

CROSSROADS



WISCONSIN TRANSPORTATION INFORMATION CENTER – LTAP at the University of Wisconsin–Madison

Fine tune equipment for efficient snow season

EFFECTIVE SNOW AND ICE OPERATIONS

begin with preparing people and equipment to do the job right.

An important element of an efficient and effective winter maintenance program is using the least amount of salt necessary to restore safety and return the road surface to acceptable winter condition. Equipment calibrated to dispense the exact amount of deicing or anti-icing material needed saves money and the environment while clearing the road for safe travel.

Managers, supervisors and crew members from highway and street departments in Wisconsin can learn more at the 2013 *Winter Road Maintenance* workshops presented by the Wisconsin Transportation Information Center. Workshop instructors will discuss equipment calibration techniques and strategies for managing salt use. Go to the workshop link at <http://tic.engr.wisc.edu/Workshop> for details about the October workshops.

Important step

Fine tuning salt spreaders and spreader controls annually or more often keeps this equipment in good shape for snow events. It is a critical “best practice,” according to Mark Cornwell, a Michigan-based consultant on winter maintenance operations who presents at the TIC workshops. Cornwell has experience in winter maintenance operations and sits on the Transportation Research



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Keeping local roads in good driving condition during snow season requires a winter maintenance program that includes carefully calibrating equipment to apply the correct amount of salt during anti-icing and deicing operations.

Board Winter Maintenance Committee and the American Public Works Association Winter Maintenance Subcommittee.

“For public road agencies looking to reduce costs and the impact of winter maintenance on lakes and streams, the single most important step is making sure their equipment is calibrated to prevent misapplication and misuse of resources,” Cornwell says. “Along with accurate weather forecasting and treatment technologies, equipment that performs with greater accuracy can maintain levels of service while controlling costs.”

Calibrating systems

Calibration is a challenge unless equipment managers understand the specific procedures for their equipment, information that is available from manufacturers, equipment vendors or other sources. The workshops will feature a visual demonstration of doing calibrations on both a ground speed controlled system and a manual system. “We’ll compare systems and see, in particular, how difficult it is to maintain a proper application rate with the variable speeds of a manual system,” Cornwell explains.

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Fine tune equipment

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Reaping the benefit of correctly calibrated spreaders and a selection of application rates depends on delivering as much of the salt as possible on the target area.

He will discuss how to verify that material application rates for ground speed control systems done out of a moving truck match with rates recorded in a static drop test. A hands-on demonstration of calibration procedures for common trucks, controller and spreader configurations will get participants involved.

Cornwell suggests highway and public works departments establish an operations chart or other reliable tools to determine application rates under various precipitation and pavement temperature conditions. An operations chart combines effectiveness with efficiency, he says, by giving managers a method for deciding the amount of salt needed to maintain safe roads in winter at the lowest cost.

On target

Reaping the benefit of correctly calibrated spreaders and a selec-

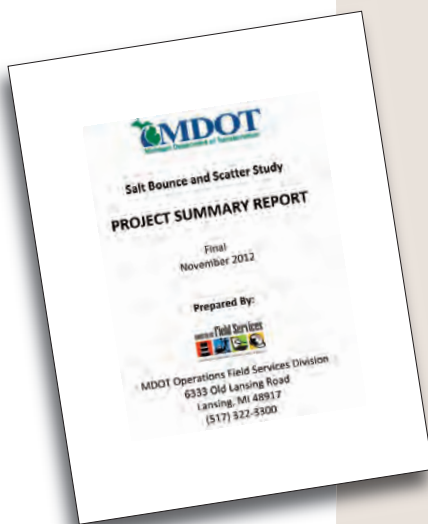


Street and highway departments can use a materials application grid like this to observe the scatter of salt delivered at various spreader and spinner speeds.

tion of application rates based on conditions depends on delivering as much of the salt as possible on the target area. If 50 percent of the material the spreader lays down goes in the ditch, Cornwell says, that salt is not doing its job.

The workshop includes a

demonstration of how salt scatters at different speeds using a grid laid out on the pavement. Presenters will share findings from a *Salt Bounce and Scatter Study* released last year by the Michigan Department of Transportation to explain the concept. *See story below.*



Keep the salt on the road

Looking to improve the effectiveness of winter spreader operations for state and local agencies, the Michigan Department of Transportation (MDOT) conducted a study last year to measure salt bounce and scatter, recording the precise amount of salt that rebounds from the target to land outside the pavement area.

Researchers experimented using three factors: vehicle speed, salt type (pre-wetted or dry) and spreader type (rear cross conveyor or Y-chute). Testing every combination, they concluded that speed was the biggest factor affecting salt bounce and scatter. Test runs at 25, 35 and 45 mph revealed that more salt stayed in the target zone at lower speeds. Seventy-eight percent of the salt hit and remained on target at 25 mph compared to 44 percent at 35 mph. Estimated salt savings were at least 25 percent. As a result of this

research, MDOT lowered spreader speeds to 25 mph for its 2012/ 2013 operations and plans to continue the practice.

Pre-wetting the salt also helped reduce bounce and scatter in the tests compared to untreated material. Delivery method had the least impact on salt loss but the conveyor system slightly outperformed the Y-chute in study tests.

While the report emphasizes that lower speeds (25 mph) produce optimal results, the final recommendations called for applying pre-wetted salt at speeds no greater than 35 mph. The study report also recommended additional testing of delivery systems and more operator training.

MDOT released its summary report on the *Salt Bounce and Scatter Study* in November 2012. It is available for download at http://www.michigan.gov/documents/mdot/Final_ReportNov2012_404228_7.pdf.

Calibrating spreaders and spreader controllers is a worthwhile investment in improving the effectiveness and efficiency of local winter maintenance operations.



Winter Road Maintenance

Dates and locations for TIC workshop on the latest strategies to improve snow and ice control.

October 8	Beloit
October 9	Fond du Lac
October 10	Manitowoc

Presenters and participants also will discuss the advantages of pre-wetting salt, review alternative application equipment and discuss other procedures that can minimize salt use while providing the desired level of service.

Control cost and minimize impact

There is significant pressure on local public works and highway departments in Wisconsin to provide a high level of snow removal service, keep maintenance

costs under control and minimize impacts on the environment. An important strategy for doing so is to improve the performance of people, equipment and materials.

TIC Program Director Ben Jordan says that calibrating spreaders and spreader controllers is a worthwhile investment in improving the effectiveness and efficiency of local winter maintenance operations.

“Even a small over-application of deicer that goes undetected through a winter season can cost an agency thousands or tens of

thousands of dollars in additional salt use,” Jordan notes. “By attending this workshop, local agencies will get the information they need to implement an effective winter maintenance equipment calibration program.” ■

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Resources

Link to Clear Roads report on *Calibrating Accuracy of Manual and Ground-Speed-Control Spreaders* that includes practical guidelines for plow operators.

<http://www.clearroads.org/research-projects/05-02calibration.html>

Minnesota Department of Transportation *Calibration Guide* features easy-to-use steps for calibrating winter equipment, developed by experienced calibrators.

<http://www.dot.state.mn.us/maintenance/research/files/MnDOT%20Salt%20and%20Sander%20Calibration%20Guide.pdf>

Sand and Salt Spreader Calibration, 13-minute DVD from Baystate Roads Program in Massachusetts discusses calibration procedures for salt and sand spreaders. Available from the TIC Video Library.



More salt stays in the target zone at lower speeds. A spreader traveling at 35 mph can send 50 percent or more into the ditch. At 25 mph, salt loss is down to about 22 percent.