Pamela Snopl, managing editor.

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Tom Struve, City of Eagan; Minnesota Street Superintendents Association  
Linda Taylor, Maintenance Office, Mn/DOT

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## Report offers guidance for applying rumble strips at rural intersections

Some counties in Minnesota use rumble strips at many of their rural stop-controlled intersections while other counties hardly use them at all. How effective are rumble strips, and what types of sites are good candidates for them? The third in a series of studies by Kathleen Harder and John Bloomfield of the Center for Human Factors Systems Research and Design at the University of Minnesota provides guidelines for more standardized usage.

In this project, the researchers studied the effect of rumble strips on the stopping behavior of drivers at 10 Minnesota intersections. They found that drivers slowed down earlier on approaches with rumble strips than on those without: the difference was, on average, 2.0 mph to 5.0 mph (depending on vehicle category and type of approach). In addition, speeding “outliers” (such as one driver nearing 80 mph) were more likely to slow down earlier on approaches with rumble strips.

A key factor, the researchers found, is whether an intersection is obscured by vegetation or man-made structures. Rumble strips had a bigger impact at sites where the driver on the minor road cannot see cross-traffic on one or both sides of the intersection.

Based on these results, Harder says, “we believe



Rumble strip and warning sign in Lincoln County

the addition of rumble strips to rural intersections with poor sightlines is likely a good idea.” Where the traffic is visible on both sides of the intersection, they do not recommend installing rumble strips, unless the stop-controlled intersection in question is preceded by miles of uninterrupted roadway.

For the project, the researchers visited 151 intersections in 16 Minnesota counties. The intersections, chosen with the help of county engineers, yielded 274 approaches, from which pairs of intersections with similar sightlines were selected; one of each pair had rumble strips while the other did not. Research assistant Ben Chihak then used a radar gun to collect speed data from more than

400 vehicles at 10 selected intersections.

This third study, funded by the Minnesota Local Road Research Board, built upon findings of two earlier studies (*The Effects of In-Lane Rumble Strips on the Stopping Behavior of Attentive Drivers*, Mn/DOT 2002-11, and *The Effects of In-Lane Rumble Strips on the Stopping Behavior of Sleep-Deprived Drivers*, Mn/DOT 2005-16).

In all three studies, drivers reduced speed earlier and to a greater extent at intersections with rumble strips.

Harder cautioned, however, that while rumble strips are likely to reduce crashes, they cannot eliminate them, nor will they prevent a driver from turning into or crossing a major road because of poor gap perception. She also noted that none of the drivers in the studies actually ran a stop sign with or without rumble strips.

*Stopping Behavior at Real-World Stop-Controlled Intersections With and Without In-Lane Rumble Strips* (Mn/DOT 2006-42) by Kathleen Harder, John Bloomfield, November 2006, [www.lrrb.org](http://www.lrrb.org) (PDF, 22.2 MB). **LTAP**

## OPERA project:

### Increasing the capacity of slab-span timber bridges

**Problem:** Owners of the approximately 1,300 treated timber bridges in Minnesota are looking for inexpensive and easy ways to increase the load capacity and serviceability of existing timber bridges to accommodate both the increased number and size of vehicles now depending on local road systems.

**Solution:** Apply University of Minnesota research analyzing the relationship between load distribution and the transverse stiffness of longitudinal slab-span timber deck systems.

**Procedure:** On bridge 86511 (CSAH 12 over Buffalo Creek in Marysville Township), existing mid-span spreader beams were relocated to the quarter-points of the respective spans, and then larger spreader beams were installed at the center point of the spans, as well as a spreader beam at the other quarter-point of each span. The bridge was resurfaced and crack control joints were sawed at each support.

**Results:** Increasing the number and size of spreader beams increased bridge capacity and performance, resulting in an inventory rating increase.

**Approximate Cost:** \$24,400 (\$10,000 approved for project)

**Implementation:** No plans to use currently, but will consider use of technology as bridges need improvement.

**Project leader:** Wayne Fingalson, P.E., Wright County Department of Highways. **LTAP**



The Exchange regularly highlights projects completed under the LRRB's Local Operational Research Assistance Program (Local OPERA). A condensed sample from the 2006 OPERA annual report is reprinted above. For a copy of the report, please visit [www.mnltap.umn.edu/opera](http://www.mnltap.umn.edu/opera).

Local OPERA helps to develop innovations in the

construction and maintenance operations of local government transportation organizations. Learn more about the program and apply for OPERA funding online at [www.mnltap.umn.edu/opera](http://www.mnltap.umn.edu/opera), or contact Jim Grothaus, Minnesota LTAP director, 612-626-1077, [mnltap@umn.edu](mailto:mnltap@umn.edu).

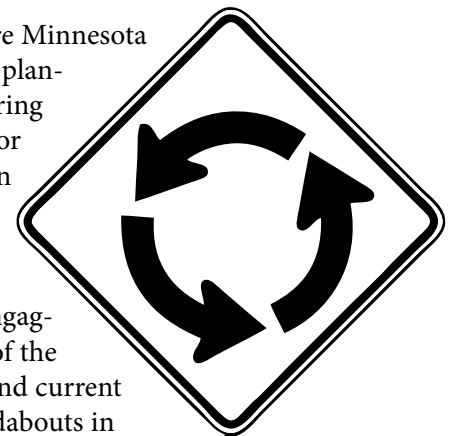
## How about a roundabout? The Minnesota experience

More and more Minnesota engineers and planners are exploring the potential for roundabouts in their communities. A new DVD provides an engaging overview of the potential for and current usage of roundabouts in Minnesota.

*How About a Roundabout? The Minnesota Experience* introduces the concepts behind roundabouts and explains how and why to use them. Produced by the Minnesota LRRB Research Implementation Committee, the DVD explains how roundabouts should be navigated by cars, trucks, pedestrians, and bicyclists.

You can play the DVD on the Minnesota LTAP Web site resources page ([www.mnltap.umn.edu/publications/videos/lrrb](http://www.mnltap.umn.edu/publications/videos/lrrb)).

