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WISCONSIN TRANSPORTATION INFORMATION CENTER - LTAP

“Plowing, when it can be done, is by far the best winter maintenance tool.”

This article appeared in the Summer 2005 issue of *Salt and Highway Deicing*, the Salt Institute's newsletter. URL: <http://www.saltinstitute.org>

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The truth about sand and salt for winter maintenance

by Donald Walker, P.E.

THE TRUTH IS... that mixing sand with salt actually reduces the salt's melting ability.

The truth is...that although abrasives play an important role in snow and ice control operations throughout the U.S., they are often wasted.

Research and practice clearly indicate that abrasives can improve traction on icy or snow-covered roads. They can be a very effective treatment in environmental and temperature conditions where deicing chemicals don't work. In addition, abrasives can be used to maintain safety at hills, curves and intersections on unpaved and low volume roads. Using chemicals on unpaved roads is ineffective and damages the surface, while many low volume roads do not merit the level of service provided by chemicals.

Unfortunately, abrasives are poorly understood and often misused, resulting in wasted material and money, and reduced safety for the traveling public. The following discussion is intended to help agency managers think about their abrasive policies and practices.



Salt melts snow and ice so pavement can be plowed clear.



Sand can improve traction if it remains between the tire and the ice.



Abrasives can have negative environmental impacts and must be cleaned up after storms.

How they work

First, let's be clear about how salt and abrasives work. Salt melts snow and ice.

The best uses of salt and other deicing chemicals are to prevent ice from bonding to the pavement and to aid in removing it from the pavement once it is stuck there.

Plowing, when it can be done, is by far the best winter maintenance tool. Nothing is more effective than plowing to remove snow and slush from the pavement. However, many storm conditions develop that make it difficult or impossible to prevent snow pack or ice from developing on the pavement. This is where a deicing chemical is needed if you want to quickly restore clear pavement conditions. Salt melts snow and ice so pavement can be plowed.

What do abrasives do? By increasing friction, they provide better traction and control for vehicles. Abrasives do not melt snow and ice. An inert piece of stone or slag will not melt anything!

Furthermore, for an abrasive to actually improve traction it must remain between the tire and the ice. It does no good when it is buried in the snow or is blown off the pavement. Research has shown that it is difficult to maintain good traction with abrasives when there is any significant traffic.

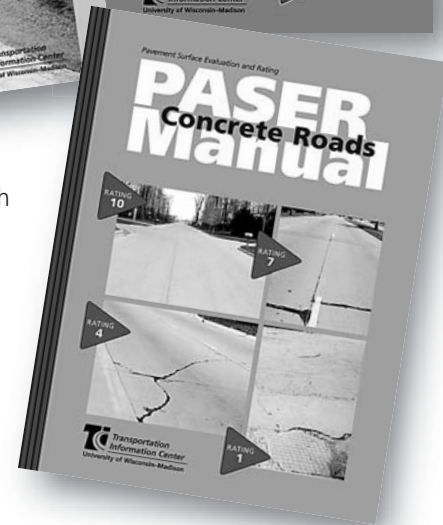
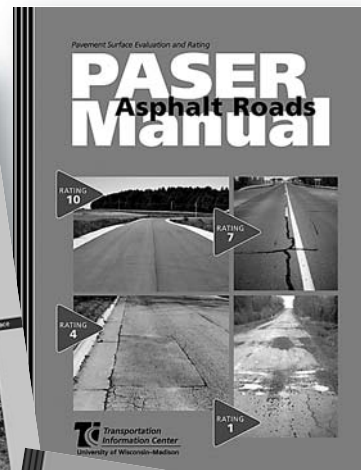
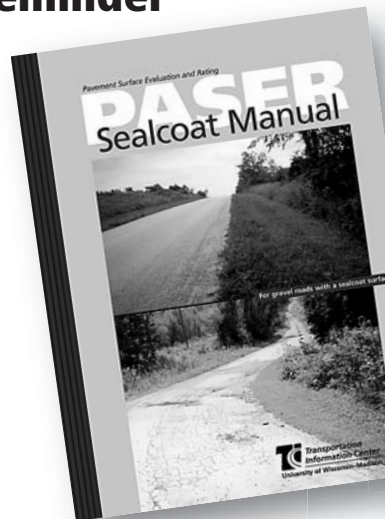
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Pavement rating reminder

LOCAL AGENCIES must rate and report the condition of all their pavements again this year. The deadline is December 15, 2005. Details on how to submit the data are in a letter sent to all municipalities after the spring elections. The preferred method is on-line with WEB WISLR. Electronic or paper spreadsheets are other options.

After three rounds of rating roads for WISLR, most localities have a trained inspector or have arranged for inspections by another agency or consultant. The rating process is not complicated and can be learned quickly from booklets and video tapes.

The TIC's manuals for all surface types — asphalt, concrete, gravel, sealcoat, unpaved, and brick/block — are self-explanatory. Booklets are available on request and as PDFs on the TIC Web page.



Videos are loaned free through County Extension offices. (To contact us, see page 10.)

If you need additional training or help, talk with your county highway commissioner or regional planning commission.

PASER Series
TIC 74 min. #18390

Three-part video with PASER training for these road surface types:

Asphalt (46 min.)
Gravel (15 min.)
Sealcoat (13 min.)

Can be used with PASER manuals to learn how to evaluate and rate pavement conditions. Also available separately.

