

Crossroads

Summer 1997



TRANSPORTATION Information Center

University of Wisconsin-Madison

Computer images help get road projects on the ground

Anyone who has tried to describe what a roadway reconstruction project will look like knows: one picture is worth a thousand words. But how do you take a picture of what isn't there yet? The new answer is: computer images.

Combining engineering, art and software wizardry, engineers and technicians can now produce photographs showing how the proposed project will actually look. One group making these images is SEH engineering consultants.

WisDOT used them to help explain the proposed rebuilding of Highway 93 near Arcadia. This scenic, wooded, winding road first built in the 1850s had become a major truck route between La Crosse and Eau Claire. It was clearly unsafe, but rebuilding it would be the largest single-season earth moving project in Wisconsin's history.

"It involved moving two million yards of material, blasting all summer, and one cut of 105 feet and several 100-foot fills. Naturally people were worried," says Lorraine Riedl, the WisDOT District 5 engineer who supervised the project. Computer-generated images of the completed project helped show the abutting landowners where the road would be in relation to their houses, barns and fields.

"On a job that big, it is hard to use your imagination to figure out what it will look like," Riedl says. "People are mostly worried because they don't know. The pictures help allay their fears."

Images help with decisions

Engineers and designers also benefit from using computer images, as a project near Monroe showed. Highway 81 had been rebuilt in the late 1970s as a 4-lane limited access highway, but suddenly narrowed to two lanes with an at-grade intersection right at the city's north edge. The situation was unsafe but nobody could agree on how to fix it.



Rebuilding HWY 93 in Trempeleau County was Wisconsin's largest single-season earth moving project ever. The original road is shown on the left; the computer enhanced image of the completed project is on the right.

"The local officials wanted a full interchange. We proposed five or six alternatives, with different locations and schemes, but none was generating support," says Guy Meyer, WisDOT District 1 Design Supervisor. "We were putting in a lot of work and time and not getting anywhere."

Working with aerial photos of the existing situation, engineering consultants added computer-generated images of the different proposals. "It helped the engineering staff too," says Meyer. "They were leaning toward leaving it as an at-grade crossing." Together the road designers and the community decided on a full interchange.

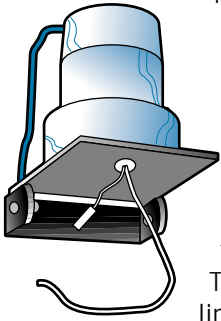
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Idea Exchange

Folddown device protects strobe lights



Motor grader operators in Iowa were damaging the top strobe lights on low door openings until Doug Moothart developed a collapsible mount. He installed a metal mounting bracket and guard with friction washers. Operators can easily pull the light down and push it back up for operation. If they forget, the light folds down, preventing damage. The device works so well they are installing one on their end loader to protect its strobe light from damage by trees and brush.

For more information contact Doug Moothart, Washington Cty, Iowa, 319/653-7733. From the Iowa *Technology News*, Dec. '96.

How to be a good supervisor

From John Wiggins, a consultant at the Rutgers, NJ, Road Technology Transfer Center, come the following suggestions on how to be a good supervisor.

Never refer to yourself as the boss Your staff already knows your position. You'll earn respect by your work, not by reminding everybody who's in charge.

Take the heat It's the boss's job to be the "lightning rod" for complaints and criticisms. Work to resolve the complaints without just blaming those around you.

Share the credit Getting credit for the good things is also part of the job. Share it generously with your staff. Without them you will accomplish little.

Be a teacher The people around you need to learn from you what you expect of them, and to learn from your experiences. Sharing your knowledge by teaching your staff to do what you can do increases their respect for you.

Be a listener Complaints, suggestions, excuses...listen to them all. Suggestions about work practices are often helpful and help staff feel a part of the solution. From work complaints, tardiness excuses and family problems, you can often understand staffing problems, operational difficulties, or individual problems like substance abuse. Don't try to solve personal problems yourself, but refer these staff members to the appropriate professionals.

Be a part of the team Encourage staff members to offer suggestions. Feel free to lay out a problem and ask for the staff's input for the solution.

It's not easy—be human No one is perfect and you are not expected to be perfect. If you make a mistake, be human and accept the responsibility fairly. Those around you will respect you for your humanity.

