

# Crossroads

Winter 2004



TRANSPORTATION Information Center—LTAP

University of Wisconsin—Madison

## Winter maintenance ideas, equipment

For those who couldn't attend the T.I.C.'s annual Winter Maintenance workshops, here are some of the strategies, techniques and equipment ideas that were presented.

### Anti-icing

WisDOT reports that 80% of all counties now use anti-icing—spraying liquid chemicals before a storm—to keep ice from bonding to the pavement, and to ease plowing. Many municipalities also use it, especially on bridge decks.

"It's pretty much eliminated early morning frost problems," says Jeff Nieland, Assistant Public Works Superintendent in Menasha. "Last year we didn't have any call-ins about bridge decks." One truck, equipped with tailgate-mounted tanks, sprays salt brine. Supervisors dispatch it when frost is predicted. "It's been working great, so we are starting to use anti-icing on main routes through the city so the snow won't adhere to the pavement," says Nieland.

City of Fond du Lac also uses anti-icing on bridge decks. "We use Melt-down M95," says Joe Longo, Streets Department Foreman. "It's less corrosive than calcium chloride, still works at lower temperatures, and is more environmentally friendly." It contains a 30% solution of magnesium chloride solids mixed 95%:5% with a product from processing corn. When temperatures below 40° F are predicted, they make a light application: 14 gallons/lane mile from a pickup truck outfitted with tanks and a portable pump. The material stays active for 3-4 days.

### Safety

Cars running into the back of snow plows was the most common type of crash involving winter maintenance equipment,



Sign warns drivers.

says Tom Martinelli, Winter Maintenance Engineer with the WisDOT Bureau of Highway Operations. "We are finding ways to improve the visibility of the back of the truck," he says.

A number of counties are adding rear airfoils on top of the salt spreader in the standard bid package for new trucks. The airfoils direct snow away from light lenses and reflective tape. Other tactics include switching to brighter LED lights, adding light strips, and mounting signs reminding drivers to stay 200 feet back. Another idea is to install a small boat-trailer fender on each tailgate hinge pin. This acts as a mini-foil, keeping rear lights free of snow and ice, says Jeff Johansen of Town of Arden.

### Lighting

**HID HEADLIGHTS** High Intensity Definition lights are much more effective in a snowstorm, says Dave Lyga, Trempealeau County Shop Superintendent. "They're non-glare and very bright. They give the driver a huge advantage in seeing the road in a snowstorm." The HIDs replace regular plow headlights for about \$700/set. "All the drivers are begging for them. We feel they're well worth it," says Lyga.

**LIGHTED ARROW STICK ON TAIL GATE** Like an arrow board, the LED lights flash in sequence to guide traffic on a multi-lane road away from the wing to the safe side of the snow operations. "We've had a real good response from truckers on the Interstate. They appreciate having advance warning of what lane to be in," says Marquette County staff.



Lighted arrow stick, airfoil, and plastic-lined dump body.

**WING LIGHTS** Marquette County has been using LED lights on right and left wings since 1998. They are wired as normal taillights with stop and turn signals. Traffic from the rear can see the wing on trucks plowing the 4-lane roads.

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## Idea Exchange

### Underbody wash removes salt and sand

For a quick and easy way to remove salt and sand build-up beneath snow removal vehicles and equipment, try the underbody wash. It's effective, lightweight, rolls easily under vehicles, and helps prevent corrosion and wear and tear on parts.



The underbody wash was constructed by the City of Ankeny, Iowa, Public Works Department staff. They built it



using 1-inch PVC pipe, lawn mower wheels, and pressure nozzles. The wash is 105 inches long and 48 inches wide. It has two cross tubes with 15 pressure nozzles. The nozzles are adjusted to spray in various directions. The water pressure is generated by a gas-powered water pump.

For more information on the underbody wash, contact Dennis Guillaume, 515/965-6481.

### Quick installation for snow fence posts

A novel technique for installing snow fence posts was reported by Bob Bembenek, Road Foreman, Town of Hull. They hang a Rhino Post Pounder from one end of an 8-foot-long, counter-weighted bar that is mounted on the side of a single axle dump truck. A platform



bolted to the back frame of the truck lets two people operate the pounder with power from a portable air compressor in the truck.