Checking signs for retroreflectivity

NEW ROADWAY SIGNS are easy to see at night. Retro-reflective sheeting picks up light from vehicle headlamps and reflects it back to the driver. Over the years, sunlight, moisture, and

pollutants make them dimmer until drivers can no longer see the warning or message. Vandalism also takes its toll.

Since damage can happen any time, and signs age at different rates, it is important to inspect them regularly. Guidelines for ensuring that signs meet minimum standards for retroreflectivity have been published for comment by the FHWA and will probably be formally adopted soon. Agencies will be required to adopt a method for meeting the requirement and for keeping documentation.

Nighttime windshield surveys and data kept in a basic computer spreadsheet can work well, especially for smaller municipalities. In fact, research has shown that trained observers can adequately determine which signs need to be replaced.

Inspection tips from "Retroreflectivity: Making Sure Signs Measure Up," by Paul J. Carlson, which originally appeared in the Texas LTAP newsletter.

To contact Dennis Premo, e-mail dpremo@co.adams.wi.us or call 608-339-3355.



Use regular nighttime inspection to find failing signs like this.

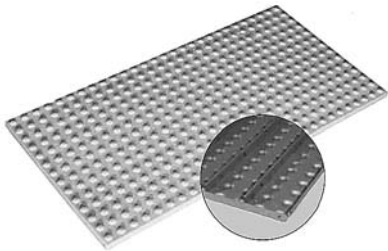
MORE TIPS FOR EFF

- The inspector must know signing and be at least 50 years old. (Older eyes require more light.)
- Use a sport utility vehicle or pick-up truck because the driver's eye is farther from the headlamps.
- Make sure headlamps are aimed properly; use low beams.
- Drive at normal speeds for the road.

The training approach used in Adams County is basic but effective. "We usually have two people to a team," says Dennis Premo, Sign and Marking Supervisor. "We have them look at old signs we have taken

New curb ramp option

ANOTHER TRUNCATED warning dome product has been added to the WisDOT Approved Products List. As of April the Advantage Tactile System was approved for use.



Truncated warning domes provide contrasting color and a rough surface to help visually impaired pedestrians at curb ramps. The surface is required by the Americans with Disabilities Act and must meet ADA specifications. For more information on curb ramps see the Spring 2005 *CROSSROADS*.

EFFECTIVE INSPECTION

- Document the procedure with a tape recorder, video recorder, second person taking notes, or other method.
- Don't inspect in rain, fog, or when water has condensed on the sign.
- If uncertain, drive past the sign again.
- When in doubt, throw it out.

down that have different grades of sheeting, ages, and condition, and compare them to new sheeting. They work at it until they get used to it." Adams County inspects about half its signs each year.

Setting safe speeds for curves and turns

A BEND IN THE ROAD can be a hazard for vehicles. While older rural highways probably have the most, every roadway system has a few curves and turns. How do you know which bends need signing? What information tells you which signs to use? The answer may be sitting in your driveway.

"Most signing decisions for horizontal alignment change, that is turns and curves, are based on the 'safe and comfortable speed,'" says Tom Heydel, Traffic Operation Engineer, WisDOT District 2. Heydel is the TIC's signing instructor, making presentations and answering questions in our February Safety workshops.

No signs are required at roadway bends under the Manual on Uniform Traffic Control Devices (MUTCD), the nation's signing "bible." Signs are helpful at locations where drivers will have to slow down 10 MPH or more from the posted limit. Past accident experience is the most reliable indicator. Visibility is critical, especially if the curve is hidden or unexpected, following a long straight section, for example.

Although an engineering study is preferred, you can determine an advisory speed by driving the curve at various speeds. You will need a test car and an experienced mature driver. For consistency throughout the system, use the same test driver. A ball bank indicator can also be helpful to develop consistency in application.

Although vehicles vary tremendously — a little sports car can corner much faster than a loaded semi — choose an average passenger car, like a mid-size sedan, for your test vehicle. Before making the test runs check the tires and inflate all of them to the proper pressure. Also calibrate your speedometer.



Use the Curve sign if the advisory speed is 35 to 55 MPH.

Check the odometer and time the car over a measured distance at specific speeds — ideally 5 MPH intervals starting at 25. A speed gun can also be used.

Drive through the curve at various speeds, staying in the center of the lane, parallel to the center line. For the advisory speed, select the highest value that lets you travel the curve in your own lane without feeling like you are losing control or without throwing you and your passengers uncomfortably to the side.



A ball bank indicator, or manual inclinometer, is a curved level with degree markings, available commercially for about \$75 each. On the flat, the gauge's small metal ball rests at the bottom of the curve, at 0. As the car travels through the curve, the ball shows the angle of deflection. When the gauge shows a maximum reading of 16 degrees, use your test vehicle's speed as the advisory speed.

If the advisory speed is 30 MPH or less use a Turn sign. Use the Curve sign if the advisory speed is 35 to 55 MPH. An Advisory Speed Plate should be mounted below the sign if the advisory speed is 10 MPH or more below the posted speed limit on the road.



If the advisory speed is 30 MPH or less use a Turn sign.

For more information see the TIC's Transportation Bulletin No. 7, *Signing for Local Roads*. (See page 10.)

TIC Highway Safety workshops held in February cover the basics of signing and marking. Mark your calendar now and look for dates and details in the next *CROSSROADS* and on our Web page.

