Device cleans stormwater and saves money for locals

A device invented at the U of M is cleaning stormwater and saving money for local agencies. Kurt McIntire, sales engineer with Upstream Technologies, talked about the device at the 23rd annual CTS Transportation Research Conference held in May.

The conference featured presentations on many topics of interest to readers of the Exchange. Several summary articles are on pages 4-5.

The SAFL Baffle is a low-cost device invented at the University’s St. Anthony Falls Laboratory to boost the performance of sump manholes for cleaning stormwater. With more than 3.2 million sump manholes in the country—perhaps 25,000 in the Twin Cities metro alone—there is a “huge opportunity for engineers to install the SAFL Baffle and improve water quality,” McIntire said.

Sumps are vertical cylinders that connect

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Removing unnecessary and ineffective signs

One of the key points of Minnesota LTAP’s workshop on traffic sign management is this: many signs are ineffective and unnecessary. Research has found that unnecessary road signs raise sign inventory costs and in some cases actually increase the number of crashes. The workshop and the accompanying guidebook discuss which signs your agency should consider removing and how to do it given the possibility of public opposition and risk liability. Some highlights from the guidebook, which is on Minnesota LTAP’s publication web page, follow.

**General guidance**
Sign removal should be considered if signs are unaffordable, unnecessary, inconsistent with guidance given from the MNMUTCD, or inconsistent with other signs in the inventory. Many signs are only effective in the presence of law enforcement. Statements of the obvious are a waste of money if there is little or no enforcement of the law.

**Which signs aren’t effective?**
STOP, STOP AHEAD
STOP signs have proven to have only a marginal effect on driver behavior at low-volume road intersections, where the need to stop may

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Jim Grothaus is new NLTAPA president

Minnesota LTAP’s own Jim Grothaus is the new president of the National Local Technical Assistance Program Association (NLTAPA). “NLTAPA and the LTAP program are trusted and valued resources that provide technical assistance to local and tribal agencies in our nation,” Grothaus says.

He kicked off his term with a few words at the annual NLTAPA conference in July. The most important work of the association this year, he said, is to keep its main objectives moving forward:

- Build awareness about LTAP in the transportation community.
- Assist the Federal Highway Administration with developing strategies for the program.
- Build the capacity of each center to best meet the needs of its customers.

Focus areas include communications with NLTAPA members, friends, and partners; evaluation of current partnerships and possible new ones; and evaluation of the services the association provides, focusing on efficiently doing association business and aligning efforts to better meet the main objectives.

Congratulations, Jim! LTAP
Corridor access management. Providing fewer access points along collectors and arterials (or reducing to three-quarter or right-in/right-out accesses) has proven to reduce overall crashes by 5% to 23% along rural two-lane highways and reduce injury/fatal crashes by 25% to 31% along urban/suburban arterials. We obviously need to provide access to private property, but that needs to be balanced with the safety and mobility provided along our major roads.

Signal head backplates with retro-reflective borders. Backplates around traffic signal indications have been used for decades to reduce the sun glare that could wash out the red/yellow/green. Recent studies have shown up to 15% reduction in crashes with the use of backplates that have reflective tape on them. This improves their visibility, especially when the power is out and the signals are dark. Longitudinal rumble strips and stripes on two-lane roads. Cutting in (milling) grooves along the center lines of two-lane roads has proven to head-on collisions by 44% in rural areas and by 64% in urban areas. Rumble strips along the shoulders of rural two-lane roads reduces run-off-the-road injury/fatal crashes by 36%

Enhanced delineation and friction for horizontal curves. Researchers are finding that a significant number of crashes in rural areas happen on horizontal curves. Installing more chevron signs along a curve reduces overall crashes by 16% and injury/fatal crashes by about 40%.

Safety Edge. Safety Edge is the practice of shaping the edge of the paved road approximately 30 degrees as it connects into the shoulder. This design eliminates a phenomenon called tire scrubbing that causes the driver to lose control of the vehicle. This treatment is estimated to lead to about a 6% reduction in crashes on rural roads. But since it costs no more to have the road built this way, it has a very large benefit-to-cost ratio. (See Minnesota LTAP’s technical topic page for Safety Edge resources.)

Medians and pedestrian crossing islands in urban and suburban areas. Providing medians on busy arterials that are wide enough for pedestrians to stop in may reduce pedestrian crashes by about 50%. Pedestrian hybrid beacon. HAWK signals are mid-block signals that turn on to stop traffic when pedestrians push the crossing button. These signals may reduce pedestrian crashes at mid-block locations by 69%

Road diet. Converting a four-lane undivided road to a two-lane road with a center, two-way left-turn lane down the middle reduces overall crashes by about 30%. These conversions also often have the benefit of improving the traffic flow because you get less weaving of traffic around left-turning vehicles.

Of the items on this list, my favorites are roundabouts, Safety Edge, and road diets. The incremental cost of implementing these improvements can be negligible if done during road reconstruction. I like big benefit-to-cost ratios.

—Mike Spack (Mike Spack, P.E., is the president of Spack Consulting. He is a regular contributor to the newsletter, writing brief articles on traffic engineering topics.)

