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WISCONSIN TRANSPORTATION INFORMATION CENTER– LTAP

The more local officials understand good construction practices, the better they can protect this significant community investment in road pavements.

INSIDE

Roadwork: what to look for as it happens

ROADWORK PROJECTS continue to take a big bite out of local government budgets. The more local officials understand good construction practices, the better they can protect this significant community investment in road pavements.

Local officials in charge of new road or resurfacing projects should coordinate details with the contractor prior to the start of construction, including who is responsible for which aspects of the project. Do not overlook agreeing on how to manage project quality control and quality assurance.

Crossroads offers some basic guidance in the form of simple checklists for both chip seal and hot-mix asphalt projects that local officials can use during discussions with the contractor and on field visits. Some communities find it useful to retain an engineering and materials consultant to provide inspection services, particularly on more complex projects.

See the job done right

Because local officials have to live with the project results, a good quality-management program is essential, says Tom Nelson, Professor of Civil Engineering at the University of Wisconsin-Platteville and an instructor for the Transportation Information Center workshop on roadway maintenance. "Local officials have to maintain these resurfaced roads once the contractor leaves. A good job makes ongoing maintenance easier and less costly," Nelson observes.

Rubber tire roller imbedding aggregate on a chip seal project.

He adds that the high cost of materials now makes every road project a bigger investment for local governments. Developing and using a basic knowledge of materials and the application process helps in seeing a job is done right.

Nelson praises contractors in Wisconsin as pros who do excellent work. Local officials do well to work closely with their contractor during a project, he says. Being on site is part of that commitment. "You learn something every time you're out there, new approaches, new equipment and new ways to use it."

Pre-paving meetings

Director of Engineering for the Wisconsin Asphalt Pavement Association, Scot Schwandt, says WAPA members welcome regular interaction with customers. It helps them meet owner expectations—essential to doing business and staying competitive.

Schwandt recommends local officials request pre-paving meetings with contractors, typically held within days of the planned work. "For contractors on state projects, pre-paving meetings are standard," he explains. "Owner and contractor go over the process, talk about what's going to take place, what's going to be achieved and pinpoint any issues that concern them."

Another aspect of planning ahead is to address quality in the bid process. Schwandt encourages local governments that reference Wisconsin Department of Transportation specification 460 "Hot Mix Asphalt Pavement" to make sure all

Continues on page 10

Find inspection checklists on page10.

Idea EXCHANGE

Fog-seal treatments show early promise

Fetzer says his main reason for applying the fog seal was to test how well it cut down on loose chips.

ON A QUEST to get more life out of local roads, the Town of Newbold in Oneida County tested several treatments on a stretch of rural town road last summer. One treatment tried—fog sealing—is rarely used in Wisconsin. ***Crossroads*** asked Town of Newbold Director of Public Works Mark Fetzer to share his findings so far.

The Town based its fog-seal experiment, in part, on information in a seal coat handbook published by the Minnesota Local Road Research Board. The handbook describes fog seal as a thin coating of diluted emulsion applied at a rate of from .06 to .12 gallons per square yard. The application of a fog seal over a chip seal generally reduces stone loss from new chip seal, and adds protection against surface breakdown from water and air.

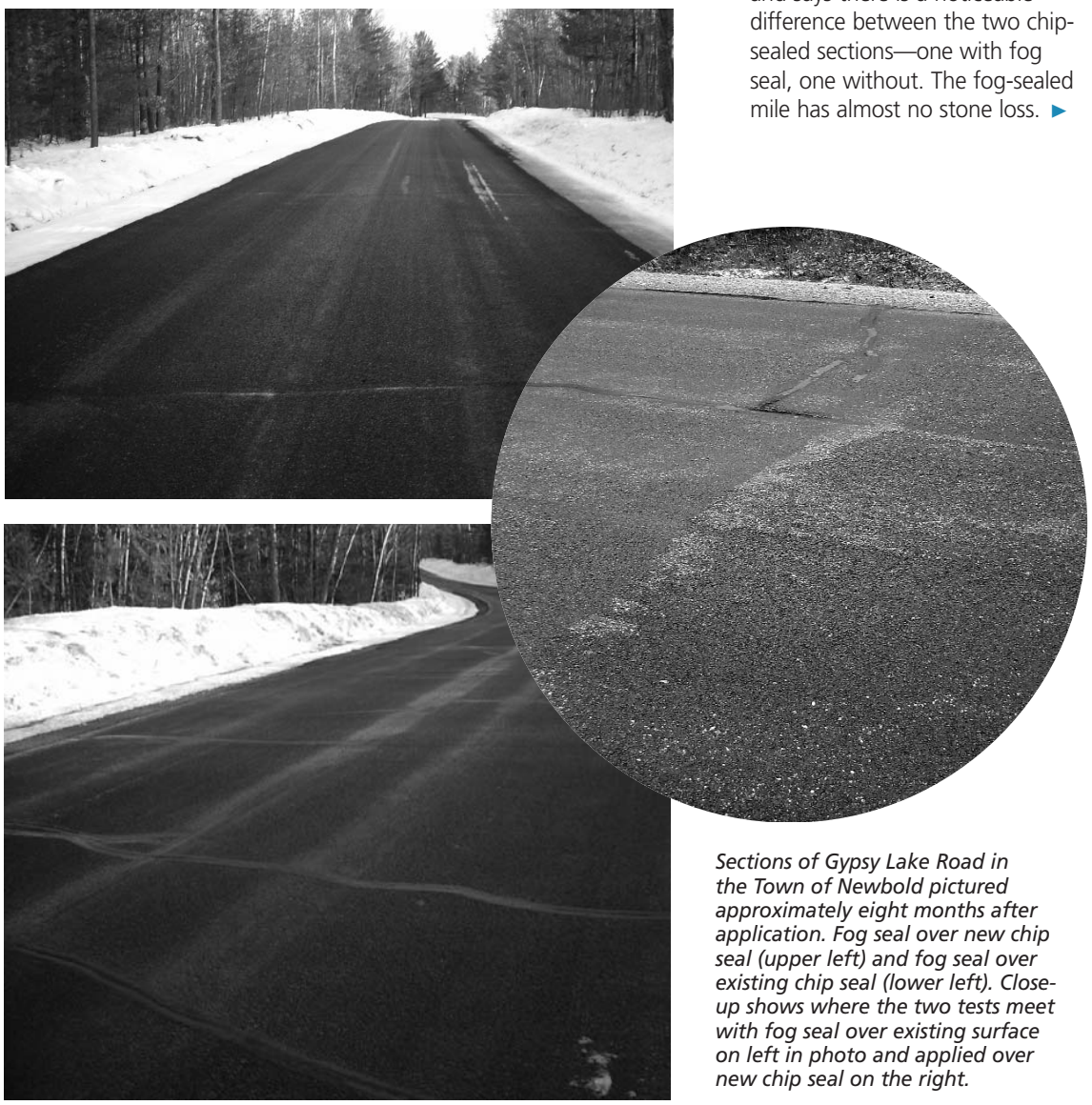
Fetzer says his main reason for applying the fog seal was to test how well it cut down on loose chips. "Because the diluted mix uses less material, it could be an economical way to keep the existing surface from falling apart or fading away."

