Technology Exchange gets a spring makeover

Spring is a time for fresh starts—which in our case, means a new look for the Technology Exchange. In this issue we swap out the old look in place since 2003 with a maroon-and-gold color palette, color photos, and a new typeface. The new look is already on our website, and we’ll phase it in to other materials over coming months.

We chose the new palette in part to better reflect our connection to the University of Minnesota. Like the U, Minnesota LTAP provides opportunities across the state for continuing education and lifelong learning—creating the skilled workforce needed today and tomorrow.

The new look is also intended to make the Exchange easier to read and more visually interesting.

We hope you like it!

Achieving long-life asphalt pavements

“A large percentage of our asphalt pavements today are overlays,” said Jon Epps, associate director of the Texas A&M Transportation Institute, at this year’s TERRA Pavement Conference. “Some public and private pavement owners would be happy if the performance life of their overlayed pavements was 5 years. New long-life pavements should be expected to last 40 or 50 years,” he declared.

In a presentation on how to achieve long-life asphalt pavements, Epps divided his comments into these categories: design, construction, rehabilitation and maintenance, and other issues.

Design

Epps limited his comments on design to issues related to the asphalt layer itself, and assumed a good subgrade and base. “We can design pavements to last 40 years from a thickness standpoint, but we’ll need to mill and fill two or three times during that period,” he said. “We want to minimize premature pavement distress, and we want to minimize rehabilitation and maintenance. That’s going to require the latest in materials, technology, and contractor know-how.”

Work-zone safety online tutorial open for business!

Getting ready for the road construction season means more than dusting off the orange cones and barrels—it’s also a good time for workers to brush up their skills and knowledge about work-zone safety.

A free online tool is now available from Minnesota LTAP to provide this important training. The Work-Zone Safety Tutorial is designed for all sorts of workers: full-time or seasonal staff, contractors, utility or cable crews, and so on.

“Spring is a very intense season for road repairs and road work, and it’s good to get geared up now,” says Monica Beeman, traffic engineer for the City of St. Paul and a member of the advisory panel that guided the tutorial’s creation. “The online tutorial is a good starter

Tutorial continued on page 8

Photos courtesy Jon Epps, Texas A&M Transportation Institute.
Assessments announce annual awards

Each year the City Engineers Association of Minnesota (CEAM) and the Minnesota County Engineers Association (MCEA) honor outstanding people and projects. The awards are presented at their annual conferences in January. Highlights are below; details are on the association websites.

City Engineers Association of Minnesota
2012 Engineer of the Year: Tom Mathisen, Crystal City Engineer and Director of Public Works

2012 Project of the Year: City of Maple Grove’s 2012 Bass Lake Road Reconstruction Project from CSAN 181 to Vinken Road. Maple Grove was the lead agency and contracting authority throughout the project, while Hennepin County partnered in funding the project. In addition, SRP Consulting Group, Inc. (SRP) prepared preliminary and final design plans and construction administration services.

The project upgraded Bass Lake Road from a two-lane rural roadway to a four-lane divided urban corridor to support rapid growing traffic volumes on the roadway system including:

- Rural street lights (six intersections)
- Stop Signs: Why Do We Have Them On the Way to Safer Travel
- The Cushion-Release Push Frame helps take the jolt out of winter maintenance

Mathisen, Tom

City of Maple Grove

2012 2012 Safety Award: Olmsted County

2012 Engineer of the Year: Al Forbing, Blue Earth County Engineer

2012 Project of the Year: Anoka County’s design/ build construction of County State Aid Highway 164, Knochneffing received a Special Project of the Year award for the County State Aid Highway 155 construction in International Falls.

2012 Safety Award: Olmsted County

Olmsted County was concerned about the number of crashes occurring on its roadways, specifically fatal and life-changing injury crashes. In the five-year period from 2003 to 2007, Olmsted County averaged 2,230 crashes per year on all roads. However, the local system (county, municipal, and township roadways) accounted for 59% of all crashes, more than 52% of fatal crashes, and 70% of severe injury crashes—indicating a need for safety mitigations on local roads. As a result, the county sought a systematic approach to address safety concerns and prioritize safety projects.

Beginning in 2008, Olmsted County applied for, awarded federal funds through MnDOT to develop the first County Road Safety Plan (CRSP) in the state. The primary objective of this plan is to identify a specific set of safety-oriented projects at specific locations to address the most severe crashes on the county’s system of highways.

As part of the CRSP development, the county hosted workshops and discussed strategies with 4 partners. The efforts resulted in the development of a plan and initiation of safety projects on the county road system including:

- Edge-line rumble
- Enhanced edge lines (wider pavement markings and edge line rumble)
- Curbed delineation
- Rural street lights (six intersections)
- Fieldlight enforcement lights (main signal corridor)

From 2003 to 2007, Olmsted County’s local road system accounted for:

- 59% of all its crashes, from more than
- 52% of fatal crashes, from more than
- 70% of severe-injury crashes, from more than

The Cushion-Release Push Frame helps take the jolt out of winter maintenance.

As a public works department, we believe it is our mission to save lives on our transportation infrastructure system in Olmsted County.”

