

LTAP Inside

AWARDS

MCEA, CEAM, NCITE, APWA.....2

LRRB UPDATE

Street sweeping, storm water.....3

Complete streets.....3

Best-value contracting.....3

PAVEMENT CONFERENCE

Statewide transportation plan.....4

Concrete sustainability.....4

Risk analysis.....5

Asphalt in a volatile world.....5

COMMUNICATIONS

Technical writing primer.....6

INFORMATION SERVICES

The Shelf.....7

Search tools.....7

SAFETY

Testing traffic counters.....7

TRAINING AND EDUCATION

Calendar.....8

MAINTENANCE RESEARCH

HID lights, induction heating system, salt skirt.....8

Pavement conference: innovative, intelligent investment

We live in a volatile world. Energy prices, the economy, resource sustainability—they all affect transportation decision making. Amid this uncertainty, the gap between infrastructure needs and available funds keeps growing. One thing is clear: the need for continued innovation.

Speakers at the 13th Annual Minnesota Pavement Conference, held February 12 in St. Paul, shared their innovative ideas to help meet today's transportation challenges. Topics included transportation investment strategies, risk analysis, and trends in the concrete and asphalt industries.

Several of the presentations are described on pages 4 and 5. In addition, a summary document of the conference will be online at www.mnltap.umn.edu. **LTAP**

Total Investments to Meet Performance Targets = \$62 billion

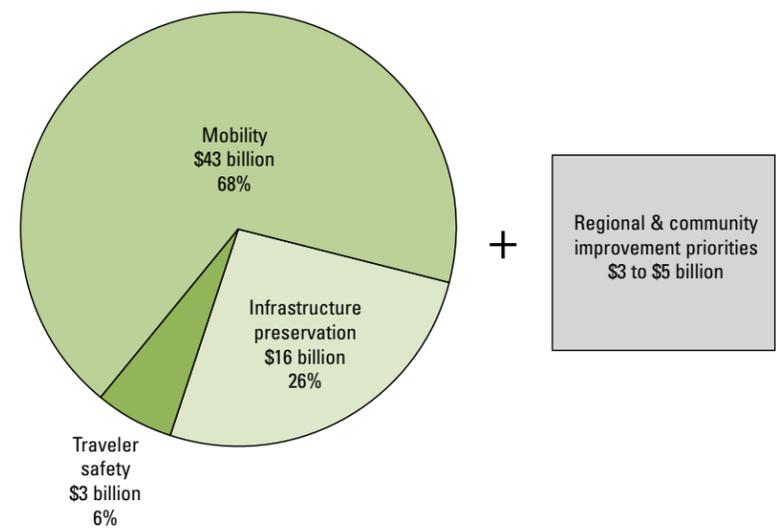


Figure 1: Statewide Highway System Needs, 2009 – 2028 (in billions of \$, calculated for the year of construction)

Getting 'best value' from your contracts

In the not-too-distant past, contracting for public projects meant soliciting three bids, and the lowest bidder got the contract. The idea behind this approach was to discourage favoritism and fraud, and to encourage competition; however, the objective criteria used to determine contract awards often led to protests and project delays. Holly Newman Mackall, of Crouse & Moore PLC, offered an overview of the new statute that now governs the awarding of contracts, referred to as the "best-value method of procurement." The rule allows the use of subjective criteria, which allows flexibility in bid awards.

Newman Mackall made her comments at the City Engineers Association of Minnesota (CEAM) annual conference on January 28, 2009.

The new rule recognizes that quality-based selection for contractors can decrease project costs. "Costs are reduced because the new rule helps to minimize claims, excessive RFPs, and change orders and decreases the odds of getting bids from contractors who are in over their heads," Newman Mackall explained.

The statutory definition of best-value procurement is based on a method that considers both price and performance criteria. This policy is based on nine criteria such as vendor quality, timeliness, customer satisfaction, and performance. The contents of the bid solicitation must list the criteria and indicate how each criterion is weighted, and the bidder interview must be disclosed.

Contract continued on page 3

Roadside vegetation handbook updated

Maintaining roadsides for safety and aesthetics is an important issue for all levels of government throughout Minnesota. In 2000, the Minnesota Local Road Research Board (LRRB) published the *Best Practices Handbook on Roadside Vegetation Management*, which served as a valuable resource for maintenance and engineering staff and was used widely in Minnesota and other states. (Minnesota LTAP assisted with the handbook's production.) The handbook's popularity, as well as the availability of new information from recent research, led the LRRB and Mn/DOT to publish an update of the handbook last year.

The 2008 edition retains all information from the original that is still accurate. It also includes a new chapter—"Managing Roadside Vegetation for Wildlife and Vehicle Safety"—that reflects recent Mn/DOT research about roadside habitats and their effects on driver safety. The new chapter's primary conclusion is that roadside habitats can be managed to balance biological diversity and safety by selectively reducing woody vegetation without entirely removing grass habitats.

The main conclusion from the handbook is that successful roadside vegetation management depends on an integrated approach. This includes a wide variety of best management practices to address the many issues involved.

Kathy Schaefer, the instructor of the Circuit Training and Assistance Program (CTAP), was a member of the technical advisory panel for the handbook update. She is using the handbook in CTAP classes in May. The handbook was also used in a session on integrated roadside vegetation management at the Minnesota Spring Maintenance Training Expo. In addition, Minnesota LTAP is offering a full-day workshop on the topic in spring 2010. The instructor will be Ann Johnson, a co-author of the handbook.

The handbook (2008-20) and a technical summary of the project (2008-20TS) are on the LRRB Web site: www.lrrb.org. **LTAP**



AWARDS

City Engineers Association of Minnesota

The City Engineers Association of Minnesota (CEAM) presented the following awards at its 50th annual conference, held January 28-30, 2009.

2008 Engineer of the Year Award

Ken Ashfeld, Maple Grove city engineer, was selected as the CEAM Engineer of the Year Award winner for 2008. Ashfeld has overseen the Maple Grove Engineering Department since 1988.



Ken Ashfeld

2008 Project of the Year Award

The City of Edina West 70th Street Roundabouts Project was selected as the CEAM Project of the Year Award winner for 2008.

The primary objective of the West 70th Street project, from France Avenue to York Avenue, was to improve safety for vehicles and pedestrians in the corridor while ensuring satisfactory traffic operations now and in the future.

The result was the construction of three single-lane roundabouts along the corridor. The roundabouts give West 70th Street a boulevard feel that results in slower traffic speeds and shorter crossing distances for pedestrians while not degrading the level of service.

Honorable Mention 2008 Project of the Year Awards

Two cities received Honorable



Edina roundabout, before and after



Mention for CEAM's Project of the Year Award.