The Newbold "test site" is a four-mile road with consistent surface condition and moderate north woods traffic. The Town paved it in 1992, 1993 and 1994 with a 2-inch hot asphalt mix. In 1999 they chip-sealed it. The road crew singled out two miles for the fog-seal tests and tested the other two miles with a polymer-modified asphalt chip seal and a chip seal using slag seal in place of conventional aggregate.

New-on-new

The first fog-seal test mile was done according to the handbook description, applying fog seal over new chip seal. Fetzer's team came up with a formula using CRS-2P asphalt emulsion diluted an additional 50 percent with water, applied at a rate of .09 to .11 gallons per square yard. Total cost for the "new-on-new" section was $14,470, including $2,500 for the fog seal.

Fetzer is pleased with the results and says there is a noticeable difference between the two chip-sealed sections—one with fog seal, one without. The fog-sealed mile has almost no stone loss. ►



Sections of Gypsy Lake Road in the Town of Newbold pictured approximately eight months after application. Fog seal over new chip seal (upper left) and fog seal over existing chip seal (lower left). Close-up shows where the two tests meet with fog seal over existing surface on left in photo and applied over new chip seal on the right.

Contact

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Resources

www.lrrb.org/PDF/200634.pdf
Link to PDF Minnesota Seal Coat Handbook from the Minnesota Local Road Research Board, Minnesota Department of Transportation.

www.dot.ca.gov/hq/maint/TAGFogSealsGuidelines.pdf
Link to California Department of Transportation, Division of Maintenance Fog Seal Guidelines.

www.fhwa.dot.gov/Pavement/preservation/ppcl04.pdf.
Links to FHWA Pavement Preservation Checklist #04 Fog Seal Application.

www.pavementpreservation.org/fogseals/
Source for information on use of fog seal and rejuvenators with project examples.

"We can see the thin layer of asphalt wearing off the top of the stones, but we expected that," he notes. "We'll monitor it this summer to see if the stone gets tacky in the hot sun, but since the coating wore off quickly we don't expect a big problem."

Fog sealing old road

The second fog-seal experiment involved fog sealing one mile of aged road surface, applying the same diluted CRS-2P 1:1 emulsion over an eight-year-old chip seal surface. Cost for this stretch was $2,500.

"Our thinking on this was the fog seal would get into the spaces between the stones and slow down oxidation of the existing asphalt," Fetzer says. "We knew the thin layer of asphalt would wear away quickly from on top of the stones, but expected it to settle between the stones and last quite a while since it's not in contact with vehicle tires or snowplow blades."

Applying fog seal on a road with a coarse surface, he reasoned, made best use of the material as it fills cracks that speed overall deterioration.

The verdict? "Looks good so far," Fetzer reports. He says the fog seal is wearing away where stones from the old chip seal protrude but appears to be sealing well inside the voids. Concerns about the application making the rough surface slippery did not materialize.

Roads ahead

Based on these findings, Fetzer hopes to make fog-sealing part of future chip-seal projects for the Town. "Since we chip seal about 99 percent of our roads, anything we can do to extend the life of that layer is a good investment." ■

MUTCD comment period closes July 31

THERE STILL IS TIME to comment on amendments to the *2009 Manual on Uniform Traffic Control Devices.* The Federal Highway Administration published the proposed changes to the next edition in January for public review and comment period that closes July 31, 2008.

Among many MUTCD amendments are updated requirements for signs, pavement markings, traffic signals and work zones that will affect local government operations and budgets. The public comment period is an opportunity to review proposed changes and provide FHWA with feedback. Local officials can object to proposed changes, suggest additional changes and report on the costs, benefits and impact they expect the changes to make on traffic safety at the community level.

Among many proposed changes in the 2009 MUTCD, this list highlights several of special interest to local operations.

- Fluorescent Yellow Green signs required for all school warning signs
- New symbol sign replaces SCHOOL BUS STOP AHEAD word sign
- End of a school speed zone marked with END SCHOOL ZONE sign
- Operating procedures for adult school crossing guards change from recommendations to requirements
- High-visibility safety apparel that conforms to ANSI Type 2 or 3 standards required of all workers in all public rights of way
- STOP or YIELD signs at all passive railroad crossings
- Flagging STOP SLOW paddles must be on rigid staff a minimum of 7 feet long
- Flaggers must use paddle, flag or automated flagger-assistance device in addition to hand signals
- Some traffic signal warrants modified, including pedestrian volume and intersections near railroad grade crossings
- Amendments to location, number and design of traffic signal faces and heads, and increased rate of pedestrian walk time from 4 to 3.5 feet per second
- MUTCD applies on private property open to public travel
- Increased sizes for signs and lettering
- All-uppercase lettering no longer allowed for street name signs
- Narrow signs for narrow medians and reduced sign sizes for alleys
- Symbol signs replacing some word message warning signs

Download proposed changes at *http://mutcd.fhwa.dot.gov/index.htm*.

Mail comments to the U.S. Department of Transportation, Dockets Management Facility, 1200 New Jersey Ave. SE, Washington, DC 20590

Submit electronically at *http://www.regulations.gov.*

Or fax comments to (202) 493-2251. Include Docket No. FHWA-2007-28977 on all comments.

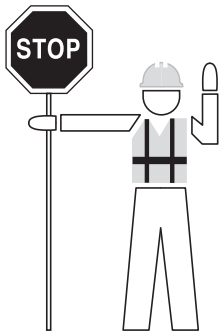
Comparing high-visibility apparel

One important proposed change in the MUTCD requires that all workers who operate in a public right-of-way wear high-visibility safety apparel that meets ANSI Type 2 or Type 3 standards. What is the difference between the two performance classes?

Type 2 apparel includes shirts, jackets or sleeveless vests that provide 360 degrees of torso visibility with horizontal and vertical retroreflective stripes. Look for genuine Class 2 tags to avoid violations. Typical occupations using this class include forestry operations, roadway construction, trash collection, high-volume parking, emergency response and law enforcement.

