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 sealing 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-winded cracks require more sealant.

Rout or cut narrow cracks at least ¼ to ⅜ 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. Apply the sealant and squeeze 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 ⅛ inch thick or snow plows 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.”

“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.

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.

“People are very sensitive about new roads,” says Guy Meyer, WisDOT District 1 Design Supervisor. “They were leaning toward leaving it as an at-grade crossing.” Together the road designers and the community decided on a full interchange.

WisDOT used computer-generated images of the different proposals. “It helped the engineering staff too,” says Meyer. “They 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 proposed intersections. “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.

Continued on page 3
Idea Exchange

Folddown device protects strobe lights

Motor grader operators in Iowa were damaging the top strobe lights on low door opennings 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 it on one of their other loaders to protect its strobe light from damage by tree's and brush.


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 would 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. Share 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 excuse and family problems, you can often understnd staff problems, operational difficulties, individual problems like substance abuse. Don't try to solve personal problems yourself, but refer these issues to appropriate professionals.

Be a team player. 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.

It's 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. Alternately, a 50-50 blend with virgin gravel is excellent because it can be bladed more easily, with its 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 1/4 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.

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 Operator House
This educational tour of a modern 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. Will participants meet at Waukanae 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 Waukanae

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), Aug 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 6 Richland Center
Aug 6 Ripon
Aug 7 Waupaca
Aug 7 Eau Claire

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 registration forms, or a name for our mailing list, fill in this form and mail it in an envelope to:

Crossroads
Transportation Information Center
University of Wisconsin-Madison
432 North Lake Street
Madison, WI 53706

Or call, fax, or e-mail us:
Phone 800/442-4615
Fax 608/263-3160
E-mail ranum@engr.wisc.edu

My idea, comment or question is _________________________________

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

Name _________________________________ Title/Agency _________________________________
Phone __________________ Fax _________________________________ 
Address __________________________ City __ State __ Zip __

Non-profit organizations are welcome to reproduce articles appearing here.

This newsletter provides information on roads and bridges to local officials and is mailed to all recipients. For additional copies, or more information, call the T.I.C. at 800/442-4615.

Crossroads is produced with assistance from the Federal Highway Administration, the Wisconsin Department of Transportation, and the University of Wisconsin—Madison.

Non-profit organizations are welcome to reproduce articles appearing in this newsletter. Please contact us if you need an update or correction.

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Correction:
A table listing July and August Crossroads workshops was missing last week. We have reprinted it here. Please mark your calendars now. Crossroads is mailed to about 5000 recipients and is best read by cutting it out and keeping it handy or by referring to the T.I.C. computer database. 

Readers are encouraged to share their ideas and experiences with other readers. If you have a comment, question or idea, please send it to the T.I.C. at the address above. The T.I.C. will encourage participation in the Crossroads project and in your local government.

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 15 Eau Claire 
Oct 16 Cable 
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
Tied your best crew against the best crews from other communes in friendly competition at the Wisconsin Chapter American Public Works Snow Plow Roadways. It’s also a great way to get everyone tuned up and ready for winter. Call Bill Kappel at 414/236-2369 or Mark Hochschuld at 414/761-5376 for more information or a registration form. (See Summer 1996 Crossroads for a detailed article about the Roadways.)

Wednesday, October 1, at the Waushara County fairgrounds.

On pg. 7, call 800/442-4615, or e-mail: ranum@engr.wisc.edu.

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To change your mailing address or to remove yourself from the mailing list, please write to the address above or call 800/442-4615.
More, faster trains; X-ing reviews critical

Railroad traffic has increased dramatically in the last ten years due to a fast-growing and rapidly expanding economy. From WWII-era government restrictions, the Fox River corridor, for example, sees 20-25 trains a day, up from five to seven trains the day before yesterday. 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 railroad crossings is a recipe for disaster. Even the full 330 ft of visibility only gives a driver 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 Kreulen, 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. Kreulen 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," Kreulen says.