The first was the City of St. Anthony Village for its water reuse facility. The system collects storm water runoff from Hennepin County Road 136, City Hall, local streets, and backwash water from the city's water treatment plant in a 500,000-gallon underground reservoir. Water stored in the reservoir is recycled to irrigate a 20-acre site.

Due to its innovative nature, the project will serve as a demonstration for future water reuse projects in the region. Nearly a dozen tours of the facility have already been conducted for Watershed, Ramsey County, and Hennepin County staff, elected officials, and managers.

The second project was the Shoreview Owasso Neighborhood Road Reconstruction Project. The new storm water system collects runoff and redirects it to specific locations, eliminating flooding problems and property damage.

Learn more about these projects at CEAM's redesigned Web site: <http://ceam.govoffice.com>.

CEAM president

Shelly Pederson, a member of the

Minnesota LTAP Steering Committee, was elected CEAM president.

Minnesota County Engineers Association

The Minnesota County Engineers Association (MCEA) presented the following awards at its 63rd Annual Conference Awards Banquet, held January 20, 2009.

County Engineer of the Year

Dave Enblom is the 2008 County Engineer of the Year. He has been the county engineer of Cass County since 1997.



Dave Enblom

Maintenance Work Zone Safety Award

The Cook County Highway Department and county engineer Shae Kosmalski were honored with MCEA's Maintenance Work Zone Safety Award. The award recognizes counties that are taking the extra steps to provide safe work zones for workers and the traveling public.

The Cook County Highway Department achieved compliance with

state work-zone traffic control standards and guidelines, developed and implemented an innovative permit and traffic control system for activities using county right-of-way (marathons, sled dog crossings, etc.), and provided local opportunities for education to promote work-zone safety. In addition, the department received a \$15,000 grant from the Roadway Safety Foundation (see below).

North Central Section of the Institute of Transportation Engineers

The 2008 Young Professional of the Year Award was awarded to Marcus Culver, traffic engineer with the City of Maple Grove. The 2008 Past President's Award for Transportation Professional of the Year was awarded to Tom Campbell, retired from Mn/DOT.

Minnesota Chapter of the American Public Works Association

Mike Eastling, director of Public Works for the City of Richfield, received the 2008 Hugo G. Erickson Award for excellence in chapter service. Other personnel awards: Director of the Year—Jon Thiel, City of Brooklyn Park; Superintendent of the Year—Robert Cockriel, City of Bloomington; Supervisor of the Year—Nancy Bailey, City of Eagan; Maintenance Employee of the Year—Gary Dallegger, City of Shoreview. The Sauk Rapids Regional Bridge project was named Honorable Mention Project of the Year. **LTAP**

Cook County receives national honor

The Cook County, Minnesota, Highway Department won \$15,000 under the Roadway Safety Foundation (RSF) *Safer Roads: Building Safety into Your Drive* public information and education campaign.

The department and RSF will undertake a public information and education campaign to raise awareness of the safety benefits and the need for roadway engineering and infrastructure improvements.



Shae Kosmalski

"We're very pleased to have received this assistance from the Roadway Safety Foundation," said Shae Kosmalski, county engineer of the Cook County Highway Department. "Cook County's winding and scenic roads, though an attraction for many tourists, have significant vertical and horizontal variations and speed zone changes—a primary cause for many drivers being caught off guard and left potentially at a major safety risk. A public information and education campaign is imperative to inform unfamiliar and inexperienced drivers about the unique characteristics of our roadways and how

to drive differently to accommodate for them."

Cook County was one of six winning entries. Panel judges included representatives of RSF, the Federal Highway Administration (FHWA), AARP, and AAA.

RSF is a national organization solely dedicated to reducing deaths by improving the physical characteristics of America's roadways. For more information about RSF, visit www.roadwaysafety.org. **LTAP** (From the RSF Web site)

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.

Minnesota LTAP

Center for Transportation Studies
University of Minnesota
200 Transportation and Safety Building
511 Washington Avenue S.E.
Minneapolis, MN 55455
Phone: 612-626-1077
Fax: 612-625-6381
E-mail: mnltp@umn.edu
Web: www.mnltp.umn.edu

© 2009 Minnesota Local Technical Assistance Program (LTAP), University of Minnesota

Minnesota LTAP Resource Staff

Director: Jim Grothaus, 612-625-8373, jgrothaus@umn.edu
Training & Event Coordinator: Mindy Carlson, 612-625-1813, carlson@umn.edu
CTAP Instructor: Kathy Schaefer, 651-366-3575, kathleen.schaefer@dot.state.mn.us
Workshop Registration & Facilitation: Teresa Washington, 612-624-3745, washi002@umn.edu
Librarian: Arlene Mathison, 612-624-3646, amathison@umn.edu
Managing Editor: Pamela Snopl, 612-624-0841, snopl001@umn.edu
Editor: Michael McCarthy, 612-624-3645, mppmccarthy@umn.edu
Design: Cadie Wright Adhikary, 612-624-0546, cwright@umn.edu
Student Support: Rattana Tanutanomras, Karen Melton, Sarah Van Nevel, Holly Miller, 612-626-1077
Freelance writers: Richard Kronick, Jeanne Engelmann

Minnesota LTAP Steering Committee

Chair: Julie Skallman, State Aid for Local Transportation Division, Mn/DOT
Deb Bloom, City of Roseville; Chair, Minnesota LRRB
Phil Forst, Federal Highway Administration
Dave Fricke, Minnesota Association of Townships
Doug Grindall, Koochiching County; Minnesota County Engineers Association
Lee Gustafson, City of Minnetonka; City Engineers Association of Minnesota
Greg Isakson, Goodhue County; Minnesota County Highway Engineers Association
Robert Johns, Center for Transportation Studies
Sue Lodahl, Research Services, Mn/DOT
Shelly Pederson, City of Bloomington; City Engineers Association of Minnesota
Mike Sheehan, Olmsted County; Minnesota LRRB Research Implementation Committee
Tom Struve, City of Eagan; Minnesota Street Superintendents Association
Linda Taylor, Maintenance Office, Mn/DOT

Printed on 50 percent recycled fibers, including minimum 30 percent postconsumer waste.



Clean sweep: street sweeping, storm water BMPs

The Minnesota Local Road Research Board's Research Implementation Committee (LRRB-RIC) recently completed helpful resource guides for two ongoing, real-life needs—street sweeping and storm water best management practices (BMPs), said Mike Marti of SRF Consulting. He made his comments at the City Engineers Association of Minnesota (CEAM) annual conference on January 28, 2009.

The goal of the resource guides is to provide easy access, as well as practical, implementable information, Marti said.

Street sweeping

The street-sweeping project, sponsored by Mn/DOT, synthesized recent research to create four information sheets and a PowerPoint presentation about street sweeping best practices. Street sweeping is vitally important for removing trash, atmospheric and vehicle-related pollution, and debris from lawns, construction sites, and roadway wear and tear.