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The truth about sand and salt for winter maintenance

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Vehicle traffic tends to work the abrasive into the snow and/or pick it up in the tires and blow it off the pavement. A paper by Professor Wilfred Nixon has a good discussion of the research relating to abrasives testing.¹

Do abrasives have much real value in promoting safety? Yes, because abrasives are often the only reasonable option we may have. Low temperatures or freezing rain conditions, for example, limit the effectiveness of chemicals. However, abrasives are far from efficient as a method for snow and ice control. Many agencies follow long time prac-



Using straight salt will not cost more in the long run.

tices—especially in using only a salt/abrasive mix—that don't reflect the reality of how these materials work.

Mixing salt with abrasives

First, it is true that if you are going to use abrasives in winter, you need to add some salt. All sand piles have moisture, even those in desert environments. When this moisture freezes, lumps form and that interferes with distribution.

How much salt is needed? Just enough to keep the moisture from freezing. Practice has shown that 50-100 pounds of salt per cubic yard of abrasive is sufficient. This is about 2%-4% by weight. If your abrasive is very wet, you are in a very cold environment, or your stockpile is uncovered, you may find it necessary to use 175 pounds (7%). Also, if the abrasive is dirty, the larger volume of fines will tend to collect more moisture and therefore it takes more salt to prevent freezing.

Many states regulate salt and sand storage to protect surface and ground water. In Wisconsin, any entity storing more than 1000 pounds of bulk road salt must pile it on an impermeable pad and keep it securely covered year round. A sand mixture that is 5% salt by weight or less is exempt. Any mixture with more salt must comply.

Uncovered abrasives piles with salt are also susceptible to leaching with any significant amount of snow or rain during the winter. One study showed that 10 inches of precipitation leached out 50% of the salt. While it is difficult to keep salt/sand piles covered, doing so—with a tarp or preferably a building—would save salt and reduce leaching into the environment.

Many agencies have a tradition of mixing more than 5% salt in their abrasives. Blends of 10% to 50% can be found in use in nearly every state in the U.S. Why? The thinking goes: "If salt works well under some conditions and abrasives are helpful in others,

why not mix them together for the best results?" In fact, salt and abrasives do different things and can actually oppose each other!

The following sections explore some of the common explanations for these practices and their actual effectiveness in providing safety and producing bare pavements.

1 – Anchor it to the road

A common belief is that salt will anchor the sand, and/or sand will anchor the salt to the road. Actually, sand and dry salt particles are separate and are not in any way tied or anchored together. As long as they remain dry, wind and traffic will quickly move both off the pavement.

Some salt may become brine from moisture in the sand or from melting ice on the pavement. In theory, a small amount of moisture will help embed the sand in the surface of the snow and then refreeze to create a sandpaper effect. This is a nice picture, and it can be done, but not very often.

Research on friction on pavements treated with abrasives shows that there is little benefit when traffic is present. In general, traffic quickly carries or blows all materials off the road. If there is very much melting, it is not likely that the abrasive will float and stay on the surface. More likely it will settle, or be pounded by traffic, down into the melting snow mixture. Now it is no longer "anchored" to the surface and provides little value for traffic safety.

2 – Sand will provide safety until the salt has a chance to work

People often use this approach when temperatures are too cold for salt to work. The object is to maintain traction until it warms up and the salt can go to work. This is true **if** the sand stays in place and **if** the salt also stays in place until it can do its job of melting. The challenge is to keep the dry salt on the road. With any

volume of traffic it will either be blown off the surface or mixed too far down into the snow to be effective.

If crews do any plowing before the temperature rises, this approach is a complete waste. The salt will be plowed off before it can possibly work. Any salt that remains may turn to brine and melt some of the ice on the road. This liquid on top of the ice actually makes the surface more slippery. Then, when the air temperature remains low it will likely refreeze the water, making the road surface ice covered. This leads to more salt applications and the process is repeated, wasting materials and not improving traffic safety very much.

3 – We save salt by mixing it with abrasives

Bulk salt is more costly than bulk abrasives, so the idea is to “extend” the salt by mixing it with abrasives. However, if you are using a blend to achieve clear pavements, then salt and plowing are doing the work. Very likely most of the abrasive is wasted because blending salt and abrasives does not actually produce a different material. In fact, research has also shown that mixing sand with salt actually reduces the salt’s melting ability. One study documents over 20% loss of ice melting capacity when salt is mixed with sand.²

Spreading rates also differ between straight salt and an abrasives/salt mixture. Straight salt is usually spread at 100-300 pounds per lane mile. Spread rates for mixtures often run over 500 pounds per lane mile. If you are using a 3 to 1 blend by volume (sand to salt), the blend by weight is actually 20% salt (sand weight of 2700 lb/cu. yd. and salt weight of 2000 lb/cu. yd.). Spreading 500 pounds of this mixture per lane mile actually applies 100 pounds of salt per lane mile. A 50-50 blend by volume means that the salt is 43% by weight, giving a salt spread rate of 212 pounds. Because of the differences in

spread rates, it may cost about the same or even more to spread an abrasive/salt mixture. Studies often show that abrasive/salt mixtures cost more than straight salt especially if any clean-up is required.

4 – Sand is visible, and the public expects it

You bet! It is nice to spread something the public can see so they stop calling and complaining. You can add law enforcement to the group that likes to see sand on the road. Very likely our own operators and managers also feel the same way. Sand becomes a security blanket for everybody.