Local officials can petition the office for review and possible closing of rural crossings. "We’ve had a steady stream of requests," Kreulen 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, straightforward explanations, methods, examples, and further references to help you effectively organize and manage street and highway maintenance activities and operations. A limited number are available on these topics.

Public Awareness and Support
Personnel
Purchasing Authority
Impact of Land Development on Road Planning
Rural Transportation Planning
Road Programming
Road Surface 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, grading, drainage, and maintenance.

The SAFER Manual—Safety Evaluation for Roadways, T.I.C., 40 pp. This is the Transportation Information Center’s recent 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, assist in 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 offices’ 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-93-045, 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.

Transit Protection, Grounding, and Shielding of Electronic Traffic Control Equipment, NCHRP Program Report #317, June 1999. 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.

G Gravel road Q 6A

Crossroads

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 4x inch gravel for our roads?

Clay is the best natural binder, but be careful. It can be easy to mistake silt 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 clays. 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 punching 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 4.

This 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

"After using these images, I felt a lot more confidence in the decision," says M. Meyer. "It was well worth the money we spent because it ended up in a successful resolution. 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 potential 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. SBH produced all the images described in this story.

ROAD WARE to become PASERWARE

Due to a trademark conflict, the T.I.C.’s pavement management computer program formerly known as ROAD WARE 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 Pudlofski at 800/442-4615.
Crossroads 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 who 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.

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 mounted on a post, changing from left to right (or right to left) with not more than one per lane. Where 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 judgment 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 speed.

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

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 evaluation of performance of Superpave™, SHRP’s new asphaltic mix design. Other asphaltic test sections will evaluate SHRP’s new method of specifying performance-graded asphalt 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 octagonal shape that helps drivers recognize it. Using an oversized 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 crossings, use the same guidelines as for a cross road or side road (WisDOT 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.

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.)

PINES DOUBLE 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. Minimum is 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 Roadway Improvement) 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).
U se signs correctly for safer roads

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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 mounted on vertical surfaces. Check the MUTCD for specifics.

Advisory speed plate on curves. Use the orange work zone traffic sign. Check the MUTCD for specifics.

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Double mounting signs

To avoid visual clutter, the MUTCD (para. 2A-2J) says not to put two signs on the same pole 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.

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 oversized 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 railroad (road) 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.

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.)

PINES DOUBLE WORK ZONE signs. Posting on local roads is not recommended. 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 18 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. Alternatives are available, but they must be approved 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 Education for Roadways) Informational 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).
More, faster trains; X-ing reviews critical

Road traffic has increased dramatically in the last ten years due to a fast- growing population, the end of WWII-era government restrictions. The Fox River corridor, for example, sees 20-25 trains a day, up from five to seven trains a day back in the 1980s. And the trains are moving 50 mph and more.

The combination of drivers not seeing many trains and brush-filled vision corners at rural crossings is a recipe for trouble. Even the full 330 feet of visibility only gives a driver 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 Kreuen, 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. Kreuen 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,” Kreuen says.

Local officials can petition the office for review and possible closing of rural crossings. “We’ve had a steady stream of requests,” Kreuen 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.

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, 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 produces 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.

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.

ROADWARE

Gravel road Q 6A

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 sealed-coated 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 4 in 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 a sample and identify the potential hazards along your roadways, 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 offices’ 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-93-045, 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.

Transit Protection, Grounding, and Shielding of Electronic Traffic Control Equipment, NCHRP Program Report #117, June 1999. 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.

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’s are loaned free through Wisconsin County Extension Offices.

NACE Action Guides Series, National Association of County En- gineers, 1992. Practical, straightforward 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  
Purchasing Authority  
Impact of Land Development on Traffic  
Road Planning  
Rural Transportation Planning  
Roadway Design  
Surface 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, grading, drainage, and maintenance.
### 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.


**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 boss.

1. **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.

2. **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.

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

4. **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.

5. **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.

6. **Be a team leader** 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.