The four information sheets, intended to be used as a group, cover these topics:

1. overview of street sweeping
2. types of street sweeping equipment and how they operate



3. reasons for street sweeping
4. the differing agency functions (city, county, and state) in appropriate street sweeping

The information sheets help agencies understand the cost-benefit of various equipment as well as functions and limitations of specific equipment. "We had to balance what the industry said the street-sweeping equipment could do versus what we found out it really could do," Marti explained.

The guides also help agencies select sweeping frequencies. Study surveys indicated that the frequency of street sweeping in Minnesota was far lower than nationwide averages. Minnesota sweeps two times annually, in spring and fall, while the average was 10 times each year. "Minnesota does its street sweeping for aesthetic reasons while other states did it for storm water quality issues," Marti said.

The guides also include a decision-making process and policies to help agencies create the most efficient operations for their area. The handy format also makes the information easy to present to city councils with budget justifications. Overall, Marti said, the guides "will help agencies that want to move toward better management practices and newer technologies for green pavement."

Kathy Schaefer, the instructor of the Circuit Training and Assistance Program (CTAP), uses the guides in her training. (CTAP is the mobile arm of Minnesota LTAP.)

To read a technical summary of the project,

Complete streets

"When we talk about complete streets, we mean accommodating multiple modes of transport," said John Powell of the City of Savage and the co-chair of the Complete Streets study mandated by the 2008 session of the state legislature. As Powell explained at the CEAM conference, complete streets are designed and operated to enable safe access for all users, and that includes pedestrians, bicyclists, transit users, and commercial and emergency vehicles, in addition to personal vehicles.

The study is under way, and a report is due back to the legislature by December 2009. The goal of the study, according to study manager Merry Daher, isn't to devise a policy. Instead, she said, "We're going to look at feasibility, cost, and benefits of adopting a complete street policy and give that to

the state legislature." The study will focus on issues such as safe access for all users, the feasibility of creating paved shoulders on rural roads, and maintenance costs.

The study advisory committee includes representatives from cities and counties. In addition, a technical advisory committee includes specialists from a variety of backgrounds, organizations, and locations in Minnesota.

The process will include public meetings, Powell said, and many sectors will be informed of progress and ideas along the way. To submit your ideas and suggestions or to receive e-mail updates, go to the study Web site (www.dot.state.mn.us/planning/completestreets). **LTAP**

— Jeanne Engelmann, LTAP
freelancer

please see www.lrrb.org/detail.aspx?productid=2254. To download the guidelines (report 2008RIC06), see www.lrrb.org/detail.aspx?productid=2159.

Storm water quality

Also at the CEAM conference, Mark Maloney of the City of Shoreview provided an overview of storm water quality BMPs—the topic of the second new LRRB guide. The guide, due out later this year (www.lrrb.org), defines and describes BMPs and provides inspection forms that users can modify to meet the needs and special purposes for storm water management techniques in local areas. The guide covers BMPs for storm water ponds, bio-retention areas, underground treatment devices, underground retention, infiltration, and

newer storm water quality techniques that are just being introduced.

A major benefit of the information is help in determining benefits and limitations of each method, "aimed at helping the end user who needs to budget and schedule inspection and maintenance," Maloney said. Maintenance forms are included to help assess if each storm water management technique is functioning properly, and the point at which it needs cleaning or replacement.

The purpose of the guide is not to promote one BMP over another. "We hope the guide will influence design decisions once people start using the checklists and doing proper evaluations of their BMP performance," Maloney concluded. **LTAP**

— Jeanne Engelmann, LTAP
freelancer

Contract from page 1

According to Newman Mackall, the new procurement method will be phased in. "The first two years, 2008 and 2009, states, counties, cities, and the top 25 percent of school districts will be required to follow the statute; in 2009, the top 50 percent of school districts will be included, and by 2010, the rule will apply to townships and the remaining school districts."

During the first three years of this process, one project annually or 20 percent of projects, whichever is greater, will be subject to the best-value method. Training is required for those who prepare or bid solicitation documents. (Thus far, however, there are no funds allocated via the statute to set up a training source.)

John Gorder from the City of Eagan described the city's experience with a best-value contracting project. "The traditional low bid process

meant sending the bid out there, and we'd expect the worst but hope for the best," he said. In 2004, the city established its own set of bidder qualifications and used a point system to evaluate bids. Gorder said the process has yielded success in that the city has had no rejections to date and has experienced better project supervision.

Gorder outlined some lessons learned from Eagan's experience with best-value contracting: check references before awarding the contract; train those involved with the bidding process; involve public works and finance staff; and hold a pre-bid meeting for contractors to explain the project as well as the criteria that will be used. Gorder said Eagan will continue using the best-value contracting process this year on other projects. **LTAP**

— Jeanne Engelmann, LTAP
freelancer

Contracting resources on LRRB site

The LRRB Web site—www.lrrb.org—has several helpful resources about innovative contracting methods.

Best-Value Based on Performance (2008-40) is a report of research sponsored by Mn/DOT and conducted by researchers at North Dakota State University. It is intended to help users move from contractor selection solely based on minimum qualifications and low bids to a new system of best-value based on performance. The new system rewards contractors for the quality of their work; public safety; compliance with contract requirements, business and employment requirements, and environmental requirements; and for coordination with other elements of the construction process. The report includes a manual and installation instructions for software (named MnCAST) that was developed as part of this project to ease real-life implementation.

A project sponsored by the LRRB's Research Implementation Committee (RIC) is analyzing which innovative contracting methods work best for local agencies. Although some state DOTs have already implemented innovative methods, there is some question about how they apply to smaller projects at the local level. Previous reports—*Performance Effectiveness of Design-Build, Lane Rental, and A + B Contracting Techniques* (2006-09) and *Best Practices for Project Construction Streamlining* (2005-34)—provide information about several of these methods and their performance. In the new RIC project, a group of stakeholders is reviewing these methods to select those suitable for use on local projects in Minnesota. A final report will summarize the findings and recommend next steps. For more information, contact Tom Behm, District 8 State Aid Engineer, 507-537-2044.

LTAP

PAVEMENT CONFERENCE

New this year, the pavement conference was sponsored by the Transportation Engineering and Road Research Alliance (TERRA). Cosponsors were the Minnesota Department of Transportation, Minnesota LTAP, the Department of Civil Engineering at the University of Minnesota, Minnesota City Engineers Association, Minnesota County Engineers Association, Minnesota Street Superintendents Association, Minnesota Chapter of the American Public Works Association, State Aid for Local Transportation at Mn/DOT, Minnesota Local Road Research Board, and the Pavement Research Institute at the U of M. It was hosted by the Center for Transportation Studies (which houses Minnesota LTAP) at the U of M.

