



TRANSPORTATION POOLED FUND  
PROGRAM

## TECHNICAL SUMMARY

### MnDOT Technical Liaison:

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### TOTAL STATE CONTRIBUTIONS

TO DATE:

\$2,755,000

### MnDOT CONTRIBUTIONS

TO DATE:

\$225,000

### PARTICIPATING STATES:

CA, CO, IA, ID, IL, IN, KS, MA, ME, MI, MN,  
MO, MT, ND, NE, NH, NY, OH, PA, UT, VA,  
VT, WA, WI, WV, WY



Clear Roads developed an [instructional video](#) to accompany its Field Testing Guide for Deicing Chemicals.



## RESEARCH SERVICES

OFFICE OF POLICY ANALYSIS,  
RESEARCH & INNOVATION

# Pooling Our Research: Improving Winter Maintenance with New Technologies

## Why a Pooled Fund Study?

New winter maintenance materials, methods and equipment are constantly being developed, and states need to know the effectiveness of these tools before they can be widely implemented. Prompt and rigorous identification and field testing of innovative solutions improve safety and save money.

The Clear Roads pooled fund study was established in 2004 to fulfill this need. The program annually funds research projects focused on identifying innovative solutions, evaluating them under real-world conditions, and assessing their practicality and ease of use within varied highway maintenance organizational structures.

Participating agencies make a \$25,000 annual commitment to Clear Roads. States may use 100 percent federal funds for their contribution. MnDOT took over leadership of the study from Wisconsin DOT in 2010.

## What is the Pooled Fund Study's Goal?

As state DOTs aggressively pursue new technologies and practices for improving winter highway operations, Clear Roads supports their evaluation in both the laboratory and the field to develop industry standards, performance measures and cost-benefit analyses, practical field guides and training curricula. The scope of the effort is currently expanding to focus on state agency needs, technology transfer and implementation, including support for staff in the field.

## What Have We Learned?

Every year, Technical Advisory Committee members propose numerous research ideas for consideration and select five or six to fund as projects. To date, 11 projects have been completed and 11 more are under way or scheduled to begin soon. While all Clear Roads projects serve to advance the practice of winter maintenance, some projects have had a particularly significant impact on MnDOT.

A [research project](#) completed in 2008 evaluated the accuracy of the automated systems used on winter maintenance trucks to deliver sand, salt and other deicing materials at a specified rate. The project's added bonus—a [spreader calibration guide](#)—provides general guidelines and procedures that can help winter maintenance programs save money by increasing efficiency and using materials more effectively.

MnDOT used the Clear Roads calibration guide as a baseline to develop its own user-friendly [how-to manual](#) that MnDOT and local governments can use to calibrate their material spreaders. "We use the guide's step-by-step instructions for calibrating both automatic and manual controllers during the hands-on portion of our training classes," said Kathy Schaefer, MnDOT's Circuit Training and Assistance Program coordinator. "And we give copies of the guide to participants in the training program to take back to their own shops."

A [2010 Clear Roads project](#) identified the circumstances and most effective methods for using liquid deicers during winter storm events. Optimizing material use and minimiz-

### *TPF-5(218): Clear Roads*

### *Winter Highway*

### *Operations Pooled Fund.*

*Launched in 2004, this ongoing, multistate study is aimed at rigorous testing of winter maintenance materials, equipment and methods for use by highway maintenance managers and crews.*

*“MnDOT continues to find great value in Clear Roads. We reaffirmed our commitment to Clear Roads by taking over as the lead state, which we continue today while remaining active in its many research initiatives.”*

—Tom Peters,  
Research and Training  
Engineer, MnDOT  
Maintenance Operations

*“A Clear Roads project that standardized test procedures for carbide insert blade wear is helping six MnDOT districts compare the cost-effectiveness and durability of multiple plow blades.”*

—Ryan Otte,  
Research Project  
Manager, MnDOT  
Maintenance Research

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A [Clear Roads project](#) found direct liquid application during a winter storm can be an effective addition to an agency’s winter maintenance toolbox, especially for use in milder weather.

ing environmental impacts are among the benefits of using liquid deicers to treat winter roadways. Joe Huneke, MnDOT Maintenance Operations winter coordinator, reported that results from the Clear Roads research coupled with warmer winter temperatures prompted last year’s evaluation of liquid-only plow routes in MnDOT Districts 3 and 7.

MnDOT’s own research program has also benefited from Clear Roads-funded research. A MnDOT research project that produced a temperature-based cost model for comparing the relative field performance of deicers and deicer blends began with an examination of the results of a [2010 Clear Roads project](#) that correlated lab testing and field performance of deicers and anti-icers.

### What’s Going On Now?

Six research projects are under way, including a [follow-up study](#) to enhance a cost-benefit analysis toolkit developed in 2010. The enhanced tool will include more materials, equipment and methods for analysis and more flexible reporting options. Last year MnDOT began incorporating the original cost-benefit tool in its training program. Costs are the subject of another project in process that is developing a [tool](#) to estimate the true costs for snow and ice removal.

A [project](#) examining the toxicity of deicing materials fits well with MnDOT’s commitment to reducing the environmental impact of winter operations. A MnDOT technical expert who oversees MnDOT’s lab and field tests of alternative winter chemicals is providing feedback to Clear Roads researchers.

Clear Roads activities go beyond traditional research, including coordinating a [national winter driver safety campaign](#), “Ice and Snow...Take It Slow,” to educate drivers about driving safely in winter conditions and a variety of [partnership projects](#).

### What’s Next?

In 2013, five scheduled research projects will address a range of winter maintenance topics: establishing effective salt and anti-icing application rates, understanding how winter chemicals perform on special pavement types, training snowplow operators and supervisors, comparing materials distribution systems and improving snowplow design.

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*This Technical Summary pertains to the ongoing Pooled Fund TPF-5(218), Clear Roads Winter Highway Operations Pooled Fund, continuing the project initiated under TPF-5(092). Details of this effort can be found at <http://www.pooledfund.org/details/study/446>, <http://www.pooledfund.org/Details/Study/317> and <http://www.clearroads.org>.*

*For more than 25 years, FHWA’s Transportation Pooled Fund Program has been providing state DOTs and other organizations the opportunity to collaborate in solving transportation-related problems. The TPF Program is focused on leveraging limited funds, avoiding duplication of effort, undertaking large-scale projects and achieving broader dissemination of results on issues of regional and national interest.*