Type 3 safety apparel provides more coverage for individuals in the category of roadway construction personnel, utility workers, survey crews, and emergency responders. This apparel class includes full jackets and pants with retroreflective stripes to improve safety for workers exposed to high-speed traffic who cannot pay attention to approaching traffic. MUTCD recommends using Type 3 if in doubt about what degree of coverage to choose.

SOURCE: NEW JERSEY LTAP NEWS



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Plan ahead to reduce work-zone impact

Bringing work-zone issues to the forefront of project planning actively promotes traveler and worker safety.

PURPOSEFUL PLANNING makes work zones safer and construction projects run smoother for everyone. That is the principle behind a policy issued last year by the Wisconsin Department of Transportation. Projects affected include construction, maintenance and utility work on major and state trunk highways, and local roads improvement projects funded by federal or state dollars. Local projects developed using the WisDOT bidding process also must comply.

While the policy does not apply to other local projects directly, the idea behind the policy and a related planning process are things local governments can use to better manage work-zone impacts on all projects.

The WisDOT policy requires agencies that manage road projects governed by the policy to submit a work zone Transportation Management Plan (TMP) to the department for approval.

Project complexity an issue

State Traffic Engineer of Design Tom Notbohm and State Work Zone Traffic Engineer Peter Amakobe, both with the WisDOT Bureau of Highway Operations, work with agencies expected to follow the guidelines. They say bringing work-zone issues to the forefront of project planning actively promotes traveler and worker safety. The policy also aims to minimize congestion and reduce adverse impacts during construction.

Notbohm says the policy recognizes that work-zone planning and implementation need to keep pace with the complexity and infrastructure demands of today's projects—a surplus of essential repairs or replacements combined with greater traffic density. Efforts that minimize disruptions help with the public's acceptance of street and road projects.

Key to the policy are the guidelines for developing a TMP. They recommend and require documentation of the work being done, the expected impact on traffic, plans to communicate with all stakeholders and mitigate negative outcomes. "When agencies put thought into these aspects of a project early, they become part of the budget process so safety and reasonable access do not get short-changed," notes Amakobe.

Assessing specific work-zone impacts this way and incorporating costs to manage them effectively is a useful model for many local projects. Notbohm points to resources like work-zone courses offered by the Transportation ►

Use "talking points" to send safe work zone message

As local officials communicate details about road closings and delays to the media and general public, they can send a strong message about work zone safety.

ROAD CONSTRUCTION and major street repairs are a fact of life in Wisconsin in summer. So are the mix of detours and traffic congestion signaled by every sign declaring ROAD WORK AHEAD. As local officials communicate details about road closings and delays to the media and general public, they can send a strong message about work zone safety. These facts and talking points help back that message up.

Work zone stats Last year, Wisconsin recorded an estimated 1,717 crashes in work zones, resulting in 11 motorist fatalities and 847 people injured. Careful planning and implementation of safety procedures, greater awareness of the rules by those who travel through work zones and stronger enforcement can bring these numbers down.

It's the law Wisconsin has a "Move Over" law that requires motorists to slow down or, if possible, change lanes when they see maintenance, utility or emergency vehicles ahead. This law gives the people who maintain our roads, enforce our laws or provide assistance to motorists a safety margin while they work.

Pay attention, be safe Drivers need to stay alert to driving conditions, especially in work zones, and slow way down. One moment of inattention or impatience at excess speed is all it takes to cause severe injury or death. Work zone signs, flaggers, orange cones and drums are there for a reason. They say *pay attention* and *be safe*.

Face the consequences Causing injury or death in a work zone has consequences. The penalty of a fine—double in work zones—or time in jail can be harsh. But the damage goes deeper. The emotional toll an avoidable work zone crash takes on families and friends of victims can stay with an inattentive driver for the rest of his or her life.

Workers at risk Road crews face significant risks working mere feet from traffic. Even when they take the best by-the-rules precautions like reflective clothing and miles of conspicuous traffic control devices, their safety depends on accident prevention plans that work. It is critical that road users respond correctly to changing conditions when entering a work zone—the better to protect themselves, their passengers and the people working on the road project.

Safe work zones can happen It does not take much to make our roads and highways safer, even during road construction season. The message is simple: ***safety first.*** That means slow down and proceed with caution when there are flashing lights, maintenance, utility, or emergency vehicles, orange signs and barrels, and workers on the side of the road. ■

Information Center and TIC's *Work Zone Safety Flipbook* and *Flagger Handbook* as a strong foundation for the best practices promoted in the TMP guidelines.

Project type influences TMP

Traffic-control mitigation strategies identified in the TMP guidelines vary based on project type. Factors like project length, location, timing, lanes affected, speeds, closures and the effect on critical services help define the four types.

TYPE 1 Projects with little or no impact due to short duration or likelihood of working off-peak hours or in areas with light traffic. *EXAMPLES* Local bridge projects that do not need a posted detour, sign work, pavement marking, mowing, patching, surveying. *REQUIREMENT* Traffic control plan and appropriate public information and outreach.

Type 2 Projects include lane/road closures on busier roadways involving work that causes minimal delays. *EXAMPLES* Road resurfacing, bridge deck overlays, and some reconstruction and intersection improvements with minimal impact. *REQUIREMENT* Traffic control plan and, as needed, public information and outreach, transportation operations and incident management considerations.

Type 3 Higher-profile projects that affect more road users for longer periods, involve delays and detours that require temporary improvements and traffic controls. *EXAMPLES* Pavement replacement or reconditioning, bridge deck replacement, urban street or intersection reconstruction with unusual access needs, freeway lane/ramp improvements. *REQUIREMENT* Outline measures for all elements of traffic control, transportation operations, public information and outreach, and incident management.

Type 4 Megaproject category with traffic and mobility impacts that cross municipal, regional and state lines, and affect many stakeholders inside a wide transportation network. *EXAMPLES* Marquette Interchange in Milwaukee and I-39/29 at Wausau. *REQUIREMENT* Detailed plans for all elements of traffic control, transportation operations, public information and outreach, and incident management.

Most local road projects fall into the first two categories but it helps to know how work-zone planning evolves as project complexity grows. A downtown reconstruction project could escalate to a Type 3 or 4 project and involve coordinating details with WisDOT and with other local agencies.

Plan traffic flow measures and worker safety as part of every road project.

Useful model for local projects

The push for greater work-zone planning and budgeting is a federal mandate spurred by the need to manage big road projects better. Translated to the state level by WisDOT policy and guidelines, the concept is a useful model for local projects.

Ashland County Highway Commissioner Emmer Shields sat in on a recent WisDOT workshop on the policy. He says following the policy—even voluntarily—would be a radical change for many towns and counties. "Most of us do a good job on work-zone safety and control now," he observes. "But developing a detailed plan means more implementation time for each project, more coordination and scheduling."

