

Crossroads

Fall 1996



TRANSPORTATION Information Center

University of Wisconsin–Madison

New tools for winter road maintenance

Truck-mounted pavement temperature sensors are one of the promising new tools WisDOT tested last winter in their Winter Maintenance Initiative program. Zero-velocity salt spreaders, on-board prewetting systems, and ground-oriented speed control units which also help make salting more efficient were also deployed. Many counties who tried out the new state-purchased equipment last winter found it very effective in helping reduce the salt required. WisDOT is looking into buying more state-of-the-art equipment.

"Traffic volumes are increasing, and so are drivers' expectations. It's a challenge to keep the same level of service. And at the same time we're concerned about the amount of salt we're using," says Tom Martinelli, WisDOT's regional maintenance engineer. New equipment and new techniques are helping meet that goal. The Winter Maintenance Initiative will invest again this year in equipment, salt sheds, and public education to better maintain the state's roads in winter.

County crews who maintain state highways are anxious to use the mobile pavement temperature sensors. Mounted on a supervisor's car or a patrol truck, they help supervisors determine when it is most effective to call for salting. "We've had requests to buy about 77 additional units for next year," says Martinelli, who expects they'll actually order just a few of the \$2000 units to try in a pilot program.

"I think the sensors produced substantial cost savings," says Roger Kolb, Brown County Highway Commissioner. "With a five or six degree difference between air and pavement temperature, it can be difficult to gauge when to begin salting. We've found pavements are often warmer than we expected so we can send crews out later." The mobile sensors were accurate when tested against stationary pavement temperature sensors, Kolb reports, and much handier than returning to the office to dial up computer reports.

Anti-icing clears pavements sooner

The sensors also help with *anti-icing* technology, the pre-emptive approach designed to keep snow and ice from bonding to pavements. "We had some good luck preventing binding last year," says Ed Kazik, a Brown County Patrol Supervisor whose vehicle carries one of the sensors. "You know when the temperature is right to give the pavements a light shot of salt to prevent icing."



This truck is fitted with new snow and ice fighting equipment: a zero-velocity spreader and pre-wetting system.

Anti-icing studies show that in snow-fighting "an ounce of prevention is worth a pound of cure." Preventing the ice-pavement bond saves a significant amount of salt.

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Idea Exchange

Dispenser for edge dropoffs

By modifying a commercial rock spreader, maintenance staff at Illinois DOT's Carlville yard have a neater, easier way to fix low shoulders along pavements. A platform built onto the front of a grader holds the spreader. It attaches to the grader's scarifying hookups and hydraulic controls.



This rock spreading system is neat and efficient.

A rock truck hooks onto a pintle at the spreader unit's front, dumping rock onto the belt as needed. The grader pushes the truck and the grader driver distributes the rock as needed.

"It's very handy," says Tom Shank, IDOT Field Technician. "It replaces one person and makes for a neater job and continuous operation." The platform is simple to build, he says, and the unit can also be used to distribute cold mix or hot mix. The unit they use is a Hi-Way brand reversible tailgate conveyer, TGC18, that costs about \$4000.

Pavement dropoffs are very hazardous and have been the subject of liability claims around the country. Large dropoffs should be repaired right away for motorist safety.

For more information contact Tom Shank at 618/633-2206. No product endorsement is intended through publication of this equipment information.

CDL exemption expected in November

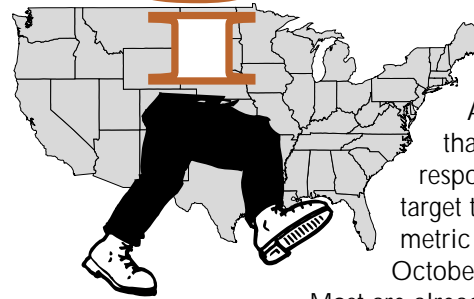
After a late July public hearing, WisDOT has forwarded to the Legislature a proposed rule exempting from the CDL requirement backup snowplow drivers in municipalities of less than 3000 population. This brings Wisconsin's rules in line with previously enacted federal rules. If there are no Legislative hearings, the rule will be published and is likely

to take effect around the beginning of November, according to Wes Geringer at WisDOT.