A supplementary brochure highlights key points. To order your own copy of the DVD or the brochure, contact Sandy McCully of Mn/DOT's Research Services Section, 651-366-3768, [sandy.mccully@dot.state.mn.us](mailto:sandy.mccully@dot.state.mn.us). You can also download the brochure from [www.lrrb.org](http://www.lrrb.org). **LTAP**



# PAVEMENT CONFERENCE

## Past, present, and future of pavement preservation

If you haven't checked out Tom Kuennen's Web site—[expresswaysonline.com](http://expresswaysonline.com)—you're missing an opportunity. Kuennen provides one-stop shopping for all kinds of information about surface transportation including history, research, current practice, the latest equipment, and politics. With all that experience behind him, Kuennen's presentation at the 11<sup>th</sup> annual Minnesota Pavement Conference, titled "Hot Button Issues in Pavement Preservation," was like a state-of-the-union address on pavement preservation (PP).

### Defining PP

Kuennen defined PP as a group of methods "intended to prolong pavement life, avoiding high future costs... through the expenditure of much lower amounts of money at critical points in a pavement's life." He listed crack sealing; fog, chip, and thin cold-mix seals; surface recycling; and thin hot-mix asphalt overlays as the most common PP methods. He also claimed that spending a dollar on PP "can eliminate or delay spending six to ten dollars on future rehabilitation or construction costs."

### History of PP

On one hand, Kuennen explained, PP was simply the next obvious step after most interstate highway construction was completed in the 1980s.



Rubberized slurry seal in Los Angeles



Minisink Township polymer-modified fiber membrane

On the other hand, he pointed to the 1990 European Asphalt Study Tour as the single event that most forcefully propelled PP into the consciousness of U.S. pavement professionals. He quoted the tour's report: "By far the study team's most striking observation was that the pavements on European motorways and trunk routes are in superior condition. The extreme forms of distress that are evident in many parts of the United States... were, simply, rarely seen. Even pavements that were being rehabilitated or resurfaced were in fairly good condition by United States standards."

As a result, several organizations and programs were formed to promote PP in the United States:

- The Foundation for Pavement Preservation (formed in 1992)
- FHWA's Office of Asset Management (OAM, created in 1999)
- The Governmental Accounting Standards Board (GASB, which in

1999 issued Statement 34 requiring state and local governments to include long-lived infrastructure assets in their annual financial statements)

- The National Center for Pavement Preservation (opened in 2003)

### Leaving 'worst-first' behind

Kuennen said that, despite all of this activity, PP continues to face a stubborn obstacle: the view held by many politicians and citizens that money should be spent on the worst pavements first. His suggested solution to this problem is hard data in the form of pavement inventories created via pavement management systems (PMSs).

### Exemplary practices, new and old

Kuennen showcased two agencies—one large and one small—that have embraced PP practices. Necessitated by the tax cuts mandated in California's famous Proposition

13, the Los Angeles Public Works Department began a PP program, using PMS data and a proprietary rubberized slurry surfacing process. At the other end of the map, the town of Minisink, New York, has had excellent results with a proprietary surface treatment called FiberMat, in which short fibers are laid down with a polymer-modified emulsion and then covered with a sealer. Minisink claims the process has reduced reflective cracking by almost 90 percent over four years. But, citing NCHRP Synthesis Report 35-02 titled *Chip Seal Best Practices*, Kuennen also showed that the tried-and-true chip seal is still a useful PP option.

### The road ahead

Kuennen closed his presentation with a view to the future. He praised agencies that have compiled and issued PP reference material, including Mn/DOT's *Minnesota Seal Coat Handbook*. He also showed that, despite tight budgets that force agencies to direct funds toward road building, agencies are making PP progress. He cited a recent NCHRP study showing that state, county, and local agencies across the country are using hard PMS data to win dollars for pavement preservation. **LTAP**

—Richard Kronick, LTAP freelancer

## Transportation issues in the 2007 legislature

Betsy Parker of Mn/DOT's Office of Government Affairs discussed transportation proposals for the legislature, noting that results may not be clear until the last days of the session in early May. Key elements of the governor's budget recommendations include:

- Implementation of the constitutional amendment to dedicate motor vehicle sales tax (MVST) to transportation.
  - Trunk highway investment: The budget includes a one-time transfer of \$100 million from the general fund to the trunk highway fund to complete priority projects, and recommends that \$1.7 billion be authorized for trunk highway bonding over the next 10 years. "The proposal has received a cool reception, to put it mildly, from Democrats," Parker said. The governor feels it is responsible to bond for highway construction, she explained, so that roads can be used while being paid for.
  - Mileage-charge demonstration: To reduce the reliance on the gas tax as a transportation funding source, \$5 million from the \$100 million trunk highway fund transfer is directed toward a pilot project to demonstrate technologies that would allow a fuel-neutral mileage charge.
  - Truck weight: Mn/DOT will pursue last year's proposal to allow heavier trucks if axles are added to protect the pavement. These trucks would be required to obtain permits and pay permit fees.
- "One burning issue at the legislature is where

**"When you look at declining or flat revenues on one hand and inflation on the other, there is a lot to argue about to pay for transportation."**

—Betsy Parker, Mn/DOT

the money is spent," Parker said. Some people may be surprised that roughly 55 percent of state construction funding from 2003 through 2005 went to Greater Minnesota and 45 percent to the metro area. Future construction is expected to have a similar split, she said.

The biggest slice of state transportation appropriations—34 percent—is state aid to local governments. Other expenditures are state highway construction (27 percent), multimodal systems (15 percent), operations and maintenance (12 percent), infrastructure planning and investment (9 percent), and general support and electronic communications (3 percent).

Another burning issue at the legislature is how to fund transportation, Parker continued. At 34 percent, the state fuel tax makes up the largest slice of the state transportation revenue pie, followed by the motor vehicle registration tax (27 percent), federal fuel tax grants (17 percent), MVST (9 percent), federal aid to local roads (7 percent), and federal and investment income and other fees (6 percent).

