

CROSSROADS

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

WISCONSIN TRANSPORTATION INFORMATION CENTER – LTAP

“An aggressive program of chip sealing on residential streets could almost double the useful life.”

A (not so) secret formula for enlarging your streets budget

WOULD YOU like to enhance your streets budget? Up it by 200%? The formula for augmentation is amazingly simple! Learn it right here, when *CROSSROADS* reveals all (with a little help)!

The City of Madison has traditionally maintained its 583 miles of serviceable asphalt pavements by crack sealing, resurfacing, and reconstruction. With this program a street's useful life was 25-30 yrs. Then the price for resurfacing skyrocketed — up nearly 400% since 1998. Now the budget can only pay for 8 miles of resurfacing a year, or about 240 miles in 30 yrs.

“We needed a way to prolong the pavement life,” says Steve Sonntag, City of Madison Pavement Management Engineer.

“We ran a simple cost analysis. An aggressive program of chip sealing on residential streets could almost double the useful life, saving more than \$130 million over 50 years.”

In 2006, for the first time, the city chip sealed residential curb-and-gutter streets. They selected a total of 10 miles of pavements, 5 on the east and 5 on the west side of the city. All had a PASER pavement rating of 6 or 7 and most were crack-sealed in 2005. The program was judged a success and expanded for 2007. What made it work?

Public acceptance is essential, making it important to address problems of dust, possible bike or roller blade crashes, pedestrian tracking, and loose aggregate on

Learn more about maintenance, repair and reconstruction options at the TIC workshops on **Road Maintenance** in March.

Take better advantage of the tools in PASER and WISLR through hands-on learning.

Attend a workshop near you. See Calendar on page 12 for details.

the street and potentially getting into storm sewers.

Key elements Madison used to deal with these concerns include:

- specifying black boiler slag
- sweeping twice
- protecting inlets
- providing plenty of public information
- careful scheduling

“You don't want this project going on when kids are walking to school, so we did it during the summer vacation, June 15– August 15,” Sonntag says. “Once it was done and swept, we had very, very few complaints.”

Black boiler slag, 100% passing the 3/8" sieve, is a finer aggregate and it doesn't seem to hold as much dust. Being black, it looks better. The price is close to similar-sized aggregate. Recent bids put the slag at \$1.05/sq yd, and standard 3/8" aggregate at \$1/sq yd. The city used a modified version of the State

Continues on page 3



Regular chip seal treatments can almost double the life of a residential street. Good information and some extra sweeping can secure acceptance.

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For more information, contact Kim Christensen or Dale Anderson at 712-546-6401.

Reprinted from the May-June 2006 issue of *Technology News*, Iowa LTAP.

Truck mounted edge rut blade

For more than 10 years, the Iowa DOT maintenance staff in LeMars have been using a truck-mounted edge rut blade system that lets a single operator do the work of several people. It's designed to use material already on the shoulder.

The equipment includes three blades. The first blade moves material from right to left to fill the edge rut. The second blade moves excess material back across the shoulder. The third blade floats along on the left side of the machine to keep material off the roadway. A roller can be

pulled by the same truck to pack the shoulder.

Mounted on the front of the truck, the edge rut blade is easy to

operate. It leaves no material on the roadway. Materials cost about \$559 to manufacture this blade system.



Crossroads stats

Issues to date: 94

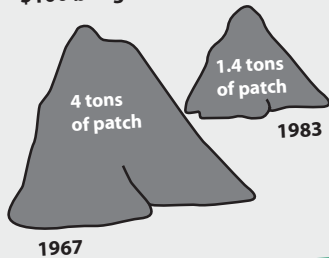
Total pages: 748

Most frequent topic: Equipment (126)

Least frequent topics: Recycling (1)
Computers (2)
Buildings (2)

Featured article, first issue Winter 1984: "Getting the most for your maintenance dollars"

\$100 bought ...



from first issue of *Crossroads*: Winter 1984

Changes at Crossroads

by Don Walker, Director
Transportation Information Center

CROSSROADS newsletter has been an important part of the TIC's activities since it began in Fall 1983. TIC is challenged to manage its budget wisely while serving our state's numerous local agencies (1,920 of them) and large geographic size. The newsletter allows us to reach all agencies with information on our programs and resources. It also is intended to make local agencies aware of new technology and emerging issues relating to their local roads. The articles provide useful information, encourage adopting new ideas, and assist with implementation by announcing workshops and listing other resources to help.

The TIC has been fortunate to have Lynn Entine as editor from the beginning. She brings the rather unique ability to explain technical subjects in a clear and interesting fashion. Lynn is effective in gathering the background information and details necessary to make **CROSSROADS** articles helpful and credible to local officials. She is a

true professional and is largely responsible for the wide readership and success of **CROSSROADS** for over 23 years.

This Spring 2007 **CROSSROADS** will be Lynn's final issue. We thank her for her contributions and wish her well in her "active" retirement.

Thanks from — the Ed.

by Lynn Entine, Editor

THANKS to the many, many knowledgeable local officials, along with staff from WisDOT, FHWA-Wisconsin, and the UW, who took the time to patiently explain, describe, answer ques-

tions, and send photos. (Once I even got a "zerk" plug in the mail when no amount of explaining over the phone let me figure out what it might look like.)

