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CROSSROADS

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WISCONSIN TRANSPORTATION INFORMATION CENTER– LTAP

Pulverization gains traction on local roads

Besides utilizing 100 percent of existing materials, pulverization corrects cross-section problems and increases the load-bearing strength of the base.

PAVEMENT LIFE and durability depend on timely maintenance measures that keep a road in good condition as long as possible. When routine crack filling, seal coating or thin overlays no longer are effective, road reconstruction or rehabilitation are the alternatives.

Over the past decade, more Wisconsin counties and municipalities have chosen rehabilitation to repair roads with a PASER rating of 4 or less, using in-place pulverization of materials as a practical way to rebuild seriously deteriorating roads.

Pulverization techniques

A common and effective pulverization technique for these roads is Full-Depth Reclamation (FDR). FDR involves pulverizing and compacting the bound asphalt pavement layers and base material together, sometimes with stabilizing agents, to produce a good-quality base for the rebuilt road.

Standard specifications in Section 325 of the Wisconsin Department of Transportation term this process "pulverized and re-laid pavement." Model specifications in the TIC Bid Documents for road construction also use the WisDOT language to describe in-place pulverizing of existing asphaltic pavement and underlying base materials to construct a new base.

The Asphalt Recycling and Reclaiming Association (ARRA) notes that besides utilizing 100 percent of existing materials, pulverization corrects cross-section problems and increases the load-bearing strength of the base. A typical pulverization takes a day to complete and allow local traffic to resume.

Bill Kahl, owner of WK Construction in Middleton, works on pulverization projects in Wisconsin and neighboring states. He has seen road recycling grow in popularity in Wisconsin as local governments look for alternatives to costly reconstruction.

Slower to gain endorsement here, Kahl says, is the use of additives to stabilize the base materials. WK uses asphalt emulsion or foamed asphalt on most FDR projects. Other additives on the market include cement, fly ash and lime. The most effective additive depends upon the type and condition of the existing base and subgrade soil. Experienced contractors or materials consultants can help local governments evaluate the additive question as part of a site evaluation.

Evaluate existing road

A site evaluation of the road is critical before investing time and money on a solution. In most cases, this means taking core samples or digging a hole to examine road layers. Core samples should reveal:

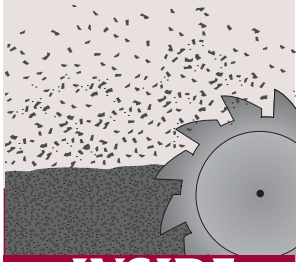
- Number and thickness of layers
- Quality and composition of each layer
- Make up of subgrade soil
- Good or poor drainage

Knowing the layers of old asphalt, gravel and chip seal that make up the existing road helps in evaluating the cause of deterioration. It also points to which approach is the best for rebuilding the road to last. A sieve analysis of

Continues page 6

COURTESY PAYNE AND DOLAN INC.

The pulverization process grinds and combines old asphalt layers with existing base materials to create a strong base for new overlay.



INSIDE

Manage railroad vision corners for safety

"Local officials are in a good position to act if they spot a vision problem by working directly with the railroad or private owners to get it corrected."

CLEAR VIEWS of an oncoming train are a first line of safety for motorists approaching rural railroad crossings. By law, local governments are responsible for their share of keeping vision corners at crossings cleared of brush and trees.

To guard against serious liability resulting from a crash or a fatality, that responsibility reasonably extends to monitoring compliance by ***all*** parties to make sure drivers can see well enough to make safe decisions, especially at crossings with no signals.

Grade Crossing Safety Engineer Mark Morrison, WisDOT Railroad Engineering and Safety Unit, says local officials should be proactive in working with both railroad companies and owners or residents of private land adjacent to a crossing.

The risk of liability generally outweighs fear of fines that range from $25 to $150 per violation for defying or ignoring the law. For this reason, many local governments have ordinances that govern vision triangles at highway intersections ***and*** highway-railroad intersections.

A vision corner at ground level. Clear cutting ensures adequate time for traffic to stop safely.

"The ultimate goal is to prevent crashes at crossings, to use the law as a practical guide," says Morrison. "Local officials are in a good position to act if they spot a vision problem by working directly with the railroad or private owners to get it corrected."

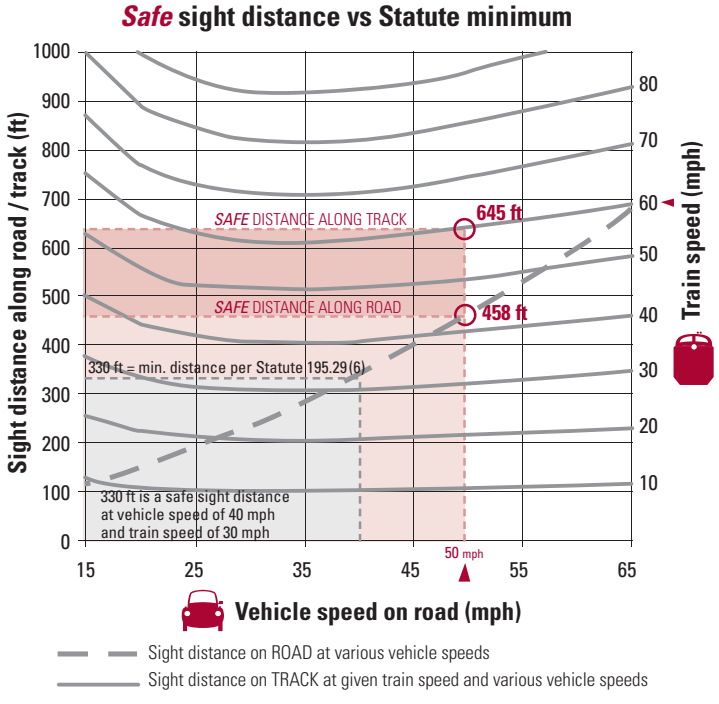
Morrison notes local officials can appeal to the Office of the Commission of Railroads (OCR) if the railroad ignores a direct request to clear overgrowth along its right-of-way at a crossing. He says a good tactic for dealing with reluctant private landowners is to get written permission from them for clearing brush and trimming trees on adjacent property at the same time local crews work on the highway right-of-way.