The truck moves along

the fence line, dragging a 10 foot rope with a flag at the end. The driver stops when the flag reaches the previous post. One crewman holds the next post while another swings the arm out and operates the hammer.

"We've been using this system for eight or nine years," says Bembenek. "In one day a crew of three can install enough posts for 250-300, 50-foot rolls of fence," he says.

For more information contact Bob Bembenek, 715/344-8280, or townofhull@g2a.net

## Resources

### Publications

The following publications are available free from the T.I.C. while supplies last.

**SAFER Manual: Safety Evaluation for Roadways**, T.I.C., 1996. Provides background information and offers an approach for reviewing safety conditions on local roads and streets. Safety rating scale helps with setting priorities and planning for immediate and future action.

**UPDATED! Using Weight Limits to Protect Local Roads**, No. 8, T.I.C., 2003. Describes the causes of spring weakness in roads and how heavy loads do damage. Gives guidelines for when and how to set seasonal and year round weight limits.

**A Walkable Community is Much More Than Just Sidewalks**, FHWA, 2000. This brochure lists typical pedestrian/vehicle conflicts and crash types along with suggested remedies for each. It unfolds into a color poster illustrating 22 measures that can improve pedestrian safety, including illustrations of traffic calming measures.

**Gravel Roads Maintenance and Design Manual**, FHWA and South Dakota LTAP, 2000. This manual provides a wealth of information on gravel road maintenance and rehabilitation techniques, drainage, dust control/stabilization, and innovative use of equipment for gravel road maintenance. Includes many color photographs and drawings to illustrate the techniques.

### Websites

**FHWA/AASHTO** National Highway Specifications Website. [www.specs.fhwa.dot.gov](http://www.specs.fhwa.dot.gov)

A clearing house and electronic library where users can search, review, cross reference, and download current specifications and related documents from all state departments of transportation.

The South Dakota DOT Study "**Effects of Off-Road Equipment Tires on Flexible and Granular Pavements**" can be downloaded at: [http://www.state.sd.us/Applications/HR19ResearchProjects/oneproject\\_search.asp?projectnbr=SD1999-15](http://www.state.sd.us/Applications/HR19ResearchProjects/oneproject_search.asp?projectnbr=SD1999-15) (The report is 131 pp. or a 4.4 MB pdf file). An executive summary of the report is available from the T.I.C.

### Videotapes

Videos are loaned free through county UW-Extension offices. Copies of the T.I.C. Video Lending Library Catalog are available on request (print) from the T.I.C. and online at <http://tic.engr.wisc.edu/>

**NEW Cold In-Place Recycling of Asphalt Pavements with Self-Cementing Fly Ash**. Wisconsin Electric, 12 min., 2002. #18619 An overview of fly ash stabilization on subgrade soils and recycled asphalt pavements. Demonstrates the process and highlights the benefits.

## Crossroads

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## Appleton designs for ped safety

Putting a premium on pedestrian safety has produced a variety of other benefits for Appleton's College Ave. reconstruction. Open just over a year, it has proven a success. Corner bumpouts improve pedestrian safety and traffic flow. Bollards protected a light pole in a crash. Two-level lighting has cut energy use. Interestingly, the pedestrian safety impetus came from the city's Police Department.

"We are out there trying to improve safety and the quality of life for the community generally," says Lt. Stephen Elliott. "That means many things other than enforcing the law, including pedestrian safety and traffic safety." An important new tool is CPTED, Crime Prevention Through Environmental Design, which focuses on design and use of the built environment to enhance safety and quality of life. Elliott, one of eight Appleton Police Community officers trained in CPTED, got involved in College Ave. planning from the beginning.

**Bumpouts** Corner bumpouts, for example, improve safety by giving pedestrians a better line of sight when they are crossing the street. Vehicles can also see the pedestrian from farther away.



Bumpouts also narrow the roadway, which works psychologically to slow traffic down. The extra space also offers more options for moving away from other people who may appear threatening. In addition, it encourages and supports downtown activities like parades and sidewalk café seating.

At the same time, bumpouts improve traffic flow. "Bumpouts allow me a lot of

flexibility in signal timing," says Eric Lom, Appleton City Traffic Engineer. "They shortened up the crossing distance, removing seven feet on either side of the street. That allowed us to significantly shorten the minimum clearance times." The intersection clears faster, allowing traffic to resume travel sooner.