If the abrasive is really working, this approach is fine. However, there is a growing list of negative environmental concerns with abrasives. These include: air pollution from the fines, stream bed pollution impacting fish reproduction, and corrosion from the salt included with the sand. In addition, problems with claims for windshield damage and chipped paint make the use of abrasives a source of public criticism.

Spreading abrasives mostly to be seen is very costly and not good for the environment. You are paying a high price to have sand just to look at. I doubt the public would be very supportive if they understood the situation.

5 – We do not want the complication and expense of using more than one type of material

Yes, it takes more effort and training to use both straight salt and abrasives with 2%-4% salt. However, it will not cost more in the long run. In fact agencies are making this change all over the country at the state and local level. A realistic review of your total costs for spreading and cleaning up abrasives will likely show the benefits. Change is not easy, but many agencies feel it is worth the effort to make this improvement.



The public expects to see sand, but is it worth the environmental and cleanup costs?

Summary

In this day and age of new and exotic chemicals, anti-icing, RWIS, and GPS, is there a place for good old sand? Yes. If, however, your agency is using a high percentage blend of salt with abrasives, you do have an opportunity to review your practice and seek improvements.

An abrasive mixed with enough salt to freeze-proof it has a place on unpaved roads, low volume roads, and in conditions where chemicals can not work. Straight salt can both prevent ice from bonding to the pavement and create slush which allows plows to clear the road. This mix of strategies will serve most agencies well into the future. We owe the public nothing less.

References

- ¹ *The Use of Abrasives in Winter Maintenance, Final Report of Project TR 434*, Wilfred A. Nixon, IHR Technical Report No. 416, Iowa Institute of Hydraulic Research, University of Iowa, March 2001.
- ² *De-icing Chemicals and Abrasives: State of the Art*, J. Hode Keyser, Highway Research Record 425, p. 36-51 (1973).

Culvert corroded? Question conditions

“Corrosion is a pretty complex and variable mechanism.”

The Culvert Selection Standard, 13-1-15 of the *WisDOT Facilities Manual* is accessible online if you have a Wisconsin user ID. Choose FDM, then select the Drainage chapter at <http://www.dot.wisconsin.gov/library/publications/format/manuals.htm>.

Or request a print copy from the TIC.

Experimental Culvert Pipe, STH 80 Juneau and Wood Counties, Wisconsin, Final Report, WisDOT WI/FEP-09-96, November 2003, 33 pp.

Describes field tests of corrosion resistant culvert pipes, water and soil characteristics, and related research. Available from the WisDOT Technology Advancement Unit, 608-243-5989.

WHEN EROSION on the shoulder or a new dip in the blacktop tells you a culvert has failed, do some detective work before you order a replacement. Find out the culvert's age, consider the water flow pattern, and look at nearby land uses. If it is steel, look at the type and location of corrosion. Depending on your area in the state (see map), gather soils and water information.

Age will tell you if the culvert failed prematurely. If there are no paper records, ask nearby landowners if they recall when it was installed. Metal culvert pipe of any type should last at least 20 years before perforation occurs. Premature failure indicates that you should look further to pinpoint sources and causes.

Corrosion primarily on a culvert bottom that should be normally dry suggests constant contact with water. Evaluate the pitch and water flow through the pipe and its connecting ditches. A faulty design or incorrect installation may be trapping water in the culvert.

Most corrosion is primarily scale: flat pieces that flake off in layers. Scale is most directly related to low pH or low electrical resistivity in the soil or water at the culvert site. It is most common where the pH is less than 6 and where the electrical resistance is less than 4000 ohm/cm.

Effluent or runoff could also be a cause. Barnyards or feedlots generally produce effluent with very low electrical resistance. Effluent from cheese factories can have a very low pH and can even dissolve the cement in concrete. Runoff from cultivated fields can contain fertilizer, herbicides, or pesticides that can also be very corrosive to metal. Look for these or other possible sources nearby, especially when soil and water tests are negative.

If corrosion takes the form of nodules, and small discrete holes the size of a dime appear, bacteria are likely the cause. Bacterial corrosion will tend to concentrate along the flow line where water flow is variable. These bacteria (called anaerobic sulfate reducing bacteria) do not attack the steel directly but create an environment favorable to corrosion. They thrive primarily in the north central part of Wisconsin where water alkalinity is low and are most active at sites of flowing water where the alkalinity is less than 120 ppm and the pH is 5 to 7.

Bacterial corrosion related to the soil also occurs where the soil is organic and poorly drained, with a pH range near neutral. This corrosion can occur anywhere in Wisconsin and is characterized by rust stained soil adhering to the outside of the pipe. Placing clean, inorganic fill around the pipe can reduce soil side corrosion.

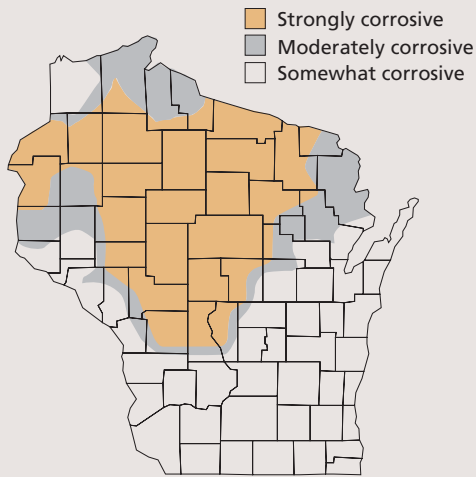
“Based on research completed by my predecessor, Bob Pate-naude, WisDOT developed an overview map of the state

showing the potential for bacterial corrosion related to water at the site,” says Dan Reid, a WisDOT geologist. “The highest potential is in the central and northwestern counties. We frequently find very low pH and alkalinity in those areas because of the bedrock.” The map appears in the WisDOT Facilities Development Manual along with recommended corrosion resistant culvert types. You may be able to get information about the corrosive characteristics of a site's soil or water from district soils or maintenance records.