Library

The Federal Highway Safety Administration has a good clearing-house (http://safety.fhwa.dot.gov/provencountermeasures) related to safety countermeasures. It’s packed with a lot of background and guidance. Here are the FHWA’s top nine countermeasures based on the latest research:

Roundabouts. Converting an intersection with stop signs or signals results in about an 80% reduction in injury/fatal crashes and a 45% reduction in overall crashes. The data are very robust—roundabouts save lives because everyone needs to slow down. It’s hard to blow through a roundabout the way a drunk or distracted person can at a signal or stop sign.

Ann Johnson receives APWA award

Ann Johnson, the director of the Construction Management Program at the U of M and a long-time contributor to LTAP and Minnesota’s transportation community, has received the Donald C. Stone Award for Excellence in Education—Individual from the American Public Works Association (APWA).

Established in honor of the founder of APWA, the award recognizes outstanding and meritorious achievement of individuals assisting in the areas of continuing and graduate professional education for public works professionals, as well as chapters in their work in delivering opportunities for all levels engaged in the delivery of public services.

Over her 27-year career, Johnson has furthered the education of countless individuals, including city and county engineers, maintenance workers, airport staff, and students. She has developed many resources for Minnesota LTAP and the Minnesota LRRB, such as courses on roadside vegetation management, erosion control, and low-volume road pavement design. She also facilitated the development of the online gravel road training class.

Congratulations, Ann!

Technology Exchange

The Minnesota Local Technical Assistance Program (LTAP) is a nationwide effort designed to improve and maintain the practice of local technical assistance programs and to ensure the efficient and effective use of Federal and State technical assistance dollars. LTAP is cosponsored by the Minnesota Local Road Research Board (LRRB) and the Minnesota Department of Transportation (MnDOT).

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’s status, or sexual orientation. This publication is available in alternative formats upon request.

Any product mentioned within or shall not be considered a product endorsement. Author’s opinions/findings do not necessarily reflect the views of Minnesota LTAP.
Evaluation of Deicing and Anti-Icing Technologies

Project leader: Jeffrey Davies
Agency: City of Grand Rapids, 218-326-7480
OPERA funding: $4,000

Problem: The deicing and anti-icing of public roadways is an annual challenge for local road agencies. In light of increasing environmental concerns and decreasing budgets, it is essential for these local agencies to use methods that minimize chemical usage and decrease operational costs. At the same time, it is important to maintain the level of service expected by the traveling public.

Solution: The City of Grand Rapids has implemented alternative technologies and procedures for deicing and anti-icing that have the potential to improve roadway maintenance and save operating costs. For several years, the city has used standard tailgate spreaders to apply deicing and anti-icing materials. More recently, the city purchased an Epoke bulk spreader. To assess the operational efficiency of these two technologies, the city compared their performance on two equivalent deicing routes.

Procedure: The city identified three evaluation criteria for study and comparison between the two technologies: material usage, operational efficiency (time to complete the route), and roadway condition after deicing. When a deicing event occurred, the city deployed the Epoke and tailgate spreaders on two equivalent routes. Equipment operators recorded the amount of material used and the time required to complete each route. After the operations were completed, a pair of observers drove each route and numerically rated the condition of the roadway—without knowing which technology was used.

Results: Overall results show that neither the Epoke technology nor the tailgate spreader had any advantage over the other. There was no statistically significant difference in material usage between the two technologies, and observer ratings reveal no significant difference in how well each technology deiced the routes. The data collected did suggest that the tailgate spreader was more efficient at completing a deicing route; however, that spreader serviced one route more frequently than the other. Therefore, the data may be a reflection of the difference in routes rather than operational efficiency.

Approximate cost: $8,000
Implementation: Unfortunately, the city was unable to draw any significant conclusions from the initial research. Additional research could be beneficial, including projects that compare the technologies on non-residential streets, on longer test routes, or over longer time periods with more snow events.

Status: Complete LTAP

Interactive guide has model ADA transition plans for local agencies

The LRRB has developed a new document—ADA Transition Plan for Public Rights of Way Guide—to provide local governments with guidance on this aspect of the Americans with Disabilities Act (ADA) requirements. The ADA, passed in 1990, requires all public agencies to develop a transition plan to identify physical obstacles that limit accessibility and identify and schedule necessary improvements. Many agencies do not have transition plans, resulting in civil lawsuits.

The interactive guide contains model transition plans, process guidelines, and current ADA laws to help organizations fulfill this requirement. Please visit lrrb.org/resources/applications to learn more and download a copy. A webinar explaining how to use the guide was offered October 25 and is available for viewing from the Minnesota LTAP training page. LTAP

Winners announced in national LTAP ‘mousetrap’ competition

Three winners were announced in national LTAP’s “Build a Better Mousetrap” national competition. The competition’s purpose is to collect and disseminate real-world examples of best practices and tips from the field and assist in the transfer of technology for local and county transportation workers and other LTAP/TTAP clients.

First place: Repurposing used truck tires for wing plow cutting edge
Agency: Ottawa County Road Commission, Grand Haven, Michigan

Problem: In 2006 the Ottawa County Road Commission began using 9-foot wings on its tandem axle plow trucks. The wings proved to be beneficial for more efficient plowing, but Ottawa CRC operations superintendent Jeff Johnson devised a solution that used strips of recycled tire rubber as cutting edges.