— Olmsted County Engineer Mike Sheehan

New YouTube videos to increase driver safety

In an effort to increase roadway safety, the LRRB has produced three YouTube videos to educate the public:

- Speed Limits: Why Do We Have Them
- Why Do We Have Them On Residential Roads
- Minnesota Pothole Professionals: Smoothing the Way to Safer Travel

The first two videos help drivers understand the correct purpose and function of speed limits and stop signs—thus minimizing the number of requests for lower speed limits and new stop signs throughout the state.

Each three-minute video features interviews, animations, and on-location footage. The videos are available at youtube.com/user/MnDOTResearch.

LRRB FY14 research projects

The LRRB approved the following research projects in December:

- Next Generation Bridge Management Tools and Inspection
- Tack Coat Testing—Measuring Field Bond Strength
- Development of a Digital Highway Framework to Facilitate Crash Avoidance: Serving County Roads
- Major Equipment Life Cycle Cost Analysis
- Guidelines for Permeable Pavement Systems
- Planning for the Use of New Materials: Investigating Their Effectiveness in Capturing Driver Attention
- Investigation of Optimal Mix Design of Full-Depth Reclamation Stabilization with Cement and Emulsion
- Minnesota Steel Pipe Service Life Map
- Best Management Practices for Establishment of Salt-Tolerant Grasses on Roadside
- Transportation Investment and Economic Development in Rural Minnesota

If you would like to take part in shaping any of these projects, please contact Sandy McCully—MnDOT at 651-366-3766, Sandra.McCully@state.mn.us.

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“In terms of thickness design,” Epps continued, “we will need to look at thickness in the pavement surface to optimize certain properties. Mix design is always a compromise among a number of factors: bond, cold and rutting resistance.” He showed a simplified pavement cross-section.

In designing the top layer of a pavement, design- ers should focus on safety, Epps said. “To do that, we need to solve the friction, splash/spray, and noise problems.” The top layer also has to resist permanent deformation, thermal cracking, and rutting.

“The middle of the pavement is where you can use RAP and RAS to increase the number of repetitions without damage,” Epps said. “Today, I think most asphalt plants have two or three, so you can make more than one run a day. You can take-make asphalt for different applications.

“In the bottom layer, fatigue resistance is important. To achieve that, we need greater asphalt con- tent and smaller nominal aggregate size. These are not new concepts,” he said.

In designing a pavement to resist fatigue, it’s important to realize that if you’re below some level of strain on the pavement, you can have a nearly unlimited number of loading repetitions without damage,” Epps said. “That idea has been reflected in concrete pavement design guides since the 1950s. But to my knowledge, it’s not in the AASHTO guide,” he said.

“You would need to cover up this number of square yards and we’ve got this much money to do it! We need to refine our method of understanding the remaining life of the pavement—and therefore how thick a layer we should put on—and how long that should last. It’s a real challenge today that involves mix design and thickness design. Do we want to do? Is it overall best thing? Should we use a seal under an overlay? The state of Texas puts a chip seal over the overlay—without compaction. They think that it gets them a lot of value, though I’m not sure. Texas has very poor-quality base courses, so if they don’t keep their pave- ments sealed, they are going to have a lot of prob- lems with that.”

Rohrbach Award recipient Rick Kjonaas: Building 10-ton roads and relationships with truckers

When Rick Kjonaas was a county engineer in Minnesota and North Dakota, he replaced many bridges and rebuilt many highways. “In so doing, I began to think about local climate change, regulatory issues,” he said. “When you’re in that position, it’s easy to look at some of the systems and think, ‘They’re damaging my roads!’ It was only later that I realized the roads for those trucks were for those trucks,” he said.

Kjonaas says he began to focus on that larger picture when he took the job as director of MnDOT’s State Aid Office in 2001. “I began to pull together conferences,” he said. “I began to think about the adversarial relationship that existed between the road building community and the road building community. I came to the conclusion that the road builders and the road users—the truckers—should be the greatest of allies. And the truckers should realize that, if the roads don’t last, it’s going to affect their business. Armed with that philosophy, I began an outreach to the trucking community and to the county and city engineers about better ways to design their roads and manage their systems.”

Construction—it’s all about quality

Epps emphasized that achieving a smooth construction and discussed several strategies for achieving quality. For example, he listed the major mechanical components of a pavement construction project—the plant, lay-down machine, trucks, and compactors—and said it’s essential to coordinate their work. “If you don’t mix asphalt and compact it under good conditions, there may be problems with segregation. But there’s also a need to get the asphalt right, and then compact it right.”

“New long-life pavements should be expected to last 40 or 50 years.”

Reference...
A new trail should typically have a 6- to 8-inch base, topped by a 3-inch-thick asphalt surface—even thicker if utilities use the trail to access power poles or other equipment.

—Stewart Crosby

Minnesota's nationally recognized regional park

25,000 MILES

of city, county, and state-owned recreational trails.

Truckers from page 1

industry ing I think the local engineers have done a wonderful job of building momentum behind that. 10 years on road system and convening local decision makers to work through the issues. We need to make sure that the engineers are the ones who are driving the projects.