Minnesota Statewide Transportation Plan: Looking 20 years into the future

Tim Henkel, director of Mn/DOT's Planning, Modal & Data Management Division, summarized the "Minnesota Statewide Transportation Plan: 2009-2028" at the Minnesota Pavement Conference. The plan, which is required by state and federal law, has been in the works since 2007 and will be published this year. The purpose of the plan, said Henkel, is to "establish a transportation vision—not just for Mn/DOT but for the entire state."

Although the plan addresses all transportation needs, Henkel focused his presentation on highway construction and maintenance needs. As shown in Figure 1 (on page 1), the plan projects that Minnesota will require \$65 billion over the next 20 years to achieve the highway system performance targets defined in the plan.

What's more, the gap between those targets and available funds is growing. Henkel reminded his audience that the last version of the plan (in 2003) stated the gap as \$1 billion per year. The 2009 plan "gives us a new figure: \$2.5 billion per year for the next 20 years," he said. (Costs are calculated for the year of construction to reflect cost increases over the next 20 years;

the previous plan estimated costs and revenues in constant 2004 dollars.) He also predicted that during the 20-year timeframe of the plan there will be a tripling of "troubled roadways"—from 600 miles to 1,800 miles.

Henkel said this new funding gap figure is based on modest revenue growth in keeping with historical levels. However, the projection does take into account new revenue that will flow from the Chapter 152 legislation passed in 2008 (see Table 1). He also warned that this projection is "our best guess at this point in time"—it gives a long-term, overall outlook—and, inevitably, it will evolve as conditions change.

Given the predicted revenue shortfall, Henkel said Mn/DOT is making a "significant change" in its overall highway infrastructure investment strategy. Instead of placing emphasis on preserving existing structures as has been done in the past, the new plan takes a "balanced approach" that will allow districts more flexibility in deciding which projects to authorize. This shift was necessitated by "the fiscal climate we're in, the differences that exist in different areas of the state, and the varying needs of our

constituents," he said.

At the same time, the plan contains alternative strategies that can be implemented when additional funds, such as the federal stimulus package, become available (see article below). Specifically, Henkel said, the plan lists a set of priorities for the top 5% of projects that are left out of the most conservative scenario. This 5% amounts to about \$2.5 billion in additional projects.

Henkel also summarized the distribution of funds from Chapter 152 to highway infrastructure projects. "The department received trunk highway bonding authority; in addition, there was a change in the gas tax rate and a few other areas that provide additional revenue—overall about \$1.8 billion." Table 1 shows how that money is to be allocated.

Mn/DOT conducted open houses around the state to explain the draft plan and solicit public comment. The department also encouraged comments by phone, fax, and Web. To learn more about the plan or submit your comments, go to www.dot.state.mn.us/planning/stateplan/index.html.

— Richard Kronick, LTAP freelancer

Table 1: \$1.8 billion in trunk highway bonds authorized in Chapter 152

- Buildings, Great River Road, etc.: - \$130M
- Bridge Program (Tier 1 and Tier 2) - \$1.2B in bonds (on \$2.5B of projects) to repair or replace Tier 1 and Tier 2 bridges by 2018. - 161 Tier 1 bridges identified, 120 will be replaced - Cost estimating and design in progress
- Pavement - \$275M for accelerated pavement/safety projects (FY 2009–2010)
- Interchange Program - \$40M (50% metro, 50% Greater Minnesota) - Devil's Triangle (\$10M, FY09) - Solicit for remaining \$30M by June (FY 2010–2012)
- Transit Advantages (under development) - \$50M (FY 2012–2018)
- TH 60 Legislative Direction - \$100M (FY 2011–2012)

Minnesota's allocation of stimulus funds

On February 17, President Obama signed into law the American Recovery and Reinvestment Act of 2009—also known as the "stimulus package." On March 3, Mn/DOT received authorization from the Federal Highway Administration (FHWA) to spend \$502 million (M) of stimulus funds on Minnesota highway projects. These funds are federally classified as Surface Transportation Funds (STP). Mn/DOT spokespeople have stated that they will be guided by the historical division of 70% on trunk highways and 30% on local roads.

Within the \$502M total, \$150.7M is designated for urban areas and further broken down according to population: \$73.2M is for urban areas larger than 200,000 people (which means it will be used in the Twin Cities metro area). In addition, \$61.8M is designated for urban areas with populations of 5,000 to 200,000, and will be used in areas such as Rochester, Duluth, and St. Cloud; \$15.7M is designated for urban areas with populations of less than 5,000. Because of the flexibility allowed within the STP program, Mn/DOT has discretion

as to whether this \$150.7M can be spent on local or trunk highways. All of this \$150.7M must be allocated to projects by Mn/DOT and approved by FHWA by March 3, 2010.

Mn/DOT has generally broader discretion in allocating the remaining \$351.6M in stimulus funds. Within that amount, \$15.1M is designated as "Enhancement" funds, meaning they can be used for purposes such as landscaping and bike/pedestrian accommodations. Mn/DOT has full discretion in allocating the remaining \$336.5M to highway projects.

Rules established in the stimulus package state that 50% of the \$351.6M (i.e., \$175.8M) must be allocated to projects and approved by FHWA within 120 days of March 3—i.e., by July 1. The remaining 50% must be allocated to projects and approved by FHWA by March 3, 2010. In all cases, advertising and awarding of projects will begin after the projects are allocated by Mn/DOT and approved by FHWA. **LTAP**

— Richard Kronick, LTAP freelancer

Cement industry can reach sustainability

Going green and achieving sustainability seem to be terms thrown around in many industries today, but according to Jean-Claude Roumain, the cement industry can achieve the goal of sustainability—through people, process, and product innovation.

Roumain, corporate product manager for Holcim (U.S.) Inc., a cement company, gave his argument for how the cement industry can reach sustainability in his presentation at the 2009 Minnesota Pavement Conference.

Concrete is the most widely used man-made product in the world and is second only to water as the world's most utilized substance, Roumain said, which is why it's crucial to make sure it is environmentally friendly. More than a ton of concrete is produced each year for every human being.

The reason for concrete's high usage, he said, is its universal availability. Concrete is used all over the world in roads, schools, homes, and hospitals, as well as in many other buildings.

The cement industry was one of the first, in 1999, to make a sustainability commitment by pledging to reduce its carbon footprint. But sustainability considers more than just CO₂ issues and climate change. It includes land and water impacts, energy use, depletion of non-renewable materials and resources, and indoor environmental quality, Roumain said.