The problem, Parker said, is that inflation is growing but the three key revenue resources are not. The gas tax hasn't been raised since 1988, and tab fees were actually lowered under former governor Jesse Ventura. And even though MVST revenues will grow thanks to the amendment, she said, estimates

predict small growth to 2011 due to less demand for new autos as baby boomers age (which affects tab revenues as well).

In contrast, Minnesota's Construction Cost Index is estimated to have increased by around 19 percent during 2006 (final numbers were not yet available). This is significantly higher than the general inflation rate and historically at the highest level to date, Parker said.

The growth is driven by the record-level price increases in asphalt (with a producer price increase of 55.8 percent), which, in turn, are driven by the unprecedented increases in crude oil prices over the last few years. Oil price increases affect not only asphalt prices but also transportation costs, excavation costs, and machinery operations. For example, Mn/DOT experienced a 34.4 percent increase in unit cost of bituminous surfacing over the last three quarters, she said.

"When you look at declining or flat revenues on one hand and inflation on the other," Parker concluded, "there is a lot to argue about to pay for transportation."

For more information about the budget, visit the Mn/DOT Web site at [www.dot.state.mn.us](http://www.dot.state.mn.us). **LTAP**

—Pamela Snopl, LTAP editor

(Edited from Parker's presentation handouts.)

## Crunching the numbers of recycled asphalt

As CEO of ASTEC Industries, Inc. (the largest manufacturer of asphalt plants in the United States) and as the holder of approximately 90 patents, Don Brock is a bona fide expert on asphalt recycling. At the 2007 Minnesota Pavement Conference, he shared some nuggets of knowledge on the subject.

Aggregate Size in RAP	Typical Asphalt Content
3/16 x 0	7%
3/8 x 1/4	4%
1/2 x 3/8	3%

Table 1: Liquid Asphalt Content in Recycled Pavement

### The times they were a-changing

Until the 1970s, Brock noted, the price of asphalt had remained about the same for about half a century. Then several factors dramatically changed the picture. First, when OPEC manipulated oil prices in the 1970s, the cost of asphalt increased by an order of magnitude: by 1979, it was about \$200 per ton. This price spike coupled with the advent of milling brought the cost of recycling below that of virgin materials.

### Why not separate recycled material?

But Brock pointed out a discrepancy in the way materials are handled today. A common practice, he said, is to separate virgin material by size but to throw all RAP (reclaimed asphalt pavement) together in one bin. As shown in Table 1, he explained that this leads to mix design problems because different sizes of RAP retain different amounts of asphalt.

“So as the rock is segregated,” Brock said, “it’s also segregating the liquid asphalt content.” This tends to limit the use of RAP in pavements to about 20 percent. But Brock explained that excellent products can be made if recycled material is separated just like virgin material.

### RAP is worth it

Brock’s next point was that paving materials obtained from RAP are a bargain compared with the virgin materials they replace. For example, in 30,000 tons of recycled pavement, there are typically about 28,200 tons of aggregate and about 70 6,000-gallon transport loads of liquid—worth roughly \$1 million. The cost to reuse that RAP is only the cost of the trucking and processing, since the same material is taken out of the road and then put back into the road. He assumed this trucking/processing cost to be \$6.40 per ton. He then compared

that with typical prices of virgin material: rock at \$9.40 per ton + asphalt at \$18.00 per ton = \$27.40 per ton. Thus, the savings from using recycled material would be \$21.00 per ton.

### Overlay vs. inlay

Brock then compared overlays with mill-and-inlay operations: Putting an overlay on a rutted road is very likely to yield a rutted road again, but milling a pavement gets rid of the rutting. Also, the rough milled surface will interlock well enough with the inlay that a tack coat is probably unnecessary. Furthermore, Brock said, “One of the best benefits is we eliminate joint density problems. When you put down a 2-inch overlay, you put down 2½ inches, and as you try to compact it, you can’t contain it on the edges, so it spreads out. As it spreads out, you create low-density areas.” But with mill and inlay, the unmilled shoulder creates a dam on each side, so the material has no place to spread out.

Furthermore, with an inlay there is no need to raise either guardrails or shoulders—and no need to decrease the posted clearance under bridges or the weight limits on bridges. Finally, Brock said, if the tack coat isn’t necessary and a transfer machine is used, a paver can follow 200 feet behind the



RAP segregated in piles

milling machine, and by double hauling (mix out, milled material back), save tremendously on hauling costs.

Brock did say recyclers need to work out some problems. For example, they need to allow more mixing time to allow water to evaporate, the superheated virgin material to cool, the RAP to heat up and melt the old liquid from recycled material, then mix new liquid. By allowing that evaporation time, they will produce a product that mixes the RAP and virgin material more homogeneously. Nonetheless, Brock ended by stating confidently that, as the cost of virgin materials continues to increase—and as we become more committed to decreasing our dependency on foreign oil—he expects all agencies to turn more and more to recycling. **LTAP**

—Richard Kronick, LTAP freelancer

## Pavement data collection: plan vs. actual

How well do actual pavement conditions match what was planned? A pilot project was conducted last year to find out.

County engineers submit their “NEEDS Report” to State Aid every year, said Rich Sanders of Polk County. The report estimates the construction cost required to improve a state-aid system to standards adequate for future traffic on a uniform basis. The data—including the year graded, year surfaced, type of surfacing, design strength, functional class, proposed section, and relative cost to improve—form the NEEDS database.

What isn’t collected, however, is the actual structure in place—in other words, what was constructed

(materials and thickness) versus what was planned. Other unknowns are the types of road users (important with increasing truck traffic) and how well the roads are performing.