Solution: After trying various manufacturer recommendations, which ranged in cost from $102 to $1,400 per blade, Ottawa CRC operations superintendent Jeff Johnson devised a solution that used strips of recycled tire rubber as cutting edges. To begin, Johnson found a source for tire processing that charged $7.00 each to process used Ottawa CRC tires. Each tire yielded a strip of rubber 9 inches wide and 7 feet long. Johnson was especially excited about reusing tires for this purpose because he had been paying $10.00 each to dispose of used tires. After the tires were cut into strips, Johnson experimented with attaching them to the wing plow. He found that two strips held in place with a worn-out steel blade from an underbody scraper provided the best balance between ease of installation in the shop and durability on the road.

Second place: Under-vehicle washer
Agency: Town of Vernon Public Works Department, Vernon, Connecticut

Problem: The use of winter deicing chemicals was having a tremendous corrosive effect on the trucks. The salt material gets caught in a lot of hidden areas under vehicles and cannot be reached by rinsing with a regular hose and nozzle.

Solution: The unit is connected to a hose—preferably with good water pressure. The unit is then moved under the vehicle and water is turned on. The operator then moves it around under the vehicle, rinsing the underside from all different angles. The hoses were placed at varying angles along the copper pipe to maximize reach and coverage.

Third place: Snow pusher
Agency: Mercer County, North Dakota

Problem: Large amounts of snow get piled up in sheltered areas and intersections. These walls of snow make it difficult to continue to plow and move snow far enough back for additional storage area for more snow. Every time additional snow is received or the wind blows, snow fills in, causing the road to block. The intersections are dangerous for the traveling public because of poor visibility created by snow. With conventional snow removal equipment it is not possible to move the snow unless you drive into the ditches. Often times equipment gets stuck, requiring additional personnel and equipment to pull it out, costing time and money.

Solution: It was necessary to design a piece of equipment to push snow back far enough from the roadway without getting equipment stuck. The snow pusher makes that possible with the added 12 feet of length. A junked snowplow was modified by cutting the top portion off. Eight-inch 1-beams 10 feet long were added to get the length required. A quick attachment from an old plow was added for easy mounting on a 950 H Cat loader. The snow pusher makes it possible to stay on the road and avoid driving into the ditch, reducing the possibility of getting stuck.
New treatment practice removed dissolved phosphate from stormwater

Stormwater treatment practices have long focused on removing suspended solids and particles from stormwater runoff (including the SAFL Baffle—see article below). However, as much as 40% to 50% of the pollutants in stormwater are actually dissolved compounds, including nutrients such as phosphorus. These pollutants are not settled or filtered in many existing stormwater runoff treatment systems found across the region, state, and nation.

Researchers at the U of M’s St. Anthony Falls Laboratory (SAFL)—led by research scientist Andrew Erickson and professors Peter Weiss and John Gulliver—have identified techniques to remove the dissolved compound phosphate from stormwater, with excellent results. Their iron-enhanced sand filtration system, named the Minnesota Filter, has been installed in a number of locations around the Minneapolis–St. Paul metro region. Erickson provided design and performance highlights of their work, which is funded by the Minnesota Local Road Research Board, at the CTS research conference in May.

The Minnesota Filter is a new technique in which iron filings are added to a sand filtration system. When exposed to rainfall, the iron forms iron oxides (rust), which adsorb phosphate. The system can be used in many applications including surface sand filters, wet detention basins, permeable weirs, and stormwater buries. SAFL researchers tested two variations of the system that developed this technology, and his district did the first field installation.

“We have adopted it as a practice virtually every chance we get,” Aichinger says. “We think it’s a very useful technique.” The biggest stormwater management problem in his district is dissolved phosphorus, he says, and the filter is “one of the few techniques out there that is targeting it.” He adds that the technique is “a good practice for small sites, so it’s appropriate in urban areas as well. And the cost is minimal.”

Two research reports (MnDOT 201108 and MnDOT 201213) and a technical summary report says. The Minnesota Filter has “worked extremely well,” says Cliff Aichinger, district administrator for Ramsey County, Minnesota. The filter is “one of the few techniques out there that is targeting it.” He adds that the technique is “a good practice for small sites, so it’s appropriate in urban areas as well. And the cost is minimal.”

Research by Stephen Druschel of Minnesota State University, Mankato, identified and characterized cement and concrete-derived sediments from a wide range of construction operations. Druschel found that large volumes of concrete sediments were created by demolition, saw cutting, and pavement grinding, with smaller amounts of cementitious particles created by concrete and mortar placement operations. Demolition operations created larger particle sizes, widely distributed over a range of sizes; saw cutting and pavement grinding created fine particles of a uniform size. The findings indicate that characterizing concrete sediments can help protect storm and surface waters adjacent to all forms of construction. Concrete sediments can be controlled using existing stormwater best management practices designed for soil-derived sediments.

Keeping concrete out of waters

Sediments composed of cement or concrete particles are created as byproducts of highway and bridge construction. These sediments have proven difficult to control using stormwater best management practices designed for soil-derived sediments.