The exempted person must be an employee of the town or village and have a valid class "D" (regular) driver's license. He or she must be operating within the boundaries of the local governmental unit and must be needed for help in plowing snow because the local unit has determined that a snow emergency exists. A local unit of government means: county, city, village, town, school district, county utility district, sanitary district, metropolitan sewerage district, or other public body created by or under state law.

Watch your local papers and association newsletters for the official announcement of the rule.

40 states to metricate by October



A survey by AASHTO found that 40 of 49 states responding are on target to convert to metric system by the October 1996 deadline.

Most are already doing design and construction in metric units. Alaska, Hawaii, Nevada, the Dakotas, Pennsylvania and the District of Columbia will delay; Maryland and Arkansas were undecided, and Washington did not reply. The survey appeared in AASHTO's January/February 1996 *Metrication Clearinghouse Newsletter*.

Do you have an idea to exchange? Have you designed a gadget or found a new way to do something that other streets and highway people can use? Use the form on page 7 to let us know, or call Don Walker or Steve Pudloski at 800/442-4615.

Crossroads

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WisDOT's no-seal policy gets attention

After studying Portland Cement Concrete (PCC) pavement performance since the 1950s, WisDOT concluded in 1990 that sealing contraction joints is a waste of money. The policy has saved Wisconsin as much as \$6 million a year with no loss in pavement quality, according to a report for the 1996 World Congress on Joint Sealing and Bearing Systems for Concrete Structures.

The research applies only to contraction joints and cracks in PCC pavement. Crack sealing in asphalt pavements appears to be effective and economical in helping preserve them. Similarly, sealing edgeline cracks between PCC pavement and asphalt shoulders can also be effective.

"The Wisconsin Division of the Federal Highway Administration has concurred," says FHWA Pavement Engineer Wes Shemwell. "Wisconsin has a lot of research to show that sealing is not cost effective and that the pavement performs better." He admits that the conclusion is very controversial. The American Concrete Pavement Association has called for a national working group to consider the issue.

Pavement performance depends much more on how the joint was initially constructed, the WisDOT report says. It is difficult and costly to really seal the joints, they note. Ten

years' effort to keep test segments on US Highway 51 completely sealed added as much as 45% more to the cost of the pavement. They also argue that when sealant fails it acts as a funnel forcing more water into the joint than would occur naturally.

The best overall PCC pavement performance is achieved with very narrow (1/8th inch), unsealed joints. Studies in the 1950s and 1960s showed that short segment spacing (15-20 feet apart) and using dowels at joints also improves performance. More recent pavement sections under study have been on USH 51 (21 years), USHs 18/151 and 16/190 (12 years), and STHs 29 and 164 (8 years). Performance is described in terms of a Pavement Distress Index which measures extent and severity of several factors including faulting, cracking, spalling, patching, etc. Ride characteristics and materials integrity were also evaluated.

"By not sealing, we also avoid inconvenience to highway users during sealing operations and increase highway safety because no crews are out on the highway closing lanes when joints are resealed," says Steve Shober, Chief of the Pavement and Research Engineer at WisDOT.

*For copies of the WisDOT study **The effect of PCC joint sealing on total pavement performance**, contact Steve Shober at WisDOT, 608/246-5399.*

Calendar

T.I.C. workshops

*Specific details and locations for workshops are in the announcements mailed to all **Crossroads** recipients.*

Winter Road Maintenance Prepare for better winter operations at this workshop on equipment preparation, safe winter driving skills, the latest on ice control materials, and operations planning. Share experiences and tips.

Sep 11	Brookfield	Sep 18	Eau Claire
Sep 12	Green Bay	Sep 19	Cable
Sep 13	Barneveld	Sep 20	Rhineland
Sep 17	Tomah		

Selecting Materials for Local Roads A two-hour ETN workshop on selecting, specifying, and testing materials used in local road maintenance and construction projects, including stone, asphalt, and culvert pipe. What you learn will help you effectively implement the *Sample Bidding Documents for Small Road Projects* developed by and available from T.I.C.

Nov 5 an ETN location in every county

Equipment Maintenance Your chance to re-evaluate your approach to equipment maintenance and repair, including trouble shooting and preventive maintenance.