For the pilot, 341 sites and nearly 1,300 total miles were analyzed, said Cameron Kruse of Braun Intertec, one of the consultants selected by State Aid to conduct the work. Testing included:

- Falling weight deflectometer, to calculate pavement strength, capacity, and remaining life
- Ground penetrating radar (GPR), to provide a picture of pavement structure and to analyze FWD data
- Coring, to calibrate GPR data

- Traffic data (volume and classification)

Coring, GPR, and traffic data were compared to reported (historical) values, and the data were used to back-calculate pavement strength, capacity, and remaining life, Cruse said.

Five percent of the CSAH system was tested in the first year. Preliminary results found that the difference between cored and reported thickness in 15 percent of cases was plus or minus 3 inches. “This suggests an opportunity to improve in that area,” Cruse said.

The pilot did not cover concrete, he added. **LTAP**

—Pamela Snopl, LTAP editor

### Awards from page 1

the traveling public. These counties demonstrated compliance with state work-zone traffic control standards and guidelines, applied innovative work-zone procedures to improve safety, conducted local efforts to promote work-zone safety to the public, and held county worker safety education.



Jim Grube

### City Engineers Association of Minnesota Engineer of the Year

CEAM named Mark Burch as the Engineer of the Year for 2006. Burch is the public works director and city engineer for the City of White Bear Lake.

### Project of the Year

CEAM announced that Columbia Heights is the winner of the Municipal Project of the Year award for 2006 for its project, “Industrial Area Redevelopment/Huset Parkway Reconstruction.”

### North Central Section of the Institute of Transportation Engineers

These awards are presented to section members of affiliates to recognize exemplary service to the profession. Bernie Arseneau of Mn/DOT has been named the 2006 President’s Award winner for demonstrating honorable achievements in the last

year or over the course of his career. The Young Transportation Professional of the Year is awarded to Chris Chromy of Bolton & Menk for work as a “rising star” in the organization and profession.

### Minnesota Public Works Association

The Minnesota Chapter of the American Public Works Association was awarded the 2006 Presidential Award for Chapter Excellence. Outgoing MPWA president Tom Klatt accepted the award at the MPWA Fall Conference. **LTAP**



Tom Klatt

### MCEA Appreciation Award

Margaret Donahoe was recognized for her tireless work to promote transportation throughout the state for nearly 20 years. She has worked as the editor of the *Legislative Update*, a production of the Minnesota Transportation Alliance, and also has worked for the Minnesota Transportation Study Board and the Minnesota State Transportation Budget Division.

# SAFETY

## Toward Zero Deaths conference

### Maintenance activities to improve safety

County engineer Sue Miller opened this session of the TZD conference by describing Freeborn County's efforts to eliminate little-used field approaches (driveways from a road or highway into a field). As farms get bigger, she said, so do the field approaches because they now need to accommodate semi tractor-trailers. These approaches, however, are potential obstructions for drivers who might run off the road, hit the approach, and "skyrocket into the cornfield," Miller said. "If you don't need that approach there, why have an extra obstruction out there for people to hit?"

She and her county's board created a policy to charge farmers \$200 for a permit to put in an approach; however, they will waive that fee for farmers who agree to give up other approaches they no longer use.

Following Miller, Mike Wagner, county engineer for Nicollet County, addressed the problem of vegetation growing unchecked in roadside ditches. Such vegetation provides protective cover for birds and other animals that could suddenly dart out into the road—and into the path of oncoming traffic. For that reason, Wagner encourages farmers to mow their ditches.

Pavement edge drop-offs can be a serious safety problem in rural areas as well. If adding extra pavement to

a shoulder is not an option, Wagner recommended tapering or beveling the edge of the pavement. That way, a driver whose vehicle strays off the road will have a better chance of righting it and controlling the vehicle—without overcorrecting and veering into the opposite lane. This beveling can be done by blading, Wagner said, "and it costs basically nothing to do that when you are paving."

Next, Jon Jackels talked about the role of pavement markings in preventing lane-departure crashes. Since so many road-departure crashes happen at night, road markings need to be retroreflective, and he told attendees to review markings at

night in order to see when maintenance is needed.

Jackels said that although higher quality marking paint might be more expensive initially, it would pay for itself over the long run. Whichever road these retroreflective markings are used on, there is a good benefit-to-cost ratio, Jackels added. For example, for roadways that carry 2,500 cars per day, the cost benefit ratio is 86 to 1. "[These markings] keep people on the roadways. If you can see the road, chances are you'll stay on it," he said.

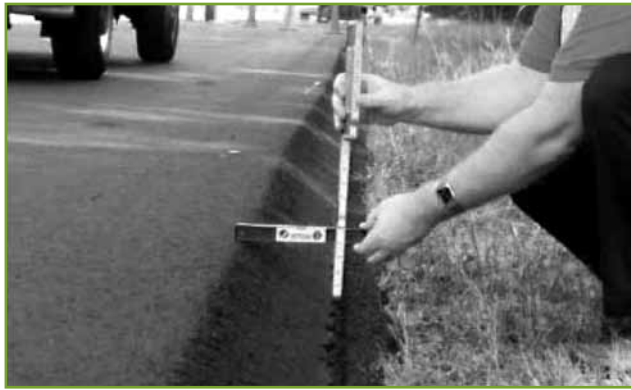
Jackels also recommended a handbook published by the American Traffic Safety Services Association and the National Association of County Engineers titled *Low-Cost Local Road Safety Solutions*. The handbook, available at [www.atssa.com](http://www.atssa.com), describes rumble strips, rumble stripes, signing, delineation, and other techniques.

Finally, Dan Gullickson, Mn/DOT forestry program coordinator, talked about a partnership opportunity available for counties, township authorities, and trunk highway authorities to work with the U.S. Department of Agriculture and its Conservation Reserve Program to establish living snow fences. The program will pay farmers to take land out of production and plant vegetation to create a snow fence at a specified distance along a highway.

Snow fences keep blowing snow off roads and prevent it from freezing on a previously cleared road. This keeps the road open—saving maintenance costs and the costs of shutting down a major highway. In addition to reducing drifting snow, a snow fence can reduce soil erosion.