The state DOT has evaluated and tested several corrosion resistant pipe materials: concrete, aluminum, aluminized steel, polymer coated steel, and polyethylene. Recent ongoing improvements in plastic pipe make it a good potential alternative, but experience with it is relatively short. If you are considering aluminum, it should be protected from road salt that can move down through the soil and corrode it from the top.



Poor installation left this culvert lower than the ditches. Constant standing water quickly rusted through the bottom.



Potential for bacterial corrosion of zinc galvanized steel culvert pipe

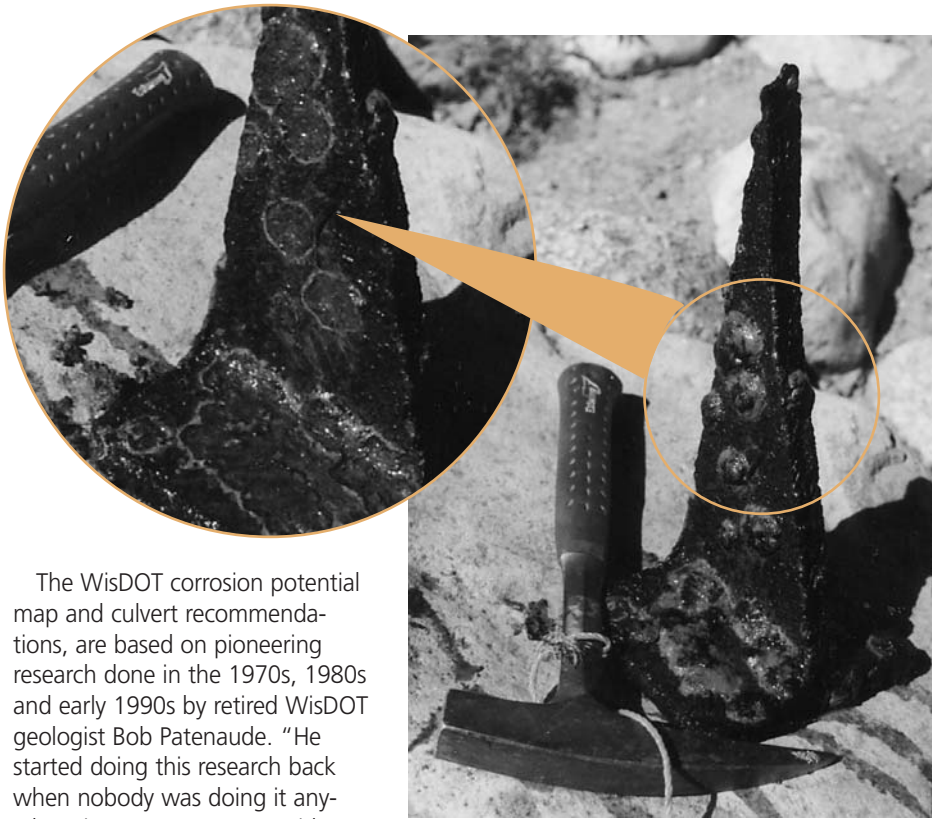
Inspect culverts regularly

It's a good idea to routinely inspect culverts, allowing you to plan and budget for their replacement. The following rating scale for zinc galvanized steel pipe may be helpful.

Corrosion Ratings for Zinc Galvanized Steel Pipe

RATING	CONDITION OF PIPE
0	No corrosion. Galvanizing or cladding intact.
1	Staining or surficial oxidation. No pitting.
2	Moderate rusting. Rust flakes tight. Possible nodules. Minor pitting.
3	Fairly heavy rusting. Some scale. Nodules. Some pitting.
4	Heavy rusting. Rust scale easily removed. Deep pitting but metal is sound.
5	Heavy scale. Deep pitting. Unsound areas easily penetrated with pick end of geology hammer.
6	Small perforations in pipe.
7	Large perforations in pipe.
8	Invert gone from pipe.

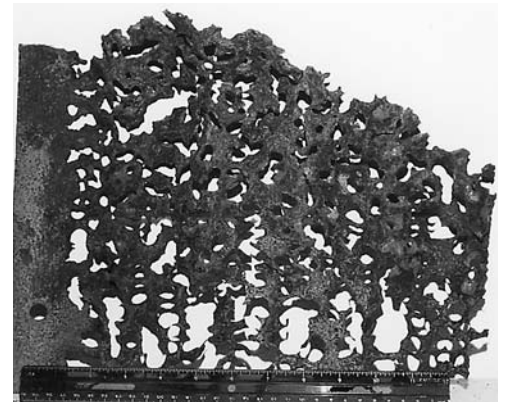
These ratings attempt to reflect both scale and nodules, Wisconsin's two principal corrosion modes. They can be used as a gross estimate of remaining service life. For example, if a pipe has a C.R. of 4 and has been in service for 20 years, the rate of corrosion is 5 years per C.R., and with 2 C.R. ratings to perforation, the remaining service life would be estimated as 10 years.