Nov 6	Green Bay	Nov 13	Eau Claire
Nov 7	Brookfield	Nov 14	Cable
Nov 8	Barneveld	Nov 15	Rhineland
Nov 12	Tomah		

Traffic Engineering This is an opportunity to review some special topics of particular interest to street and highway operations, including several simple traffic studies. Also review the warrants for traffic control signs and signals and look at selected traffic control materials.

Dec 10	Eau Claire	Dec 12	Green Bay
Dec 11	Wausau	Dec 13	Waukesha

UW-Madison Seminars

Local government officials are eligible for a limited number of scholarships for the following engineering courses in Madison. Use the form on page 7 for details or call 800/442-4615.

Managing Snow and Ice Control Operations, Oct 7-8

Timing Traffic Signals Using TEAPAC, PASSER, TRANSYT & NETSIM, Oct 21-23

Advanced TEAPAC Application Techniques, Oct 24-25

Traffic Engineering Fundamentals, Oct 22-24

Pavement Rehabilitation and Construction, Nov 13-15

Improving Quality in Street and Highway Design and Construction, Nov 18-20

Highway Bridge Design, Dec 9-10

Bridge Condition Evaluation, Dec 11-12

Pavement evaluation a long-term success

For rural Jackson County and suburban Brown Deer, long-term use of the PASER Pavement Surface Evaluation and Rating system has made a difference.

"Our overall pavement condition has shown marked improvement," says Mike Hemp, Jackson County Highway Commissioner. Between 1992 when they did their first PASER inventory and the second one in 1995 the number of road miles rated excellent (9 or 10 on the PASER scale) increased from two to 18. At the same time the number of miles in the worst condition (rated 1 or 2) dropped from 19.6 to 11.8. The improvement came after PASER helped Hemp make the case for a larger highway budget.

Last fall for the first time, Hemp used **Roadware**, the computer program that takes PASER rating information and develops alternate, "what if" scenarios. The program showed that Jackson County should be doing a lot more sealcoating and crack filling. They planned 35 miles of sealcoating for 1996. Unfortunately, that was reduced to approximately 13 miles because of the state limit on tax increases and widespread winter damage to pavement.

"A lot of our roads are deteriorating at the same time, and at a faster rate than we can replace them," says Hemp. Using PASER they had developed a six year rehabilitation and patching program (ending in 2000) which has strong county board support. But, when they checked the plan recently using **Roadware's** scenarios it revealed that even more effort is needed.

"When we projected the present budget to 2000 adding just a 3% per year inflation increase, overall road condition ratings actually went down from 4.86 to 4.59," says Hemp. The scenarios project that \$100,000 more per year beyond inflation is needed to move road condition ratings up even a little (to 4.92). "All we can do is try to minimize the amount we're falling behind and hope for an increase in the future," says Hemp. While the situation is challenging, PASER and **Roadware** information has helped foster strong board support for Jackson County's Highway budget at a time when other budget items were cut back.



Crack sealing became a bigger part of Brown Deer's streets budget after PASER showed how it saves money in the long run.

PASER helps Brown Deer

Like Jackson County, Brown Deer has a lot of deteriorating same-age pavements. When they first used PASER five years ago, it revealed that pavements were in more serious condition than they suspected. The Village's manager and highway committee agreed to a five-year accelerated road improvement program and increased funding from \$150,000 to \$300,000 per year.

"PASER was instrumental in helping us make a convincing presentation," says Village Engineer Richard Halfman. "When we did a pavement evaluation in 1994, one year into the new program, it showed our progress." They'll rate pavements again this fall and expect to see the trend continue.

Crack sealing became a much bigger part of the Village's street improvement program after PASER showed it would save money in the long run by extending the life of existing asphalt pavements. A private contractor does a significant portion of Brown Deer's crack sealing work.

Village engineering technician Jim Buske is working on entering PASER files into the new **Roadware** program.

Roadware's alternative scenarios will be another useful tool for developing their long-term maintenance and rehabilitation plans. They also are integrating the files with a new GIS (Geographical Information System) program which will let them print out digitized maps showing both road segments and utilities.

"In general we've been really pleased with the system. It's made things simpler and standardized things for us," says Buske.

Three booklets prepared by the T.I.C. explain the PASER system in text and photographs. Copies are available from the T.I.C. We also can advise you on where to get training and help in using PASER and Roadware. Call us at 800/442-4615, send an e-mail to "Pudloski@engr.wisc.edu" or mail or fax the form on page 7.