Gravel road Q & A

Ken Skorseth, a gravel road expert from South Dakota, talked about maintaining gravel roads at a T.I.C. workshop presented over the statewide Educational Telephone Network. Here are some of the questions from participants in the workshop and his answers.



Is it a good idea to recycle blacktop and mix in sand and fines to make road gravel?

Old asphalt that has been run through a crusher is well sized. I have seen some excellent results if you simply place it as surface gravel. Don't try to place it in a thin lift because it sometimes takes on the characteristics of asphalt pavement again,

developing potholes and resisting blading except during a rain. Four inches is the minimum lift depth. Alternatively, a 50-50 blend with virgin gravel is excellent because it can be bladed more easily, but has excellent binding characteristics. It reduced maintenance by over 50%. Place this in a lift of three inches over a three-inch base.

What blend of different size aggregates do you recommend?

You want a blend of gravel, sand, and silt/clay. In the base you want 40-80% hard stone graded from 1/4 to 3 inches in diameter, but on the surface use smaller size stone. The standard state specs call for 3/4 inch aggregate for surface gravel (crushed stone) with 20-60% sand (less than 1/4 inch) and 8-15% fines. The specifications are in *Sec. 304.2.6 of 1996 State Standard Specifications*.

Continued on page 3

Crossroads

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Non-profit organizations are welcome to reproduce articles appearing here. Please contact us first for any updates or corrections.

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Gravel road Q&A

from page 2

What experience have you had paving gravel roads?

A good gravel road is not necessarily a good base for asphalt. There are problems with excess fines, crown, and depth. While surface gravel needs a good percentage of fines to give it a binding characteristic, base material needs cleaner material with fewer fines.

Gravel roads have a greater crown than you want on an asphalt surface. Unless you reshape them you can have problems. For example, I've seen some sealcoated roads where after ice storms cars would slide off.



An average gravel road has about four inches of surface gravel. This is not adequate base for an asphalt surface. If you have any truck traffic at all, you need a minimum of six inches of base, and preferably eight. Otherwise you will have tremendous breakup problems.

What good binding material can we add to the 3/4 inch gravel for our roads?

Clay is the best natural binder, but be careful. It can be easy to mistake silts and clay when you're out in the field. Take the material to a lab. Clay, which you want, will have tremendous cohesion which shows up on lab tests as a good plasticity index (P.I.).

When preparing a subgrade we ran across clay pockets. To what depth should we excavate to remove the clay and replace it with cleaner material such as sand?

You may not need to excavate if the road is a minimum of two feet above the surrounding terrain and you have good ditches. Otherwise, excavate six inches and install a geotextile. Cover it with any type of gravel, then put two to three inches of surface gravel over that. The geotextile prevents the clay from pumping up through the gravel. If you're not using geotextile, excavate down two feet.

If you would like to learn more about gravel roads, sign up now for one of the T.I.C.'s August **Maintaining Gravel Roads** workshops. See the *Calendar*, page 6.

The T.I.C. bulletin **Gravel Roads, No. 5**, is also helpful. Use the form on page 7, call or e-mail to get your copy.

Computer road images

from page 1

"After using these images, I felt a lot more confidence in the decision," says Meyer. "It was well worth the money we spent because we were spending a lot on indecision. This helped bring the process to a conclusion." The images cost about \$3000 each and they developed four of them.

Helping with complex projects

Rebuilding Highway 59 west of Milwaukee was WisDOT's top priority project in 1971. But the project was shelved due to lack of local support. WisDOT has tried to improve the highway several times since then, with the same result. The road is located half in New Berlin and half in Brookfield, and it marks the edge between suburban and urban areas. The project was resurrected again in 1993 and is needed to increase safety and capacity and to replace deteriorated pavement.

"There has been a lot of controversy about what it should look like," says Don Berghammer, the WisDOT District 2 manager for the project. "We developed a set of plans and computer images for five major intersections and one mainline section. They showed the proposed road along with landscaping and side paths so people could see what was being proposed." Designers worked hard to make the designs blend with the road's suburban character. The resulting public support helped gain state financing for the project which is now scheduled for construction in 2000.

The photos, which are supposed to give a general idea, are so realistic that sometimes people think they actually show which specific trees will be cut, Berghammer cautions. But he's convinced that they are worth it anyway.

"When you just narrate plans, people get this picture of huge disturbance and hardship, and then when they see it, they can tell that it is a reasonable thing to do," Berghammer says.