The WisDOT corrosion potential map and culvert recommendations, are based on pioneering research done in the 1970s, 1980s and early 1990s by retired WisDOT geologist Bob Patenaude. "He started doing this research back when nobody was doing it anywhere in U.S.," says Dan Reid.

Patenaude studied a lot of corroded pipe in his many years with the state. His research on state highway 80 in Juneau and Wood counties helped solve a long-standing culvert failure mystery and explain the mechanisms of bacterial corrosion.

"Corrosion is a pretty complex and variable mechanism," says Patenaude. "The causes of corrosion at an individual site can be unique to that situation." So when a culvert fails too soon, take a hard look at it and check the variables—water and soil characteristics, local land uses, and original design and installation—before you replace it.



Bacterial corrosion severely perforated this 10-gauge pipe arch invert. Nodules have dried and fallen off the metal.

LEFT Corrosion in the form of nodules was likely caused by bacteria. In closeup, nodules have been removed revealing underlying pits.

For less disturbance, lower cost, think trenchless



"We use liners whenever we can. They are more expensive, but we don't have to tear up the road, and traffic can keep going through."

FIXING A FAILING CULVERT

without excavation is a growing trend. It minimizes disruption, preserves the pavement surface, and can be less expensive. In some situations it may be the only viable method, or the best one, even at a higher direct cost. Sliplining with smaller diameter plastic or metal pipe is the most common approach.

Interstate highways saw some of the state's earliest plastic sliplining projects. In St. Croix County, for example, former Highway Commissioner Dan Fedderley managed projects on six, 24"-36" diameter culverts. "They were 250-300 feet long and under very high fills, but we could do it without the traffic knowing there was anything going on below," says Fedderley. In addition, the cost of sliplining was significantly less than excavation.

"I wouldn't say you should slipline every pipe," Fedderley says, "but as dollars get tight and full-fledged reconstruction is less possible, it's a good economical option in some applications."

For Chairman Paul Swart, Town of Koshkonong, it was the only option to fix a failing culvert under a dead end road. "We had 75 homes down there; only one way in and out; and no way of making a temporary road," says Swart. "And utilities were in the way — power, phone, cable tv, and gas."

Swart's crews were able to thread two 30' sections of new 4' metal pipe through the old 6' culvert, even though it was starting to deform. Calculations showed the smaller diameter was adequate because upstream changes had reduced the flow volumes. They were finished in a day and a half.

Worth the cost

George Koval was worried. He had a 60-year-old culvert under deep fill and it was starting to sag. From experience the long-time Chairman of the Town of Keystone in Bayfield County knew he didn't want to disturb that clay fill. Back in 1986 it took nearly 800

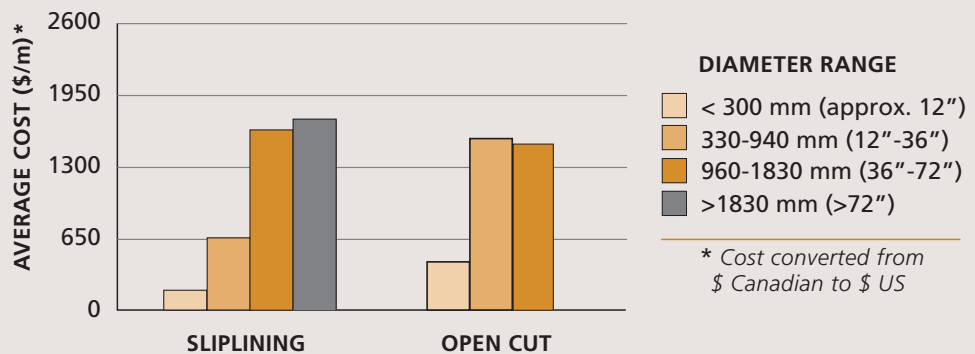
cubic yards of fill to fix it after a flood. A plastic liner could be the answer, but would cost almost twice as much as cutting a trench.

"My side board couldn't see the extra \$10,000," Koval says. After a couple meetings where they talked about other costs — for fill, pavement repair, and moving the buried telephone cable — along with the disruption from a long excavation project, and the relatively short service life of new metal culverts, they decided to go ahead.

In one day, the job was done. Town and county crews pulled plastic sections through the 165' culvert, filled in between with grout, and finished the ends with rock riprap. "I'm really satisfied with it, and I can sleep nights again," he says.

Bayfield County has installed more than 100 slipliners so far. "We use liners whenever we can," says Keith Larson, Patrol Superintendent for the Bayfield County Highway Department.

Relative Cost of Construction and Rehabilitation Methods



Source: Construction and Rehabilitation Costs for Buried Pipe with a Focus on Trenchless Technologies, Research Report No. 101, June 2002. Jack Q. Zhao; Balvant Rajani, published by Institute for Research in Construction National Research Council Canada Ottawa, Canada.



Sliplining with plastic pipe left deep fill in place, and the crew finished in one day.

“They are more expensive, but we don’t have to tear up the road, and traffic can keep going through.” He also expects a significantly longer service life. “Plastic probably will go for 75 to 100 years where 20 to 30 is the average for steel.”