Statute 195.29(6) governs maintenance of trees and brush at crossings by all three landowner groups. The law requires keeping road and track right-of-ways clear of brush and trees for 330 feet or more. Determine the area of the vision triangle by measuring the required distance from the crossing along both the road and track. Then connect the two remote points to form the triangle. Private holdings that fall within this area must meet the same requirements to preserve adequate open views at crossings.

The law does not require the highway authority to exceed the 330-foot rule unless an OCR order specifies a greater distance. Nonetheless, Morrison recommends local officials err on the side of safety, especially where high speeds are the rule on roadway and railroad track. Using train and vehicle speed in his calculation, Morrison gives the example

Contact

Mark Morrison
Wisconsin Department
of Transportation
Railroad and Harbors Section
mark.morrison@dot.state.wi.us



This simplified rendering of a sight distance graph from WisDOT's Railroad Crossing Report shows how train and vehicle speed factor into the calculation for a vision triangle.

of a train traveling at 60 mph approaching a roadway crossing where the posted speed is 50 mph. The estimated vision triangle to provide a safe stopping distance is 458 feet down the highway and 645 feet down the railroad, well beyond the legal minimum. Highway approach grades also factor into the equation.

If there is no order on file with OCR denoting the vision triangle for a crossing, local officials can make their own calculations using a graph found in the *WisDOT Railroad Crossing Report Form DT1589*, similar to the one depicted on the previous page.

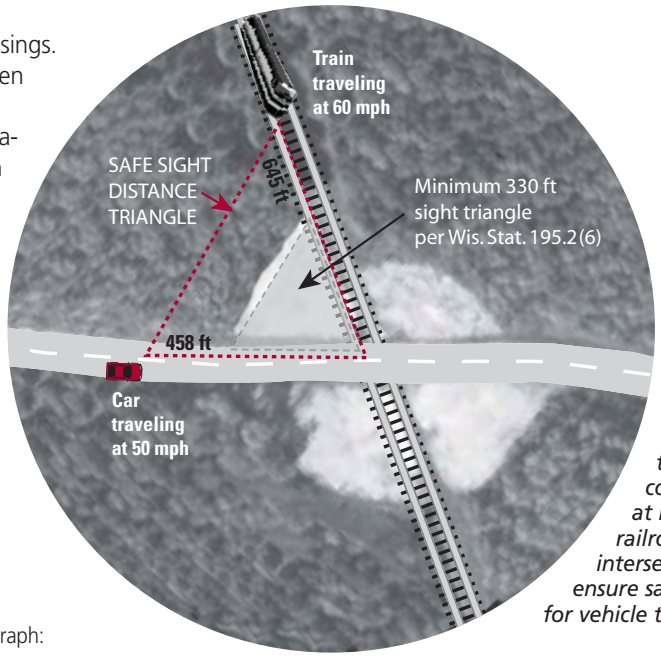
Charting vision corner dimensions this way helps illustrate the extent of clearing necessary to give motorists a safe view at crossings.

How far is far enough when trimming and cutting back? Morrison says railroad companies generally cut vegetation inside their jurisdiction down to the ground without exception. Local governments and private owners often take less radical steps, but should clear-cut to ensure open sight lines if necessary. ■

Resources

Wisconsin Statute 195.29(6): *www.legis.state.wi.us/statutes/Stat0195.pdf*

WisDOT web page with link to Railroad Crossing Report form DT1589 with the sight distance graph: *www.dot.wisconsin.gov/forms/*



Vision triangles connect at highway-railroad intersections to ensure safe views for vehicle traffic.

Work Zone Word Puzzle

Test your flagger safety IQ with this work zone puzzle. Check Calendar listings on page 12 for details on *Work Zone and Flagger Safety* TIC workshops planned at five locations in January.

Answers on page 11.

ACROSS

1 A flagger should be able to clearly see the back of the _____ _____.

4 One way to indicate "all clear" is to lift your _____.

6 Always treat motorists _____.

8 Work zone guidelines are published in the _____.

10 For safety always have an _____ _____.

11 Don't ever turn your back on _____.

13 Flag color used in emergencies.

14 The primary traffic control device for flaggers.

15 Never turn this part of your anatomy to oncoming traffic.

16 Transportation Information Center, briefly.

18 A flagger must wear an approved _____.

19 Flaggers should stand in a safe position on the _____.

20 _____ the public well-informed.