Council advises Center

The T.I.C. relies on an advisory council to help keep our news. Representatives of nine county, city, and town streets and highway Affairs unit met with T.I.C. staff this spring to advise us on Center of Keystone to Racine's Jim Blazek, these advisors represent the needs, and background experiences typical in Wisconsin.

"The Advisory Council continues to be a valuable resource," says Don Walker. "We really appreciate their help and information." Nelson, UW-Extension professor of governmental affairs and:

William Bittner, Dir. of Public Works, Eau Claire
James Blazek, City Engineer, Racine
Robert Henken, Dodge Co. Highway Commissioner
Nate Klassy, Dir. of Public Works, Monroe
Roger Kolb, Brown Co. Highway Commissioner

Prepare drivers with Snowplow Roadeo

Before it arrives, take advantage of the relatively quiet early fall period to run your own Snowplow Roadeo. The four-part knowledge and driving course competition can help train new drivers and sharpen experienced drivers' skills. Then send a team to Waukesha to try for state honors (or just to watch) on October 2nd.

"It's not hard to set up a small obstacle course in a Public Works yard," says Bill Kappel, Milwaukee's Municipal Equipment Superintendent. "And the competition helps sharpen skills and get the drivers ready for winter. You don't have to be planning to go to the state competition to get benefit out of it."

Guidelines and sample tests prepared by the American Public Works Association explain how to set up your own Roadeo. The complete competition has four parts: knowledge test, pre-trip vehicle inspection, participants' equipment inspection, and driving skills course. Copies of APWA's Roadeo guidelines and sample written tests are available from the T.I.C.

Training takes time, energy and money, but it can help minimize accidents. "Backing accidents are our biggest problem," says Kappel. "Out of 213 preventable accidents by Milwaukee Public Works equipment in 1995, 85 were backing accidents." The Roadeo includes backing up to a dock as one of the nine obstacle course maneuvers.

Send drivers over assigned routes on a dry fall day. Have them drive a plow equipped truck scouting for obstacles like raised manholes and overhanging mailboxes. This is especially important for novices and for backup and supplementary drivers who only drive the route occasionally.

"A dry run helps drivers know where the blade is on the truck," says Kappel.

*Copies of the APWA's **Equipment Roadeo Guidelines** and a sample written quiz are available from the T.I.C. Mail or fax the form on pg. 7, call or e-mail for your copy.*

etter, factsheets, and workshops up-to-date and useful. way departments and of the UW Extension Governmental er programs. From George Koval in Bayfield County's Town e varied geography, community, and budget size, roadway

for ideas and a good sounding board," says T.I.C. Director " Current members of the T.I.C. Advisory Board include Ken

George Koval, Town Chair, Keystone
 Al Sattler, Town Chair, Calumet
 Emmer Shields, Ashland Co. Highway Commissioner
 John VanAlstine, Dir. of Public Works, Stevens Point

*This year's statewide APWA **Snowplow Roadeo** starts at 9:00 am (registration at 8:00) on Wednesday, October 2, at the Waukesha County Fairgrounds just off I-94 on CTH T. Registration, \$50/driver team, covers awards, gifts, food, and facility rental. To register contact: Mark Hochschild, City of Greenfield phone: 414/761-5376, fax: 414/761-5321.*



Backing up is a common cause of crashes. In this backup test, drivers must avoid hitting a barrier or the dock and make no extra stops or jerky movements (left).

Diminishing clearance maneuvers test how well the driver knows the blade clearances, a skill that helps prevent sideswipe crashes (below).



Clearing snow from a curve demands precision and steady control.

T.I.C. can retrieve, store information

The Wisconsin Transportation Information Center (T.I.C.) has collected a lot of information on roads and bridges—booklets, research reports, training materials, video tapes, etc.—in its 14 year history. More importantly, Don Walker, Steve Pudloski, and the other T.I.C. staff frequently review materials to make sure they are still current and useful.

If you want to know what's available in a specific topic area, be sure to check with us. We can even check with centers in other states to see if they have what you may be looking for.

If you've found some useful information — video, print, audio, photographs — please send us a copy, or send us the reference and we'll collect it, check it out, and let others know about it.