Despite the additional work involved in the process, Shields says the approach has potential. A documented transportation management plan challenges local agencies and contractors to put more thought into strategies that limit delays and inconvenience for the traveling public. "It sets an expectation for better decision making all around."

He recommends WisDOT do more to refine the standards for Types 1 and 2 in the guidelines, and target training for local government officials in how to apply those standards to their projects. TIC is developing a modified version of the WisDOT training for local officials it plans to offer in the near future.

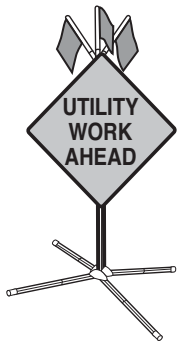
Coordinating, communicating

Early coordination between agencies is central to the TMP approach. Planners doing advance planning on projects governed by the policy must communicate anticipated work-zone impacts with officials at every level in communities affected.

Amakobe and Notbohm say that connecting with local officials taps into local expertise about local traffic patterns, events, schools and business districts, emergency routes and other planned road projects. The more local officials understand and follow the guidelines themselves, the stronger role they play in work-zone safety on all projects in their jurisdictions.

"The TMP process makes us think about every possible impact of a road project and come up with the best way to maintain a reasonable level of safety—for the workers and for the public," Amakobe concludes. "You only need to hear one or two stories of death or injury in a work zone to realize how important this is." ■

Work-zone planning and implementation need to keep pace with the complexity and infrastructure demands of today's road projects.



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Resources

https://trust.dot.state.wi.us/extntgtwy/dtid_bho/extranet/programs/workzone/workzone.shtm

Link to download WisDOT TMP Guidelines and other resources; requires user ID and password.

Or to request Guidelines, contact Peter Amakobe by phone (608-261-0138) or email *peter.amakobe@dot.state.wi.us*

Meeting sign retroreflectivity levels

Lupes says the FHWA encourages agencies faced with meeting the standards to focus first on developing a complement of recommended management or assessment methods to monitor sign life.

Hand-held retro-reflectometers like this one use a light sensor to read the material brightness of a sign and give a digital readout.

UPDATED STANDARDS

for sign retroreflectivity in the MUTCD (Manual of Uniform Traffic Control Devices)—adopted earlier this year by the Federal Highway Administration—require transportation agencies who maintain traffic signs to institute a sign inventory system and a method for managing that inventory above a minimum level of nighttime performance.

Deadlines for implementing each phase of the standards are: January 2012 to have a management or assessment method in place, January 2015 for replacing regulatory, warning and ground-mounted guide signs, and January 2018 for replacing street name and overhead guide signs.

The new standard establishes minimum maintained retroreflectivity levels (units of cd/lx/m^2) based on sign material and type. Numerical levels featured in MUTCD Table 2A-3 of the standards describe the efficiency of recommended sheeting materials, or how well a material performs based on the amount of light that hits it. For example, the maintained minimum level for a black on yellow sign that measure less than 48 inches is equal to or greater than 75 cd/lx/m^2.

Matt Lupes, Highway Safety Engineer with FHWA and a member of the rule-making team, cautions against getting lost in the numbers. "Improving nighttime visibility is the primary goal of the new standards and that starts with the signs themselves," he says. "The research tested the retroreflective performance of sign materials at different light levels so we have a baseline for deciding the suitability of each."

Manage signs, know sheeting types

Lupes says the FHWA encourages agencies faced with meeting the standards to focus first on developing a complement of recommended management or assessment methods to monitor sign life. With that in place, get to know this simple breakdown of sheeting types and applications.

Prismatic sheeting: acceptable for all signs.

High-intensity beaded and super engineer-grade sheeting: acceptable for all signs except white legend on overhead guide signs.

Engineer-grade sheeting: Acceptable for all signs except (1) white legend on guide signs, (2) white legend on street name signs, and (3) all yellow and orange warning signs.

As a footnote to this list, the MUTCD states that acceptable sign materials will differ in quality and particular types degrade quickly to below minimum levels. It suggests investing in higher-performance sheeting can be a cost-effective approach.

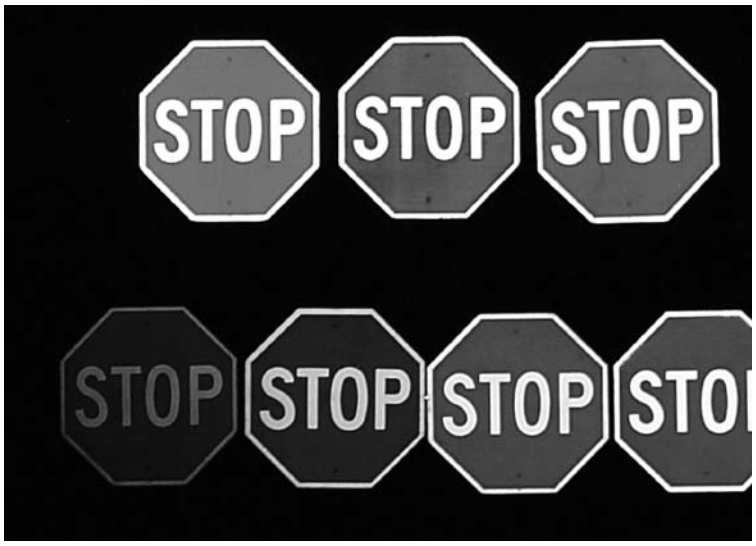
New assumptions

Research on retroreflectivity standards for signs and markings dates back more than 20 years with several transportation safety agencies documenting acceptable levels. Changes in headlamp aim and brightness in the late 1990s prompted additional research on overhead and street name signs. That work led to updating minimum levels for all sign types—taking into account factors like driver age, headlamps, vehicle types and sheeting material.

Research Engineer Paul Carlson of the Texas Transportation Institute served as a consultant to the MUTCD rule-making team. He helped conduct the research behind the change in minimum maintained levels.

Carlson put older drivers with an average age of 62 behind the wheel and had them read traffic signs in a highway-like setting on an unused airport runway. The research team tested highway signs at 32 different headlight settings to measure the threshold of brightness older eyes need to read the signs.

"This was a new way to look at how bright signs need to be for legibility," Carlson says. "What we learned differed significantly from previous research, in part because our research plan was built around applied-research techniques rather than relying on theoretical modeling done by computers."



Example of sign weathering racks used to measure retroreflective durability.