22 Barricade stripes should slope _____ toward path of travel.

25 Don't stand over the crest of a _____.

26 Hand signals need to be _____.

27 Flags, paddles and flares are flagger _____.

28 Rate of travel, briefly.

29 Color used to mark centerline.

DOWN

2 When in doubt whose turn it is, you should stop ____ _____.

3 At night, traffic control devices must be _____.

4 Not a flagger tool.

5 When flagging, avoid screeching _____.

7 These trucks are on the highway 24/7.

9 Flaggers should not stand in the _____.

11 Most common number of flaggers to control traffic.

12 Don't stand in a group of _____ when flagging.

13 When suspending operation even for a short time, signs should be _____.

15 If you have questions, consult your flagger hand _____.

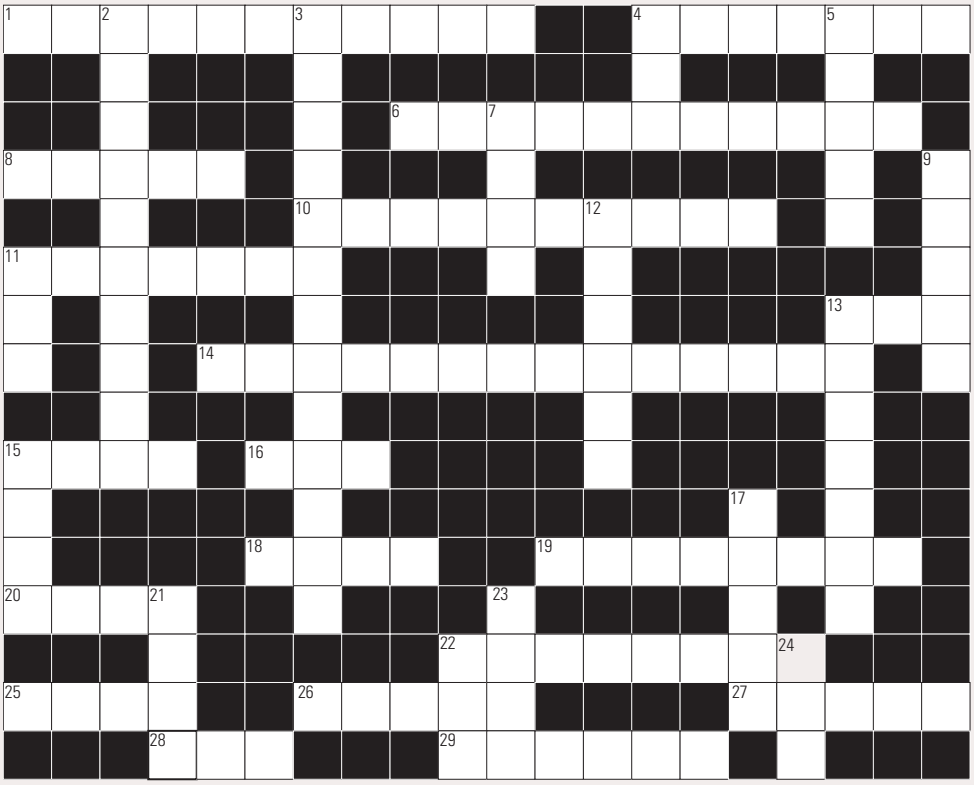
17 When flagging, it is important to stay _____.

21 When giving hand signals, expose your _____.

22 Don't ____ dream on the job.

23 Muscles at the end of a flagging shift.

24 Important highway agency.



Thanks to the Connecticut Transportation Institutes' Technology Transfer newsletter for the word-puzzle idea.

A bridge inspection in progress.

Inside bridge sufficiency ratings

BRIDGE SAFETY made major news last summer with the collapse of the I-35W Bridge over the Mississippi River in Minneapolis. Media reports at the time reflected public concern about the structural status of highway bridges nationwide. Federal and state officials at the scene and in subsequent press conferences quoted the technical terminology of bridge ratings until words like "deficient" and "critical" began to lose their meaning.

The job of communicating accurate information about bridge safety to constituents and journalists also falls to local officials. In Wisconsin, they are the people responsible for monitoring 8,700 bridges across the state. ***Crossroads*** goes inside the terms of bridge rating to clarify what they mean and highlight the state program for bridge improvement assistance.

Rating methodology

Transportation authorities in every state and municipality rely on a Federal Highway Administration methodology to calculate bridge highway sufficiency ratings. Bruce Karow, Chief Structure Maintenance Engineer with the Wisconsin Department of Transportation, says WisDOT looks at about 75 factors that measure bridge adequacy, from traffic volume and road widths to national security. Those factors become a sufficiency number between 0 and 100. This measure of bridge condition helps set priority rankings for replacement and rehabilitation, and eligibility for state or federal funds.

Four definitions

Karow recalls his department's response to media inquiries about state bridges after the Minnesota bridge collapse. They made it clear, he says, that ominous-sounding terms associated with sufficiency ratings have logical engineering definitions. "We explained, for example, that 'structurally deficient' does not mean a bridge is unsafe, and that if we found it to be so, we would post it or close it immediately." Karow here outlines the four terms that emerge most often in sufficiency rating discussions.

Structurally deficient This rating signals the need for monitoring and/or repair of some bridge elements. On a scale of 0 (failed) to 9 (excellent), a bridge earns the structurally deficient rating when the riding surface, the supports beneath the surface, or the foundation, supporting posts and piers achieve a 4 (poor) rating or less. The rating does not imply an unsafe bridge but one that requires more frequent inspection and timely repair or replacement. Authorities may reduce weight limits and post the bridge and, if an inspection warrants, close it down. Karow notes this rating automatically excludes a bridge from the ***functionally obsolete*** category.

Functionally obsolete Out-of-date but not-out-of service, a bridge rated functionally obsolete is older and built to standards not used today. These bridges often have narrower lanes and shoulders than newer bridges or inadequate horizontal or vertical clearances. A bridge with this rating often cannot handle current traffic volume. To achieve a functionally obsolete rating, Karow says a bridge must rate a 3 (serious) or less on the scale in one of several areas, including deck geometry, under clearance and approach alignment.