Research by Stephen Druschel of Minnesota State University, Mankato, identified and characterized cement and concrete-derived sediments from a wide range of construction operations. Druschel found that large volumes of concrete sediments were created by demolition, saw cutting, and pavement grinding, with smaller amounts of cementitious particles created by concrete and mortar placement operations. Demolition operations created larger particle sizes, widely distributed over a range of sizes; saw cutting and pavement grinding created fine particles of a uniform size. The findings indicate that characterizing concrete sediments can help protect storm and surface waters adjacent to all forms of construction. Concrete sediments can be controlled using existing stormwater best management practices designed for soil-derived sediments.
Adding axles reduces damage from heavy farm equipment

Over the past few decades, farm size has increased significantly and farm equipment has become larger and heavier. In 2008, the Transportation Engineering and Road Research Alliance (TERRA) initiated a pooled-fund study to evaluate the effects of this heavy agricultural equipment on paved roadways.

Researchers from the University of Minnesota and Iowa State University studied pavement structural response, such as stresses and strains, under heavy farm equipment and a typical five-axle semi-trailer track. The study included two asphalt roadway sections—representative of a typical 10-ton and 7-ton roadway—and two concrete pavement sections at the MnROAD research facility near Albertville, Minnesota.

Study results found that the heavy farm vehicles caused high pavement stresses and resulted in more damage to the roadway than the standard semi. Results also indicated that the number of axles, traffic, and axle loads affected pavement response. The researchers confirmed that weight per axle is more important than gross vehicle weight, suggesting that adding more axles to a vehicle could be beneficial as long as there is even load distribution.

The study also found that pavement damage could be reduced by avoiding travel after heavy rain, during the spring thaw, and on hot afternoons when pavement surface temperatures rise. The presence of a paved shoulder also reduced damage, as did operating vehicles at least 16 inches away from the pavement edge.

Study results could facilitate the updating of spring load restrictions and help agencies design roads that are more capable of resisting damage related to heavy loading (see sidebar). The project’s final report, Effects of Implements of Husbandry (Farm Equipment) on Pavement Performance—is on the CTS website.

The project included funding and other contributions from MnDOT, Iowa DOT, Illinois DOT, Wisconsin DOT, the Minnesota Local Road Research Board, and the Professional Nutrient Applicators Association of Wisconsin. Many industry partners, including equipment and tire manufacturers and farm applicators, also participated in the project and contributed labor and equipment. LTAP

—Michael McCarthy, LTAP editor

Implications for counties
Gary Danielson, public works director of Kandiyohi County, served on the Technical Advisory Committee for this project. Here’s what he says about the research:

What are the implications for permitting in your county and other counties?

“Those are valuable results, and should be valuable in years to come. For my county, the study will help us in determining our permitting policies for heavy vehicles. We currently do some permitting for sugar beet haulers for heavy vehicles, but we haven’t opened up the whole system for them. The study provides clear evidence that extra axles do make a difference—it’s not the gross weight that’s the problem, it’s the weight per axle. We thought this was true over the years, but the study confirms that. We’re now more open to heavy (97,000 pound, seven-axle) permitted vehicles than we used to be, on more roads in the county.”

What else did you learn?

“Another thing the study showed was that as you keep vehicles from the pavement edge, there’s less road damage. This led us to move our striping in—making lanes a little narrower—to keep vehicles from wandering off the pavement. We now stripe at 11 feet instead of 12. And interestingly, observing driver behavior over the last several years, we see less lane wander: people seem to be more conscious of their position and stay in the lane better. So the change not only helps prevent pavement damage—it helps keep people on the road, too.” LTAP

Portable, low-cost weigh-in-motion system could help protect rural roads
University of Minnesota Duluth electrical and computer engineering professor Taek Kwon has developed a portable weigh-in-motion (WIM) system for rural highways. The system would help protect roads from heavy truck volumes hauling agricultural commodities and collect better traffic data for pavement design.

Permanent weigh stations cost upward of $250,000, but Kwon’s portable solution, which can be easily deployed much like a tube counter, is a fraction of that at about $20,000. A prototype was completed in 2011 and successfully tested on the MnROAD low-volume road and on Minnesota Highway 53. The Minnesota Department of Transportation funded the research to develop the system. Eventually, the goal is to contract with a manufacturer to produce a commercial version.

More about the system, including technical details, is on the CTS and TERRA websites. LTAP

—Michael McCarthy, LTAP editor

Team recommends changes to culvert design to ensure fish passage
Lacking a state standard, Minnesota culvert design is currently based on the judgment of county, state, and DNR personnel who work to maintain natural stream dimensions and patterns through culvert crossings. If designed properly, culverts allow aquatic organisms and fish to move upstream.

At the CTS research conference, senior scientist Brad Hansen presented findings from a study that assessed the hydraulic conditions related to recessed culverts and other design elements over a range of landscapes in Minnesota. Hansen and Professor John Nieber from the University of Minnesota’s Department of Bioproducts and Biosystems Engineering led the study. The research team looked at the geomorphic and hydrologic functions of streams to determine how well these improvements for fish passage were applied to culvert crossings.