Local projects could benefit from computer imaging techniques when they are complex or controversial. Depending on the quality of the image and the complexity of the project, images may cost from a few hundred to several thousand dollars each. The relatively minor costs can produce a major effect.

Contact your engineering consultant or the local WisDOT District office for more information on computer visualizations. SEH produced all the images described in this story.

ROADWARE to become PASERWARE

Due to a trademark conflict, the T.I.C.'s pavement management computer program formerly known as ROADWARE will now be called PASERWARE.

Nothing else about the program has changed. To learn how PASERWARE can help you manage your streets and highway system call Steve Pudloski at 800/442-4615.

Use signs correctly for safer roads

A number of questions and comments on signing came up at the T.I.C. Highway Safety workshop taught last winter by Don Walker, T.I.C. Director and Tom Heydel, WisDOT District 2 Traffic Engineer. Those of you who missed the workshop may appreciate hearing the answers. If you are concerned about signing and safety issues you may want to attend the T.I.C.'s next safety workshop in January 1998.



Poor condition signs are hard to see, especially at night, and should be replaced promptly.

Basic signing responsibilities

Local highway authorities are responsible for installing and maintaining signs. They should review sign conditions periodically and make repairs or improvements. You should also regularly check sign condition, replacing deteriorated signs and fixing those that are improperly installed.

Signing guidelines Guidelines for signing, including what to mount, where, when, and how, are published in the *Manual on Uniform Traffic Control Devices (MUTCD)*, and the *Wisconsin Supplement*. Copies are widely available and every local highway authority should have them.

Mounting height Be sure to measure the mounting height from the edge of the travel lane and not the shoulder.

Yellow vs. Orange DIP sign For long-term situations, use the yellow sign. Where the dip is short term or related to repair work, use the orange work zone traffic sign. Check the *MUTCD* for specifics.

Striped (object) markers are required on the ends of narrow and one-lane bridges if the parapet or curb is less than six feet from the edge of the roadway, not including the shoulders.

Chevrons These sideways arrow heads are designed to be used as a group of six or more to give notice of a sharp change in the road's horizontal alignment, like a curve. They are not intended to mark transitions in roadway width or lane size or approaches to narrow bridges. If the curve is so short that six chevrons won't fit, delineate it with a different type of marker, like a large arrow sign.

Advisory speed plate on curves Determine a safe and comfortable speed for the average vehicle, using professional judgement and an instrument such as a ball bank indicator. A good rule of thumb is: install an advisory plate when drivers must slow down 10 mph or more below the regulatory posted speed of the roadway.

SIGNAL AHEAD sign should be installed when the speed limit is 45 mph or more on the roadway leading to the traffic signals.



Mounting unrelated street signs with stop signs is against *MUTCD* guidelines. This is now being reconsidered.

Double mounting signs To avoid visual clutter, the *MUTCD* (para. 2A-21) says not to put two signs on the same post unless they supplement each other or where route or directional signs must be grouped. This means that normally you should not mount a street name sign on top of a STOP sign, but you could add a sign like TRAFFIC FROM RIGHT DOES NOT STOP. Authors of the new *MUTCD* will be addressing the problem of urban areas which lack space for multiple sign installations, according to Tom Heydel, from WisDOT District 2.



Unrelated arrow sign is incorrectly mounted with stop sign (left). Good sign installation with route marker separate from stop sign and supplemental sign mounted below it (right).



Studies will improve 21st century pavement design

Wisconsin is taking advantage of the Hwy 29 reconstruction to study pavement performance, alternative designs, and noise reduction through pavement texturing. Thirty-eight test sections will be constructed this season using a variety of designs as part of the Strategic Highway Research Program's (SHRP) international pavement performance study. The sections will be monitored for up to 20 years.

"This is the first comprehensive, national pavement engineering study since the 1960s," says Steve Shober, WisDOT's Chief Pavement and Research Engineer. "It will help us understand how to design thickness, bases, mixes, and drainage features."

One portion of the study looks specifically at the effects of environmental factors on asphaltic pavement deterioration. Another evaluates the performance of Superpave™, SHRP's new asphaltic mix design. Other asphaltic test sections will evaluate SHRP's new method of specifying performance-graded asphalts which are designed to assure less cracking and longer lives. Recycled asphalt pavements using the new mix designs will also be studied.