Fracture critical Bridge design influences the fracture critical rating. Typically, a fracture critical bridge has a steel superstructure with load-carrying components arranged in a way that, if one component fails, total or partial collapse of the bridge is likely. Two-girder bridges and most truss bridges are examples. In contrast, redundancy is a staple of most new bridge construction today. If one component fails, other bridge elements handle the load and prevent collapse. The fracture critical designation does not mean a bridge is unsafe, however, only that it lacks the strength of redundancy in its design.

Scour critical Heavy rains in southwestern Wisconsin last August washed out roads and bridges and brought attention to spans at risk of high water. Karow describes a scour critical bridge as one with abutment or pier foundations rated as unstable based on two measures: (1) observations of the scour, or erosion, from water around the substructure, or (2) scour potential based on an evaluation study that uses mathematical models to estimate scour depth. WisDOT Bridge Hydraulic Engineer Najoua Ksontini is studying data from the summer rains to identify the severity of flood events and the impact on bridge structures. Her initial review of how high and how fast the rivers ran as a result of the rainfall indicates severely affected counties experienced anything from a 25-year flood event to flooding that exceeded a 100-year event. "The information we're gathering is important in determining how to make scour critical bridges stable again and safe," Ksontini says. "It also helps in the planning of new structures where our goal is to build bridges that can withstand a 500-year flood event."

Contacts

Bruce Karow
WisDOT Chief Structure Maintenance Engineer
bruce.karow@dot.state.wi.us

Michael Erickson
WisDOT Local Bridge Program Manager
michael.erickson@dot.state.wi.us

Resources

Updated bridge page on WisDOT website with information on inspections, terms and links to relevant sources.
www.dot.wisconsin.gov/projects/bridges/index.htm#inspections

Federal Highway Administration information on bridge technology and ratings.
www.fhwa.dot.gov/bridge/

Planning bridge replacement or rehab

Understanding sufficiency terms well enough to communicate local bridge facts to the public is essential. It also helps local officials identify the structures that qualify for replacement or repair.

WisDOT administers the Local Bridge Improvement Assistance program combining dollars from a federal highway bridge improvement program (the Highway Bridge Replacement and Rehabilitation Program) with state funds to help local governments cover the costs of replacing or renovating eligible structures.

Each county receives a proportional share of the estimated $66.2 million available for the program through 2012. Approved projects are funded 80 percent by the Local Bridge Program, 20 percent by local governments.

Michael Erickson, Local Bridge Program Manager for WisDOT, says bridges eligible for funding are those included on a federal list at the time of design or construction. Bridges constructed or reconstructed within the last ten years do not qualify.

Bridges with ratings less than 80 are eligible for rehabilitation if it makes economic sense. Erickson emphasizes local authorities must do an independent engineering study to establish the rating and show rehabilitation will correct existing deficiencies and extend bridge life by at least 10 years.

A sufficiency rating less than 50 may qualify a bridge on the federal list for rehab ***or*** replacement and also must meet criteria consistent with study results.

WisDOT approved local bridge projects last summer for the 2009-2012 program. It will solicit projects for the next cycle in spring 2009. ■

Ratings review prompts postings

CROSSROADS reported a year ago on the impact of new higher legal truckloads on bridge ratings monitored by local agencies. We discussed inspection programs and the critical need to screen over 1,000 local bridges for possible updated postings. Daniel J. Fedderly, Executive Director for the Wisconsin County Highway Association, notes that the costs for doing a load rating analysis vary based on factors like the number and type of structures in the study, the length of each structure and the number of spans under review. "Generally, you can expect to pay approximately $500 to $2000 per bridge for a typical single-span structure when it's rated with a group of other structures," he says. "Signage and installation costs, should the structure need posting after the rating is done, can run a few hundred dollars more."

Fedderly encourages local governments to do the studies and keep their bridge inventory up to date. Officials in two counties that conducted ratings reviews in 2007 tell us what they found.

Lincoln County

Out of 98 bridges monitored by highway authorities in this northeast Wisconsin county, WisDOT earmarked 33 for closer review in light of the new 98,000-pound legal loads. Highway Commissioner Randy Scholz says an analysis of the identified structures did prompt new lower postings on 16 bridges, including one due for replacement in 2009. Two other bridges posted at lower limits are on the list for replacement in the near future. Structures affected are a mix of multi-span and single-span bridges, steel girder and wood. Updated postings on the six county and ten town bridges range from 12 tons to 45 tons. Scholz says it was interesting to find so few bridges on the target list needed new postings, a fact he attributes in part to original ratings that far exceeded existing loads. He adds that local officials acted quickly to alert truckers and the community at large about the change in posted weight limits after finalizing the list in August.

The six-span steel truss CTH M Bridge over the Chippewa River has a new load rating and posting BELOW after a review in 2007.

Chippewa County

This northwest Wisconsin county monitors 259 county and local bridges. County Highway Department Operations Superintendent Pat Calabrese says they categorized all aid-eligible bridges and off-system structures in response to WisDOT recommendations for local bridge owners by reviewing load ratings on file and identifying any bridges that needed closer scrutiny. A total of 45 bridges reviewed in 2007 received first-time postings. Using WisDOT guidelines for categorizing by superstructure type and aspect ratio, county staff determined four structures required closer analysis—a six-span steel truss crossing the Chippewa River, a single-span timber slab, a two-span steel deck girder and a two-span haunched concrete slab. Evaluation showed two of the four (the steel deck girder and concrete slab) capable of carrying the higher loadings. The other two needed posting. Calabrese says one thing they found from doing the load ratings was that it is important to evaluate both substructure and superstructure. The posting of one bridge analyzed was newly set at 35 tons based on the condition of the timber piling.