Sign color and type	Minimum level of maintained retroreflectivity (cd/m²)
WHITE on GREEN Guide signs	**WHITE** ≥ **120** Engineer grade not allowed. **GREEN** ≥ **15** Engineer grade ≥ 7 allowed.
Overhead guide signs	**VARIES BY SHEETING TYPE**
BLACK on YELLOW or BLACK on ORANGE Warning signs	**YELLOW/ORANGE** ≥ **50** Signs 48" or more and all bold symbol signs. Engineer grade not allowed. **YELLOW/ORANGE** ≥ **75** Signs less than 48" except symbol signs. Engineer grade not allowed.
Warning in Work zone	
WHITE on RED Stop, Yield, Wrong Way Do Not Enter, etc.	**WHITE** ≥ **35** **RED** ≥ **7** Contrast ratio of 3:1 or greater. (white retroreflectivity ÷ red retroreflectivity)
BLACK on WHITE Speed Limit, One Way U.S. Highway, etc.	**WHITE** ≥ **50**

Simplified version of MUTCD Table 2A-3 shows sign types and minimum retroreflectivity levels.

Among those assumptions, the minimum maintained traffic sign retroreflectivity represents driver needs in dark rural conditions with little or no ambient lighting, no glare and no visual complexity. Sign readability depends on a legibility index of 40-feet-per-inch of letter height and assuming the only source of light comes from a single vehicle. The final minimum levels represent the nighttime visibility needs for older drivers.

The rule-making team held workshops to review recommendations with state and local officials and members of the public. Their feedback helped shape the final FHWA report. It also validated the value of a visual inspection, Lupes says, as participants consistently identified signs that did not meet proposed minimums.

Assessment method using retroreflectometer

Agencies following the minimum-level numbers closely as part of their sign-management approach may choose to assess sign life using a retroreflectometer. The devices measure retroreflectivity or material brightness at the MUTCD-specified observation angle of 0.2 degrees. The operator places the device opening flat against the sign then pulls and holds a trigger until each reading is complete. The unit collects and averages multiple readings.

Adams County recently added a retroreflectometer to its sign-management program. Dennis Premo, Patrol Superintendent for the Adams County Highway Department, says prior to using this assessment method, the county conducted nighttime inspections method for retroreflectivity assessment. "So far, we've found our earlier assessments were fairly accurate. But with documented readings and the MUTCD-provided parameters, I think we can do a better job of justifying and anticipating asset replacement."

Premo says the only challenge so far in using the retroreflectometer is reaching taller signs and the limitations of operating it in cold weather. The agency combines metered assessments with routine visual inspection and blanket replacement during road construction projects.

PHOTO COURTESY OF TAPCO

Retroreflectometer measuring stop sign.

More resources coming

Lupes says the FHWA has heard from many local and state officials who want more guidance in understanding and meeting the MUTCD standards. An "implementation tool kit" is being developed to help agencies in charge of sign replacement evaluate which management or assessment method will work best for them. Regular updates appear on the FWHA website *www.fhwa.dot.gov/retro*, including links to resources like a retroreflectivity sheeting identification guide.

Lupes adds, "We continue to listen for feedback and invite questions from people on how to respond to the new standards." ■

The rule-making team held workshops to review recommendations with state and local officials and members of the public. Their feedback helped shape the final FHWA report.

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Resources

http://mutcd.fhwa.dot.gov/

Manual on Uniform Traffic Control Devices website with links to information on retroreflectivity standards.

http://safety.fhwa.dot.gov/roadway_dept/retro/sign/sign_retro.htm

FWHA's sign retroreflectivity website.

http://safety.fhwa.dot.gov/roadway_dept/retro/sign/retrore_sheet_id.htm

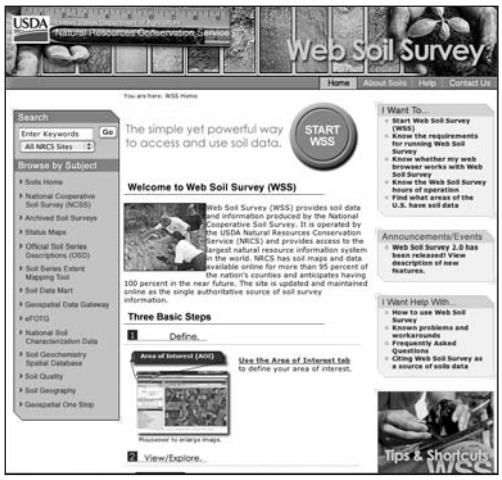
Link to FWHA's *Retroreflectivity Sheeting Identification Guide.*

Web Soil Survey provides access to soil data

The website currently provides up-to-date digitized soils information on more than 95 percent of the nation's counties– including every county in Wisconsin.

SOIL SURVEYS have come a long way since 1899 when the U.S. Department of Agriculture began publishing maps and data to help farmers and ranchers use and manage soil resources. The surveys migrated to the web three years ago. The latest edition is an interactive online database known as the Web Soil Survey (WSS).

Developed by the National Resources Conservation Service of the USDA, the website currently provides up-to-date digitized soils information on more than 95 percent of the nation's counties—including all in Wisconsin.



WSS homepage, entry point for soil survey data.

Jim Fortner, Soil Scientist with the National Soil Survey Center of the NRCS in Lincoln, NE, says engineers and consultants working on land-use projects account for about half the site's users nationally. Landowners, developers, community officials and others who want or need to understand soil issues also use WSS as a practical, accessible resource.

Local governments responsible for road, bridge and culvert improvement projects may find WSS a tool for planning and communicating with project designers. Jesse Turk, Major Land Resource Area Coordinator for Technology and Data with the Wisconsin office of the NRCS/USDA, says the site has all soil information for the state, noting Wisconsin was one of the first states to translate its soils data to digital. This includes soil classification data that meets AASHTO (American Association of State Highway and Transportation Officials) requirements.

Turk encourages local officials to visit WSS *(http://websoilsurvey.nrcs.usda.gov)*, explore the range of soil survey data available and follow the simple steps to customize their search. "They can pull up and print out maps and tabular data to verify existing soil conditions, identify sources of sand or top soil, make site selections—a range of applications."

Help with planning, decision-making

Fortner says the soil survey tool has potential for local governments evaluating plans for a variety of road projects. Survey data like the depth of bedrock, locations for borrowing fill material and facts about reclaiming excavated areas supply users now with information that helps guide their planning process.

"We hear from local and county planners at association meetings across the country who tell us they need information like this to judge project proposals and make informed decisions about awarding a contract," Fortner says. "The more they know about soil strength and composition, its suitability for whatever development is planned, the better equipped they are to ask questions and work with the experts."

Other typical users are crop consultants, land managers, individual landowners and homeowners. The Wisconsin office of NRCS/USDA is working to introduce WSS as a data source for town and rural assessors who need information on farmland and hunting land. It is also a teaching tool for students in conservation and land management.