I learned a lot about pavement cracks, culvert installation, and the best techniques for plowing, sanding, and salting. I found it interesting. My children, however, still amuse their friends with tales of me describing alligator cracks or the rolling temperature of asphalt.

Sometimes it was a challenge to stitch pieces of information into a story that made sense. Don's accurate understanding of our readers and their interests was always a help. There's no question, however, that **CROSSROADS** articles remained lively, meaty, and varied

because Wisconsin is blessed with passionate, thoughtful, and innovative people managing its roads.

May the "road rise to meet you," as the Irish Blessing says, and may it always be smooth, well-drained, and safe.



Don Walker, TIC director, and Lynn Entine, **CROSSROADS** editor since its inception in 1984.

Formula for enlarging your streets budget continued from page 1

Standard Specification for chip sealing, Section 475, calling for a CRS 2P polymer modified asphalt emulsion.

To manage loose aggregate, Madison arranged for double sweeping. Finished segments were vacuum swept within 24 hours by the contractor, and then city crews returned a week later to sweep again. The slag is staying in place, Sonntag says, even after several plowable snowstorms. "The surface looks good and we have not seen substantial piles of slag at the curbs."

Chip sealing on curb-and-gutter streets is more demanding than on a road with shoulders. "It can be hard to keep the material away from the curb. The contractor has to be more precise and there's more handwork," Sonntag says. All inlets, manholes, and water valves have to be protected—covering in advance and then uncovering after the sweeping.

This year all eligible pavements in two other aldermanic districts will be chip sealed, about 12-14 miles. Only streets with solid curb and gutter, good drainage, and little settlement are chosen. All



affected residents will be notified by letter and invited to view a PowerPoint presentation that explains the program.

Worry about negative reactions from politicians and residents keeps many public works departments from proposing chip seals on

Preventive maintenance treatments cost and benefit

Treatment	2005 cost (per sq yd)	Added life (yrs)
Crack sealing	\$0.30	4-6
Slurry seal	\$1.00	6-10
Chip seal	\$1.05	7-10
Microsurfacing	\$8.00	8-12
Thin overlay	\$12.00	8-12

Source: City of Madison, Department of Public Works Engineering.

improved local streets. But it may be time to reconsider. The economics are very convincing.

"This will save us tens of millions of dollars and we can maintain our good streets that have a PASER rating of 7 or 8 at a higher standard," says Sonntag. "Our goal is to use as much of our budget as we can on preventive maintenance, such as crack and chip sealing. You get so much more benefit at \$1 per square yard, compared to \$22 a square yard to resurface," he says.



Using black boiler slag for the chip coat looks better and sticks better.

After a week, crews sweep newly treated streets a second time. Double sweeping keeps nearly all the loose aggregate out of gutters.



"Our goal is to use as much of our budget as we can on preventive maintenance, such as crack and chip sealing."

Contact Steve Sonntag at 608/267-1997 or ssonntag@cityofmadison.com for more information on the Madison program of chip sealing residential asphalt streets.

View the informational presentation, "City of Madison Proposed Chip Seal Project for Curb and Gutter Streets," at:

<http://www.cityofmadison.com/engineering/Projects/projhome.htm>



Pavements are ready for crack filling and chip sealing when the PASER rating is 5, 6, or 7.

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SPRING 2007

3

Pervious pavements have potential



PHOTO © NATIONAL READY MIXED CONCRETE ASSOC.

Water draining through pervious concrete.

“You have to do a careful balancing act between the strength you need and the perviousness you want.”

The industry terms are: pervious concrete, porous asphalt or HMA

PERVIOUS PAVEMENTS are a growing trend for parking lots, sidewalks and paths, and other low volume or light-duty surfaces. Available as concrete and asphalt, these coarse, open surfaces let water run right through.

The pavements offer safety benefits, stormwater management options, and other environmental benefits. They also need specialized installation, extra maintenance to retain their perviousness, and gentle treatment by snow plows and other equipment. They have been used in southern states for years, but concerns about freeze/thaw durability limited their use here. Recent Wisconsin installations using improved technology and design are proving themselves in our climate.

Permeability is created by using a small-diameter aggregate that is uniform size or “gap-graded,” with little or no fines. This produces pavements with 15%-25% void space, a portion of which is interconnected allowing water to move through. Strength is reduced, however, when there is less contact between the aggregate pieces. “You have to do a careful balancing act between the strength you need and the perviousness you want,” says Willie Gonwa, a senior project manager with Symbiont in West Allis.

In 2005 Gonwa supervised a pervious paving project at the Milwaukee School of Engineering (MSOE). It was one of several area demonstration sites for runoff reduction and stormwater management tools.

The 1.25 acre site at MSOE is about 65% pervious pavement. Of that a quarter is pervious concrete and three-quarters is porous asphalt. Parking stalls are pervious while the main access drives are standard asphalt, as is a 10 foot strip abutting a building. The School follows maintenance recommendations: vacuum sweeping the lot at least three times a year to prevent clogging, and using a rubber blade on the snow plow.