If material from the T.I.C. seems out-of-date or inaccurate, let us know. We'll check to see if anything more recent is available.

The T.I.C. has just received a collection of work zone safety information from the Safety Committee of the Wisconsin County Highway Safety Association (WCHA). "When we started looking into making a video tape on how to drive in work zones, we had to search all over the country for references and materials," says Bob Fasick, the WisDOT Highway Operations Engineer who works with the committee. Now that the video, *There are two sides to every work zone*, is complete (see **Resources** for a description) WCHA and Fasick want others to have easy access to what they collected.

Call, write, fax, or e-mail the T.I.C. if you have information to share or need information to help you. Write or fax using the form on page 7; phone: 800/442-4615, e-mail Don Walker at: donald@engr.wisc.edu or Steve Pudloski at: pudloski@engr.wisc.edu

Resources

A limited number of copies of the printed materials listed here are available from the Wisconsin T.I.C. unless otherwise noted. To get your copy call 800/442-4615 or use the form on page 7. Videotapes are loaned free by Wisconsin County Extension Offices.

Weather forecasting information and services You need accurate weather forecasts to use snow removal resources most efficiently. The Winter '96 *Crossroads* had a feature on weather forecasting and offered a list of private and public forecasting services. Copies of the article and list are available again from the T.I.C.

Maintenance of Small Traffic Signs: A Guide for Street and Highway Maintenance Personnel, FHWA-RT-90-002, April 1991, 38 pp. Covers the importance of maintaining signs, and repair and replacement of sign panels and posts. Reviews materials, equipment, and maintenance records, all illustrated with drawings and pictures.

Understanding and Using Asphalt, Wisconsin Transportation Bulletin #1, revised March 1996, 8 pp. This updated T.I.C. factsheet describes types of asphalt, typical uses, physical properties, and the standard tests used to evaluate and specify asphalt. It includes a list of related publications and resources.

The Superpave System: New Tools for Designing and Building More Durable Asphalt Pavements, FHWA-SA-96-010, 1996, 8 pp. Describes Superpave™ and how it was created to address two pavement distresses: permanent deformation caused by inadequate shear strength in the mix and low temperature cracking. The Superpave system includes binder selection based on several new tests, volumetric mix design and analysis, and mix analysis using environmental and performance models.

How 'super' is Superpave? article series from *Roads & Bridges*, February, 1996, 5 pp. Includes a primer on Superpave by the Asphalt Institute and a review of the experience with this new mix-design process, including Wisconsin DOT's approach to implementation.

Metric Sliderule Converter, FHWA. Handy to have as you learn the metric system. Converts temperature, pressure, distance, area, force, mass, and volume. Multiple are copies available.

Bidding documents for small road projects Sample documents appropriate for simple paving or sealcoat projects prepared by the T.I.C. Also includes owner checklist. These documents will be provided at the November ETN workshop.

The effect of PCC joint sealing on total pavement performance, 24 pp. Report to the 4th ACI World Congress on Joint Sealing and Bearing Systems for Concrete Structures. This report details WisDOT's research efforts and conclusions regarding PCC joint sealing. Copies are available free from Steve Shober, Chief Pavement and Research Engineer at WisDOT, 608/246-5399.

Videotapes

There are over 200 videotapes in the T.I.C.'s library. You can borrow them free through the Extension office in your county. Tapes cover topics from Asphalt Pavement to Winter Road Maintenance with a special emphasis on safety issues.



We review all tapes for accuracy and up-to-date information. If you didn't get your copy of the newly revised **Videotape Lending Library Catalog**, June 1996, contact the T.I.C.

There are two sides to every (work) zone, WisDOT, 15 min., 1996. A "referee" tells drivers how to drive safely in work zones likening the situations to football conflicts. Distributed, with instructor guide and student quiz, to driver education teachers in Wisconsin. Copies are available from WisDOT Office of Public Affairs, 608/266-2405, PO Box 7910, Madison, WI 53707.

Glass: the new aggregate

Recyclers, aggregate suppliers, and WisDOT are working together to take advantage of a new raw material for roads: mixed glass. Between 35,000 and 45,000 tons are produced a year at Wisconsin recycling facilities. Cleaned, milled, and blended 10%, and possibly as much as 20%, with aggregate, the glass can be used economically and effectively as utility trench backfill and base course material.