The CTH J Bridge in Lincoln County, LEFT due for replacement next year, has an updated posting after the 2007 review, as does the Axen Road Bridge, RIGHT which remains in good shape.

Pulverization gains traction on local roads

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Cost saving is an across-the-board consideration on all road projects. Advocates of the method say pulverization pulls the value out of initial road construction and subsequent overlays by blending in new materials and giving the materials in place new integrity.

base and subbase layers measures the amount of silt and clay and helps determine what, if any, stabilizers to use.

If a core sample includes subgrade soil, it confirms soil type and also answers the additives question. Does the mix of sand, clay, silt or other material create a firm or weak subgrade? If the latter, a stronger pulverized base and thicker reclaimed surface will spread the load better.

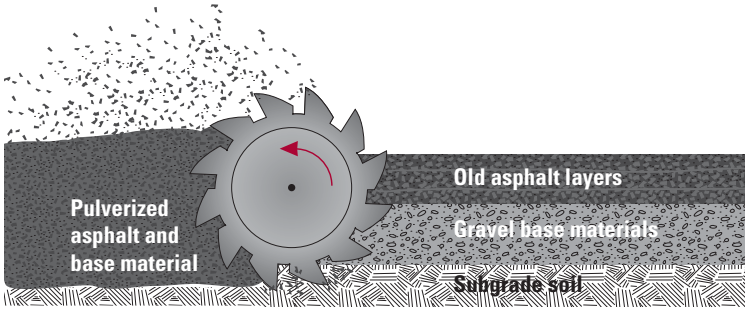
Ron Chamberlain, Adams County Highway Department Commissioner, says he depends on information from core samples for every aspect of a pulverization project. "Core samples really guide us from start to finish," Chamberlain says. "We hire a soils firm to analyze the cores and come up with a pavement design. The core tells us what if any aggregate to add after we pulverize and, finally, our additive contractor uses it to choose and apply the product that goes into the final shaping and grading of the recycled base."

Along with knowing road composition, local officials need to define traffic loads on the reconditioned road and factor that into the redesign. A low-volume secondary road requires fewer inches of reclaimed base than a primary road subject to heavy traffic.

Practical fix

Local governments around the state consider pulverization a practical fix for the worst roads, a proven solution tailored to conditions.

The City of Oak Creek has pulverized all low-rated roads since 1994. It contracts with an outside vendor for both the pulverization and paving work. Brian Johnston, a civil engineer with the city, reports that a stretch of road pulverized in 1994 and finished with a three-inch asphalt overlay, rated a 5 this year on the PASER scale, which generally calls for treatment with sealcoat or a thin, non-structural overlay.



Cross section illustrates pavement layers typically involved in pulverization and combined in the recycled base materials.

Johnston describes a 2007 project reclaiming a deteriorated industrial park road that included first-time installation of curb and gutter. Drainage on the road improved from almost flat to a three-percent slope.

Crews pulverized 16–20 inches of asphalt and stone into a base. Despite raising the pavement anywhere from zero to 12 inches to accommodate the curb-and-gutter work, they had ground-up product to spare. "We always try to use all material on site and avoid hauling anything in to create the base," Johnston says. After pulverizing more than 6,000 feet of pavement, the contractor actually hauled away about 425 cubic yards of excess material.

Without adding a stabilizing agent, the contractor graded the pulverized base, rolled it and let traffic back on the road for a period of time to pack it down and break up any large particles. After proof-rolling the road with a 20-ton truck to check for soft spots, crews applied a 6-inch asphalt overlay, appropriate to a road with heavy truck traffic.

Before ABOVE and after photos of a section of the Northbranch Industrial Park road the City of Oak Creek rehabilitated in 2007 using pulverization. The project also added curb and gutter elements.

Iowa County Highway Commissioner Leo Klosterman says seeing the results of pulverization on a stretch of CTH C next door in Sauk County persuaded him to consider the process three years ago. "It intrigued me as an option for projects here because we've got many miles of bad road where the banks and shoulders remain in good shape. A typical overlay repair would raise the road and create a steeper grade at the shoulder," Klosterman says. "Pulverization offers an alternative that doesn't disturb the ditch line or anything."

Rather than own or run the equipment to pulverize, Iowa County hires a contractor. County highway crews then spread the overlay, working from their own hot-mix plant. Klosterman says this approach makes best use of local resources and a downsized staff.

He reports that the first roads they treated with pulverization "are holding up well" with few if any cracking problems.

Stabilizing base and subsoil

Adams County ran its own reclaiming equipment for about six years. Today, with real competition in the private sector for pulverization projects, Chamberlain says he also finds it cost-effective to hire contractors with the latest equipment to handle pulverization. The county's positive experience with the process also inspired them to experiment with different methods of stabilizing the pulverized base and the subsoil underneath.

Since 2004, the county has used an additive on projects that Chamberlain says works exceptionally well. Using core sample readings as a guide, they add an asphalt emulsion to the pulverized product. HG Meigs of Portage was hired to prepare and spread CSS-1H, a cationic slow-setting asphalt emulsion designed to strengthen the recycled base. An asphalt distributor truck spread the emulsion over the reclaimed material and a reclaimer followed behind to mix it in. Chamberlain says emulsion and application added between $15,000 and $20,000 to the per-mile cost. "The projects where we've used the oil show minimal cracking and awesome road stability," he notes.