After the first year the porous asphalt pavement was graying as surface oils wore away, and it showed some scuff marks. Indentations made on hot summer days have healed over time. The pervious concrete pavement was considerably stronger than the asphalt at the beginning. However, durability became a concern because it was losing a lot of stone from the surface and raveling at the joints. Pressed to fix the surface before classes started, MSOE covered the concrete with a 2-inch overlay of porous asphalt. “The parking lot is still permeable pavement and is working just fine,” says Gonwa

“Looking at the American Concrete Institute (ACI) recommendations that came out later, it turns out we violated a few rules,” Gonwa says. The newly placed mix should have been covered within 20 minutes and kept tightly covered for 10 days to retain water for curing. For better joints the concrete should have been placed in alternating strips, allowing the edges to cure for a day before the abutting strip was put in.

“Pervious concrete is very sensitive to installation and product mix,” says Gonwa. “There’s not much room for error. To be successful you need a contractor who has had training and certification and really knows how to install it.” Contractor certification programs to train installers, developed by the National Ready Mixed Concrete Association, are now available in Wisconsin. Anyone planning to request bids on a pervious concrete installation should require the contractor to be certified.

There has been considerable pervious concrete research, testing, and improvements in technical specifications recently. “[It] has come along way in Wisconsin



Rain water drains through porous asphalt top and bottom, but remains on standard asphalt (center).

since 2005. With refined technology, we are moving forward," says Heath Schopf, Director of Construction Engineering at the Wisconsin Concrete Pavement Association (WCPA).

Asphalt installation is not as sensitive. However, the liquid asphalt binder is quite sticky, so paving in cooler months is better. Rolling should be limited and done at cooler temperatures so compaction doesn't damage the porosity. It's also important not to seal coat the surface in future years or the gaps will be filled. The National Asphalt Pavement Association has developed detailed specs and guidelines.

Benefits and considerations

Safety is a significant benefit of pervious pavement. Since rain and snow melt run through, pavements don't get slick; there's less opportunity for hydroplaning or for skidding on patches that freeze overnight. For safety reasons, a related asphalt product called stone matrix asphalt (SMA) is often the surface layer on Interstate roadways. SMA is made with open graded aggregate, using larger stones for greater strength.

In parking lots, pervious pavements can help in handling stormwater and runoff because rainfall is detained in a deep base of open aggregate. The technology is approved by the U.S. Environmental Protection Agency as a best management practice. A hydrologist or engineer should calculate the effectiveness, however.

Soil type is very important. Over soils with higher permeability rates the water will percolate through the aggregate and subsoil, eventually recharging the groundwater. For such sites, the subsoil should be at least 3 to 4 feet thick above the water table and bedrock to reduce the chance of groundwater contamination. Over clays, the installation can become an underground detention pond. Water is held in the aggregate then released slowly through a drainage field into streams or storm sewers.



Pervious concrete pavers

In parks, near schools, and similar areas, pervious pavements can keep contaminants out of surface waters better than conventional pavements. Some contaminants filter into the pavement and base where biological activity seems to break them down. Since there's no appreciable runoff, other contaminants stay on the surface where they can be collected by vacuum sweepers and disposed of in landfills. Pervious pavements are not recommended on sites like truck stops or heavy industrial areas with a high potential to contaminate groundwater.

Air and water can get through the pavement to reach tree roots that extend underneath the pavement and keep the trees healthy. Typically, roots extend underground 1½ to 2 times the height of the tree.

"Urban retrofits are where it really shines," says Gonwa.

"There are sites where you don't have space to install a detention pond or bioretention, but you do have parking lots. When a Walgreens is building on a 'million dollar corner' they have to use every square inch. They can't afford not to. That's a great application for it."

There are other pervious surfacing options such as pervious pavers and a plastic matrix seeded with grass. Pavers can be used in smaller areas where the job size is uneconomical for contractors or where esthetics is at a premium. Grass reinforced with plastic matrix has great potential for big parking areas that are used intermittently, like overflow parking at fair grounds, for example.

As more land surface gets covered every day, pervious pavements offer an opportunity to make a big difference. If you are considering them:

- Make sure you follow current industry group specs and recommendations.
- Test the subsoil and develop a design that accommodates the drainage characteristics.
- Protect the aggregate base and surface course during construction. Require that contractors keep soil from being washed or tracked into it, and protect it from compaction.
- For pervious concrete, require that contractors have NRMCA Pervious Concrete training and certification.

"Urban retrofits are where it really shines."