Kjonaas also has invited bridge designers to some of the classes so the designers can better understand the different needs of the various types of trails. They can then design the bridges to be more accommodating to the needs of the trail community.

Kjonaas says experience has taught him that no road authority—state, city, county, or private—can take on the whole trail system on its own. Instead, he says, the trail community needs to concentrate their dollars on that system. At the same time, we've shown that the whole network is more than the sum of its parts. We need a 10-ton system:

Truckers

The Shelves

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

Best Practices: Culvert Replacement

This DFO focuses on best practices for replacing culverts.

Evaluation of the Safety Edge in Iowa: Phase II (Iowa DOT, FHWA)

This report documents the evaluation of a project that assessed the effectiveness of implementing Design Guidelines for Selecting a Geometric Design, Traffic Control Devices, Passenger Vehicles, and Motorcycles in relation to transit services.

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Local concrete flatwork specifications and webinar online

An April 16 webinar shared highlights from the Minnesota Concrete Flatwork Specifications guide developed by the Minnesota LRRB and Minnesota LTAP.

The guide provides specs for local agencies and the concrete industry to follow as they move through the life of a local concrete project. It is intended to be used separately from the MnDOT specifications, except for the use of the existing approval process developed and maintained at MnDOT for any products and certifications.

The document allows contractors more control over mix design and construction inspection quality control; items such as joint layout will become the responsibility of the contractor. Acceptance of the concrete will be based on concrete strength from concrete cylinders built on the job site. This specification will allow, at the engineer’s choice, the option to use bridge-quality aggregates, concrete smoothness, and maturity testing for concrete strength.

Watching the webinar is worth 0.25 Roads Scholar elective credit. The webinar and the specs are both on our website. LTAP

Gravel road webinar, online training

Minnesota LTAP is offering a webinar on May 29 from 1:00 to 2:00 p.m. about gravel road drainage, maintenance, and design. In the webinar, three gravel road experts will share their knowledge of and experience with the importance of properly designing and maintaining a gravel road for effective drainage. The webinar will be archived for later viewing.

In addition, Minnesota LTAP continues to offer an online course—Gravel Road Maintenance and Design. It provides a high-quality training option at a low cost, and it counts as one required credit in the Roads Scholar Program. The course was developed by Minnesota LTAP in partnership with the LRRB. LTAP

ONLINE TRAINING

Gravel Road Maintenance and Design—Online (1 cr) LTAP

Anytime, anywhere!

Work-Zone Safety Tutorial—Online LTAP

Anytime, anywhere!

Training and Education Calendar

If your professional organization meets on a regular basis, let us include the information here. Contact us at mnltap@umn.edu. For details and an up-to-date list of events in Minnesota, please see mnltap.umn.edu/training.

CTS Transportation Research Conference
May 22–23, St. Paul

Gravel Road Drainage Webinar (0.25 cr) LTAP
May 29, 1:00 – 2:00 p.m. CST

Motor Grader Operator Training (2 cr) LTAP Various dates and locations around the state Contact Mindy Carlson, 612-625-1813

National Rural ITS Conference
Aug. 25–28, St. Cloud

AirTAP Fall Forum
Sept. 26–27, Minneapolis

Toward Zero Deaths Annual Conference
Nov. 14–15, St. Cloud

APWA-MN Fall Workshop: Winter Maintenance Supervisory Training (1 cr) Nov. 20, Brooklyn Center

From Line to Leadership (Hennepin Technical College)
 TBD

Snowplow Simulator Training (0.5 cr) LTAP Fall TBD

Truck-Weight Compliance Training (1 cr) LTAP Fall 2013 through spring 2014

LTAP Workshops

LTAP workshops, along with events cosponsored by Minnesota LTAP, are marked with an Sw. Check the web for details and to register online: mnltap.umn.edu/training. To be added to our print or electronic mailing lists, contact Minnesota LTAP at mnltap@umn.edu or call 612-625-1813.

CTAP workshops

CTAP workshops bring LTAP services to 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 (0.3 cr)
• Culvert Installation and Maintenance (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)
• Snowplow Controller Hands-on Workshop (0.5 cr)
• Work-Zone Traffic Control and Flagger Training (0.5 cr)

For more information or to schedule classes, call the CTAP instructor, Kathy Schaefer, at 651-366-3575, or e-mail Kathleen.Schaefer@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. To learn more or enroll in the program, visit mnltap.umn.edu/roads-scholar LTAP

Tutorials from page 1 tool for those who are new to working in a work zone, such as summer hires, and for other staff as a reminder of the basic critical actions and awareness they need to work safely,” she says.

The tutorial teaches the basic concepts of the work-zone area and the fundamentals of work-zone safety. It also addresses many of the hazards inherent in road and street work—and how to minimize these dangers to keep motorists, pedestrians, and employees safe.

The training includes a slide presentation, pictures, video, and a question/answer section to check comprehension of the material. It is based on a version developed by the Cornell Local Roads Program and includes new video shot in Minnesota. Try it yourself at mntap.umn.edu.