Concrete has many sustainable attributes: for example, it's locally derived, consumes CO₂ from the atmosphere once in place, is non-toxic, and is resource efficient. On the flip side, Roumain said, the industry faces several challenges to



Concrete continued on page 8

PAVEMENT CONFERENCE

Improving project predictions by managing risk

When asked for a project cost estimate, we typically provide a single dollar figure—but Khalid Bekka labeled that a mistake. In his presentation at the 2009 Minnesota Pavement Research Conference on February 12, Dr. Bekka, an economist with HDR, Inc., said, “If we do it that way, it means there’s a 50% likelihood the eventual cost will be above that number and also a 50% likelihood the cost will be below that number. How many of us would bet our mortgage on a 50-50 chance? We wouldn’t! So why are we willing to do that with an infrastructure project?”

Furthermore, Bekka predicted that, with the funds on the way from the American Recovery and Reinvestment Act of 2009 (the “stimulus package”), we can expect our “due diligence” processes to be carefully scrutinized. “We will be judged on the types of processes we use, the transparency of those processes, and what kinds of risk we assume.” (*Ed. note: This prediction became reality a few days later*

when President Obama appointed a former Secret Service agent with experience in rooting out corruption as chairman of the Recovery Act Transparency and Accountability Board.)

In response to these issues, Bekka explained a process that he has used to manage risk in more than 100 infrastructure projects. The first step, he said, is to state each key variable as a range rather than a single number: “I like what Warren Buffett said: ‘I would rather be approximately right than precisely wrong.’”

Bekka emphasized that this should be done for the broadest possible range of factors that might affect a project. As an example, he discussed a 2003 project at Ground Zero in Lower Manhattan. “The MTA showed us their time estimate for digging a tunnel. But we concluded that they should move the completion date out at least two years. One risk that led us to that conclusion was the possibility of archaeological findings. It turned out that, on average,

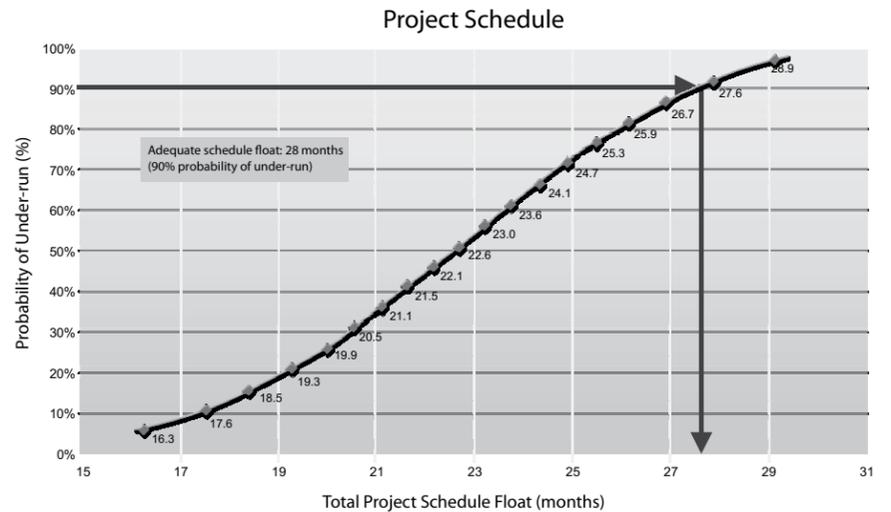


Figure 2: Probability of under-run plotted against schedule impact

archaeological findings had delayed them an additional year in previous projects.” Figure 2 shows how Bekka and his associates plotted this variable: To achieve a 90% probability of completing the project by its estimated completion date, the MTA needed to push its prediction out 28 months.

To be sure all important factors are being considered, Bekka recommended proactively inviting a broad range of opinions to the table as early as possible in planning each project. “Of course you will bring in experienced engineers,” he said, “but you should also invite academics, planners, and the public—even skeptics—and let them all throw darts at your project.”

Bekka’s next step is to assess the risk attached to each factor involved in a project. Figure 3 is an example of how he compares factors in terms of their probable impact on project cost.

Finally, Bekka explained that, once you see where the uncertainty is in your project, you can

take steps to mitigate those uncertainties. “Do I need more surveying? More public relations? How can I reduce the uncertainty? The more you mitigate, the more you have due diligence, confidence, credibility, and transparency.”

As a final example, Bekka discussed the ROC-52 project, completed in 2006, in which U.S. Highway 52 in Rochester, Minnesota, was widened. “The major issue was whether to do it in the design-build mode or the traditional way,” Bekka said. “We heard from lots of people that their businesses would be disrupted during the project. Initially, construction plans were projected for 11, 7, or 3 years. With input from local citizens, Mn/DOT, and some university professors who we hoped would not be tied to a political viewpoint, we did a side-by-side assessment of design-build and design-bid-build. What emerged is that, by doing the project with design-build in three years, there would be a cost increase. But there would also be a tremendous amount of public benefit in terms of reducing the impacts on business, property values, and

Project prediction continued on page 7

Correlation with Total Project Cost

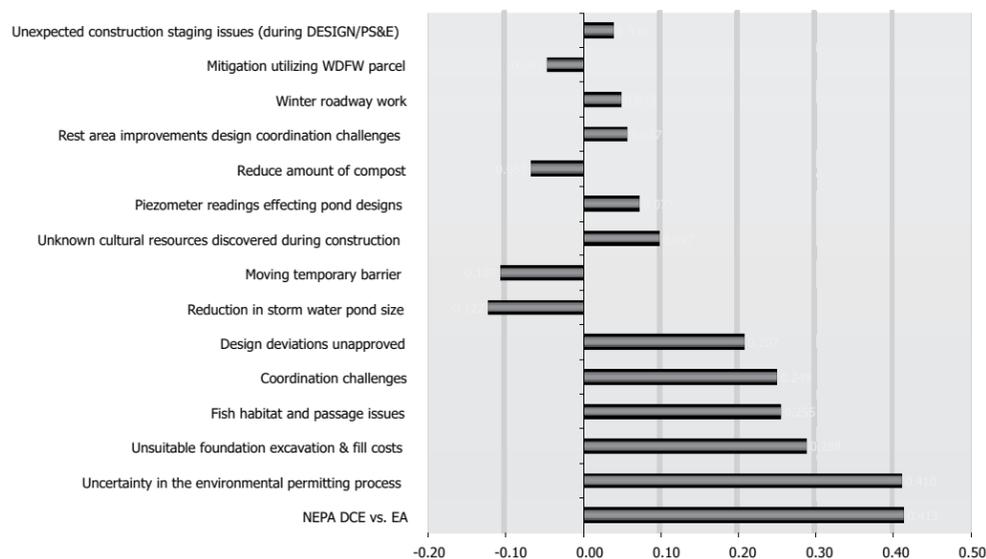


Figure 3: Comparing risks in terms of how they impact cost

Asphalt supply in a volatile world

With many transportation and road projects likely to receive funding from the recently passed stimulus package, many members of the industry are wondering, “What does the supply situation for asphalt binder look like for this year?”