"Outagamie County is now using a glass-aggregate mix in backfill," says Jeanine Knapp, who manages the Outagamie County Materials Recycling Facility. Under a Department of Natural Resources grant, the County Highway Department has also experimented with adding glass to asphalt mixes in some test pavements, a technology about which WisDOT pavement researchers have strong reservations.

A statewide working group plans to hold two demonstrations before the 1996 construction season ends, Outagamie County Recycling Facility Manager Jeanine Knapp says. These may show glass being used as backfill, base material, drainage medium, or in the lower layers of asphalt pavement. She hopes a number of Wisconsin's streets and highway people will be able to attend.

Having completed two research projects on glass use, WisDOT now encourages using it for base course and backfill material. A Supplemental Specification to the *Standard Specifications for Road and Bridge Construction* is nearly complete. Updated sections in the *Facilities Development Manual* describing glass and other recycled material use are due out soon.

One aggregate dealer, Valley Sand and Gravel in Muskego, is producing a "compacted bank run" material

that includes glass up to 1/2 inch in diameter. Before mixing the glass with the aggregate, the dealer uses screens to "beneficiate" or clean the mixed color glass, removing unwanted material like plastic or metal. "There will be no restrictions or tracking requirements when the material is used in accordance with approved specifications," says Kate Cooper, chief of the Waste Reduction and Recycling Section at the Department of Natural Resources.

Recycling facilities can sell color-separated clear, green and brown container glass, but there are limited markets for what is called "mixed color cullet." Some Wisconsin recycling facilities currently pay to have their mixed color cullet mechanically color sorted and beneficiated at a high-tech facility in Illinois. Other recycling facilities are stockpiling their glass and searching for local projects where glass can be used beneficially. Mixing glass with aggregate and incorporating it into trenches and road base courses is a good way to reuse these resources.

"As long as the glass-aggregate meets performance requirements and specifications we're happy to have contractors and municipal crews use it," says Steve Shober, Chief Pavement and Research Engineer at WisDOT.

*For information on the fall demonstration projects contact Jeanine Knapp, phone: 414/832-4710, fax: 414/788-4130. A performance report: **Use of recycled glass in edge drain trench**, #WI-03-96, is available from the T.I.C. Use the form on page 7, call, or e-mail for your copy. When the new specifications and Facilities Development Manual sections are ready they will automatically be sent to people who normally get those materials. Others can contact: Mark Truby at WisDOT, 608/266-9349, PO Box 7965, Madison, WI 53707-7965 to request copies after they are printed.*

Reader Response



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

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Or call, fax, or e-mail us:
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 e-mail Ranum@enr.wisc.edu

- Please put me on your **Crossroads** mailing list.
- Please send me information on _____

- My idea, comment or question is _____

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

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

New tools for winter road maintenance from page 1

New salting equipment may be needed, however. The WisDOT program will be exploring new multi-purpose equipment that combines pre-wetting systems by using both salt spinners and spray bars. As pavement temperatures drop and snow accumulates, a truck with this equipment could quickly switch from anti-icing with a light brine solution to de-icing with pre-wetted salt. Another anti-icing technique under study is to apply a finer gradation of pre-wetted salt with zero velocity spreaders.



Zero velocity application means more deicing material stays on the road than with a conventional spinner.

Share WisDOT's equipment buying power

You can invest in this new winter maintenance technology with relative ease. Through the state's cooperative purchasing agreements with vendors any municipality (county, city, village, town) can order the same new equipment being used by counties.

According to Tom Lorfeld, who is familiar with WisDOT's winter equipment purchasing effort, local municipalities are welcome to buy equipment under the state's contract. He has detailed equipment specs and vendor information. WisDOT is considering buying some of the following equipment types. (These 1995 prices are for equipment only, not installation):

Infrared pavement temperature sensors	\$2000 to \$2500
Zero-velocity spreaders	\$8990
Ground speed oriented spreader controls	\$2550
3000 gallon calcium chloride storage tanks	\$7150
5000 gallon tanks	\$8050
On-board prewetting systems (depending on truck type, hydraulic capacity, configuration, etc.)	\$2350 to \$4745

For equipment specs, vendor names, and contract information, call Tom Lorfeld at 608/267-3149.


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