The practice of recessing culverts is frequently implemented to allow improved fish passage through a culvert. The culvert invert is placed below the streambed elevation, enabling the sediment carried by the stream to accumulate in the recessed portion of the culvert to an elevation equal to that of the streambed. Alternately, sediment or rocks may be placed in the culvert at the time of installation.

The design process begins with sizing a culvert based on the stream bankfull width or to match a calculated hydraulic capacity. The initially designed culvert size is maintained above the streambed elevation, and the added or oversized portion of the culvert is buried below the streambed to accommodate the recessed depth.

Thirteen of the 19 sites surveyed throughout the Minnesota technology exchange

Duschee Creek in Fillmore County, Minnesota, was one of the culverts examined in the study.

Minnesota had a recessed culvert as part of the design. The main criterion the researchers used in

Culverts continued on page 6
not be obvious. Fewer than 20% of vehicles voluntarily stopped at STOP signs vs. 9% at intersections with no control. A STOP sign that is visible along a low-speed road does not need a STOP AHEAD sign in front of it nor an INTERSECTION AHEAD sign unless there is sight restriction along the road. Without compelling reasons, there is no need to install STOP signs at residential low-volume intersections; doing so wastes fuel. These signs could be removed if an engineering study determined that doing so did not result in an unusual level of hazard.

Culverts

Culverts

determining whether a culvert was functioning properly for fish passage was the presence (or absence) of sediment in the recessed culvert barrel. If properly designed, the recessed barrel should accommodate sediments that increase roughness and reduce water velocities through the culvert. A clean recessed barrel could produce excess velocities that might prohibit fish passage. Based on this criterion, 6 of the 13 recessed culvert sites were not functioning properly due to lack of sediment accumulation. By comparing culvert and stream parameters, the researchers concluded that the combination of insufficient culvert width (compared to channel bankfull width) and limited access to side barreling could be enough to raise velocities to a point where sediment accumulation was insufficient for aquatic organisms to pass through the culvert.

The research team suggests possible solutions to this problem:
- A better understanding of stream and site data collection needs prior to culvert design to ensure the design more closely matches the local stream channel conditions.
- An improved procedure for placing sediment or anchoring it to the culvert bottom to protect against excess velocities washing sediment out of the culvert.

CROSSING signs.
The CHILDREN AT PLAY sign may in fact contribute to worsening the environment as parents are given a false sense of security that the sign is protecting their children.

Crosswalks and pedestrian warning signs

Studies have shown that marked pedestrian crosswalks and advance warning signs are not safety devices when used at uncontrolled locations. Pedestrian crash rates are higher at marked locations.

CROSSING signs.
The CHILDREN AT PLAY sign may in fact contribute to worsening the environment as parents are given a false sense of security that the sign is protecting their children.

Speed limit signs

Speed limit signs have never proven to change driver behavior. Drivers only comply with speed limits (and the signs) if the posted limits are consistent with a driver’s perception of the road environment and their selection of a safe speed, approximated near the 85th percentile speed. Analysis of a sample of urban, conventional roads found that crash rates decreased with increased speed limits.

Which signs are effective?

Advance curve warning signs

Advance curve warning signs were found to reduce road-departure crashes by about 20% to 30%, and the use of chevrons reduced crashes by 20% to 50%. The advance curve warning signs were found to be effective in only a fairly narrow range of curve radii—curves with radii between 1,000 feet and 1,800 feet. There was no safety effect in larger radius curves and in shorter radius curves. Achieving consistency across the system leads to success. If there are curve warning signs in advance of long radius curves, those could be candidates for removal based on system-wide considerations.

Advisory signs

If the KEEP RIGHT and LEFT TURN LANE signs are along a city street with continuous street lighting, the signs aren’t required, as they only tell the driver what they already know. Limited sight distance signs have not been proven effective at either reducing crashes or changing driver behavior. These signs don’t provide the driver with guidance relative to an intended action. A better idea would involve adopting ordinances that prohibit land owners from planting trees or shrubs that impair visual sight lines at street or driveway intersections and allow city crews to enter private property to trim landscaping in cases where there is danger to the public. The cities of Eagan and Faribault have implemented this in their City Code of Ordinances. Signs could be candidates for removal if they are obstructed by tree limbs but not important enough to have the vegetation trimmed.

Guide signs

Guide signs, such as junction and street name, have been found to have a minimal effect on intersection crashes but are assumed to improve wayfinding and navigation.

Managing risks of sign removal

To successfully manage risks in sign removal, employ the local high-risk decision-making body to adopt a policy or pass a resolution specifying types of signs that will be installed, contrasting with those that will not (and are candidates for removal). Document the outcome of actions taken relative to installing/replacing signs consistent with the direction provided by your decision-making body. Other options are to conduct an engineering study, document the applicable guidelines in the MMNUTCOD, document conditions in the field, and document decisions made.

Discretionary immunity is generated by actions consistent with adopted policies and ordinances. Official immunity is generated by exercising your engineering judgment as part of an engineering study and then documenting your actions.

Public outreach

If sign removal is included as an integral part of your comprehensive sign maintenance/management program and you intend to remove a variety of signs along your roads and streets, consider two public information and outreach actions. First, prepare a short public notice that could be run in your official paper, put on your website, or distributed with newsletters or utility bills.