The plastic pipe he uses comes in 19 or 21 foot sections. Crews push them through the old culvert with an excavator or “come-along,” snapping together the built-in couplers as a new section is needed. When the liner is in place, they pump slurry in between the two to fill the void and support the plastic culvert’s sides. Then they seal the ends with concrete and add a metal apron or other end treatment.

A slurry made with fly ash works best, Larson says. Sand tends to settle out. In situations with relatively little pitch to the pipe, they add silicon beads to the slurry to improve flow. “The silicon makes it so slippery it will flow through the old culvert where it’s rusted out and fill a void outside it,” says Larson.

Consider indirect costs

While the installation cost for slipliners is generally higher, other direct costs are lower than open cuts, or are avoided all together. Traffic control, excavation, and backfilling are less; landscape restoration is the same, and pavement removal and restoration are avoided. Another cost to consider is safety: the risk associated with excavation and the expense of shoring up or stepping back trench walls.

The indirect costs of a project, though hard to put a number on, can also be significant. In addition to longer travel times for drivers, these may include loss of productivity; loss of business or revenue; and impacts to health and safety, public image, and esthetics. The minimal disruption of trenchless techniques may help satisfy these concerns.



Traffic, utilities, and pavement are undisturbed with sliplining

For more information contact

Keith Larson at 715-373-6115 or
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Paul Swart at 920-563-2803 or
e-mail pnswart@compufort.com

George Koval at 715-209-0057 or
e-mail gmstore@cheqnet.net

Peer exchange groups: low cost, low key, lots of learning

AT MOST public works, highway and streets departments, only one or two people are doing a particular job. Talking to someone with similar responsibilities from another community can often be helpful. Sharing information and ideas, or getting a new perspective or a “heads-up” on a problem can also save time.

One great place to make such connections is the regional TIC workshop; you tell us so on the feedback forms. Unfortunately,

travel time, program costs, and conflicting commitments keep a lid on such opportunities. Another way you can do it is by joining or organizing an informal peer exchange group. Public works directors in several areas of the state have done just that.

As Director of Public Works in Shawano 30 years ago, Maurie Rott helped form “SNEWPS”—the Society of North Eastern Wisconsin Public Works Supervisors. DPWs serving smaller communities in the five-county

area, along with streets superintendents from the larger ones, started meeting for half a day, about four times a year.

“The topics were issues that interested us,” says Rott, who now works for SEH (Short Elliott Hendrickson), based in Madison. “We would meet in different communities, sometimes tour a public works facility or have a speaker. There was always a roundtable discussion where we could talk about a hot topic and share lessons learned.”

Continues next page

RESOURCES

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/>

Publications

A Landowner's Guide to Building Forest Access Roads, USDA Forest Service NA-TP-06-98, July 1998. Provides information on road construction and maintenance for low volume roads including information on culvert sizing and the use of Geotextiles. In print from TIC and online at <http://www.na.fs.fed.us/spfo/pubs/stewardship/accessroads/accessroads.htm> (html version) or <http://.../accessroads.pdf> (pdf).

REVISED **Signing for Local Roads**, Wisconsin Transportation Bulletin # 7, 12 pp. A handy overview of signing responsibilities and principles, common sign types and their uses, sign placement (including distance charts), and installation. Includes brief section on pavement markings. Revision current with MUTCD 2003 Edition and the 2005 Wisconsin Supplement.

REVISED **Using Salt and Sand for Winter Road Maintenance**

Wisconsin Transportation Bulletin # 6, 4 pp. Basic information and practical tips on how to use deicing chemicals and sand. Discusses factors that affect deicing action, environmental impacts, pre-wetting, use and misuse of abrasives, and gives a brief introduction to anti-icing.

Websites

Section J of **Iowa Traffic Control Devices and Pavement Markings: A Manual for Cities and Counties** provides a discussion of what data to collect in a sign inventory, the cost of data collection, and how to select software. The manual is available at <http://www.ctre.iastate.edu/pubs/itcd/index.htm#j>

Videotapes

NEW **Foamed Bitumen, Wirtgen Road Equipment**, 10 min. #18774 Explains how foamed asphalt is made and used. Shows both laboratory examples and field construction methods. Applications include stabilized base and cold mix surfacing using recycled asphalt pavement.

NEW **Tire Chains How to Install and Use Them**, US Army Cold Regions Research & Engineering Laboratory, 20 min. #18775. A two-part video. The first 15 minutes covers snowplowing with a Humvee truck. The second 5-minute video gives basic information on installation and use of tire chains. Good installation details. Intended for equipment operators.

Members would take turns planning the next meeting, hosting, providing snacks, and sending notices. Annual dues of \$25 covered basic expenses, and they wrote up some basic bylaws.

When he became Operations Director for Janesville, Rott and another SNEWPS alumnus, now in Evansville, formed a similar group in that area. He also learned about others in Waukesha, Tomahawk, the Fox Valley, and the Milwaukee area.

These days, as their informal "grandfather," Rott tries to visit each group once a year and hosts a statewide meeting for them about every other year. He gets support from his current employer, SEH, and from the Wisconsin Chapter of the American Public Works Association where he's an active member.

MAPWO meets monthly

For about 15 years Milwaukee Area Public Works Officials (MAPWO) members have been heading to West Allis every second Thursday, from September through June. Mike Pertmer West Allis DPW, who co-founded the group with Bill Kappel of Wauwatosa, provides the facility, coffee, and a secretary to take minutes.