For information on pervious concrete contact Heath Schopf, Director of Construction Engineering, Wisconsin Concrete Pavement Association, 608/240-1020, hschopf@wisconcrete.org

or visit:

National Ready Mixed Concrete Association Web site at www.nrmca.org

Pervious Pavement Web site: www.perviouspavement.org/

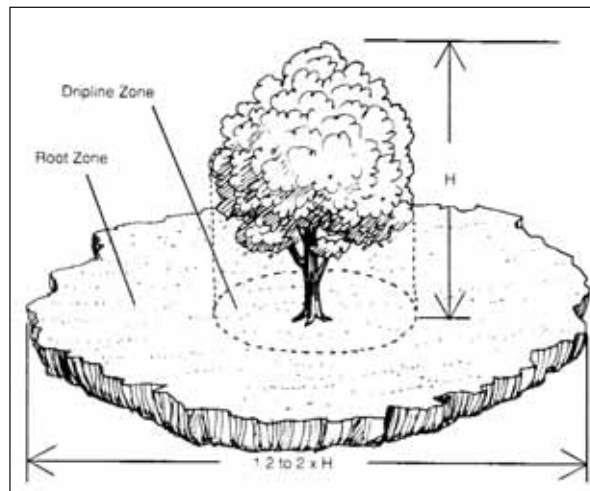
The American Concrete Institute Web site: <http://www.aci-int.org>

For information on pervious asphalt, contact Scot Schwandt, Director of Engineering at the Wisconsin Asphalt Pavement Association, 608/255-3114, scot@wispave.org

or visit:

National Asphalt Pavements Association Web site: <http://hotmix.org>

Contact Willie Gonwa at 414/291-8840 willie.gonwa@symbiontonline.com



Pervious pavements protect mature trees by helping roots stay healthy.

Sign tracking systems — what's yours?

"The program is designed so any sign tech can use it, especially the guys who hate computers."

HOW MANY traffic signs are on your roads? How old is each one? Can it be seen at night? Many municipalities can't give an accurate answer.

Recently an informal survey of counties about their sign management practices drew 32 responses. Seven said they have no inventory method, and three didn't do systematic inspections either.

You might think sign management systems are not a high priority, but next year the new *MUTCD* will include retroreflectivity standards. Local agencies have always been responsible for ensuring night visibility of warning signs. Now that visibility will be measurable.

The FHWA recommends you use the "assessment" method — regularly evaluating every sign in the jurisdiction; or a "management" method — tracking or predicting retroreflectivity and replacing signs at a certain age. Both require inventory and record keeping.

Two commercial inventory programs — SimpleSigns and SIGNview — are being used or considered by several counties in the state. SimpleSigns is designed to be simple, affordable, and easy to learn. While SIGNview costs more and requires training, it has more capabilities.

SimpleSigns — limited and easy

JOE FLINN, Waupaca County Sign Supervisor, began using SimpleSigns in December. "We have over 4,000 signs on county high-ways alone. I didn't know that before," he says. To get started, Flinn created an Excel spreadsheet of signs, types and locations on each county trunk.

To get the information, two sign techs drove all the county trunk roads, beginning at the south or east edge of the county. Using a distance meter, they created "Routes," measuring mileage from a major intersection to each sign and recording that sign's identification number. SimpleSigns loaded the information into the program's Access database and Flinn is now entering sign conditions and histories from paper records.

Flinn looks forward to using the program to make work assignments. "I can use filters to list all the signs with a condition rating of "poor" along a particular Route and easily get two days' work for the sign crew in just a few minutes," he says. "Right now I have to go through hundreds of pages of paper."

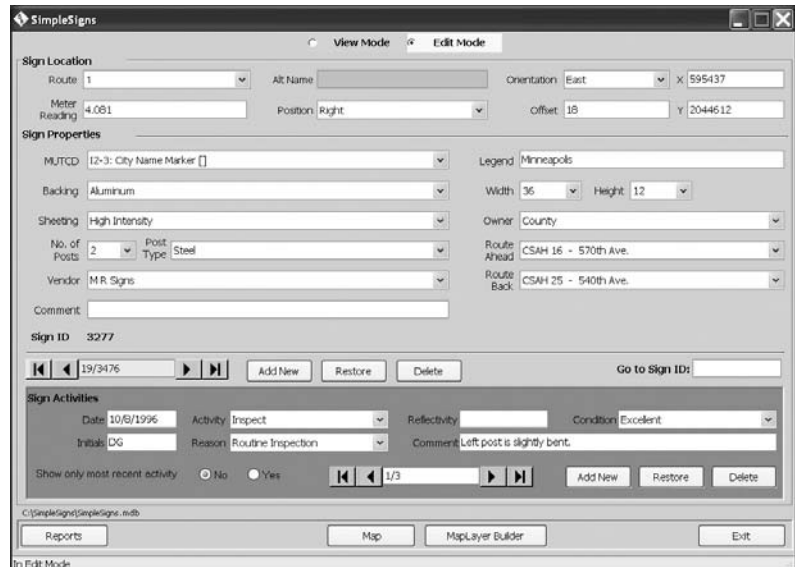
After the program is running smoothly, the crew will do a night sign inspection, and retroreflectivity ratings will go into SimpleSigns. "Currently we don't have records on the ages of our signs,"

says Flinn. "As we get that information into the program, I can use it to keep all our signs within the 10 to 12 years that the sheeting is good."

Keeping track of signs in storage, developing budget projections, and finding rainy-day work for summer construction crews are other benefits Flinn anticipates. "I've already figured out that we have \$83,000 worth of signs in inventory. That's a lot of money tied up," he says.

"The program is designed so any sign tech can use it, especially the guys who hate computers," says SimpleSigns creator Mike Rowekamp, a Minnesota-based GIS consultant. It has been available in Minnesota for about 18 months and in Wisconsin since December.