Easy to extract info

Turk and Adolfo Diaz, Major Land Resource Area GIS Specialist with the NRCS/USDA in Wisconsin, describe WSS as user friendly and accessible by anyone with basic computer skills. The site includes, among its library of information, an introduction to soils that helps people without technical knowledge better comprehend the data they find there.

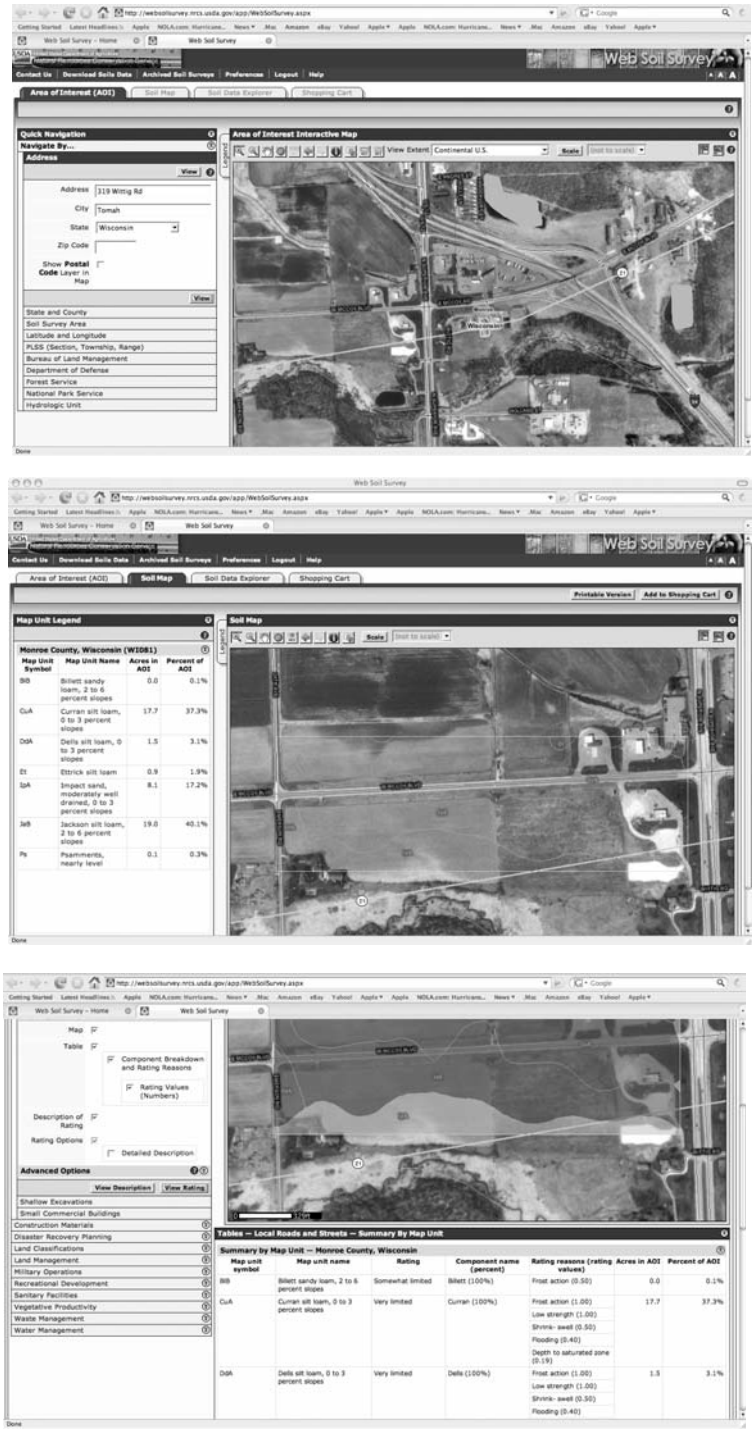
WSS users follow four basic steps to extract information. They start by defining an area of interest via a choice of parameters, including state, county, section, township or address. The system captures requested soil data for areas measuring 10,000 acres or less. Once a survey session begins, tabs along the top of the page guide users through each step. They can generate and print out a variety of thematic maps and reports, and can go deeper to explore a range of information.

The site provides access to soil properties and qualities like erosion factors, depth to water table, flooding frequency, percent of organic matter and other measures. It provides links to reports on building site development, land management and other topics.

WSS for local roads

One WSS application useful to local officials is accessing soils data when planning a road reconstruction project. Basic survey information can help identify soil-related distresses visible on the existing road and guide decisions about what type of reconstruction to do.

Access to the data is straightforward. Enter an address on the project road and WSS produces a map and aerial photo of the area. From that map or by using the AREA OF INTEREST tool to narrow the field, the SOIL DATA EXPLORER tab takes users into the website to BUILDING SITE DEVELOPMENT, from there to the SUITABILITIES AND LIMITATIONS subcategory and finally, to LOCAL ROADS AND STREETS. Choosing VIEW RATING creates a map and table with information on construction-



Three sample pages from a survey session show the presentation of maps and charts in WSS that users can customize to find the specific soil data they need.

related limitations for the specific soil. Ratings and definitions include:

- ***Not limited***. Features favorable for specified use; expect good performance, low maintenance.
- ***Somewhat limited***. Features moderately favorable for specified use; special planning, design or installation needed to overcome limitations; fair performance, moderate maintenance can be expected.
- ***Very limited***. One or more features unfavorable for specified use; major soil reclamation, special design or expensive installation procedures needed to overcome limitations; expect poor performance, high maintenance.

The table also lists conditions that influence the rating—like *low strength*, *shrink-swell, frost action* and *depth-to-saturated zone*—and rates for greatest negative impact.

Two sample condition ratings, with suggested conclusions:

(1) *Houghton muck*
Very limited
Ponding (1.00)
Depth to saturated zone (1.00)
Subsidence (1.00)
Frost action (1.00)

CONCLUSION: Indicates very poor soil requiring significant soil stabilization and drainage improvement to achieve reasonable road life. Even with improvements, expect poorer than normal performance and high maintenance costs.

(2) *McHenry silt loam, 2 to 6% slopes*
Somewhat limited
Shrink-swell (0.50)
Frost action (0.50)
Low strength (0.22)

CONCLUSION: Expect reasonably good performance out of a road on this soil as long as pavement design, drainage design and materials selection provide for soil-strength improvement and anticipate possible frost heave, and shrinking and swelling of the soil.