Soil stabilization further strengthens the road foundations by improving the ability of weak soils to resist loads. The process mixes a stabilizer into the subsoil. Adams County, with instances of peat soils, is considering soil stabilization in its pulverization projects, using a mix of cement, fly ash and water.

Saving green, being green

For governments, cost saving is an across-the-board consideration on all road projects. Advocates of the method say pulverization pulls the value out of initial road construction and subsequent overlays by blending in new materials and giving the materials in place new integrity. Twenty years or more in practice, pulverization offers benefits for both saving green and being green.

- Reusing in-place material extracts more out of original investment
- Stronger base material require thinner surface layers
- Less hauling equals lower trucking costs
- Minimal use of virgin materials reduces impact on depleted aggregate sources

Kahl says FDR combined with the appropriate additive does, in his experience, produce a road that costs less over time than new construction and lasts longer. "Local governments are more cost conscious these days, but they need to look past initial costs to analyze the life-cycle of a road," he notes. "We've worked on roads using this treatment that remain in good shape 20 years later."

Klosterman, Chamberlain and Johnston echo Kahl's assessment of cost savings. "Pulverization is very inexpensive for Oak Creek compared to hauling in new material," Johnston says. He compares the current cost of composite aggregate at $15.50 per ton—not including haul costs—with the $1.50 per square yard Oak Creek pays for pulverizing, shaping and compacting recycled material in place.

The Portland Cement Association estimates that costs for recycling a road normally run at least 25 to 50 percent less than removing and replacing pavement materials.

Innovation also plays a part. Chamberlain says Adams County plans to add crushed glass from a local recycling center to aggregate on future pulverization projects. The alternative appeals because it taps a nearby resource in an aggregate-poor area and puts another recycled material to good use.

Reliable approach for worst roads

Even well-timed and comprehensive maintenance cannot make a road last forever. They all face the need for rehabilitation sooner or later. Pulverization is a practical, reliable approach to restoring the worst roads—and one that, over time, reduces project impact on budgets and the environment. The experience of local governments across the state demonstrates pulverization is gaining traction as a better way to bring local roads back to life. ■

"Local governments are more cost conscious these days, but they need to look past initial costs to analyze the life-cycle of a road."

Resources

The Asphalt Recycling and Reclaiming Association defines various road reclaiming and recycling processes.
www.arra.org/content/category/6/20/35/

The Portland Cement Concrete Association describes the FDR method using cement as an additive.
www.cement.org/pavements/pv_sc_fdr.asp

U.S. Department of Transportation site features publications on studies related to asphalt recycling and pulverization.
www.dot.gov/

Contacts

Ron Chamberlain
Adams Cty Highway Commissioner
608-339-3355
rchamberlain@co.adams.wi.us

Brian L. Johnston
Civil Engineer
City of Oak Creek
414-768-6531
bjohnston@oakcreekwi.org

Leo Klosterman
Iowa Cty Highway Commissioner
608-935-3381
leo.klosterman@iowacounty.org

Bill Kahl
Owner, WK Construction
608-836-4424
bkahl@wk-construction.com

A *Crossroads* retrospective

by Don Walker

It was good information then and continues to be now as we follow trends and innovations of importance to local officials.

AS I COMPLETE work on my last issue of ***Crossroads***, I took a few minutes to read the first issues of the publication from early 1984. I am struck by how similar they are to ***Crossroads*** in 2008. Our subject matter 24 years ago was not so different from what the Transportation Information Center (TIC) and its newsletter address today. All the same, we tend to think our challenges are unique and many long for the "good old days."

Back in those days, the Winter 1984 issue of ***Crossroads*** dealt with the concerns of local highway agencies. These concerns included rising costs, lower budgets, reduced purchasing power, increasing traffic and energy shortages. Sound familiar?

The first two issues of ***Crossroads*** introduced our staff—TIC Director Don Walker, Editor Lynn Entine, Designer Susan Kummer and Program Assistant Zayda Bower. The publication gave us a forum to describe our new program of providing training and technical assistance.

Articles explained the benefit of preventive maintenance when budgets are tight. Others discussed bridge load posting, strategies for improving bridge approaches, asphalt prices (ranging from $22 to $26 per ton in place), the benefits of seal coating and how to plan for traffic safety. It was good information then and continues to be now as we follow trends and innovations of importance to local officials.

TIC is in good hands with Steve Pudloski and Ben Jordan leading the program. Our new editor

So long, Skipper

by Steve Pudloski

There are many examples of the workable solutions Don helped transfer to local governments. However, the one with the most positive impact on better local government operations and decision-making is PASER.

FOR 24 YEARS, Wisconsin's local governments have benefited from Don Walker's steady hand on the TIC tiller. In his retrospective for this issue of ***Crossroads***, Don looks back on the themes and problems that have been consistent throughout his tenure as TIC Director. The problems may be much the same, but many of the solutions have changed, primarily as a result of new technology, materials, tools and improved decision-making processes.

The sheer number and small size of Wisconsin local governments tend to dampen adoption of new technology and materials because there is limited time and resources to search for "a better way."

Don knew this from his own local government experience. That's why he focused TIC activities on identifying ***better ways*** to address these concerns and get the word out to local governments through ***Crossroads***, workshops, fact sheets and participation in the programs of local government associations—like the Wisconsin Towns Association, the League of Municipalities, the state chapter of the American Public Works Association and the County Highway Commissioners Association.