The main entry screen looks like a paper report form. Drop-down lists let the tech highlight location, sign and post properties, and repair activities. This cuts down on the amount of typing that's required. With filters, the user can get custom reports, such as a list of all the STOP signs. The basic program costs \$1,500, which includes free tech support. Data conversion is \$500, and an add-on GIS mapping tool is \$500. Sign data is stored in Access, a commercial database program, making it easy to access and manipulate for other purposes.



SIGNview — comprehensive

SIGNview, by Iowa-based Cartègraph has data entry screens and report forms that the user can modify. Sign information can be linked to a GIS environment where it can be manipulated and displayed graphically. SIGNview integrates with other Cartègraph programs for service requests and work management. Large counties like Dane and Waukesha use SIGNview, as does WisDOT.

"SIGNview has great reporting capabilities," says State Signing Engineer Matt Rauch who oversees maintenance of Wisconsin's 310,000 active signs. "We use it to produce reports for counties to replace signs. It will show what signs are on a segment, in order. The crew can start at one end and they don't have to backtrack. It's a lot more efficient."

Rauch also uses it for budget projections and in planning improvement projects. To meet the minimum retroreflectivity standards, the state tracks the type of sheeting on each sign, the manufacturer's name, and date it was fabricated. "Right now we're concentrating on regulatory, warning

and school signs," he says. "Anything 1995 or older, we're tagging to be replaced."

Users need training and practice. "Unless you use it regularly, it will be tough to use," says Rauch. "It took our folks quite some time to catch on to it. However, now they don't know what they would do without it."

Washington County Traffic Signer Jeff Spaeth has been using SIGNview about a year and a half. "I'm still learning," he says. "There are so many different things you can do with it. Once we get our data in order, I think it will be well worth it."

The county had paper records on all their signs, going back 10 years or more. These had ID numbers and locations of all the county's signs. Sign techs regularly updated them as signs were added or removed. An engineering consulting firm entered that information into SIGNview and added GPS coordinates. Now Spaeth is adding and refining information on the county's 3,411 signs.

"By using SIGNview we now have a history of a specific sign and the ability to add or remove data at our fingertips," says Spaeth. The program is on a laptop that Spaeth takes in his truck, entering inspection data as he goes. They plan to use the "expected sign life method" of maintaining adequate retro-reflectivity.

Other Washington County departments use specialized inventory programs from Cartègraph. By linking the data together, a user can generate maps showing all the services in a segment. "You can do reports and filter whatever you want," says Spaeth. "You can do layers, and it will show on the map the exact location of the sign."

Sign tracking systems can be on paper or in simple spreadsheet programs. If you have more than a couple hundred signs, a computerized system with an up-to-date sign inventory will make sign maintenance more efficient, accurate, and consistent.

"By using SIGNview we now have a history of a specific sign and the ability to add or remove data at our fingertips."

For more information on SimpleSigns go to: www.rowekamp.com/SimpleSigns.htm

For more information on SIGNview go to: www.cartègraph.com

Contact Jeff Spaeth at jeff.spaeth@co.washington.wi.us or 262-335-5027

Contact Joe Flinn at JFlinn@co.waupaca.wi.us or 715-570-7880



SIGNview®

Q&A from Signing Workshop

by Tom Heydel, WISDOT
SE Regional Traffic Engineer

Q *Is a vandalism sticker required on a sign? Where can I find town codes for labeling signs?*

Yes, Wisconsin Statute 86.192 requires vandalism stickers on all signs. Generally they are placed on the front of the sign. An identifier code should be placed on the back of the sign. Each town, city or village has a special five digit code based on the county where it is located. For example: 01-20 would be Adams County, Town of New Chester. You can see a list of all municipal codes by clicking on "CVT Index" at www.dot.wisconsin.gov/localgov/highways/gta.htm

Q *On wood sign posts, what are CCA and ACQ? Is it important?*

These abbreviations refer to the copper content of preservatives in the wood post. CCA is Chromated Copper Arsenate; ACQ is for Ammoniacal Copper Quat. ACQ posts have a high copper content (66%). This will quickly corrode a metal sign at the fastener contact, causing the sign to fall off the post in about 6-12 months. In CCA wood posts the copper content is 16% and does not corrode the signs. (See the article, "Wood preservative corrodes signs," in the Winter 2005 *CROSSROADS* for more information.)

If you have already installed ACQ posts, you can eliminate the contact by installing a plastic washer between the post and the sign at the bolt connection.

To determine which type you have in stock look for the ACQ or CCA label on the post end.

Q *I thought we weren't allowed to put street name signs on top of STOP signs?*

You are permitted to do this except at STOP signs on approaches to state highways, according to the MUTCD and Wisconsin Supplement (WMUTCD). It is allowed on STOP signs at

approaches to county highways if you obtain prior approval from the county (Section 2D.38 WMUTCD).

Q *How can I clean signs that have been hit by paint balls?*

While nothing will ultimately clean it 100%, a Mr. Clean eraser pad has been shown to work.

Q *Can I mount signs at a 6-foot mounting height?*

Yes, in a rural area. However, 5 feet, the minimum mounting height in a rural area, is better. It provides optimum breakaway characteristics and the best reflection of driver headlights and thus the best viewing angle.