A challenge Gullickson noted is establishing snow fences on private land, since farmers are often reluctant to give up crop land for planting trees. One approach that has proved successful is to give farmers recognition in their community for doing so, Gullickson said. **LTAP**

Download the TZD proceedings at [www.cts.umn.edu/publications](http://www.cts.umn.edu/publications)



A 30-degree safety edge

### Clinical diagnosis: safer roads through road safety audits

Moving toward zero deaths on Minnesota roadways may seem like a difficult goal—but simple steps can help move Minnesota in that direction, said speakers at a session on road safety audits.

A road safety audit (RSA) is a formal safety performance examination of an existing or future road or intersection by an independent audit team. Minnesota's Comprehensive Highway Safety Plan has identified the use of RSAs as one strategy to help reduce the number of fatal and life-altering crashes on Minnesota roadways.

Some common problems are predictable and can be fixed inexpensively, according to Dan Brannan, traffic safety specialist with Mn/DOT. Posting signs where crashes consistently happen and putting more police officers on the road in areas where drivers frequently speed will help to increase safety, he said.

Olmsted County is working toward zero deaths by using statistics to fix some of their local problems. County engineer Mike Sheehan said that some of the most prevalent problems in Olmsted County are crashes caused by failure to yield to right-of-way. The percentage of crashes caused by failure to yield is 14 percent for the county, compared to 6 percent statewide, Sheehan said.

To alleviate this problem, signing on right-turn lanes and relocating stop bars are potential solutions that could lower the number of crashes.

Other problems that seem to be more prevalent in Olmsted County include speeding and inattentive driving. The county averages 15 percent of its crashes from speeding, compared to 7 percent statewide, he said.

Lieutenant Mark Peterson explained some of the ways in which the State Patrol is using road safety audits to solve roadway problems.

More than 4,000 drivers are speeding over 75 miles per hour each day. To control this, Peterson said the State Patrol has put more officers on the road at times when the most drivers are speeding. Short-term studies are showing that increasing the number of officers on the road is reducing speeding and therefore reducing crashes, Peterson said.

It works because people become more cautious and more aware of their pocketbook; drivers tend to think, "If I speed, I run the risk of getting caught, and that's going to cost me money," he said. **LTAP**

### Managing pavement edge drop-offs

Pavement edge drop-offs were one of the problems mentioned at the TZD Conference (see above). Each year an estimated 11,000 Americans are injured and at least 160 are killed in crashes related to unsafe pavement edges. In addition, tort liability claims resulting from pavement edge drop-

offs cost highway agencies millions of dollars every year.

One solution for the problem is to adopt a standard contract specification requiring an asphalt-fillet safety edge at a 30- to 40-degree angle along each side of the roadway in all resurfacing projects (see Figure 1).

The cost of the asphalt fillet is minimal compared to the total amount of the resurfacing contract, and it pays back in countless dollars saved from a reduction in fatalities, injuries, property damage, and lawsuits. The fillet ties the existing shoulder into the resurfaced roadway and allows a vehi-

cle to reenter the road safely. **LTAP**

Source: Minnesota County Engineers Association March/April 2006 newsletter, Vol. 2, Issue 2 ([www.mncountyengineers.org/Committees/Safety%20Committee/Newsletter%20Archive.htm](http://www.mncountyengineers.org/Committees/Safety%20Committee/Newsletter%20Archive.htm))

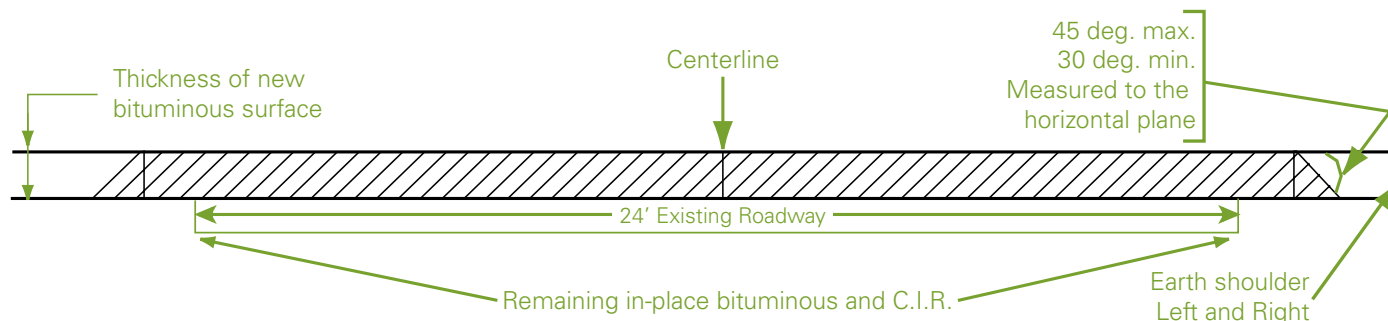


Figure 1: Typical section sheet with the safety edge

## The Shelf

Questions? Contact Arlene Mathison, Minnesota LTAP librarian, 612-624-3646, amathison@cts.umn.edu.

## Reports

**National Cooperative Highway Research Program: Research Results Digest 310**

This digest presents the results of the NCHRP Project 8-55, "Integrating Geospatial Technologies into the Right-of-Way Data-Management Process."

**National Cooperative Highway Research Program: Report 568. Riprap Design Criteria, Recommended Specifications, and Quality Control**

This research report serves to develop design guidelines; recommend material specifications and test methods; recommend construction specifications; and provide construction, inspection, and quality control guidelines for riprap for a range of applications including revetment on streams and riverbanks, bridge piers and abutments, and bridge scour countermeasures such as guide banks and spurs.

**National Cooperative Highway Research Program: Report 569. Comparative Review and Analysis of State Transit Funding Programs**

This report provides supplemental analyses of information collected in the USDOT Bureau of Transportation Statistics annual survey of state public transportation funding conducted for the American Association of State Highway and Transportation Officials and the American Public Transportation Association. It includes peer analyses and offers visual displays of the results.