Don't mount a DO NOT ENTER sign on the back of a STOP sign because it protrudes and alters the distinctive octagon shape that helps drivers recognize it. Using an oversize STOP sign that completely covers the other sign would be one solution to the problem where space is limited.

Advance warning signs for snowmobile crossings Use advance warnings whenever motorists need to be warned of existing or potential hazards on or adjacent to a highway or street. For snowmobile crossing signs, use the same guidelines as for a cross road or a side road (*Wisconsin Supplement to the MUTCD, paragraphs 2G-11 & 2G-12*). These include: Locations which have accident history, or sites where a driver stopped on the cross road or snowmobile crossing cannot see approaching traffic on the through highway for a distance equal to 10 seconds of travel time at the speed of traffic on the through highway.

Larger street name signs New *MUTCD* proposed rules published in the January 1997 *Federal Register*, will increase the recommended letter size for street name signs to a minimum of six inches for upper case letters instead of four. This helps drivers read names without having to stop. Every inch in letter height adds 50 feet to the distance at which it can be read, which means 200 feet for four-inch letters versus 300 feet for six-inch ones. Municipalities have 15 years to phase in the larger signs.

For best visibility, mount the first street name sign on the far right corner of the intersection for traffic on the major street. If a second sign is placed, locate it diagonally on the opposite corner.



Railroad exempt signs, authorized only by WisDOT, inform school bus drivers and others that they are only required to stop if a train is approaching.

EXEMPT signs at RR crossings *Exempt* does not mean that the track is abandoned. It means that, because the track is rarely used, school buses carrying children, vehicles carrying passengers for hire, and vehicles carrying flammable or hazardous materials need not stop and open their doors at the crossing unless a train is approaching or occupying the

crossing. This sign must be authorized by WisDOT. (See *RR crossing story on page 6.*)

FINES DOUBLE IN WORK ZONE signs Posting on local roads is not required. This law is in effect everywhere in the state. Signs posted on state highways near state borders and outside major cities serve as notice to all drivers.

Pavement markings The *MUTCD* recommends centerlines on roadways wider than 16 feet, on roads with 400 or more vehicles a day or where speeds are higher than 35 mph, and on undivided pavements of four or more lanes. Once you put in a centerline, you must maintain it and establish no passing zones. Edgelines are optional, but you must not use edgelines without a center line.

Signs and speed limits on connecting highways Connecting highways are designated state highways going through municipalities. Local officials must get approval from the WisDOT District Traffic Operations office to add a stop or yield sign. The authority having jurisdiction can change the speed limit on a connecting highway within the limits of the statutes. This normally is lowering the speed 10 mph from the statutory limit. The local municipality having jurisdiction must pass an enabling ordinance before making the change and is responsible for maintaining the signs.

For help with safety, signing and marking issues and safety improvement funding, contact your County Traffic Safety Commission.

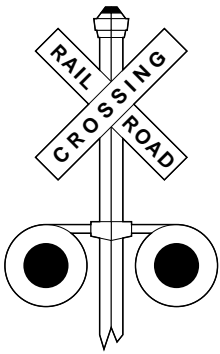
You may find the following T.I.C. publications helpful: the SAFER (Safety Evaluation for Roadways) Manual; Bulletin No. 8: Signing for Local Roads; and Bulletin No. 9: Pavement Markings. Single copies are available through the T.I.C. Please call, fax or e-mail to request yours (see the form on page 7).

Full-depth concrete only in driving lane saves on pavement costs.

Tests on Portland concrete cement pavements involve thickness and dowel spacing. If the study shows that shallower pavement in the passing lane performs adequately, for example, future construction projects will be less costly. Lane width, concrete shoulders, joint sealing, and alternative drainage systems will all be evaluated.

Refined methods for adding texture to the surface will be tried on ten more Hwy 29 sections. Other sections, built in 1994, have already shown that it is simple to build safe PCC pavements and eliminate the characteristic noisy "whine" with no extra expense.

"The traveling public will probably never notice the studies," says Shober, "but we will get some very important long-term payoffs from the project. What we learn will help us design pavements well into the 21st century."



More, faster trains; X-ing reviews critical

Railroad traffic has increased dramatically in the last ten years due to a fast-growing economy and freedom from WWII-era government restrictions.