Second, if the sign removal involves intersection control (STOP or YIELD), consider the temporary placement (four weeks is a typical duration) of Traffic Control Change Advance Warning Signs on a TYPE III barricade or a temporary support (supplement with flags to draw attention to the sign). In doing so, maintenance costs will be lowered and crash numbers could be reduced.
FTA Fact Sheets: Moving Ahead for Progress in the 21st Century (MAP-21) (Federal Transit Administration, August 2012)

Several fast fact sheets have been released for selected MAP-21 programs, including Funding Grants for Rural Areas. The fact sheets contain information on FTA’s implementation of MAP-21, including program information and guidance for grantees.

Report 725: Guidelines for Analysis Methods and Construction Engineering of Curved and Skewed Steel Girder Bridges (Transportation Research Board, August 2012)

TRB’s National Cooperative Highway Research Program (NCHRP) offers guidelines for grantees.


TRB’s National Cooperative Highway Research Program describes various tools and strategies used by municipalities to improve the safety, convenience, and accessibility of the pedestrian experience.

Complete Streets Local Policy Workbook (Smart Growth America, August 2012)

This workbook helps local policymakers develop policies for complete streets.

A Summary of Design, Policies, and Operational Characteristics for Shared Bicycle/Bus Lanes (National Center for Transit Research at the University of South Florida, July 2012)

This report evaluates the design and operation of shared bicycle/bus lanes in municipalities in the United States and other countries.

Federal Resources for Sustainable Rural Communities (Environmental Protection Agency, Summer 2012)

This publication highlights funding and technical assistance opportunities available through the Partnership for Sustainable Communities, as well as examples of new rural communities across the country that have put federal programs into action.

Benefit Cost Models to Support Pavement Management Decisions (Ohio Department of Transportation, June 2012)

This report explains a newly developed cost benefit model to help support pavement management decisions.

Field Evaluation of a Restricted Crossing U-Turn Intersection (Federal Highway Administration, June 2012)

This report describes operations at a restricted crossing U-turn (RCUT) intersection on a four-lane divided rural highway with a roughly comparable conventional stop-controlled intersection on the same corridor. The report also includes before-and-after crash analyses for the converted intersections.

Transportation, Mobility, and Older Adults in Rural Michigan (University of Michigan Transportation Research Institute, May 2012)

This report explores issues regarding transportation and mobility in rural areas, specifically in rural areas of Michigan.

TRB’s National Cooperative Highway Research Program offers guidelines for grantees.

21, including program information and guidance for grantees.

Several fact sheets have been released for selected MAP-21 programs, including Funding Grants for Rural Areas. The fact sheets contain information on FTA’s implementation of MAP-21, including program information and guidance for grantees.

Related to the research mentioned above, TRB has published a page for governments that provides links to helpful information and research used by other organizations and state governments. All Dakota County and field training components. All Dakota County and other organizations and state governments. The page includes links in the areas of policy development, surveys and research, guidelines, and best practices.

The Minnesota Office of Enterprise Technology’s Social Networking Page is a social networking portal available on the web and on mobile devices for the public works industry.

The Minnesota Office of Enterprise Technology’s Social Networking Page is a social networking portal available on the web and on mobile devices for the public works industry.

While a growing number of local agencies are using social media to reach out to their constituents, many others aren’t quite sure how to get started. Following are some resources to help you get started.

• Minnesota Office of Enterprise Technology’s Social Resources for Media for State Government, 2011. The resources section contains links to helpful information and research about policies, usage, and best practices being used by other organizations and state governments. The page includes links in the areas of policy development, surveys and research, guidelines, and best practices.

• Strategic Approaches to Developing a Social Networking Page, Transportation Research Board, 2011.

• “Planning for an Organization’s Social Media Debut,” Janet Fraser, TR News, No. 271, November-December 2010: 19.

• Government on Facebook. Facebook has published a page for governments that provides guidance on creating and using Facebook.

• Twitter basics

Covers the basics of how to join Twitter, manage an account, and insert a feed on a website; also has a Twitter glossary: http://support.twitter.com/groups/31-twitter-basics

Suggested Twitter feeds for local agencies

• Minnesota Department of Transportation: @mndotnews

• University of Minnesota: @UMNCTs

• Federal Highway Administration: @USDOTFHWA

• AASHTO: @aashtospeaks

• ITS World Congress: @ITSWC

• Reconnecting America: @reconnecting

• American Public Works Association: @APWATWEETS

• USDOT Secretary Ray LaHood: @RayLaHood

• Transportation Research Board: @TRSoIN

• Public Works: @PublicWorks (provides online resources for public works professionals)

• PublicWorksAgency.com: @PWA1N (this is a social networking portal available on the web and on mobile devices for the public works industry)

• National Complete Streets Coalition: @completestreets

• Your local news outlet

The Minnesota Office of Enterprise Technology’s Social Networking Page is a social networking portal available on the web and on mobile devices for the public works industry.

• Minnesota LTAP held motor-grader operator training this summer at two sites. Instructor Corey Uhrich has had 18 years of experience working with heavy equipment, including 10 years managing maintenance, operations, and operator training for heavy construction crews. In his classes, students operate actual equipment as he focuses on the safe and efficient operation of heavy equipment.