“Good,” said Clint Rybak, of ConocoPhillips, as a part of his session at the 2009 Minnesota Pavement



The 2009 recipient of the Gerald Rohrbach Minnesota Pavement Conference Award is Mark Maloney (right), the public works director/city engineer of Shoreview. Presenting the award is 2008 recipient Doug Schwartz.

Conference. While Rybak said there might be localized shortage issues at times, the asphalt supply looks to be stable in the upcoming year.

Rybak discussed how the last few years have seen dramatic fluctuations in the price and supply of asphalt and additives such as polymers.

Although oil prices have dropped, Rybak said the future of asphalt supply remains uncertain. He discussed the primary drivers of supply and price volatility of asphaltic products.

Asphalt base is derived from crude oil. Although the U.S. demand for oil has seemingly been down, Rybak said, the United States has not been a driver of the oil markets since 2004. “Developing nations are becoming more and more of an influence in global markets,” he explained.

The refining process also affects the supply of asphalt, as the refineries convert crude oil into the asphalt base. This base is one of the several possible products from crude oil, along with jet fuel, gasoline, and diesel fuel. Most often refineries focus on producing either fuels or asphalt, Rybak said.

While the number of refiners is down in the

United States, the production level is up in the refineries that are in operation. Today’s typical refinery is bigger and produces more than in past decades.

Because gasoline margins have held up and pricing has been good, Rybak said the outlook is positive for the asphalt market. The higher asphalt prices are relative to crude, the more asphalt will be produced.

While numbers look different year to year, Rybak said there is “no reason to believe (asphalt supply) will be anything but ... normal” this year.

“As we go forward, the outlook will look different year to year,” he said, “but certainly there are plenty of refiners that have plans to give themselves the option of putting the bottom of the barrel in the highest valued market.” **LTAP**

—Holly Miller, LTAP intern

COMMUNICATIONS

Technical writing for transportation professionals

By Richard Kronick, freelance technical writer and writing trainer

I have been a technical writer specializing in transportation issues for 20 years and a teacher of technical writing for 22 years. So, when asked to write a series of how-to articles on technical writing for transportation professionals, I knew right away that my first topic should be Rule #1 for tech writers:

Rule #1: Get to know your readers and their needs. But then I realized it would be ironic if I didn't practice what I preach. So I asked a couple of experienced civil engineers who are good writers what they see as the biggest writing problems among their colleagues. The one thing both of them mentioned was "not writing for the reader." That settled it!

The School Writing Trap

The problem of not writing for the reader sneaks up on you during your school years. For each high school and college assignment, it was obvious that your audience was one person—your teacher or professor. In most cases, this was someone you knew pretty well—someone with whom you had a face-to-face relationship. But now that you're in business or government, you are in a totally different situation. Though you often address a business document to just one person, everything from a major proposal to a quick e-mail is read by more than one person. Furthermore, readers other than the one addressed are often crucially important to your success. For example, an RFP may tell you to direct your proposal to one person, but in most cases it will be several other people who actually decide who gets the project. And yet, if you don't stop to think carefully about who these important readers are, there's a strong tendency to act as though you were still in college writing for the single, obvious audience. I call this the School Writing Trap.

Map your audiences

For most work-related documents, you know either the names—or at least the job descriptions—of your readers. So, to avoid the School Writing Trap, get into the habit of listing your audiences as the first step in writing every business document. Actually, the best way is to *map* your audiences. For example, let's say you're a county engineer writing a proposal for a new highway department building. Your audience map might look like the example above.

By taking a minute to create this map, you forcefully remind yourself that your audience is more numerous and more complex than the five county commissioners. And as soon as you see this reality, you will undoubtedly begin thinking about how different these people are from each other. This is what makes writing at work so hard! You only get to write the document once, but you have to communicate to all these different people simultaneously. Just the fact that you take one minute to map out your audiences will serve you well. You will begin to strategize about important aspects of writing such as order of presentation, tone of voice, and degree of detail.

Categorize your audiences

The next step in getting to know your readers is to categorize them. At the most fundamental level, readers fall into three categories:

- Primary audiences: Those who make decisions based on your document.
- Secondary audiences: Those who are affected by the decisions of the primary audiences.
- Intermediary audiences: Those who merely pass your document on to someone else.



Primary audiences

By definition, primary audiences are the people who have the power to decide how to respond to your document. This gets at a fundamental truth about technical writing, which is that the purpose of every document is to motivate someone to do something. (The next article in this series will focus in more detail on defining your purpose.) For the document described above—the proposal for a new county highway building—certainly the county board members are primary audiences. But what about their spouses? If they read and discuss the proposal with the commissioners, they become "secret" primary audience members because they will influence the board members' action—or inaction.

Let's also look at a second example. Say you're that same county highway engineer, but now you're writing a procedure for the road maintenance workers who report to you. For this document, those workers are the primary audience. The decision they will make is whether or not to follow your procedure. My point here is that you should not assume that "decision maker" always means a higher-up person. Your primary audience can be anyone; it depends on the type of document you're writing.

Secondary audiences

Secondary audiences are those readers who are not in the "driver's seat." In other words, they don't get to make a decision based on what you have written, the way primary audiences do. Instead, secondary audiences are directly affected by the decisions made by primary audience members. So, in the first example above (proposal for a new facility), if the county board gives you the "thumbs up" response, the consulting architect is one of several people who will be directly affected by the board's decision. In the second example (work procedure), if the road maintenance workers don't understand or don't agree with your procedure, their boss (the maintenance supervisor) is directly affected. In fact, in this second example, the maintenance supervisor is probably both a primary and a secondary audience. In real life, everything is complicated!

For each work-related document that you write, you have both primary and secondary audiences—and it's very much to your advantage if you identify them and think about these important differences before you begin writing.

Intermediary audiences

"Intermediary" is a fancy word for a "pass-through" person. I'm sure you've encountered this many times: You address a document to someone—say a boss—but you know the boss is only going to look at your document for a minute and then forward it to someone else with a Post-it that says, "Jane, please take care of this." If all the boss does is send the document down the org chart to Jane, then you're really writing to her. But documents can also be passed up the org chart. For example, you may address a document to an administrative assistant, knowing full well that he or she will only look at your document for a moment—and then put it in the boss's in-basket. You'll want to identify any

intermediary audiences for a given document—so you can disregard them. This is a good thing; it's complicated enough to write to your primary and secondary audiences!

It will take you no more than a minute to categorize your audiences into these three important categories—but it's very much worth your while.

Analyze your audiences

The third and last part of getting to know your readers is to analyze them. After mapping and categorizing, pick out the most important audience members and, for each one, answer these questions, which I have adapted from the book, *Persuasive Business Writing* by Mary Cross:

Personal factors

- Job title, department, responsibilities?
- Length of time with the organization?
- Educational background?
- Age and gender?
- Politics, attitudes?
- Knowledge factors?
- How well does the reader know you?
- What does the reader already know about the subject?
- What else does the reader need to know?