The Fox River corridor, for example, sees 20-25 trains a day, up from five to seven a decade ago. And the trains are moving 50 mph and more.

The combination of drivers not used to seeing many trains and brush-filled vision corners at rural crossings is a recipe for disaster. Even the full 330 feet of visibility only gives a driver about a six-second safety margin when the train is going 50.

"Not only do the trees and brush restrict sight, they also absorb the sound, and you need to clear them to pick up those fractions of seconds of visibility," says Rodney Kreunen, Commissioner of the Office of the Commissioner of Railroads. Local governments are responsible for clearing brush and trimming trees on highway right of ways; property owners are responsible for clearing the area in a sight triangle with 330 foot sides along the tracks and the road.

Local highway authorities should survey all grade crossings for visibility every June when the leaves are fully out. They are responsible for clearing brush on their land

and for alerting owners to problems on private land. A complaint to the Commissioner's office can help if owners are not complying or the railroad company has not cleared brush on its right of way.

Other solutions to potentially dangerous crossings involve closing the road that crosses the tracks, putting in stop signs, and installing signals. Kreunen has personally reviewed over 300 crossings since he took office a year ago, meeting with local officials and citizens to determine the best course of action. "Every crossing has its own peculiarities," Kreunen says.

Local officials can petition the office for review and possible closing of rural crossings. "We've had a steady stream of requests," Kreunen says. Depending on the situation, the railroad may pay the cost to cul de sac a road, or often a simple barricade is all that's needed.

You can reach the Office of the Commissioner of Railroads at 608/266-7607, P.O. Box 8968, Madison, WI 53708.



Resources

Materials listed are available from the Wisconsin T.I.C. unless otherwise noted. To get your copy call 800/442-4615, use the form below, or e-mail: ranum@engr.wisc.edu. Videotapes & CD-Is are loaned free through Wisconsin County Extension Offices.

NACE Action Guides Series, National Association of County Engineers, 1992. Practical, straight-forward explanations, methods, examples, and further references to help you effectively organize and manage street and highway maintenance activities and organizations. A limited number are available on these topics:

Public Awareness and Support Personnel	Bridge Maintenance on Local Roads
Purchasing Authority	Bridge Rehabilitation on Local Roads
Impact of Land Development on Road Planning	Safety Improvements
Rural Transportation Planning	Traffic Operations
Road Programming	Drainage
Road Surface Management	Soil Erosion Prevention
	Subsurface Soils Exploration
	Solid Waste Management

People Skills, by Robert Bolton, Simon & Schuster, Inc., 1986, 300 pp. A simple to read and apply handbook that can help you be a better communicator. Learn skills that will increase your ability to listen to others, assert yourself, resolve conflicts, work out problems, and communicate calmly, even in stressful, emotionally charged situations. A great book for new supervisors.

Gravel Roads, No. 5, T.I.C., 4 pp. Discusses characteristics and types of gravel, blading, drainage, and maintenance.

The SAFER Manual—Safety Evaluation for Roadways, T.I.C., 40 pp. This is the Transportation Information Center's newest publication. It presents a hazard rating scale that is demonstrated with many pictures and brief text. The manual will help you identify potential hazards along your roadsides, at intersections and railroad crossings, and associated with roadway geometrics. It also covers the role of proper signs and pavement markings in reducing hazards. The *SAFER Manual* will help you identify hazards, rate safety needs, address immediate problems, and budget for longer term safety improvements.

Signing for Local Roads, No. 8, T.I.C., 6 pp. This fact sheet briefly reviews local officials' signing responsibility and describes common regulatory signs.

Pavement Markings, No. 9, T.I.C., 4 pp. A summary of pavement marking materials, principals, and applications.

Highway/Utility Guide, FHWA-SA-93-049, 1993, 298 pp. This guide assembles under one cover, state-of-the-knowledge on the better practices for addressing issues that arise when highways and utilities share a common right-of-way. Discusses permits, mapping and notification, legal issues, relocation reimbursement, and other topics. Only a few copies are available.

Transient Protection, Grounding, and Shielding of Electronic Traffic Control Equipment, NCHR Program Report #317, June 1989, 84 pp. Recommends installation methods to protect traffic control equipment against lightning and other transient and electromagnetic interference. Shows grounding, shielding, and filtering techniques for cabinets and components. A companion training videotape for technicians, *The Nuts and Bolts of Jolts*, has been added to the T.I.C. videotape library. Tapes are available through your UW-Extension County Office.