“Thanks so much for helping Dakota County host the [motor grader] training,” says Mike Greten of Dakota County. “I received nothing but great comments about the class, both the classroom and field training components. All Dakota County and Empire Township staff said Corey did a great job, and all learned a lot.”

• If anyone is interested in hosting a training next summer, contact Mindy Carlson of Minnesota LTAP.

Motor grader training clips online

Check out a sand and salt spreader calibration video developed by the Massachusetts LTAP Center and DOT that’s available on YouTube. The calibration instructions are for V-box/live bottom trucks, which are used by some Minnesota cities. “This is a very good video,” says Kathy Schaefner, instructor of Minnesota’s Circuit Training and Assistance Program (CTAP). The link is on Minnesota LTAP’s videos page.

Social media: resources to get you started

While a growing number of local agencies are using social media to reach out to their constituents, many others aren’t quite sure how to get started. Following are some resources to help you get started.

• Minnesota Office of Enterprise Technology’s Social Resources for Media for State Government, 2011. The resources section contains links to helpful information and research about policies, usage, and best practices being used by other organizations and state governments. The page includes links in the areas of policy development, surveys and research, guidelines, and best practices.

• Strategic Approaches to Developing a Social Networking Page, Transportation Research Board, 2011.

• “Planning for an Organization’s Social Media Debut,” Janet Fraser, TR News, No. 271, November-December 2010: 19.

• Government on Facebook. Facebook has published a page for governments that provides guidance on creating and using Facebook.

• Twitter basics

Covers the basics of how to join Twitter, manage an account, and insert a feed on a website; also has a Twitter glossary: http://support.twitter.com/groups/31-twitter-basics

Suggested Twitter feeds for local agencies

• Minnesota Department of Transportation: @mndotnews

• University of Minnesota: @UMNCTs

• Federal Highway Administration: @USDOTFHWA

• AASHTO: @aashtospeaks

• ITS World Congress: @ITSWC

• Reconnecting America: @reconnecting

• American Public Works Association: @APWATWEETS

• USDOT Secretary Ray LaHood: @RayLaHood

• Transportation Research Board: @TRSoIN

• Public Works: @PublicWorks (provides online resources for public works professionals)

• PublicWorksAgency.com: @PWA1N (this is a social networking portal available on the web and on mobile devices for the public works industry)

• National Complete Streets Coalition: @completestreets

• Your local news outlet

—Marilee Tuite, LTAP librarian
Newsgroup coordinator: broaden your skills in 2013

With a new year looming just around the corner, it's a good time to think about what the future holds and how we might make a fresh start. Perhaps you've been thinking about broadening your skills or maybe you are interested in taking on more of a leadership role in your agency. Right now is a good time to reflect on your needs and desires and come up with a plan to reach your goals.

Training and educating builds self-confidence and shows our employers that we are committed to enhancing our job performance. If personal or professional development is on your mind, a first step might be to think about what skills you could learn that would complement the skills you already have. Talk to your supervisor to align your educational goals with your agency's needs. Keep in mind that along with technical knowledge, understanding how to effectively communicate and build relationships is just as important.

And finally, before I end my thoughts about continued education, consider what methods of learning work best for you. There is an old proverb: "I hear and I forget, I see and I remember, I do and I understand." Training and educational opportunities come in many different forms, including face-to-face classroom style learning, online and web-based self-paced courses, and hands-on and demonstration workshops. Whatever method you choose, applying and practicing your new skill or knowledge on the job will help you retain what you've learned.

Fall LTAP workshops are under way, and winter/spring 2013 workshops are finalized. Don't miss the opportunity to sign up for the Bridge Maintenance workshop being offered in March. This class was last held in 2008 and has been revised and updated. If you attended the old bridge workshop and wish to take the new version, you will have to attend the old one. Contact LTAP Workshops for more information or to schedule classes, call the LTAP instructor, Kathy Schaefer, at 651-366-3575, or e-mail Kathy.Schaefer@state.mn.us.

Nominations sought for Road Salt Symposium award

The 12th annual Road Salt Symposium will be held February 7 at the Minnesota Landscape Arboretum in Chaska. A highlight of the symposium, which is worth one Roads Scholar credit, is the presentation of the Environmental Leadership Awards. We need your help! Please tell us about innovative organizations or individuals who have taken steps to reduce the amount of salt used during winter maintenance. Nominations are informal and should be sent to connie@stottnoconsulting.com. Send an e-mail by November 30 describing why this individual or organization deserves to be recognized for salt reductions, and we will gather the necessary details for our selection committee. Visit the Freshwater Society’s website for more details on the symposium and to view last year’s winners.

Visit our website for updates about upcoming training, such as the Minnesota Roadway Maintenance Training and Demo Day in April. The event provides classroom teaching and outdoor demonstrations.