**Quantification of Smoothness Index Differences Related to Long-Term Pavement Performance (LTPP) Equipment Type (FHWA-HRT-06-064)**

This report examines the work of researchers in the LTPP program who used an inertial profiler to collect longitudinal profile data at

regular intervals on two wheel paths located along the LTPP program test sections.

**Risk Assessment and Allocation for Highway Construction Management (FHWA-PL-06-032)**

This instructional report was developed as part of the Federal Highway Administration's scan team's implementation plan to raise awareness of risk management techniques and begin the process of incorporating risk management elements into the institutional structures of highway agencies. The report is designed for use in conjunction with workshops on implementing risk management.

**Long-Term Pavement Performance Data Analysis Support: National Pooled Fund Study TPF-5(013) (FHWA-HRT-06-121)**

This study outlines the various effects of multiple freeze cycles and deep frost penetration on pavement performance and cost.

**Compilation and Evaluation of Results from High-Performance Concrete Bridge Projects, Volume I: Final Report and Volume II: Appendixes (FHWA-HRT-05-056 and FHWA-HRT-05-057)**

The FHWA initiated a national program to implement the use of high-performance concrete bridges in 1993. The project was carried out in four parts. This report and appendix outline the details of the four parts of the project.

**Optimized Sections for High Strength Concrete Bridge Girders – Effect of Deck Concrete Strength (FHWA-HRT-05-058)**

This report contains an evaluation of the effect of high-performance concrete on the cost and structural performance of bridges constructed with high-performance concrete bridge decks and high-strength concrete girders.

## Manuals

**Seismic Retrofitting Manual for Highway Structures: Part 1 – Bridges (FHWA-HRT-06-032)**

Part 1 of this manual is based on a previous FHWA publication on the subject published in 1995 (FHWA-RD-94-052). This manual outlines the revisions that have been made including current advances in earthquake engineering, field experience with retrofitting highway bridges, and the performance of bridges in recent earthquakes.

**Seismic Retrofitting Manual for Highway Structures: Part 2 – Retaining Structures, Slopes, Tunnels, Culverts, and Roadways (FHWA-HRT-05-067)**

Part 2 of this manual includes new procedures for determining the seismic vulnerability of other important highway system structures such as retaining structures, slopes, tunnels, culverts, and roadways. Guidance is provided for various systems.

**Long-Term Pavement Performance Program Falling Weight Deflectometer Maintenance Manual (FHWA-HRT-05-153)**

This manual provides FWD owners, operators, and technicians information as a supplement to the Dynatest 8000 owner's manual.

## Syntheses

**National Cooperative Highway Research Program: Synthesis 361. Visualization for Project Development Details: A Synthesis of Highway Practice**

This synthesis presents information on visualization, the visual representation of proposed alternatives and improvements, and their effects on surroundings, specifically dealing with transportation. The synthesis was devel-

oped by conducting interviews with various transportation agencies, universities, and consultants throughout the United States.

**National Cooperative Highway Research Program: Synthesis 362. Training Programs, Processes, Policies, and Practices Details: A Synthesis of Highway Practice**

This synthesis focuses on program components required to have a sound set of policies, processes, and procedures for planning, developing, implementing, funding, and evaluating state department of transportation training, development, and education programs.

**National Cooperative Highway Research Program: Synthesis 363. Control of Invasive Species Details: A Synthesis of Highway Practice**

This synthesis explores the extent that state departments of transportation are identifying actions that affect the spread of invasive species, preventing introduction, and tracking status and location of "invasives" in a timely and ongoing manner. It also explores what they are doing to control found invasive species, restore habitats, conduct research, and share lessons. The synthesis was created by material collected from 40 state departments of transportation and the U.S.D.A. Forest Service. Personal interviews were also conducted.

**Transit Cooperative Research Program: Synthesis 67. Bus Transit Service in Land Development and Planning Details: A Synthesis of Transit Practice**

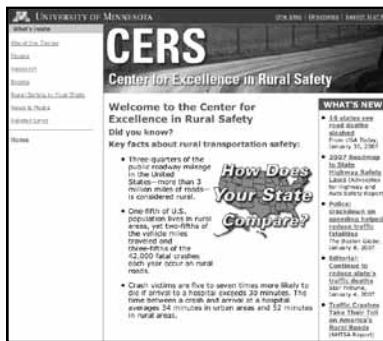
This synthesis documents the relationship between bus transit service and planning for new developments. It identifies successful strategies that assist in the incorporation of bus transit service into land developments, as well as challenges that the transit agencies face. **LTAP**

**Center for Excellence in Rural Safety launches Web site**

The Center for Excellence in Rural Safety (CERS) launched its Web site, [www.ruralsafety.umn.edu](http://www.ruralsafety.umn.edu), featuring detailed information about the organization and its activities.

The new Web site will play a key role in communicating the results of national rural transportation safety research projects to policymakers and the public. The Center's research activities explore policy, behavior, and technology innovations through projects addressing safety-conscious planning, ITS and rural emergency response, integrated policy approaches, and related human factors, societal trends, and stakeholder needs analysis.

The Center for Excellence in Rural Safety, established by the 2005 federal transportation act, is a joint program between the University of Minnesota's Hubert H. Humphrey Institute of Public Affairs and the Center for Transportation Studies, and is sponsored by the Federal Highway Administration. Its mission is to facilitate citizen-centered research, training, and outreach activities related to rural transportation safety. **LTAP**

**Web site provides Minnesota county truck weight info**

The Minnesota Truck-Weight Compliance Program Web site ([www.mnltap.umn.edu/programs/truckweight](http://www.mnltap.umn.edu/programs/truckweight)), developed in 2006 for Mn/DOT's State Aid Division by Minnesota LTAP, has introduced a new tool for finding basic county-level truck weight information.

A clickable, county-level Minnesota state map provides county contact information as well as links, where available, to maps detailing restrictions for bridges and seasonal load. Information, resources, and functionality vary, depending on the county. (The tool is still in development; send comments to Minnesota LTAP.)