Calendar

T.I.C. workshops

Details and locations for workshops are in the announcements mailed to all **Crossroads** recipients. For additional copies, or more information, call the T.I.C. at 800/442-4615.

Asphalt Plant Open House This educational tour of a modern working asphalt plant will give a close up view of: the latest plant equipment, a materials testing lab, asphalt paving and compaction equipment, and a quarry and crushing operation. Participants will meet at Waunakee H.S. to be briefed on plant operations, environmental issues and controls, and quality control testing and methods. Sponsored by the FHWA, T.I.C., Wisconsin Asphalt Pavement Assoc., and WDNR in cooperation with Payne & Dolan, Inc. Advance registration required.

July 9 Waunakee

Maintaining and Controlling Roadside Vegetation This series of ETN workshops focuses on maintaining and controlling roadside vegetation. It is presented by the UW Local Government Center and the T.I.C. at over 103 locations throughout Wisconsin. *Workshop 1* highlights the rights and obligations of local governments and reviews important engineering and safety considerations. *Workshop 2* covers aesthetic concerns and a discussion of maintenance policies, standards, and methods. *Workshop 3* reviews the use of pesticides.

10:30-11:50 am: July 8 (#1), August 12 (#2), and Sept. 9 (#3)

Gravel Road Maintenance This workshop focuses on keys to good gravel roads: proper materials, correct cross-section, drainage, grading and construction. It addresses the causes of common problems and how to correct them.

Aug 5	Richland Center	Aug 14	Rhineland
Aug 6	Waupaca	Aug 15	Cable
Aug 7	Eau Claire		

Winter Road Maintenance Time to prepare for winter operations. This workshop covers equipment preparation, the latest on ice control materials, and operations planning. Includes time to share experiences and tips for better winter operations.

Oct 14	Tomah	Oct 22	Green Bay
Oct 15	Eau Claire	Oct 23	Brookfield
Oct 16	Cable	Oct 24	Barneveld
Oct 17	Minocqua		

UW-Madison seminars

Local government officials are eligible for a limited number of scholarships for the following courses in Madison. Use form on pg. 7, call 800/442-4615, or e-mail: ranum@engr.wisc.edu.

Planning, Financing, and Implementing Stormwater Management Programs, June 23-25

Fleet Maintenance Management, June 26-27

Culvert Design, August 18-20

Traffic Engineering Fundamentals, Sept. 9-10

Managing Snow and Ice Control Operations, Oct. 6-7

Urban Forestry Management, Oct. 16-17

Pavement Rehabilitation, Nov. 3-5

Other training opportunities

Test your best crew against the best crews from other communities in friendly competition at The Wisconsin Chapter American Public Works **Snow Plow Roadeo**. It's also a great way to get everyone tuned up and ready for winter. Call Bill Kappel at 414/286-2369 or Mark Hochschild at 414/761-5376 for more information or a registration form. (See Summer 1996 **Crossroads** for a detailed article about the Roadeo.)

Wednesday, October 1, at the Waukesha County fairgrounds.

Reader Response



If you have a comment on a **Crossroads** story, a question about roadways or equipment, an item for the *Idea Exchange*, a request for workshop information or resources, or a name for our mailing list, fill in this form and mail *in an envelope* to:

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Or call, fax, or e-mail us:
 phone 800/442-4615
 fax 608/263-3160
 e-mail Ranum@engr.wisc.edu

Please put me on your **Crossroads** mailing list.

Please send me information on _____

My idea, comment or question is _____

(We'll contact you to get more details or answer your question.)

Name _____ Title/Agency _____
 Address _____ City _____ State ____ Zip _____
 Phone () _____ fax () _____ e-mail _____

Crack-sealing and seal-coating tips

Sealing cracks and applying chip seals make pavements last longer. But it has to be done well or the money is wasted. Key issues in cracksealing are methods and timing. For chip seals the key is stone quality, says UW-Platteville Civil Engineering Professor Tom Nelson who taught the T.I.C.'s Spring Roadway Maintenance workshop.

Spring and fall have the best weather for asphalt pavement crack sealing. Temperatures between 45° and 65° F put the cracks at the middle of their working ranges. In summer when pavement expansion narrows the cracks you may not be able to get enough sealant into the crack, while winter-widened cracks require more sealant.