Mounting height is measured vertically from the bottom of the sign to the edge of the roadway travel lane. It is not measured down the installed post to the ground below. If the post is located downslope, for example, you have to install the sign higher than 5' as measured along the post.

For areas where parked cars and pedestrians are present, the minimum mounting height is 7'. If there is a supplemental plaque under the main sign, you can use 1' less in the mounting height.



Q *If I store a sign, does that time count against how long it will last?*

No. Sign life is based on installation date as long as the sign was stored properly, away from sunlight or other weather effects. The date sticker should use the instal-

lation date. This question relates to FHWA's new minimum retroreflectivity standards which use sign life as a basis for determining when a sign needs to be replaced.

Q *Is a Stop Ahead sign required for a local road?*

Sometimes. On a rural county road approaching a state highway or a rural state highway approaching another state highway, a Stop Ahead sign is always required, regardless of sight distance.

For other situations, the answer depends on travel speed and driver sight lines. Stop Ahead warning signs are required if the STOP sign is not readily visible due to curves, hills, or other obstructions. The Wisconsin Supplement visibility chart (Section 2C.29, WMUTCD) provides minimum distances. For example: if the speed limit is 55 MPH the visibility needed is 495'. For 45 MPH it is 360' (see table).

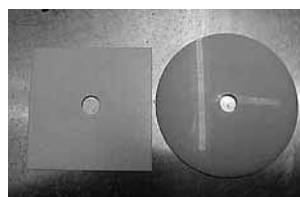
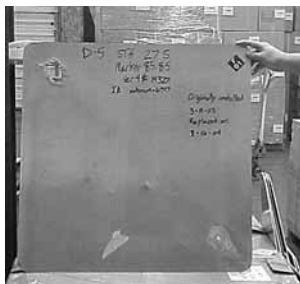
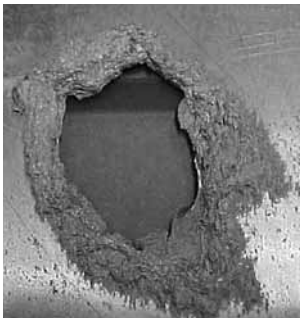
You also can install a Stop Ahead warning sign to improve safety even if there is good sight distance. For example: where the approach is facing east/west and the sun is a problem; or where trees in the background of a T intersection make the STOP sign hard to discern.

Minimum visibility distance to determine need for sign (not for placement)

Posted or 85th percentile speed	Minimum visibility distance
25 mph	155 ft
30 mph	200 ft
35 mph	250 ft
40 mph	305 ft
45 mph	360 ft
50 mph	425 ft
55 mph	495 ft
60 mph	570 ft
65 mph	645 ft

Source: *Signing for Local Roads*, No. 7, TIC.

This table is just to determine if a sign is needed. These are not sign placement distances. Sign placement distances are shown in the TIC bulletin No. 7, Signing for Local Roads, and Table 2C-4 of the WMUTCD.



Q How many children crossing a roadway at a particular location determines whether a school crossing sign is needed?

The MUTCD does not provide a threshold; rather it discusses having a school route plan to develop uniformity in the use of school area traffic controls. Factors to consider include:

- Availability of adequate sidewalks at the crossing
- Age levels of students

A school route plan will identify where children are crossing and will designate preferred locations where signs would encourage children to cross. The Wisconsin Safe Routes to School (SRTS) program has resources, training, and funds for community SRTS projects. (See "Wisconsin opens Safe Routes to School program" in the Winter 2007 *CROSSROADS*.)

Q Can delineators be yellow on a two lane road?

No. If delineators are used, the reflector color is white when located on the outside shoulder. This follows the pavement marking principles. On a two lane roadway edgelines, if used, are white; therefore, delineators must be white. Yellow separates opposing traffic—which is at the centerline of a two-lane road.

Q Is a YIELD sign required on the post of RR crossbucks?



By July 1, 2007, railroad companies are required by statute 192.29 (5)(b) to install a YIELD sign on all passive crossings (those without automatic signals

or automatic gate arms) if the passive crossing does not have a STOP sign. Keep in mind that an engineering study is required before installing a STOP sign at a passive RR crossing. STOP signs are not permitted at active RR crossings.

Q Is the T intersection warning sign allowed on an approach to a T intersection with a Stop sign?

Yes, the W2-4, T intersection warning sign is allowed in this situation. However, this does not negate the requirement for a Stop Ahead sign if there is not sufficient sight distance per the visibility chart in Section 2C.29 *WMUCTD*.



For more information, see *Signing for Local Roads*, TIC Bulletin No. 7.

Easier Web access to WisDOT reference docs

WISDOT has created a Roadway Standards home page on the Web to improve searching and access to its major references. Users no longer need a state-assigned login ID and password to view:

- Facilities Development Manual (FDM)
- Construction & Materials Manual (CMM)
- Standard Specifications for Highway and Structure Construction (Spec)
- Contract Management System Guidance (CMS)
- Guide to Utility Coordination (added in early Dec. 2006)

"We want users to be working with the most accurate and up-to-date information, so we're trying to promote using the online versions of these documents," says David Castleberg, a Supervisor with WisDOT's Bureau of Project Development.