Planners worked hard to develop functional bumpout designs for plowing, fire trucks, and other services. "We laid out full-scale radii with spray paint at the City Garage parking lot," says Lom. "The crews hooked plows up to trucks in the summer and we kept adjusting them until everybody was as happy with them as they could be." Each intersection was individually designed and adjusted.

The effort proved worthwhile. "Operationally it's not a problem," says Operations Supervisor Mike White, of the first winter's experience. "It was useful doing dry runs. We turned some radiuses in the yard." For snow removal, contractors clear the sidewalks, then the city plows and removes the snow at night using articulated 6-wheel-drive motor-graders. Interestingly, however, public expectations about snow removal became higher after the reconstruction.

**Bollards** Planners placed concrete bollards at the corners to protect people and traffic signals. "We don't have a problem picking up knockdowns," says Lom, "but when you're in a high pedestrian traffic area, there's a lot of danger with a 30 foot pole falling." The bollards, which were tested to be crashworthy at 40 mph, proved their value last July. An errant vehicle crashed into a parked car at the height of lunch hour. The bollards protected both the people standing on the corner and the signal pole.

"The bollards add cost to the project, but with the savings in signal poles, they



pay for themselves," as well as protecting people, says Trevor Frank, an architect and design consultant on the project from OMNNI Associates.

Bollards are one of many subtle but significant suggestions that come out of CPTED. "Many of the CPTED principles are common sense, and they don't add much to the cost," says Frank. Some, like two-level lighting, actually save a considerable amount of money.

**Lighting** Lighting is a very important safety feature both for motorists and pedestrians. The old College Avenue lighting focused primarily on the roadway surface, leaving pedestrian areas shadowed by mature trees. "In a



downtown area, you need to light up the crosswalks and sidewalks," says Lt. Elliott.

"There was a long debate about lighting, whether to just light with streetlights, or use lower scale, lower level lights for

the sidewalks and higher wattage lights on the street," says Frank. Some people were concerned that the two-level lighting would be more expensive.

It turned out that not only would the same number of fixtures do the job, but they could do it with a lower total wattage. The fixtures alternate in height and size: 250 watts on a pole for the street, then 110 watts on the sidewalk. "We saved \$10,000 a year in energy for 72 poles in the project while supplying better quality light and in better locations, where it was needed," says Frank.

CPTED principles guided numerous other design decisions as well, including a colored concrete amenity strip at the curb side of the sidewalk, colored pedestrian crossing zones, benches turned to face along the sidewalks, and more. The result is an attractive, safe and pedestrian friendly downtown with better vehicle flow.

For more information about Appleton's redevelopment and CPTED contact Eric Lom, at [Eric.Lom@appleton.org](mailto:Eric.Lom@appleton.org), 920/832-3958; Steve Elliott at [Steve.Elliott@appleton.org](mailto:Steve.Elliott@appleton.org), 920/832-5500; or Trevor Frank, OMNNI Associates, [TFrank@omnni.com](mailto:TFrank@omnni.com), 920/735-6900. The College Avenue reconstruction web site is [www.collegeave.info](http://www.collegeave.info)



## Winter maintenance tips *from page 1*

### RED FLASHING LIGHTS ON TRUCK CAB

Marquette County has mounted rotating beacons with one red and one yellow light on truck cabs. "People treat it with a lot more respect," says Marquette County Staff. Red lights, not usually used on plows, are permitted in the Statutes (Section 347.26) as Marquette has confirmed with the State Patrol. They also advised their local law enforcement officers before beginning to use them. "It's a test we're doing jointly with the State Patrol," says Marquette Co. Shop Manager Lee Sauer.

## Equipment

**PAVEMENT TEMPERATURE SENSOR** All state patrol section trucks and a few county trucks in Marquette Co. are now fitted with pavement temperature sensors. A display on the dash gives the road surface and ambient air temperatures so the driver can decide whether to apply salt and if the salt should be treated.

### DUAL SPINNERS ON TAILGATE SALT SPREADER

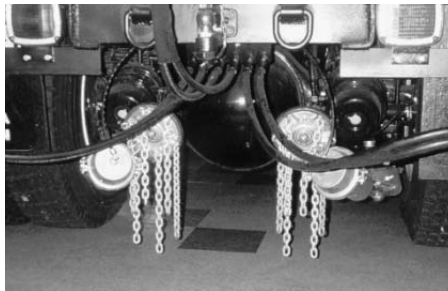
Having two salt spinners lets the operator easily cover the high side of curves and both lanes of multi-lane roads, says Lee Sauer of Marquette Co. Reversing the hydraulic flow on the single auger changes its direction. "It decreases salt usage because we are able to spot salt where it's needed. It also shortens the time it takes to get the product where it's needed and we can avoid additional trips," says Sauer.