Calendar

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Location</th>
<th>Contact</th>
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<tbody>
<tr>
<td>December</td>
<td></td>
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<tr>
<td>Dec. 5</td>
<td>59th Annual Asphalt Conference</td>
<td>St. Louis Park, Minn.</td>
<td><a href="http://www.asphaltisbest.com">www.asphaltisbest.com</a></td>
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<tr>
<td>Dec. 6</td>
<td>60th Annual Concrete Conference</td>
<td>St. Paul, Minn.</td>
<td><a href="http://www.coa.umn.edu/concrete">www.coa.umn.edu/concrete</a></td>
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<tr>
<td>Dec. 7</td>
<td>Freight and Logistics Symposium</td>
<td>Minneapolis, Minn.</td>
<td><a href="http://www.cts.umn.edu/Events/FLSSymposium">www.cts.umn.edu/Events/FLSSymposium</a></td>
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January–April

<table>
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<tr>
<th>Event</th>
<th>Location</th>
<th>Contact</th>
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<tr>
<td>Jan.–Apr. Truck-Weight Compliance Training (1 cr)</td>
<td>Statewide</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<tr>
<td>Jan. 22–25 Minnesota County Engineers Association Annual Conference</td>
<td>Gulf B. Lake, Minn.</td>
<td><a href="http://www.mceoengineers.org">www.mceoengineers.org</a></td>
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<td>Jan. 30-Feb. 1 City Engineers Association of Minnesota Annual Conference</td>
<td>Brooklyn Center, Minn.</td>
<td><a href="http://www.ceam.org">www.ceam.org</a></td>
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<tr>
<td>Feb. TBD NCITE Traffic and Transportation Engineering Symposium (1 cr)</td>
<td>TBD</td>
<td><a href="http://www.mnltap.org/Events">www.mnltap.org/Events</a></td>
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<td>Feb. 7 Annual Road Salt Symposium (1 cr)</td>
<td>Chaska, Minn.</td>
<td><a href="http://www.mnltap.org/training/saltbasement">www.mnltap.org/training/saltbasement</a></td>
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<td>Feb. 14 TRRA Pavement Conference (1 cr)</td>
<td>St. Paul, Minn.</td>
<td><a href="http://www.cts.umn.edu/Events/PavementConf">www.cts.umn.edu/Events/PavementConf</a></td>
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<td>Feb. 20 Pavement Rehabilitation: Products, Processes, and Strategies (1 cr)</td>
<td>Rochester, Minn.</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<tr>
<td>Feb. 27 Pavement Rehabilitation: Products, Processes, and Strategies (1 cr)</td>
<td>Twin Cities metro</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<td>March 2 Bridge Maintenance (1 cr)</td>
<td>Twin Cities metro</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<td>March 5 Transportation Career Expo</td>
<td>Minneapolis, Minn.</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<tr>
<td>March 6 Pavement Rehabilitation: Products, Processes, and Strategies (1 cr)</td>
<td>Brainerd, Minn.</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<td>March 6 57th Annual Asphalt Contractors' Workshop / Quality Initiative Workshop</td>
<td>Brooklyn Center, Minn.</td>
<td><a href="mailto:info@mnmapa.org">info@mnmapa.org</a></td>
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<td>March 8 Seal Coat Operations: A Workshop for Practitioners (0.5 cr)</td>
<td>St. Cloud, Minn.</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<td>March 13 Seal Coat Operations: A Workshop for Practitioners (0.5 cr)</td>
<td>Owatonna, Minn.</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<td>March 13–14 Concrete Paving Association of Minnesota 51st Annual Concrete Paving Workshop</td>
<td>Rochester, Minn.</td>
<td><a href="http://www.concretebuilder.com">www.concretebuilder.com</a></td>
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<td>March 19–20 Northland Chapter of ATSSA &quot;How To&quot; Training &amp; Education Workshop (0.5 cr)</td>
<td>Fargo, N. Dak.</td>
<td><a href="http://www.northlandatssa.com">www.northlandatssa.com</a></td>
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<tr>
<td>March 20 Micro/Slurry Surfacing: A Workshop for Practitioners (0.5 cr)</td>
<td>Mankato, Minn.</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<td>March 26 Bridge Maintenance (1 cr)</td>
<td>Brainerd, Minn.</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<td>March 28 Bridge Maintenance (1 cr)</td>
<td>Brainerd, Minn.</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<td>March TBD Reducing Risk and Liability (1 cr)</td>
<td>TBD</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<tr>
<td>Apr. TBD Work-Zone Safety, Temporary Traffic Control and Raging (0.5 cr)</td>
<td>TBD</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<tr>
<td>Apr. TBD Minnesota Roadway Maintenance Training and Demo Day (1 cr)</td>
<td>St. Paul</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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<tr>
<td>Apr. TBD Work-Zone Ragger Training (CTAP) (0.5 cr)</td>
<td>TBD</td>
<td>612-625-2900, <a href="mailto:coeconf02@umn.edu">coeconf02@umn.edu</a></td>
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LTAP workshops

LTAP workshops, along with events cosponsored by Minnesota LTAP, are marked with an LTAP above. Check the web for details and to register online: www.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

Circuit Training and Assistance Program (CTAP) workshop 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 (0.5 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) • Snowplow Controller Hands-on Workshop (0.5 cr) • Truck and Equipment Washing Best Practices (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 Kathy.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 (credits are indicated above). To learn more or enroll in the program, visit www.mnltap.umn.edu/roadscholar, LTAP.