"Meetings start at 9:00 and we're done by 10:30, or 11:00 at the latest," says Kappel. "We decided that keeping it as part of the work day was attractive." As with the Northeast group, meeting responsibility and snacks

duty are passed around. Each December they plan the topics for the next year, usually leaving one or two dates open in case a hot issue comes up.

At one recent meeting a DNR representative talked about local tree pests, like gypsy moths and birch borers, and how to deal with them. Other meetings have covered emergency response mutual aid agreements, labor contracts, and designing utilities for stormwater management.

"We have programs on anything people want to discuss," says Kappel. "It's helpful when some communities are ahead of the curve on an issue and they can share information."

Membership is open to anyone who wants to join, and members will often bring staff when a meeting topic might interest them. Quite a few urban foresters came to the tree pests meeting, for example.

Another approach

With a big membership area ranging from Shawano to Lake Michigan and up to Marinette, the Northeast group only gets together three times a year, usually for half a day.

"We keep it very low key," says Dick VandenBoogaard, Street Commissioner for the Village of Kimberly. "We get together about 9:00 a.m., shoot the breeze a little, then a vendor comes in to give a product overview, or we might have a speaker."

Vendors sometimes also sponsor the meeting.

One fall they went to see how Green Bay uses baling for their leaf disposal. "I wanted to see if it would work for us," says VandenBoogaard. "It turns out you need a lot of leaves."

Each session ends with members sharing information. They describe what's new in their community, like a good piece of equipment or the bid price of salt, and sometimes what's bad as well. Hearing about other people's triumphs and mistakes can make a difference on the job. At the same time, getting acquainted with your neighbors lets you find support when you need it, or make joint purchases to get a lower price.

Person to person, neighbor to neighbor, peer exchange meetings can make a big difference for a negligible cost.

For information about a group in your area or help in forming your own, contact Maurie Rott, by e-mail: pmr@ticon.net or phone: 800-732-4362

CALENDAR

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Other training opportunities

Snow Plow Roadeo

Wisconsin Chapter American Public Works Association Snow Plow Roadeo and Equipment Show September 21, Lambeau Field, Green Bay, WI. Roadeo teams interested in competing must register by September 1.

Contact

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Also at

<http://wisconsin.apwa.net/>

Pesticide Applicator Training

Pesticide Applicator Training and testing for right-of-ways is held annually in January or February. Information and pre-registration online at <http://ipcm.wisc.edu/PAT/> or call Rose Scott at 608/262-7588, or e-mail: PAT-program@facstaff.wisc.edu

Individual study options also available.

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, & the University of Wisconsin—Extension. For permission to reproduce articles or graphics, please contact us.

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FALL 2005

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



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CALENDAR

TIC Workshops

Specific details, locations and registration forms are sent to everyone on the CROSSROADS mailing list before each workshop. You can also get additional workshop information and register by calling 800-462-0876 or going online at <http://tic.egr.wisc.edu/enroll.html>

Winter Road Maintenance

Prepare for winter operations. This workshop covers the effective use of salt and sand, anti-icing and prewetting, winter operations planning, equipment, and safe winter driving. It's a great opportunity to learn what is new in snow and ice chemicals, equipment and technology, and share experiences and tips for better winter operations.

- Oct 25 DePere
- Oct 26 Menomonee Falls
- Oct 27 Barneveld
- Oct 31 Rhinelander
- Nov 1 Cable
- Nov 2 Eau Claire
- Nov 3 Tomah

Can't make these dates? Schedule your own, on-site workshop (see below).

Highway Safety This workshop series is held in February. Plan ahead for your opportunity to review the basics of signing and marking, good sign installation, sign maintenance, safety hazards on local roadsides, and using crash information to improve safety. Details on TIC Web page and in the next **CROSSROADS**.

Work Zone and Flagger Safety

Training for road supervisors and maintenance personnel who plan and set up work zones. Held in January. Details on TIC Web page and in the next **CROSSROADS**.

On-site Workshops

Save time and travel costs by bringing instruction to your shop or office. Schedule training for the time and place most convenient for you and ask the instructors to tailor content to your specific needs.

On-site workshops let you train more people for the same or less cost—including staff from other municipal departments, from nearby communities, and from businesses you contract with.

Some workshops the TIC can offer at your location include:

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

Contact the TIC early to ensure you get the program you need on the date you want. Details on the TIC Web page.

Local Transportation Issues

Fall WisLine Teleconferences are on Thursdays 10:30-12:20. Registration information is in brochures mailed to **CROSSROADS** recipients. Also on the TIC Web page (click on the Teleconference link) and at your local Extension office. Topics are:

- Nov 10** DOT funding for local roads
- Dec 8** Bidding projects on local roads
- Jan 12** How to get permits for local road projects

UW-Madison seminars

Local government officials can request a scholarship for the following Engineering Professional Development courses. Descriptions are available at <http://epd.egr.wisc.edu> or call 800-462-0876. All courses are held in Madison unless otherwise noted.

SEPTEMBER 2005

29-30 Managing Snow and Ice Control Operations

OCTOBER 2005

17-18 Storm Water Detention

19-20 Storm Sewer System Design

NOVEMBER 2005

14-16 Traffic Signal Design and Operation (Milwaukee)

30-Dec 2 Highway Bridge Design

JANUARY 2006

9-10 Improving Public Works Construction Inspection Skills

11-12 Maintaining Asphalt Pavements

For other opportunities, see page 11.