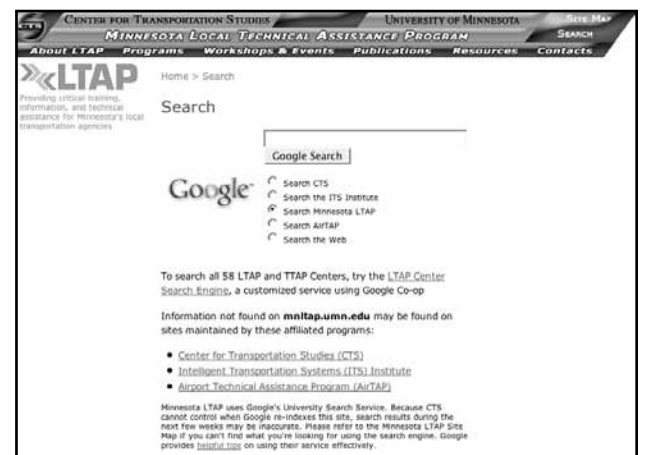
The program Web site, hosted on the Minnesota LTAP site, also includes a number of other useful features, including the schedule for upcoming workshops, links to key resources, and sample weight calculations with quizzes to check your knowledge.

The Minnesota Truck-Weight Compliance Program promotes voluntary compliance to significantly reduce damage to public roads and highways and the resulting repairs and expense due to overweight vehicles. The program's sponsors and partners are Mn/DOT, the Minnesota Local Road Research Board (LRRB), Northland Community and Technical College, and Minnesota LTAP.

For technical questions about the program or course content, contact instructor Greg Hayes, 218-684-1764, [Greg.Hayes@northlandcollege.edu](mailto:Greg.Hayes@northlandcollege.edu). **LTAP**

**Comparative LTAP search engine now available**

Transportation librarians such as Michel Wendt of Washington State DOT and Arlene Mathison of Minnesota LTAP have been creating customized search tools using Google. The tools let you search all 58 LTAP and TTAP centers at once, helping you to zoom right to the great LTAP information you need. Other customized search tools include all state DOTs and all university transportation centers. Just head over to the search page on the Minnesota LTAP Web site ([www.mnltap.umn.edu/search/index.html](http://www.mnltap.umn.edu/search/index.html)) to try them out. **LTAP**



# EVENTS & TRAINING

## Calendar

If your professional organization meets on a regular basis, let us include the information here. Contact us at [mnltp@umn.edu](mailto:mnltp@umn.edu). For an up-to-date list of events in Minnesota, please see the LTAP workshops and events calendar: [www.mnltp.umn.edu/workshops/events](http://www.mnltp.umn.edu/workshops/events).

Date	Event	Location	Contact
<b>May–June</b>			
May 1–2	18th Annual CTS Transportation Research Conference	St. Paul	Electra Sylva, 612-624-3708, <a href="mailto:conferences5@cce.umn.edu">conferences5@cce.umn.edu</a>
<b>LTAP</b> May 1	Culvert Installation and Maintenance (1.0 cr)	Rochester	Shirley Mueffelman, 612-624-4754, <a href="mailto:conferences2@cce.umn.edu">conferences2@cce.umn.edu</a>
<b>LTAP</b> May 2	Culvert Installation and Maintenance (1.0 cr) <b>FILLED</b>	Medina	Shirley Mueffelman, 612-624-4754, <a href="mailto:conferences2@cce.umn.edu">conferences2@cce.umn.edu</a>
<b>LTAP</b> May 3	Culvert Installation and Maintenance (1.0 cr)	Brainerd	Shirley Mueffelman, 612-624-4754, <a href="mailto:conferences2@cce.umn.edu">conferences2@cce.umn.edu</a>
May 9–11	Minnesota Public Works Association Spring Conference	Nisswa	Oona Besse, 612-624-3492, <a href="mailto:conferences3@cce.umn.edu">conferences3@cce.umn.edu</a>
<b>LTAP</b> June 19–20	Mechanic Training (2.0 cr)	Minneapolis	Mindy Carlson, 612-625-1813, <a href="mailto:carlson@cts.umn.edu">carlson@cts.umn.edu</a>
<b>September</b>			
Sept. 12–14	Minnesota Surveyors and Engineers Society 85th Fall Outing	Madden's Resort, Brainerd	Ann Manthey, 651-457-2347, <a href="mailto:ann@mases.org">ann@mases.org</a>
Sept. 17–18	Toward Zero Deaths Conference	Duluth	Shirley Mueffelman, 612-624-4754, <a href="mailto:conferences2@cce.umn.edu">conferences2@cce.umn.edu</a>
<b>October</b>			
Oct. 3–4	Minnesota Fall Maintenance Expo (0.5 cr/day)	St. Cloud	Kathy Warren, 651-351-7432, <a href="mailto:kwarren@usinternet.com">kwarren@usinternet.com</a>
Oct. 16–17	AirTAP Fall Forum	Breezy Point	Mindy Carlson, 612-625-1813, <a href="mailto:carlson@cts.umn.edu">carlson@cts.umn.edu</a>
<b>LTAP</b> Oct. 17	Application and Inspection of Geosynthetics (1.0 cr)	Brainerd	Shirley Mueffelman, 612-624-4754, <a href="mailto:conferences2@cce.umn.edu">conferences2@cce.umn.edu</a>
<b>LTAP</b> Oct. 24	Application and Inspection of Geosynthetics (1.0 cr)	Shoreview	Shirley Mueffelman, 612-624-4754, <a href="mailto:conferences2@cce.umn.edu">conferences2@cce.umn.edu</a>
<b>LTAP</b> Oct. 30	Application and Inspection of Geosynthetics (1.0 cr)	Rochester	Shirley Mueffelman, 612-624-4754, <a href="mailto:conferences2@cce.umn.edu">conferences2@cce.umn.edu</a>

**LTAP workshops**  
LTAP workshops, along with events cosponsored by Minnesota LTAP, are marked with an **LTAP** above. Check the Web for details: [www.mnltp.umn.edu/workshops](http://www.mnltp.umn.edu/workshops). You may also register online. Brochures advertising upcoming LTAP workshops are mailed six weeks prior to the first scheduled workshop. Electronic notices are sent as a reminder approximately three weeks later. To be included on our electronic mailing list, please contact Minnesota LTAP at [mnltp@umn.edu](mailto:mnltp@umn.edu) or call 612-625-1813. Disability accommodations are provided upon request.