Time factors

- When will the reader read this message?
- How much time will the reader spend on it?
- Is there a deadline by which the reader must act?

Organizational factors

- Where is this reader on the org chart?
- Where is most of the reader's work done? (at a desk? in the field?)
- Who will this reader confer with before acting?

Attitudinal factors

- How interested is the reader in the arrival of this message?
- How will the reader feel about it? (good news? bad news?)
- How will the reader's job be affected by this message?

Small investment—big payoff

Reading this article may have taken you 15 minutes. But doing what I have recommended will take you no more than five minutes, once you've tried it a few times. And you probably don't need to write down any of it; just do it in your head. Five minutes is a small investment of your time, but it will pay off mightily in the quality of your business writing. When you have mapped, categorized, and analyzed your audiences, you automatically will have developed a sophisticated strategy that will serve as the foundation for each document. As a result, you're likely to actually convince people to do what you want them to do!

I'd love to hear from you about how it worked.

LTAP

Richard Kronick is a freelance technical writer and writing trainer specializing in transportation, civil engineering, and architecture. He has presented more than 1,000 business writing and technical writing seminars around the world. He can be reached at www.richardlkronick.com.

The Shelf

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

Briefs, Digests, and Syntheses

Color Effectiveness of Yellow Pavement Marking Materials

(Transportation Research Board, Research Results Digest 328)

This digest explores a range of chromaticity coordinates that observers classify as yellow and white under daytime and incandescent illumination. www.trb.org/news/blurb_detail.asp?ID=9100

Brochures

Intersection Safety Strategies

(Federal Highway Administration, 2008)

This brochure is a quick reference to the countermeasures described in the NCHRP Report 500 volumes on reducing crashes at unsignalized (Volume 5) and signalized (Volume 12) intersections and is a supplement to individual guide sheets for each of the 77 countermeasures. <http://safety.fhwa.dot.gov/intersections/intsafestratbro> (PDF, HTML)

Reports

A Guide to Small Sign Support Hardware

(AASHTO, ARTBA, AGC, AASHTO-AGC-ARTBA Task Force 13)

A compilation of small sign support hardware, this document presents the state-of-the-art perspective and addresses crash-worthiness features of small sign supports. This guide is the key reference for FHWA accepted breakaway ground-mounted sign supports. www.aashtotf13.org/Small-Sign-Support.asp

A Guide to Standardized Highway Barrier Hardware

(AASHTO, ARTBA, AGC, 2005 AASHTO-AGC-ARTBA Task Force 13)

A publication that provides specifications for both highway barrier hardware and systems. Includes barrier systems test level designation for various highway barrier applications. Also provides individual component details and specifications as well as system details. <http://aashtotf13.tamu.edu> (PDF)

A Guide to Standardized Highway Drainage Products

(AASHTO, ARTBA, AGC, 1999 AASHTO-AGC-ARTBA Task Force 13)

This guide supersedes the 1996 edition. It is intended to provide guidance and specifications for users of highway drainage products. www.aashtotf13.org/Standardized-Drainage-Products.asp

A Guide to Standardized Highway Lighting Pole Hardware

(AASHTO, ARTBA, AGC, 1980 AASHTO-AGC-ARTBA Task Force 13)

Standard details and specifications are suggested in this publication for those lighting pole items that are widely used and have well-defined service requirements. www.aashtotf13.org/lighting-pole-hardware.asp

A Guide to Traffic Control of Rural Roads in an Agricultural Emergency

(TRB, 2008, NCHRP Report 525: Volume 13)

This guide provides recommended practices and procedures associated with traffic control on local and state roads during agricultural emergencies. http://trb.org/news/blurb_detail.asp?id=9580 (PDF)

Advanced Surveying and Mapping Technologies: Systems Overview & Application

(FHWA, 2008, FHWA-CFL/TD-08-002)

This report presents a study, with resulting conclusions, to investigate emerging surveying and mapping technologies and their applicability to typical assignments of the Office of Federal Lands Highway (FLH) of the FHWA. www.cflhd.gov/techDevelopment/completed_projects/survey/index.cfm (PDF)

Multimodal Level of Service Analysis for Urban Streets

(TRB, 2008, NCHRP Report 616)

This report will be of interest to public agencies responsible for the planning, design, and operation of urban streets. This report provides a method for assessing how well an urban street serves the needs of all of its users: auto drivers, transit passengers, bicycle riders, and pedestrians. www.trb.org/news/blurb_detail.asp?ID=9470

Guidance for Implementation of the AASHTO Strategic Highway Safety Plan: Volume 20: A Guide for Reducing Head-On Crashes on Freeways

(TRB, 2008, NCHRP Report 500)

This 20th volume of NCHRP Report 500: *Guidance for Implementation of the AASHTO Strategic Highway Safety Plan* provides strategies that can be employed to reduce head-on crashes on freeways. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v20.pdf (PDF)

Search me

The Minnesota LTAP Web site features custom search engines to help you find information. You can search:

- LTAP & TTAP Centers
- State DOTs
- Transit agencies
- University transportation centers

Bookmark www.mnltap.umn.edu/SearchOptions.html.

Another great resource is TLCat, the Transportation Libraries Catalog. It is an online database of the leading transportation libraries with extensive transportation-related research and publications. Along with links to many other organizations, TLCat is accessible at www.mnltap.umn.edu/KnowHow/TransportationOrganizations.html. **LTAP**

Modernize and Upgrade CANDE for Analysis and LRFD Design of Buried Structures

(TRB, 2008, NCHRP Report 619)

This report documents research performed to develop, modernize, and upgrade CANDE (Culvert ANalysis and Design). CANDE installation files are included on a CD-ROM with this report. www.trb.org/news/blurb_detail.asp?ID=9438 **LTAP**

The Traffic Corner: Testing Traffic Counters

When I was an intern, I was put in charge of inspecting and measuring quantities on several street lighting projects. I measured about four miles of installed cable. The contractor questioned my quantity—saying it was low—and said I was shorting him. I met him early the next day, expecting a long day of spot checking. The first thing I did was lay out my 25-foot tape measure and check to make sure my measuring wheel was accurate. I asked him to do the same. His wheel said the 25-foot tape measure was 28 feet long. We did the math and his quantities were off by the 28/25 ratio. Case closed in about half an hour.

Spring is here (we hope), and it is a good time to make sure your field equipment is in working order. Are you sure the traffic data you have been collecting is accurate? We test all our counters every three months with a Jamar traffic counter tester in addition to visually verifying our counts every time we set up in the field. The traffic counter tester blows a prescribed number of air pulses so we can test the accuracy of our air switches (volumes as well as speed and classification data). We also do a manual test on our Jamar manual count boards—punching in a prescribed number on each button. It seems logical to me that you need some way to ensure your counters are working properly.