*Dual spinners.*

**CHEMICAL TANK MOUNTED BETWEEN CAB AND DUMP BODY** This lower, forward placement, with fill tubes at the bottom of the box, means the operator is not climbing on a slippery box, or a catwalk, to fill the tank. It is possible when there is adequate space between body and cab. "It uses wasted space on top of the fuel and hydraulic tanks which are mounted between cab and box on our trucks," says Sauer.

**AUTOMATIC CHAINS** The operator can deploy automatic chains when they're needed without leaving the cab, then quickly disengage them. "They're not used often and usually just for very short periods, generally on hilly terrain or icy roadways," says Sauer of Marquette Co. Different types are available. They cost about \$1800/truck. The wheels must be turning at least 5 mph in order to apply the chains so they become effective.



*Automatic chains.*

**AUTOMATIC TARPS COVER SALT** These tarps allow the operator to cover and uncover salt loads from inside the cab. A small, reversible electric motor winches the tarp open on a spring-loaded arm, and retracts it onto a roll on the cab shield. "We like them because our operators are not out crawling on the side of the truck and possibly falling off," says Lee Sauer.

## Operator aids

**OPERATOR INSTRUCTION CARD.** Trempealeau County keeps a brief instruction card in the truck cab for drivers who must operate a variety of different spreader types. "We generally make them ourselves as a quick read for the proper steps," says Dave Lyga.

**HEATED WINDSHIELD WASHER FLUID** A new product is the "Hot Shot" in-line heater (by Micro Heat Co.) that heats fluid within 30 seconds to spray and wash. Expected benefits include releasing stuck wipers, clearing blocked or frozen nozzles, and keeping the rubber softer on wiper blade so they are more effective. The base system cost \$258 plus installation, says Lee Sauer.

## Plows, blades etc.

**CUTTING EDGE SHIELD** A new style of thin cover protects the carbide blade and eliminates the need for a full size cover. The shield, about 1/8" by 2" is welded on to protect the fragile carbide insert. "It scrapes much better than a double blade

and it will be cheaper in the long run," says Dave Lyga whose operators have used them for two winter seasons. The shield costs \$39/foot.

### PLASTIC FACING ON PLOWS, DUMP BODIES

Facing the plow with 1/4", rigid plastic sheeting makes it easier to push snow. "Less friction creates fuel savings, and maintaining the plow is easier," says Sauer. Lining the dump body with plastic eases clean-up, prevents



*Plows with plastic facing.*

freezing, and lets salt slide easier, meaning the operator doesn't need to raise it as high. Marquette Co. applies the plastic to plows itself but contracts out the bodies at about \$1600 each.

**"RHINO" SPRAYED PLASTIC COATING** Spray-on plastic coating is a cheaper alternative to plastic sheets on plows. The liquid permits a spot repair rather than replacing a whole sheet. The material has to be sprayed on professionally by a vendor. "We've tried one so far and it seems quite effective," says Lyga.

## Wiring, electrical

**ALL LIGHTS WIRED INDEPENDENTLY** Wiring each light separately and having multiples of each light, means a truck can keep operating after a light fails because others continue to work. "We don't have 24-hour duty mechanics, so this allows us to stay out with part of an operating system," says Sauer.

**MARINE GRADE WIRING** "This is our third year of using all marine-grade wiring and we haven't had any failures yet," says Lee Sauer. The tin-coated copper wire is more flexible for installation and easier to solder. Purchased in quantity, it cost Marquette County less than standard automotive wiring.

**DI-ELECTRIC GREASE ON ALL ELECTRICAL CONNECTIONS** Using liquid deicing chemicals means corrosion is a bigger problem. Trempealeau Co. uses "Weather Pak" sealed connectors that are filled with di-electric grease. This prevents moisture buildup but allows 100% conductivity of electricity. "It's probably twice as expensive as a standard connector but we've had fewer breakdowns in the winter months and see little or no corrosion," says Lyga.