Rout or cut narrow cracks at least 1/4 to 3/4 inch wide to make room for the sealant, Nelson says. Remove dust and moisture before you fill it. Hot air lances like those from Linear Dynamics, Cimline and Seal-All, are excellent crack-cleaning tools.



Cracks must be at least 1/4" for sealant to work.

Apply the sealant and squeegee the material to force it into the crack, level the surface, and remove the excess. It is important to form an overband that is less than 1/8 inch thick or snowplows will peel the sealant right out. Blotting is the next important

step. Sand or toilet paper works well, but you must be sure to use low quality toilet paper that is only one thickness or ply.

Chip seals need dry, dust-free stone

Either crushed stone or pea gravel will work for chip sealing as long as it is free of dust and moisture. Dusty, wet gravel won't stick in the asphalt cement. Pea gravel has better skid resistance and holds under traffic better. Crushed stone is more readily available and resists pull-out by snow plows.

"Look at the performance of past chip seals," says Nelson. "They should last about five years, so if you are getting crushed gravel pulling out from snowplows within a year or two, switch to a more rounded material."

It is important to remove the excess stone, Nelson says. "Many operations use vacuums because it lets them reuse the stone, cuts dust, and keeps stone out of lawns."

If you would like copies of tables showing equipment, typical sealant configurations, properties and types of sealants, contact the T.I.C. by phone, e-mail, fax or mail. Watch Crossroads for info on the next T.I.C. Spring Roadway Maintenance Workshop.



Single-ply toilet paper is a good blotter.

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1997 Videotape Catalog Supplement

The T.I.C. maintains a lending library with several hundred videotapes covering topics from *Asphalt Pavement* through *Winter Road Maintenance*. Tapes are loaned free, except for return postage, through UW-Extension County offices. The 1996 catalog of tapes was distributed to all **Crossroads** recipients.

The following tapes have been added to the library this year. Please put this list with your catalog so you have the most complete, current listing. If you need a catalog, call the T.I.C. at 800/442-4615 for a copy. No updated catalog will be distributed in 1997.

What is Anti-Icing #17957

Federal Highway Administration — 9 min

This emerging technology approaches ice and snow pack control through an anti-icing program. Application of chemical to prevent bonding of ice or snow to the pavement is the key.

Anti-Icing for Maintenance Personnel #17958

Federal Highway Administration — 13 min

Presents a systematic approach to winter road maintenance through the application of the right tools: material, equipment, strategy and personnel, at the right place and right time.

Snow and Ice Control — A Review of Innovative Practices, Volumes I & II #17967

Minnesota Center for Transportation Studies — 116 minutes

A national satellite workshop broadcast on December 6, 1995 highlights a wide variety of snow and ice control practices in Minnesota. Topics include planning, policy, liability, cooperative service, public relations, preventive maintenance and new equipment. Useful for supervisors and elected officials.

Safety Around Conveyors #17972

VISTA — 13 min

Discusses the safety features of operating conveyors and the danger areas. It emphasizes the importance of properly outfitting the conveyor for specific application.

Conveyor Maintenance Safety (Aggregate Operations) #17973

VISTA — 16 min

Emphasize by demonstration the step by step shutdown, lock out and tag out of a conveyor. It also reviews other proper procedures for a safety maintenance and start-up of conveyor.

Safely Controlling the Power of the Crawler Excavator — Segment 1 #17974

VISTA — 13 min

Whether you call it the dipper or the stick, the tool or the bucket, the lower or the undercarriage, you need to know what you are really looking for when you do a pre-start inspection. In only 13 minutes, less time than it takes to do a good walk-around, operators will learn to look for things they never thought could give them trouble.

Safely Controlling the Power of the Crawler Excavator — Segment 2 #17975

VISTA — 18 min

There are safe operating techniques to use in sewer mainline work, road construction in heavy traffic, clinging to a mountainside, taking down a bridge at night or working in a scrap operation. This 18½ minute video shows all these operations, and many more. A dynamic video produced and narrated by real operators, specifically for other operators.

Safely Controlling the Power of the Crawler Excavator — Segment 3 #17976

VISTA — 12 min

This isn't the story of how to check for oil levels. Here are 12½ minutes of genuine safety tips to help operators, mechanics and truck drivers avoid painful injuries and expensive downtime. The tips on safe transport can keep you from buying a bridge, and help you stay in business. Your insurance company will love you for buying this video.