**CTAP workshops**  
If the events above aren't convenient for you, consider scheduling a Circuit Training and Assistance Program (CTAP) workshop in your neck of the woods. CTAP uses a fully equipped van to provide on-site technical assistance and training. Current CTAP training courses and special presentations are:

- Asphalt Pavement Maintenance and Preservation (0.5 cr)
- Culvert Installation and Maintenance (0.5 cr)
- Dust Control on Unpaved Roads (0.5 cr)
- Gravel Road Maintenance / Dust Control (0.5 cr)
- Roadside Vegetation Management and Erosion Control (0.5 cr)
- Snow and Ice Control Material Application (0.5 cr)
- Truck and Equipment Washing Best Practices (0.5 cr)
- Work-Zone Traffic Control and Flagger Training (0.5 cr)

CTAP workshops are informal and usually hands-on—in fact, many are held in or adjacent to maintenance facilities. Sites with easy access for the van are preferred. CTAP fees are \$250.00 for 8 to 10 participants and \$350.00 for 11 to 40 participants. The fees are for a two- to four-hour CTAP workshop. To schedule classes, call the CTAP instructor, Kathy Schaefer, at 651-366-3575, or e-mail [Kathleen.Schaefer@dot.state.mn.us](mailto:Kathleen.Schaefer@dot.state.mn.us).

**Roads Scholar credit**  
You can earn credits in Minnesota LTAP's Roads Scholar program by attending LTAP and CTAP workshops and other cosponsored events. (Credits are indicated above.) Required workshops and electives are subject to change. To learn more or enroll in the program, visit [www.mnltp.umn.edu/roadsscholar](http://www.mnltp.umn.edu/roadsscholar). **LTAP**

## Compost products control stormwater runoff on roadways

The next time someone tells you to “put a sock in it,” there might be a good reason—if the request is for a compost filter sock. A compost sock is a type of contained compost filter berm that can be used in place of a traditional sediment and erosion control tool such as a silt fence or straw bale barrier.

Last December, Hennepin County offered a training seminar on the use of compost to reduce stormwater runoff and improve water quality. The presenters were Dwayne Stenlund, Mn/DOT ecologist, Office of Environmental Services; Ginny Black, organics recycling coordinator, Minnesota Pollution Control Agency; Chuck Joswiak, certified compost installer, Windscapes Inc.; and Bruce Spanier, principal engineering technician with Hennepin County's Transportation Design Division.

Spanier described how Hennepin County is using compost for its roadway project on CSAH 1 in Eden Prairie. To learn more about the project, visit [www.co.hennepin.mn.us](http://www.co.hennepin.mn.us), then click on Environment, Property, & Transportation, then on Transportation, and then on Roads & Bridges.

Stormwater control is a growing priority for local government. The National Pollutant Discharge Elimination System (NPDES) per-

mit program, authorized by the Clean Water Act, requires local agencies to control stormwater velocity. Coming in 2008, the program will also require them to control the volume of stormwater discharged.

Following are some highlights from the seminar:

Compost blown into mesh filter socks can be placed along a slope or in a ditch line, perpendicular to water flow, to slow the velocity of water, similar to silt fence or rock checks. Compost socks retain large volumes of water and stay in place under heavy flows with minimal staking. They do not need to be cut into the soil (as silt fence does), nor do they pose a hazard to vehicles that leave the roadway (as rock checks do). Compost socks also have the ability to filter pollutants from the water, including suspended solids, oils, nutrients, and heavy metals, and can ameliorate the effects of sodium.

A two-inch compost blanket can also be blown over the surface of disturbed roadside soils. The compost blanket can help dissipate energy and add valuable nutrients to what is often a very nutrient-depleted zone. The added nutrients aid in the establishment of vegetation and help to prevent aggressive, invasive species from taking hold. The compost blan-



A compost sock

ket also extends the growing season about three weeks later in the fall due to the dark color holding in heat.

“Fully cooked” compost is necessary to prevent killing seeds and seedlings. All compost should be certified under the Seal of Testing Assurance (STA) program. Under Mn/DOT Spec #3890, there are three grades of compost:

1. Grade 1 is from animal feedstock.
2. Grade 2 is from leaf and grass clippings.
3. Grade 3 is 10% Grade 1 and 90% Grade 2.

More information on compost is available at [www.compostingcouncil.org](http://www.compostingcouncil.org). NPDES information, including a menu of best management practices, is on the U.S. Environmental Protection Agency site: [cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm](http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm). **LTAP**

—Kathy Schaefer, CTAP instructor

## Scholarships

### Minnesota County Engineers Association

Civil engineering students may apply for one of seven \$1,000 scholarships offered by the Minnesota County Engineers Association. For more information visit [www.mncountyengineers.org](http://www.mncountyengineers.org). Submissions are due July 1. For more information, contact Roger Gustafson, MCEA Scholarship Committee chair, [rgustafs@co.carver.mn.us](mailto:rgustafs@co.carver.mn.us).

### American Society of Civil Engineers

Any full-time student who is enrolled in or admitted to a transportation/traffic engineering degree program (master's or doctoral) in civil engineering at a qualified university is encouraged to apply for the 2007 Jack E. Leisch Scholarship, made available by the American Society of Civil Engineers.

The amount of the award is expected to be up to \$3,500 depending on funds available from the endowment. Applications are due before May 12.

Visit ASCE's Web site at [www.asce.org/inside/stud\\_leisch.cfm](http://www.asce.org/inside/stud_leisch.cfm) for more information. **LTAP**