**EPOXY-LINED BUTT CONNECTORS FOR REPAIRS**

When repairing a wire between connectors, use a good epoxy-lined butt connector that shrinks and seals tightly when heat is applied with a heat gun. You can further protect it by brushing on liquid vinyl wire coating, Lyga says.

**RUN WIRES IN "LOOMS"** Using a corrugated plastic tubing called a loom to cover all wiring keeps out moisture. "It's like a plastic conduit that you can snap over the wiring," says Dave Lyga. "It costs pennies a foot at a parts store. We've been using it for 7-8 years."

**Maintenance**

**FUEL AT SHIFT END** When a truck comes in from plowing, its fuel tank is cold, as is the fuel supply in underground tanks. After sitting all night in a garage, the tank is warm so adding cold fuel can produce condensation in the tank, Lyga says.

**GREASE AFTER EACH STORM** Greasing pushes salt and sand out of fittings, protecting steering and other joints. Trempealeau Co. drivers wash and re-grease after each storm because they use a lot of liquid salt brines that promote corrosion.

**CHANGE HYDRAULIC, FUEL FILTERS EACH YEAR.**

Moisture and dirt can damage fuel or hydraulic systems. "We change the filters in the fall before the plowing season and actually cut them apart to see if there's contamination," says Dave Lyga. They check the fluid. If it is milky looking it is contaminated and they change it as well.

**LUBRICATE, REMOVE AUTOMATIC TIRE CHAINS**

**AFTER SEASON.** "Whether we take the chains off depends on where we will use the truck in summer," says Lyga. It's important to keep corrosion out of the mechanism's friction wheel.

**FLUSH, FILL LIQUID CHEMICAL SYSTEMS.**

Because liquid de-icing chemicals are very corrosive, it is important to thoroughly flush all tanks and pumps with water. Storing them full of fluid prevents corrosion by eliminating oxygen and keeping the seals wet. Windshield washer fluid is a very cheap, readily available fluid that works well for the job, says Dave Lyga.

*For more information about items reported here, please contact Dave Lyga, Trempealeau County, 715/538-2221 or tremphwydave@mail.com; Lee Sauer, Marquette County, 608/297-9127 or lsauer@co.marquette.wi.us*

## Corner safety

Snow piles, low-hanging trees, fences, even retaining walls and buildings can all interfere with a driver's vision at intersections. Keeping vision corners clear is one of the many safety issues facing local highway and streets officials. The T.I.C.'s February Highway Safety workshops help identify roadside safety hazards.

Some communities have made corners a priority. Systematic inspection, collaboration with landowners, and prevention are useful techniques for keeping corners safe, say streets officials in Waupaca and La Crosse.

"For the last several years we've been really going after enforcement on vision corners," says John Edlebeck, Director of Public Works, City of Waupaca.

"I think it has made a substantial difference on safety." They enforce an ordinance which specifies clear vision areas at corners in a triangle 10 feet down each line from the property corner in which everything must be under 30 inches or taller than 8 feet.

The city has offered to remove hazards by trimming trees and shrubs, repositioning mailboxes, and relocating power poles at city expense. "We're pretty proactive in trying to minimize the cost to the property owner," says Edlebeck.

One key is staying aware of changes and moving quickly. Noticing a fence being installed, city staff were able to negotiate with the property owner to place it at an angle. "The community is small, and we know the area," Edlebeck says. "As we drive it, we can pretty easily identify places with poor sight distances."

In snowy winters, it's also important to watch for snow piles at corners. Keep an eye out also for temporary hazards that block sight lines like merchandise displays, construction and farm equipment, brush piles, corn and other tall crops, etc.

A court decision last year has made it both more urgent and easier for municipalities to address vision corner problems. In a negligence case where an overgrown tree obscured a Stop sign, the Wisconsin Appeals Court found the county and town both responsible, even though the tree was on private property.



## Preventing problems

Does your zoning code have a vision corner requirement? Requiring setbacks and protecting the vision triangle improves safety. La Crosse has had its code in force for about 10 years.

"Owners have to come in and get a building permit and file a zoning plan. With the code we can avoid the problem before they spend money on construction," says Pat Caffrey, La Crosse Director of Public Works. In residential areas, anything between 30 inches and 8 feet high that blocks the view of approaching pedestrians or vehicles is prohibited from the vision triangle—an area defined as 20 feet back from the intersection of the right of way lines in residential areas. In other zoning categories—commercial, business, industrial—the distance is 10 feet.