Paper copies of the manuals, which are hundreds of pages, along with updates, supplements, and the like, will no longer be distributed automatically. Instead, e-mails will announce updates and changes. Individuals who prefer hard copy can download and print what they need.

A new feature allows users to search for a topic in one or more documents at the same time. Live links in the text make it easier to jump between related sections within the same document or across documents. These cross references let the user more easily find and review the complete subject topic—design through construction.

Search capabilities will keep improving. "It's a dynamic process," says Castleberg. "As we do updates we'll put more electronic tags into the documents."

"We are excited to offer a one-stop-shop for critical documents," says Castleberg. "It helps when local officials and contractors and consultants all have the same access and the most current versions. Everybody is playing by the same set of rules every time. That makes it a lot easier for a contractor to know how to bid."

To access these electronic documents go to <http://roadwaystandards.dot.wi.gov/standards/>.

(Note that some hypertext links within the documents go to sources that may still require a login ID and password.)

To get e-mail update notifications sign up on the *Roadway Standards* page. Click on "Subscribe to e-mail update service" and follow the instructions.

"It helps when local officials and contractors and consultants all have the same access and the most current versions. Everybody is playing by the same set of rules every time. That makes it a lot easier for a contractor to know how to bid."

If you have questions, send an email to roadwaystandards@dot.state.wi.us.

Articles from the past eight issues are listed by topic and title. Previous indexes appeared in the spring *CROSSROADS* of odd-numbered years. Contact the TIC to request copies of an issue or story of interest, or download the issue as a PDF from the TIC Web page.

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Spring checkup for local bridges	Sp05

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CDL update and clarifications	Sp06
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Biodiesel B20 works fine for UW-Madison	F06
Gravel saver for grader blades	Su06
Green Bay leaf collector unit saves money, labor	Sp06
New “super tanker” truck works hard all year	Sp05
New diesel fuel is in the pipeline	F06
Retreads an option for truck tires	Sp06
Sharing stretches budgets	Su05
10 tire tips — For tire life and worker safety	Sp05

Gravel roads

Gravel to asphalt. When should you convert?	W07
Maintaining gravel roads	Su06

Highway safety

Control driveway access for safe, efficient roads	Su06
Crash data and more from TOPS Lab	F06
Curb ramp warning fields: check design and installation	Su06
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Roundabouts make safer intersections	W07
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Setting safe speeds for curves and turns	F05

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Geosynthetic on town road—less aggregate, stronger base	Su05
New WISLR tools improve pavement planning	W06
New solution for sinking surfaces over softest soils	W06
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Pavement ratings 2005 — when, how, and what’s changed	Su05
Web ratings entry easier, quicker	Su06
WISLR data study validates department’s work	Su06

Pedestrian, bicycle

Wisconsin opens Safe Routes to School program	W07
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Roadsides

Rare roadside plants need your help	Sp06
Weeds and culverts timeline	Sp05

Safety, worker

Adjust mirrors to eliminate blind zones	Sp05
Low cost ways to keep service techs safe from asbestos	W07

Security

Highway Watch ® seeks observers	Sp05
Highway Watch ® training picks up speed	Su05
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Signs, markings

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Getting more out of signing upgrades	Sp06
Key changes to the Wisconsin Supplement of the 2003 MUTCD	Su05
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Winter maintenance

Between the storms — Tasks for no-snow days	F06
Snow removal (and other work that closes a traffic lane) - Editorial	Sp05
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Winter maintenance ideas from 2006 workshops	W07

Work zones

Plan traffic mobility along with safety	W07
TIC to emphasize on-site work zone safety training	W06
Work zone traffic control and the real world	Sp05

TIC Workshops

Test yourself.

What is the PASER rating for this road segment? What treatment does it need? How can your roads budget cover the cost?

(See answers below)



Publications

Seal Coating & Other Asphalt Surface Treatments, No. 10. TIC Bulletin. Practical information on the application of chip seal surface treatments.

Innovative Intersection Safety Improvement Strategies and Management Practices: A Domestic Scan, FHWA, Report # FHWA-SA-06-016, September 2006. Describes improvements and innovative technologies implemented in five states to increase motorist and pedestrian safety at intersections. Many color photographs included. Supply limited.

Web sites

The *Wisconsin Department of Transportation* has enhanced its Web site, providing improved access to the most current versions of standards and manuals. Search capabilities and live links allow the user to quickly find related topics in different documents. Included are: *Facilities Development Manual (FDM)*, *Guide to Utility Coordination (UC Guide)*, *Standard Specifica-*

tions (Spec), *Construction and Materials Manual (CMM)*, and *Contract Management System (CMS)*. (See story on page 9). <http://roadwaystandards.dot.wi.gov/standards/>

WISLR – For more information and for links to their Web site, go to <http://tic.engr.wisc.edu> click on “Links” and then select “WISLR” (Access to WISLR requires a password)

FHWA – “Pavement Preservation Checklist #02 Chip Seal Application” is available for download at http://www.fhwa.dot.gov/pavement/pub_details.cfm?id=39. A dozen other checklists are also available via links on this Web page.