Don Walker

There are many examples of the workable solutions Don helped transfer to local governments. However, the one with the most positive impact on better local government operations and decision-making is the Pavement Surface Evaluation and Rating system, or PASER.

Don created the rating system for asphalt, concrete and gravel roads about 20 years ago. With additional financial support from the Wisconsin Department of Transportation, he expanded PASER to cover all Wisconsin pavement types about 12 years ago and organized a statewide training program in cooperation with regional plan commissions and county highway commissioners.

Today virtually every Wisconsin local government uses PASER to rate its pavements. But PASER's impact goes well beyond the state. The technical soundness of the system, its ease of application and data-collecting approach also provides decision makers outside Wisconsin with information they need to plan maintenance and improvement programs and communicate their decisions to the public. All local roads in Michigan are rated using PASER. Many local governments in other states also use the rating system. And the U.S. Forest Service rates forest roads with PASER.

Don set the bar high for TIC. We will miss his thoughtful and common-sense approach to providing useful information and assistance to Wisconsin local governments. As he begins a well-deserved retirement and finds more time for sailing, we honor Don's contributions and pledge to continue his legacy of service. ■

Mary Maher already has three issues of ***Crossroads*** completed with the continuing design help of Susan Kummer. Jane Sauer and Susanna Fuerstenberg provide invaluable continuity with their administration and office management experience.

The program would not have continued to thrive if not for the financial and technical support from the Federal Highway Administration and the staff at the Wisconsin Department of Transportation. Thanks to these ***partners*** for making this an excellent example of collaboration.

Finally, I want to thank the local agency associations and local agency staff for all their support. That has made the effort behind TIC and the newsletter worthwhile and enjoyable.

I look forward to reading ***Crossroads*** 24 years from now to see what has changed and what has stayed the same. ■

A sampling of TIC publications 1984 to 2007. . .

Winter equipment roundup

WINTER MAINTENANCE workshops held in October by TIC gave local agencies a chance to show and see equipment that is in use around the state. This "round-up" is a sampling of what public works departments in Wisconsin rely on to handle winter maintenance projects effectively and efficiently.

Optimum light source

Outagamie County is mounting new headlight lenses on its snowplows in 2007-08 to improve visibility in storm conditions and at night. Shop Supervisor Jim Bennin says the Euro-design HELLA-brand lens and bulb assembly concentrates light to the ground in a way that cuts through obscuring snow flurries. For winter use only, the lenses sit at hood height *(photos left)* on the plow frame. Bennin credits Bob Kesler of the Town of Harrison in Calumet County with recommending the lights. Bennin says his source for the product was Voland Supply in Kiel, Wisconsin, and that Wholesale Direct also carries the HELLA brand.

SOURCE: RUD.COM

Better tire chains

The Town of Richfield in Washington County added easy-to-handle snow tire chains *(similar to picture at left)* to their winter equipment inventory a few years ago. Shop Foreman Bob Muesch describes the cross-link chains—made by RUD, a German company—as a boon because one person can install and remove them quickly on a truck's rear wheels. Muesch says they run quieter and smoother, and fit tightly to the tire. Another tangible benefit is that the chains persuade operators to put them on without hesitation in hazardous conditions. Muesch suggests checking any local heavy equipment source for the chains and ordering early since they are a seasonal product.

Tough all-season truck bodies

Dane County introduced new truck dump bodies made of AR400 high-tensile strength steel in 2004. Shop Supervisor Jeff Lukken says the Canadian-manufactured Bibeau dump bodies turn out to be a significant improvement over the mild steel bodies they replaced. The new dump bodies *(photos A-B)* resist denting and rusting. Lukken anticipates few if any repairs over the 13- to 15-year life of the equipment. More than that, the vehicles with high-strength dump bodies operate year-round, hauling concrete rubble in the summer months with no damage.

Video coverage

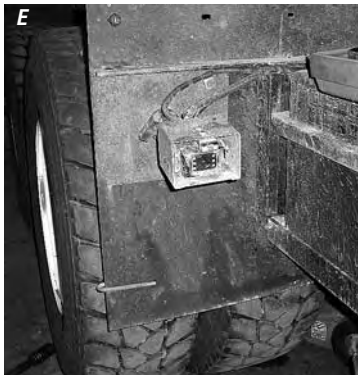
Price County has fine-tuned its use of video cameras *(photos C-E)* on plow trucks in recent years, giving operators real-time visual coverage of everything from blade position to levels of salt in the dump body. Shop Supervisor Ken Hilgart describes the installation as eliminating typical and not-so-typical blind spots. Five individual cameras monitor specific views. A bullet camera at the rear comes on when the truck goes in reverse to show any vehicle or obstruction. One camera trains its lens inside the dump body to read the load level. Two separate cameras monitor operation of the front and rear cross conveyers. Finally, a video camera trained on the wing position lets operators see its relationship to the road shoulder, mailboxes and other objects along the plow's path. Lights attached to each camera illuminate the area in view. An automatic airwash system tied into the truck air system activates the cameras. Hilgart says a recent innovation is a programmable timer that pumps washer fluid to keep the camera lenses clean. A monitor *(photo F)* inside the cab has a four-way split screen that allows the operator to check regularly for visual cues in each position. ■


A


B


C


D


E


F

RESOURCES

Publications

Sample Bid Documents and Specifications serve as a template for producing specifications and bid documents when bidding local street construction and maintenance projects.

"*User Tips*" brochure from Asphalt Zipper, offers practical advice for small-scale Full-Depth Reclamation projects, including practical rules-of-thumb for incorporating stabilizing additives as part of a pulverization project.