Comprehensive, navigable knowledge base

Fortner encourages local officials to sample WSS and weigh its value as an information resource. The site standardizes soil survey information to keep the quality high and delivery of data consistent. By managing the information electronically, it is possible to update site content annually or whenever new data—like a post-flood survey—is available. Such timely turnaround was not possible with printed surveys.

WSS also depends on regular user feedback to improve and add new functions. With every new audience the site reaches, Diaz and Turk encourage users to contact them with suggestions or comments.

As it represents the largest natural resource information system in the world, WSS offers a comprehensive and navigable knowledge base for local officials and others who want to know more about soil issues early in the decision-making process. ■

The site includes, among its library of information, an introduction to soils that helps people without technical knowledge better comprehend the data they find there.

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Resources

http://websoilsurvey.nrcs.usda.gov
Link to Web Soil Survey site and the entry point for a survey session.

http://soils.usda.gov/
Link to National Resources Conservation Service soils website containing science-based soils information.

Roadwork: what to look for

continued from page 1

Checklists make it easier to identify potential quality issues evident on site and discuss them with the contractor.

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contractors submitting bids understand that WisDOT's Quality Management Program, which outlines a comprehensive quality-control and quality assurance process, is part of the bid request. See related article on next page.

Basic checklists helpful

Most local officials are not expert at every detail of a chip seal or hot-mix asphalt project. Checklists like the ones provided here make it easier to identify potential quality issues evident on site and discuss them with the contractor.

Based on recommendations culled from various sources, ***Crossroads*** narrowed its lists to the basics. Critical in a chip seal job, for example, is compatibility between emulsion and chips. Nelson adds a caution to local agencies that supply their own chips: Do not switch specified aggregate material without notifying the contractor; the mix balance is important to materials bonding. Rolling and sweeping of the new surface are other points in the chip seal process to monitor closely in an on-site inspection.

Work on a chip seal project.

Equipment settings and material temperature matter on an asphalt-resurfacing job. Nelson notes spray bar position affects coverage of the tack coat layer. Issues of air temperature and weather conditions also belong on the agenda, along with producing a consistent blend of asphalt to aggregate.

Many reasons to be on job site

Nelson reports that local officials who routinely visit their roadwork job sites have many reasons for being there. Local officials serve as a contact point for members of the public who have questions about the project. They can use first-hand knowledge of project progress to update staff members, elected officials and residents about what is going on and the completion of key elements.

Finally, having a visible presence at the job site is good public relations. It reassures residents to see their local officials on the job, making sure the project spends public funds wisely. ■

Chip Seal Inspection Checklist

- ☐ Are asphalt and chip materials compatible? *The contractor usually checks and needs to know the source of chips if contracting agency provides the aggregate material. An incompatible chip/emulsion combination can separate within months. [see photo]*
- ☐ Is the chip material of a uniform size? Is it clean and free of excess dust?
- ☐ Is the road surface clean and dry? Have localized surface distresses been repaired and cracks sealed?
- ☐ Is the asphalt distributor truck spray bar set at a height that allows fans of asphalt to overlap and produce consistent double or triple coverage of the surface?
- ☐ Are all spray bar nozzles set at an angle of 15 to 30 degrees from parallel with the spray bar?
- ☐ Are all nozzles free of clogs? Does the spray pattern appear uniform or is there visible streaking? *If not uniform, the distributor should be stopped immediately, nozzles cleaned, and gaps sprayed by hand prior to restarting. [see photo]*
- ☐ Are chips spread uniformly across the entire road surface or street?
- ☐ Is the contractor using rubber-tire pneumatic rollers? *Do roller weight, tire size and pressure comply with manufacturer specifications? Are all tires inflated to the same pressure?*
- ☐ Does the chip spreader follow closely behind the asphalt distributor? *When using an emulsion, 100 feet or less is the recommended distance.*
- ☐ Does sweeping begin when there is sufficient bond between chip and binder? *Test-sweep a spot by hand using a whiskbroom. If you do not dislodge chips, the surface is ready to sweep.*
- ☐ Does traffic on the fresh chip seal move at 25 mph or less? *Avoid opening road to normal traffic until sweeping is done.*

Result with incompatible materials.

Streak caused by clogged nozzle.

Hot-mix Asphalt Overlay Inspection Checklist

- ☐ Is pavement surface clean, dry, and free of dust and debris? Are manhole covers and water valves raised to prevent awkward dips in the newly surfaced pavement? [see photo]
- ☐ Is tack coat asphalt applied properly? *Is distributor spray bar set at proper height to provide double coverage of tack coat, applied uniformly at the specified rate?*
- ☐ Are approved asphalt release agents used on trucks and rollers? *Diesel fuel should not be used. Be sure trucks and equipment do not leak hydraulic fluids, oil or fuel on the road surface; leaks can cause a poor bond or strip asphalt from newly placed mix.*
- ☐ How does contractor manage weather conditions? *Do they delay or stop paving if rain is forecast early, or if it occurs during the paving process? WisDOT specifications allow hot-mix asphalt application at a minimum air temperature of 36°F.*
- ☐ Did the hot-mix asphalt arrive at paving site within specified temperature range? *Check with instant-read thermometer. Cover all loads during inclement weather or when air temperature falls below 65°F.*
- ☐ How are the trucks unloaded? *Is care taken to avoid bumping the paver when backing up? Driver should raise truck bed slightly to break the load from the dump body before unloading into hopper and discharge material without spilling onto the pavement. End of load should not be cleaned out on pavement.*
- ☐ Is the mix placed at proper grade and cross-slope and specified thickness? *Overlays help correct existing cross-slope problems and road surface drainage.*
- ☐ Does the placed surface texture appear uniform, free of segregation, tearing or scuffing? *Does the paver screed adequately control thickness, provide a smooth surface and initial compaction of the mixture? Are manual adjustments kept to a minimum? Fold paver wings over every load or not at all to avoid placing cold segregated material.*
- ☐ Are there sufficient trucks to keep paver moving at a uniform speed, balancing production and delivery of material? *Is the amount of hot-mix asphalt material in the paver kept fairly constant to help produce a smooth surface?*

Sunken manhole should have been raised before paving.

QMP now part of hot-mix asphalt bid price

QMP (Quality Management Program) is the Wisconsin Department of Transportation program for quality control (QC), quality assurance (QA) and quality verification (QV) of pavement materials. QMP places much of the responsibility for materials production testing on the contractor. They must conduct regular QC/QA tests for materials at specified regular intervals. Project owners also must conduct verification testing of materials. Local officials may not be aware of QMP, but the program has been part of WisDOT's hot-mix asphalt specifications in some form since 1992.