"We have a number of examples in older parts of the city where a building is right out to the corner," says Caffrey. "It's very dangerous. We've had to install additional traffic controls to make intersections safer." Structures built before the zoning code change can remain, but if they are replaced, the new building must conform.

*For more on evaluating vision corners and other roadway safety issues, request a copy of the T.I.C.'s **SAFER Manual: Safety Evaluation for Roadways**. The topic will also be addressed in the February Highway Safety workshops (see page 6).*



## Calendar

### T.I.C. Workshops

*Specific details, locations and registration forms are sent to all Crossroads recipients prior to each workshop. Registration begins after announcements are sent.*

**Work Zone and Flagger Safety** For road supervisors and maintenance personnel who plan and set up work zones. This workshop covers traffic control devices, the parts of a work zone, and a variety of work zone set ups, including mobile operations and flagging operations. Participants will set up work zones using the *Wisconsin Pocket Guide to Workzone Safety* and *Flagger's Handbook*. Fee: \$45

Jan 20	Eau Claire	Jan 28	Tomah
Jan 21	Cable	Jan 29	Barneveld
Jan 22	Minocqua	Jan 30	Brookfield
Jan 23	Green Bay		

**Highway Safety** Reviews basics of signing and marking, and highlights good sign installation and maintenance practices on local roads. The workshop will also help you identify roadside safety hazards and understand and use crash information to improve the safety of local roads. Fee: \$45

Feb 16	De Pere	Feb 20	Tomah
Feb 17	Rhineland	Feb 23	Brookfield
Feb 18	Cable	Feb 24	Barneveld
Feb 19	Eau Claire		

**Road Maintenance** Presents maintenance, repair and reconstruction options for your local roads and streets and best practices for maintaining and improving drainage and extending pavement life. The workshop includes exercises to help you decide which maintenance techniques are best for a particular situation along with a spring maintenance checklist. Fee: \$45

Mar 11	Barneveld	Mar 17	Hayward
Mar 12	Brookfield	Mar 18	Eau Claire
Mar 15	De Pere	Mar 19	Tomah
Mar 16	Rhineland		

### Local Transportation Issues (WisLine)

The T.I.C. and UW Extension Local Government Center present a series on transportation at WisLine Teleconference locations around Wisconsin. Fee \$15/session.

Call 608/262-9961 for more information or visit [www.uwex.edu/lgc](http://www.uwex.edu/lgc)

**Liability and Legal Issues**, Jan 8, 10:30 a.m.-12:20 p.m. Improve your understanding of road-related legal issues and liability management techniques. Includes liability of

elected officials, agency responsibilities, and some management practices to limit liability and maintain legal compliance.

**Local Transportation Funding**, Feb 13, 10:30 a.m.-12:20 p.m. Receive the latest information on state and federal funding programs for local projects. Review funding options, hear about recent changes, discuss example projects that effectively utilize funding programs, and ask questions about funding opportunities and issues.

**Using Stone on Roadway Projects**, Mar 4, 10:30 a.m.-12:20 p.m. Stone—one of the most important and widespread building materials in road construction and maintenance—is used as road base, as aggregate in asphaltic and Portland cement concrete, as shoulder surface material, as foundation and backfill for drainage pipes, and to fill undercuts in soft soils. Review the physical properties of stone, the tests used to classify it, and specifications for its many purposes.

### On-site Workshops

On-site workshops save money. We come to your shop at your request. Topics include: Basic Surveying for Local Highway Departments, Basic Work Zone Traffic Control, Flagger Training, Flagger Instructor Training. Contact the T.I.C. for a brochure or see our web page <http://tic.engr.wisc.edu>

### Other Opportunities

**Pesticide Applicator Training** Three sessions for Right-of-Way Applicators, 8:30 a.m.-2:00 p.m. followed by exam:

Jan 13 Waukesha. Pre-register by Dec 28.  
Jan 14 Wausau. Pre-register by Dec 29.  
Mar 17 Waukesha. Pre-register by Mar 3.