Using Recovered Materials in Highway Construction, Wisconsin Transportation Bulletin No. 20, 1999. Early TIC review of asphalt recycling and using reclaimed materials in road reconstruction.

Using Salt and Sand for Winter Road Maintenance, Wisconsin Transportation Bulletin No. 6, 4 pp., 2005. Reviews factors affecting deicing, the environmental impact of different materials and methods, storage and more.

Flagger's Handbook, 28 pp., 2007. Latest pocket-sized handbook on flagger safety includes important changes in the federal Manual on Uniform Traffic Control Devices (MUTCD).

Websites

Asphalt Recycling & Reclaiming Association Downloadable presentations on asphalt reclaiming and recycling processes. Includes milling, cold in-place recycling and Full-Depth Reclamation.
www.arra.org/content/category/6/20/35/

The Portland Cement Concrete Association has information about using Portland Cement as a stabilizing additive for pulverization and Full-Depth Reclamation.
www.cement.org/pavements/pv_sc_fdr.asp

Fly Ash Facts for Highway Engineers is available for downloading at the FHWA website. Publication describes using use fly ash in Full-Depth Reclamation and soil stabilization.
www.fhwa.dot.gov/pavement/recycling/fatoc.cfm

Find the *Pavement Preservation Toolbox* online with articles on cold in-place recycling and *Full-Depth Reclamation.*
www.pavementpreservation.org/toolbox/guidelines.html

Information on bridge inspections, ratings terms and links to relevant sources on the WisDOT website.
www.dot.wisconsin.gov/projects/bridges/index.htm#inspections

DVD/VHS/Multimedia

Timely resources from the TIC collection related to topics in this newsletter.

Cold In-place Recycling of Asphalt Pavements with Self-cementing Fly Ash, Wisconsin Electric, 2002, 12 min., VHS. Overview of fly-ash stabilization on subgrade soils and recycled asphalt pavements. Demonstrates the process and highlights the benefits.

Foam Injection Recycling, Payne and Dolan, Inc., 2001, 8 min., VHS. A look at the process of foam injection recycling of asphalt pavements. Helpful for elected officials and managers.

Foamed Bitumen, Wirtgen Road Equipment, 2001, 10 min., VHS. Tells how foamed asphalt is made and used, from laboratory to the field. Applications include stabilized base and cold mix surfacing using recycled asphalt pavement.

Bridge Inspection and Maintenance, Ontario Ministry of Transportation, 1995, 36 min., VHS. Demonstrates bridge inspection fundamentals and reviews bridge types, components, safety practices, routine inspection and required tests. Useful for those involved in highway and bridge maintenance, and inspection.

Anti-icing/RWIS Training, AASHTO, 2003, CD. Interactive CD provides hands-on computer training to assist individuals responsible for the use of liquid chemicals for anti-icing. Topics focus on understanding weather forecasting, use of forecasts and application of anti-icing chemicals. CD includes seven lessons.

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 Website

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

ANSWERS TO WORK ZONE WORD PUZZLE, PAGE 3

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Steve Pudloski DIRECTOR
pudloski@epd.engr.wisc.edu
Ben Jordan STAFF
jordan@epd.engr.wisc.edu
Don Walker STAFF
donald@epd.engr.wisc.edu
Susanna Fuerstenberg PROGRAM ASSOCIATE
tic@epd.engr.wisc.edu
Mary Maher WRITER/EDITOR, WRITING & CREATIVE CONCEPTS
Susan Kummer GRAPHIC DESIGNER, ARTIFAX

PHONE
800.442.4615
FAX
608.263.3160
EMAIL
tic@epd.engr.wisc.edu
WEB SITE
http://tic.engr.wisc.edu

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CALENDAR

TIC Workshops

Specific 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*

Work Zone and Flagger Safety workshop provides road supervisors, maintenance personnel and others responsible for work-zone set up, inspection or maintenance with information on Wisconsin standard practices and guidelines for good traffic control and safety. Fee: $45

Jan 15	Barneveld
Jan 16	Waukesha
Jan 29	Eau Claire
Jan 30	Tomahawk
Jan 31	DePere

Road Maintenance workshop presents maintenance, repair and reconstruction options for local roads and streets, and best practices for maintaining and improving drainage and extending pavement life. Also examines the preferred maintenance techniques for particular pavement conditions. Fee: $45

Mar 6	Barneveld
Mar 7	Pewaukee
Mar 10	Tomah
Mar 11	Eau Claire
Mar 12	Hayward
Mar 13	Tomahawk
Mar 14	DePere

Pesticide Applicator Training

Manuals and other training resources for *Wisconsin Commercial Pesticide Applicator* certification are available online at the University of Wisconsin Pesticide Applicator Training Program. Go to *http://ipcm.wisc.edu/pat* or contact Rose Scott at 608/262-7588 or e-mail at *PAT-program@facstaff.wisc.edu.*

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 call 800-462-0876 for details.

JANUARY 2008

7-8	Improving Public Works Construction Inspection Skills
9-10	Maintaining Asphalt Pavements
17-18	Highway-Rail Grade Crossing Safety Course
28-29	Implementing a Sidewalk Management System

APRIL 2008

7-8	Municipal Engineering Fundamentals for Non-Engineers
7-8	Geosynthetics: Current Practices in Design and Construction
14-15	Mastering the Fundamentals of Culvert Hydraulic Design
16-17	Implementing Effective Culvert Maintenance
17-18	Drainage Engineering Fundamentals for Non-Engineers
28-30	Effective Roadway Lighting