A recent change in the specifications makes it more important to know about QMP when following WisDOT's Section 460 to bid out asphalt paving projects. Previously, costs associated with QMP came under a separate contract bid item. Effective in January 2008, the revised specification makes QMP incidental to the hot-mix asphalt pay item. Local officials who reference 460 for their projects or who use the TIC model specification based on 460, should make sure all contractors bidding on a project know QMP is expected and incidental so they uniformly consider it in preparing their bids.

With quality so important on every roadway project, QMP can help local agencies ensure best outcomes on their hot-mix asphalt jobs. QMP requires the contractor to make QC/QA information available to the owner. Local governments that specify the process need to provide verification testing to measure product quality. A qualified engineering and materials testing firm can assist local officials in understanding QMP, interpreting contractor-provided QC/QA information and identifying the tests needed for a particular project.

Publications

Quality Guidelines for Work Zone Traffic Control Devices, ATSSA. Pocket-size book for inspecting traffic control devices in the field. Text and color photos illustrate ratings for signs, barricades, drums, cones and other work zone devices as acceptable, marginal or unacceptable for use. Limited quantities from TIC.

Pavement Preservation Checklist Series for various asphalt pavement maintenance processes, including for seal, chip seal, and thin overlay. Available as a pocket-sized flipbook or as a downloadable PDF at *www.pavementpreservation.org/reference/brochures.php.*

Road Maintenance Workshop (3/08). Information on crack sealing, patching, chip seals, slurry seals and asphalt overlays.

Websites

Access to documents on some WisDOT links requires a WisDOT user ID and password which can be set up at: www.dot.wisconsin.gov/business/extranet/ wisuserid.htm

Guidelines for Developing Work Zone Transportation Management Plans, WisDOT (1/08), available with user ID and password.

https://trust.dot.state.wi.us/extntgtwy/dtid_bho/extranet/programs/workzone/workzone.shtm

Or contact Peter Amakobe at 608-261-0138 or *peter.amakobe@dot.state.wi.us* to request *Guidelines* document.

Transportation Management Plans (TMPs) for Work Zones Download PDF of Federal Final Rule on Work Zone Safety and Mobility.

http://ops.fhwa.dot.gov/wz/resources/tmp_factsheet.htm

Manual on Uniform Traffic Control Devices (MUTCD) Proposed changes and how to submit comments.

http://mutcd.fhwa.dot.gov/resources/proposed_amend/index.htm

WisDOT *Standard Specifications,* including Section 450 "General Requirements For Asphaltic Pavements" and Section 460 Hot Mix Asphalt Pavement.

http://roadwaystandards.dot.wi.gov/standards/stndspec/index.htm

WisDOT Construction and Materials Manual, with information on inspection and testing of materials, and additional information on the QMP process.

http://roadwaystandards.dot.wi.gov/standards/cmm/index.htm

Hot Mix Asphalt Pavement Guidelines from FHWA provides checklist of major asphalt paving inspection considerations.

http://www.fhwa.dot.gov/construction/reviews/revhma01.cfm

Minnesota Seal Coat Handbook, download useful information for design, construction and inspection of fog seals and chip seals.

www.wsdot.wa.gov/TA/T2Center/Pavement/pdf/Minnesota_Seal_Coats_2006.pdf

Introduction to fog seal use has project examples and photo gallery. Based on *Spray Applied Polymer Surface Seals Final Report,* 8/07, Foundation for Pavement Preservation and available for download. *http://www.pavementpreservation.org/fogseals/*

Fog Seal Guidelines Link to PDF copy of California Department of Transportation publication.

www.dot.ca.gov/hq/maint/TAGFogSealsGuidelines.pdf

RESOURCES

Print copies of listed publications available free from TIC while supplies last. Download electronic copies for some items at: http://tic.engr.wisc.edu/publications.

Video, CDs, and DVDs loaned free through county UW-Extension offices. Print copies of the current TIC Lending Library Catalog were distributed in July 2007. Also look for titles on the TIC website.

TIC website

http://tic.engr.wisc.edu/

DVD/VHS/Multimedia

Timely resources new to the TIC collection or related to topics in ***Crossroads****.*

An Introduction to Pipe & Cable Locating, download to see all steps of underground pipe and cable locating. Tips and tricks from locating-experts in the field. Demonstrates one manufacturer's locating equipment but is a useful introduction for anyone doing pipe and cable locating.

www.schonstedt.com/index.cfm?page=training

CROSSROADS provides information on roads and bridges for local officials. Published quarterly by the Wisconsin Transportation Information Center (TIC)—part of the nationwide Local Technical Assistance Program (LTAP)—with assistance from the Federal Highway Administration, WisDOT, and the University of Wisconsin–Extension. For permission to reproduce articles or graphics, please contact us.

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CALENDAR

TIC Workshops

Details, locations and registration forms are sent to all Crossroads recipients prior to each workshop. Additional workshop information and online registration available at: http://tic.engr.wisc.edu/workshops/listing.lasso

Winter Road Maintenance

This workshop provides practical information and procedures for snow and ice control on local roads. Includes discussion of de-icing material, equipment and operational issues. Fee: $45

Oct 13	Tomahawk
Oct 14	Hayward
Oct 15	Eau Claire
Oct 20	De Pere
Oct 21	Pewaukee
Oct 22	Barneveld
Oct 23	Tomah

On-Site Workshops

Save time and travel costs by bringing instruction to your shop or office. Schedule training that is convenient and tailored to your specific needs. On-site workshops let you train more people for the same cost or less, including staff from other municipal departments, nearby communities, and businesses you contract with. Contact TIC early to book the program and date you want. On-site workshops include:

- Basic Surveying for Local Highway Departments
- Basic Work Zone Traffic Control
- Flagger Training

UW-Madison Seminars

Local government officials are eligible for a limited number of scholarships for these Engineering Professional Development courses held in Madison. Go to http://epd.engr.wisc.edu or 800-462-0876 for course details.

SEPTEMBER 2008

15-16 Introductory Principles of Engineering Project Management
17-18 Management Skills for Engineering Capital Projects
19 Computer Tools for Engineering Project Management

OCTOBER 2008

6-7 Managing Snow and Ice Control Operations
15-17 Docks and Marinas 2008
27-28 Legal Aspects of Engineering, Public Works and Construction

Independent Study

Enroll Anytime

Project Management 100:
The Basics, Plus Important Insights

Other Events

Snow Plow Roadeo and Equipment Show

Sponsored by the Wisconsin Chapter American Public Works Association, the 19th annual event takes place at Lambeau Field in Green Bay on Wednesday September 17.

Learn more at *http://wisconsin.apwa.net* or contact Gordon Paprocki at (414) 302-8809 or *gpaprocki@ci.west-allis.wi.us*.