Pre-registration and \$25 fee are required. Self-study is an option. Information and pre-registration online at <http://ipcm.wisc.edu/PAT/>, call Rose Scott at 608/262-7588, or e-mail at [PAT-program@facstaff.wisc.edu](mailto:PAT-program@facstaff.wisc.edu)

**Public Works Supervisory Academy** A series of basic management courses for first and second line city and county public works supervisors held in Janesville and West Allis. Upcoming topics include: Customer/Resident Relations; Labor Relations & Negotiations; Communication Skills; Equipment & Workplace Safety; Budgeting, Fund Accounting & Grant Administration; Purchasing & Inventory Control. For complete listing call 800/442-4617 or go to: <http://www.dcs.wisc.edu/pda/academy.htm>

**Safety training—customized, on-site** Safety training is essential, but can be costly in fees, down-time, and public relations. The

Wisconsin Council of Safety (WCS) offers on-site programs in a wide variety of safety topics from Audits and Ergonomics to Work Zone/Flagger courses and Vehicle Instructor Courses. WCS is a non-profit, non-governmental affiliate of the Wis. Chamber of Commerce Foundation.

On-site programs are economical for training several staff members at a flat rate in the range of \$500-\$650/day. Individuals are welcome at scheduled programs, often for as little as \$20-\$90/student.

See a complete listing of programs under WI Council of Safety at: <http://www.wis-chamberfoundation.org/SafetyPrograms> or request a brochure. Phone: 800/236-3400, e-mail: [wcs@wischamberfoundation.org](mailto:wcs@wischamberfoundation.org).

**Chain Saw Safety** F.I.S.T.A., the Forest Industry Safety & Training Alliance, offers on-site, hands-on Chain Saw Safety workshops covering Personal Protective Equipment (PPE); Body Mechanics; OSHA Regulations; The Chain Saw; Tools to Aid Safe Tree Felling; Safe Tree Felling Demonstration; Limbing, Bucking, and Topping, and others. Cost is \$600/day for up to 15 participants, on-site. You provide a typical site along with your existing PPE and saws. For more information contact F.I.S.T.A. at 800/551-2656.

### UW Seminars

Local government officials are eligible for a limited number of scholarships for the following Engineering Professional Development courses in 2004. Offered in Madison unless otherwise noted.

**Maintaining Asphalt Pavements** Jan 5-6

**Improving Public Works Construction Inspection Skills** Jan 7-8

**Designing and Implementing Roundabouts** Feb 9-11

**Railroad-Highway Crossings: Planning/Design/Construction** Mar 1-2

**Urban Street Design** Mar 8-10

**Implementing a Sidewalk Management System** Mar 15-16

**Designing Best Management Practices for Stormwater** Mar 29-31

**Land Development Traffic Impact Analysis** Apr 15-16

**Geosynthetics for Beginners** Apr 20-21

**Municipal Engineering Fundamentals for Non-Engineers** Apr 22-23

**Soil Engineering for Non-Soils Engineers and Technicians** Apr 22-23

**Effective Roadway Lighting** Apr 26-28

## Improving a local road? Check standards

Most people are aware that state or federally funded improvements to local roads have alignment, width, slope and grading standards. But, you may be surprised to learn that state standards also apply even when the funding is entirely local. Codes, TRANS 204 (towns) and TRANS 205 (counties), are intended to ensure uniformity in town roads and county highways.

"It's a legal requirement, although there can be some ambiguity as to when you have to follow the standards," says Kim Johnson, President, KJohnson Engineers. She is the local program management consultant for WisDOT District #1.

For a simple resurfacing project, you can follow the existing pavement characteristics. That is relatively easy to do for lane or bridge widths. However, side slope changes may need help from an engineer, or an exemption from WisDOT. Doing cold, in-place recycling, for example, can raise the pavement 6-8 inches which can mean a fairly significant change to the shoulder and side slopes.

"Slopes are not black and white," says Johnson. "They are a function of topography, past history, and judgment. Plenty of departments do them by eyeball. The problems occur when they have done a recent improvement and then there is a crash." To protect yourself and ensure that you are in conformance with the laws and requirements, it's a good idea to involve an engineer, especially when dealing with slopes and grading.

Projects built with Local Roads Improvement Program (LRIP) funds must follow codes in TRANS 204, TRANS 205 and Chapter 11-20-01 of the *WisDOT Facilities Development Manual* (for cities and villages) says Scott Bush, LRIP Unit Leader. "The standards for roadway widths and alignment are based on Average Daily Traffic (ADT) counts and design speed," he says. "Last year unfortunately, two communities with LRIP projects didn't meet the standards and didn't receive an exception. They had to reimburse the department for the LRIP funds programmed on these projects."