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### Gravel road Q & A

Ken Skoshek, 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. Alternately, a 50-50 blend with virgin gravel is excellent because it can be placed more easily with 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 smaller size stone. The standard state specs call for 1/4 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 of 1996 State Standard Specifications.

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### 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 O Pen 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 WCDR 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 (#), August 12 (#), and Sept. 9 (#)

**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 6 Richland Center
- Aug 14 Rhinelander
- Aug 7 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 15 Eau Claire
- Oct 16 Cable
- 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 Roadway. It's also a great way to get everyone tuned up and ready for winter. Call Bob Kappel at 414/286-2369 or Mark Hochschild at 414/761-3576 for more information or a registration form. (See Summer 1996 Crossroads for a detailed article about the Roadways.)

Wednesday, October 1, at the Waunakee County fairgrounds.

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### 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 registration forms, or a name for our mailing list, fill in this form and mail in an envelope to:

**Crossroads**

Transportation Information Center
University of Wisconsin-Madison
432 North Lake Street
Madison, WI 53706

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

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

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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 U W-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 ¼ to ¾ 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. Apply the sealant and squeeze 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 ¼ 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.

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’s 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.

“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.

Continued on page 3
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
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
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
Minnesota Center for Transportation Studies — 116 min
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
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 O-perations)
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
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
VISTA — 18 min
There are safe operating techniques to use in sewer mainline work, road construction in heavy traffic, climbing to a mountainside, taking down a bridge at night or working in a scrap operation. This 18 1/2 minute video shows all these operations, and many more. A dynamic video produced and narrated by real operators, specifically for other operators.

Utility Cut Repair: Doing It Right
M N 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
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
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 Shortview, Minnesota’s 50 year Capital Replacement Plan. Case II, “Playing Catch Up,” covers Evansville, Indiana’s 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?
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
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 AASHO Roadside Design Guide
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 CutsProved
In Paved Roads, Parts 1&2
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

CD-I

CD-I (Compact Disc Interactive) Player

Snow & Ice CD

Work Zones CD

Meetings Bloody Meetings CD

CD-I is a multimedia interactive training tool used in conjunction with a television. A player and 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.

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.

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.

This disc presents the five steps necessary to conduct productive meetings in a humorous way. Stars John Cisese from Monty Python’s Flying Circus. This training is designed for supervisors, managers, and project engineers that organize and conduct meetings.
1997 Videotape Catalog Supplement

The T.I.C. maintains a lending library with several hundred videotapes covering topics such as Snow and Ice Control, Traffic Circle Projects, and Cemetery Design. The library includes a wide variety of subjects for professionals and the general public. These tapes are available through T.I.C. office locations, or by mail for a small fee. The catalog is updated annually and includes a comprehensive list of all available titles, along with their descriptions and prices.

### What Anti-Icing
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 including 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 min
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, cooperation, 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
Emphasizes demonstration of 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, climbing to a mountainside, taking down a bridge at night or working in a scrap operation. This 18 min video shows all these operations, and many more. A dynamic video produced and narrated by real operators, specifically for other operators.

### Utility Cut Repair: Doing It Right
#17977
MNLocal 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.

### Traffic Control: What Works?
#17989
Minnesota Local Road Research Board — 13 min
This is a guide for municipal engineers to define the proper traffic control for public works and transportation. It presents a systematic approach to winter road maintenance and includes 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.

### CDs

#### 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 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.

#### CD-I, Volume 1

**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 and materials, and takes from 50 to 60 minutes depending on the experience, knowledge and planner’s background.

**Meetings Bloody Meetings** #17965
Prepares the five steps necessary to conduct productive meetings in a humorous way. Stars John Crosse from Monty Python’s Flying Circus. This training is designed for supervisors, managers, and project engineers that organize and conduct meetings.

### 1996 AASHO Roadside Design Guide

**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.

### Liveable Neighborhoods: Rethinking Residential Streets

**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 Ohi o’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.