One of our public sector clients has 20 tube counters of its own. This winter the agency had us go through our test regimen on their counters. Seven of their 20 counters had at least one bad

air switch. Staff had enough time to send in their counters for repair and still get them back to start collecting data this spring.

I am guessing there is an intern somewhere who used traffic counters last year but didn't think to question the accuracy of the equipment. Let's make testing a habit so we all collect accurate data. **LTAP**

(Mike Spack, P.E., is the president of Spack Consulting. Before starting his firm, Spack worked for the City of Maple Grove as traffic engineer. He is a regular contributor to the newsletter, writing brief articles on traffic engineering topics.)



Counter tester

Learn about degree scholarships

Scholarships and fellowships for degree students interested in a transportation-related field are described on the Center for Transportation Studies Education Web page, www.cts.umn.edu/Education/StudentResources. The site includes links to a number of professional organizations. **LTAP**

Project prediction from page 5

congestion. It was the difference between a short pain and a long pain. I'm not saying you should always use design-build, but in that specific project, the rate of return completely outweighed the premium in cost."

For an in-depth look at risk assessment in infrastructure projects, see *Highlights of an Expert Panel: The Benefits and Cost of Highway and Transit Investments* (GAO-05-423SP) available at <http://www.hdrinc.com/15/42/1/default.aspx?listingID=801> (accessed 2/22/09). This U.S. Government Accountability Office document summarizes ideas on how to conceptualize, measure, improve, and use information about benefit-cost analysis of highway and transit investments.

— Richard Kronick, LTAP freelancer

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 an up-to-date list of events in Minnesota, please see the LTAP workshops and events calendar: www.mnltap.umn.edu/events.

Date	Event	Location	Contact
May–October			
<small>LTAP</small> May 18–22	Motor-Grader Operator Training	Carlton County	Mindy Carlson, 612-625-1813, carlson@cts.umn.edu
May 19–20	CTS 20th Annual Transportation Research Conference	Bloomington, Minn.	Sara Van Essendelft, 612-624-3708, cceconf5@umn.edu
<small>LTAP</small> June	CTAP Sign Retroreflectivity Training	Statewide	Ken Schroepfer, ken.schroepfer@dot.state.mn.us
<small>LTAP</small> June 15–19	Motor-Grader Operator Training	Goodhue County	Mindy Carlson, 612-625-1813, carlson@cts.umn.edu
<small>LTAP</small> June 22–26	Motor-Grader Operator Training	Stearns County	Mindy Carlson, 612-625-1813, carlson@cts.umn.edu
Sept. 28–29	Airport Technical Assistance Program (AirTAP) Fall Forum	Mankato, Minn.	www.airtap.umn.edu/Events/FallForum/index.html
Oct. 7–8	Minnesota Fall Maintenance Expo	St. Cloud, Minn.	Kathy Warren, 651-351-7432, kwarren@usinternet.com
Oct. 25–27	American Segmental Bridge Institute 21st Annual Convention	Minneapolis, Minn.	www.asbi-assoc.org/news/events
Oct. 28–29	Toward Zero Deaths Conference	Duluth, Minn.	www.minnesotatzd.org/events/conference/index.html

LTAP workshops

LTAP workshops, along with events cosponsored by Minnesota LTAP, are marked with an **LTAP** above. Check the Web for details: www.mnltap.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, contact Minnesota LTAP at mnltap@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)
- 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.

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.mnltap.umn.edu/roadscholar. **LTAP**

Maintenance Research Corner

Staff of Mn/DOT's Maintenance Operations Research (MOR), along with the members of the Mn/DOT New Technology, Research, and Equipment Committee (NTREC), publish a monthly one-page bulletin of their latest news and findings. Below are highlights from recent bulletins. If you would like to be added to the bulletin mailing list, please e-mail Farideh Amiri of Mn/DOT Maintenance Research at farideh.amiri@dot.state.mn.us.

HID lights

The Dresbach truck station in District 6 will test and evaluate two sets of high-intensity lights. The first is a flood light and the other is a directional light. District 6 will evaluate the service life of the lights, their effectiveness in whiteout conditions, and the effects the lights may have on opposing traffic. HID technology uses a tube of xenon gas and small amounts of other gases. The gas tube replaces the filament in regular light bulbs.

Contact Joel Risser, 507-643-6310, or see www.brighthouse-hid.com.

Induction heating system

District 1 will evaluate induction heating using the Autotron 3300. This system will give mechanics the ability to heat areas of the vehicle—such as frozen nuts and bolts that may be near sensitive materials, wires, and hoses—without causing damage. The heat is very focused, easily monitored, and controlled by the hand-held inductor. The Frame Pro Inductor is a heating attachment designed specifically for rapid heating of frame rails and structural panels of automobiles for straightening and stress relieving. It can heat

¼-inch steel to 1300 °F in just a few seconds. In addition, mechanics in District 1 will evaluate the Autotron 3300 for its ability to speed up the windshield replacement and molding repairs.

Contact Dave Ollila, 218-742-1078, or see www.arrowautosupply.com.

Salt skirt

The salt skirt is a cup brush mounted about 1 inch below the spinner. It is 24 inches in diameter and has 16-inch-long bristles. While material prices are at their highest and hard to find, it is important to keep as much material in the target area as possible. District 7 will evaluate these salt skirts for their ability to save material, leave more material in the target area, and help prevent material scatter and bounce. Since the salt skirt is mounted 1 inch below the spinner, it will give the operator the ability to broadcast material in intersections and in hazard areas.

Contact Ron Gaffke, 507-831-8020, or see www.industrialbrush.com. **LTAP**



Salt skirt

Concrete from page 4

sustainability. The concrete industry is fragmented and diverse. It has limited acceptance of new performance standards, is slow to investigate and adopt new technology, and reluctant to change. And a gap in product knowledge often exists.

To achieve sustainability, Roumain presented what he calls the "Sustainability Triple Bottom Line" of people, process, and production innovation. People—architects, engineers, contractors, and suppliers—need to be educated about sustainability and the benefits of cement and concrete. The industry also needs to recruit the "best and the brightest" to the field.

Concrete is a product but it is also a process, he continued. The industry needs to identify how people (architects, engineers, specifiers, testing agencies, batchmen, ready mix truck drivers, contractors, and finishers) facilitate or hinder the process to achieve durable and cost-effective concrete.

And most important, Roumain said, the industry must be receptive to innovation. To remain competitive, the industry must continually improve the delivery, quality, ease of placement, and sustainability of concrete. Different strategies and tactics will be needed to accelerate the acceptance of new technologies.

His presentation concluded with a look at future trends in the industry, citing specific examples in cement manufacturing techniques. **LTAP**

— Holly Miller, LTAP intern