With the next programming cycle about to begin, LRIP staff are working hard to remind local officials about the standards and exception process. "We encourage them to look at the issues early in the project scoping phase so it doesn't come as a surprise as decisions are made," says Bush.

### Standards, alternatives, and other considerations

Town roadway standards in the administrative code vary, depending on type of improvement, ADT and "design speed" (defined as *the maximum safe speed that can be maintained over a specified section of a highway when conditions are so favorable that the design features of the highway govern.*) So, for example, when resurfacing a town road with 250-400

ADT, the roadway must be at least 24 feet wide, including a 20 foot traveled way and two 2-foot shoulders, and the alignment must meet a 40 mph design speed. Roads with greater ADT must have wider pavements and shoulders, and the alignment must meet a higher design speed. Standards for county highways are a bit more varied and complex.

In some situations it may not be practical to meet the statutory design standards. In that case, local officials may request an exception from the WisDOT District Director "in special cases ... in which deviation is not contrary to the public interest and safety." (TRANS 204)

When planning an improvement, it's also important to take other road users into consideration, such as bicyclists, snowmobilers and ATV riders. They are not included in the standards, but may be using the road anyway. A couple feet of paved shoulder can significantly improve safety for bicyclists and drivers sharing a road, for example.

The main thing is to "make sure your bases are covered," when you resurface or reconstruct a road by being aware of the standards and fulfilling your responsibilities under them, says Johnson.

TRANS 204 & 205 are on-line at <http://www.dot.wisconsin.gov> under Transportation Rules, and "Roads and Highways." You can also consult with your county highway commissioner or state DOT district office. For information about the LRIP program contact your county highway commissioner.

## 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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# Limit loads to extend road life

How can you make a road last? Protect it from very heavy loads. Spring is the critical season, but some roads need full-time protection. Local officials have authority to protect their roads by regulating legal weight limits and using permits to manage trips by exempted vehicles. A newly revised T.I.C. publication, **Using Weight Limits to Protect Local Roads**, No. 8, describes the process.

Balancing the economic benefits of heavy vehicles using local roads against the costs of repairing damage can be a political challenge. But study after study has shown that heavy loads cause harm.

The amount of damage is directly related to the weight of the load and how often it is applied. Spreading the weight over dual or tri axles helps reduce damage, while weight concentrated on a single axle significantly increases it. Weakened roads are damaged not just by oversize loads, but by vehicles carrying legal weight loads of up to 80,000 pounds GVW.

The damage goes up faster than load size, so the potential for damage is much

higher for loads above the legal limit.

The harm occurs regardless of tire type. A recent South Dakota DOT field test confirmed this with off-road agriculture and construction equipment. Higher axle loads caused early pavement distress regardless of tire pressure, tread type, travel speed, road roughness, and vehicle suspension, or pavement type.

**Setting limits** You can set weight limits just in spring, or year-round. Spring weight limits should begin with the first thawing and continue five to six weeks. A weight reduction of just 20% during critical weeks in spring can increase pavement life by 68%.

Some roads are too weak year round to carry vehicles with legal loads. Under state statutes, local road agencies can protect them by designating them as Class B highways or by posting permanent weight limits. State law on Class B highways has changed recently. Two types of loads are exempted: local pick-up and delivery, and waste hauling if there are health concerns. As a result,

you may want to review existing Class B highways and consider them for specific load limit reductions.

Issuing permanent weight limits requires passing an ordinance and posting the road. Setting the actual limits can be complicated; you may wish to hire a consultant to do engineering analyses.

**Exemptions, enforcement** Haulers of some commodities can carry overloads on state highways under exemptions in the Statutes. However, this special treatment does not automatically extend to local roads with load restrictions. Local officials may make exemptions, but are not required to.

Before posting lower load limits on a road, plan how to enforce them with local law enforcement, county deputies, and State Patrol officers. You will also need access to certified scales.

Use judgment, common sense, and coordination with haulers to manage road use by heavy vehicles. The result will be a reasonable balance between maintaining commerce and protecting your local roads from damage.


For more information, see *Resources*, page 2.

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