The *National Ready Mixed Concrete Association* pervious pavement Web site at <http://www.perviouspavement.org/> provides information on the design, construction, inspection and maintenance of pervious concrete pavement.

The *Wisconsin Asphalt Pavement Association* has a slide

show on Porous Asphalt Pavement design, construction and maintenance available for download at <http://www.wispave.org/downloads/PorousAsphalt.pdf> (Large File – 7.1 MB)

Videotapes/ Multimedia

Endangered Roadside Plants
This PowerPoint presentation, available to review or download from the TIC Web site, LINKS page, introduces 12 rare or endangered plants that may grow along Wisconsin roads. Photos and maps show what to look for in your area. Simple protective actions like posting “no-mow” signs, are recommended.

Dangerous Travelers: Controlling Invasive Plants Along America’s Roadways, USDA Forest Service Technology and Development Center, 2006. Format: DVD. #18818.

This timely video covers the best management practices to assist road maintenance crews in controlling the rapid spread of invasive plants. It highlights plant identification, inventory systems, mapping, mechanical removal, herbicide treatments, weed-free products, maintenance techniques, and cleaning of equipment.



Wild parsnip, an invasive species found on roadsides.

RESOURCES



Pale purple coneflower. Endangered plant that may grow in roadsides.

Print copies of publications are available free from the TIC while supplies last. Electronic copies may be downloaded from the TIC Web site.

Videos and DVDs are loaned free through county UW-Extension offices.

The Web addresses listed here and elsewhere in this newsletter are live in the electronic version of **CROSSROADS** on the TIC Web page. Clicking them should take you directly to the indicated page. If you are not able to retrieve a document, contact us and we will get a print version to you.

TIC Web site

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

to Manage Your Roads.

Workshop: Using PASER and WISLR
TIC budget and planning tools at the TIC

(3) Find out by learning to use WISLR

(2) Reconstruction

(1) 2

Answers

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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 Wisconsin
LTAP

SPRING 2007

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FEEDBACK

Please fill out this form and fax or mail (in separate envelope) with the mailing label below.

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ADDRESS _____ CITY _____ STATE _____ ZIP _____

PHONE _____ FAX _____ EMAIL _____

Mailing list change/addition Information/resource request Idea/comment

Other



CROSSROADS

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CALENDAR

TIC Workshops

Details, locations and registration forms are sent to all CROSSROADS recipients prior to each workshop. Registration begins after announcements are sent.

Using PASER & WISLR to Manage Your Roads

Local governments must submit pavement condition ratings to WisDOT again in December. TIC is holding workshops around the state to help with the process. Learn to rate the condition of your roads using PASER and how to enter ratings into WISLR. Take the next step with budgeting and using the WISLR planning and communication tools. Print reports and maps of your road data. Analyze pavements and develop 5-year maintenance/improvement plans. Determine costs and consequences of different strategies using your own data, so you can get the most out of available funds.

Plan to sign up if you inspect and rate pavements; evaluate which roads to maintain and rebuild; or decide and explain maintenance policies and programs. CROSSROADS recipients will receive separate announcements by mail.

Jul 31	DePere
Aug 1	Waukesha
Aug 2	Barneveld
Aug 6	Tomahawk
Aug 7	Hayward
Aug 8	Eau Claire
Aug 9	Tomah

Road Maintenance This workshop presents maintenance, repair and reconstruction options for local roads and streets and presents best practices for maintaining and improving drainage and extending pavement life. Learn which maintenance techniques are best for particular pavement conditions. *Fee: \$45*

Mar 12	Tomah
Mar 13	Eau Claire
Mar 14	Hayward
Mar 15	Tomahawk
Mar 16	De Pere
Mar 22	Barneveld
Mar 23	Pewaukee

On site Workshops

Save time and travel costs by bringing instruction to your shop or office. Schedule it at a convenient time and

place and have content tailored to your specific needs. You can train more people for the same or less cost including staff from other municipal departments, nearby communities, and those you contract with. Contact us early to ensure you get the program you need on the date you want:

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

UW-Madison Seminars

Scholarships available for local government officials. Details at <http://epd.engr.wisc.edu> or 800-462-0876. Courses in Madison unless otherwise noted.

MARCH 2007

- 21-22** Highway-Rail Grade Crossing Safety Course
- 26-28** Designing Efficient Culverts and Open Channels
- 29-30** Effective Drainage for Site Development Projects

APRIL 2007

- 10-11** Municipal Engineering Fundamentals for Non-Engineers

- 10-12** Foundation Engineering
- 26-27** Geosynthetics: Current Practices in Design and Construction

MAY 2007

- 21-22** Introductory Principles of Engineering Project Management
- 21-23** Using HEC-RAS to Compute Water Surface Profiles for Floodplains, Bridge and Culvert Hydraulics
- 22-25** Highway Bridge Design
- 23-24** Management Skills for Engineering Capital Projects
- 23-24** Project Management Skills for New Product Development
- 25** Computer Tools for Engineering Project Management

JUNE 2007

- 11-13** Principles and Practices of Estimating for Construction and Design Professionals
- 13-15** Comprehensive Practices for Effective Construction Project Management
- 25-26** Improving Intersection Safety and Efficiency
- 27-29** Traffic Signal Design and Operation