Utility Cut Repair: Doing It Right #17977

MN Local Road Research Board — 11 min

Discusses the major points of proper utility cuts including safety considerations, pavement cuts, proper backfill materials and procedures, compaction and resurfacing.

Making Safer Roads #17981

Insurance Institute for Highway Safety — 13 min

This presentation focuses primarily on the need for increased attention to improving safety on secondary roads. It provides examples of hazardous features and what can be done to reduce or eliminate the hazard.

Planning and Financing Capital Improvements Programs #17988

Transportation Information Center, Department of Engineering Professional Development, UW-Madison: Tape 1 — 71 min, Tape 2 — 102 min

This is a two tape set from a satellite course held October 30, 1996.

Tape 1 includes an overview of effective capital programs by Rich Noll, Assistant City Manager of Kansas City, Missouri, reaction by a bond consultant and a bond rating specialist.

Tape 2 includes the following three case studies: Case I, "A 50 year Capital Replacement Plan," is Shoreview, Minnesota's 50 year Capital Replacement Plan. Case II, "Playing Catch-Up," covers Evanston, Illinois' CIP process that has included several decades of extensive replacement, upgrade and expansion projects. And Case III, "Taking Public Guidance, Building Public Support," describes Phoenix, Arizona's extensive citizen participation process that it has used to develop and support its Capital Improvements Program.

Traffic Control: What Works? #17989

Minnesota Local Road Research Board — 13 min

This video provides good information on how public officials develop reasonable research based traffic control strategies and apply engineering judgment in selecting traffic control devices.

Ready...Set...Winter! Driving Safely On Ice and Snow #17990

AAA Foundation for Traffic Safety — 14 min

Preparing and Driving

1. How to prepare vehicles for winter driving.
2. What to watch out for
3. Steps to take if you encounter trouble.

1996 AASHTO Roadside Design Guide #17996

FHWA/DOT — 123 min

The tape shows crash testing of automobiles on various roadside obstacles. It has remedies for existing obstacles such as untreated culvert ends, severe side and back slopes, mailboxes, and guardrails. The video emphasizes the need for close attention to the installation of roadside safety equipment. It also points out the need for agencies to develop programs that control roadside obstacles and to develop a roadside safety program.

Utility Cuts in Paved Roads, Parts 1&2 #18003

LTAP — 41 min

A two part video that presents recommended procedures for completing utility cuts from initial planning through final clean up.

Livable Neighborhoods: Rethinking Residential Streets #18001

Transportation Information Center, Department of Engineering Professional Development, UW-Madison: Tape 1 — 85 min, Tape 2 — 88 min

Tape 1 features a panel discussion on the philosophy, processes, and politics that municipal engineers may overlook when neighborhoods request their help in making their neighborhoods "a better place to live." The panel includes a traffic engineer/planner, a crime prevention specialist, a public works director, and a mayor. The panel is followed by a lecture that presents the tools of traffic calming.

Tape 2 features three case studies: Dayton Ohio's approach to revitalizing the Five Oaks neighborhood using traffic calming; Seattle Washington's comprehensive program that has used successfully traffic circles to solve neighborhood traffic problems; and The City of Toronto's traffic calming project on Balliol Street.

CD-I

CD-I (Compact Disc Interactive) Player #17782

CD-I is a multimedia interactive training tool used in conjunction with a television. A player and the three training discs described below are available from the library. You can borrow the player and a disc and organize individual training for your employees. All you need is the player, disc, TV and a quiet place for the training.

Snow & Ice CD #17783

This disc presents the basics of materials, equipment, and methods in a question and answer format that allows the user to test their knowledge. This training is designed for the driver and takes from 30 to 60 minutes depending on the experience and knowledge of the user.

Work Zones CD #17784

This disc presents the basics of a traffic control plan, proper devices, placement, and maintenance in three situations: two lane roadway on a curve, four lane divided, and an expressway ramp closure. This training is designed for design and maintenance personnel and takes from 60 to 90 minutes depending on the experience and knowledge of the user.

Meetings Bloody Meetings CD #17965

Presents the five steps necessary to conduct productive meetings in a humorous way. Stars John Cleese from Monty Python's Flying Circus. This training is designed for supervisors, managers, and project engineers that organize and conduct meetings.