



TRANSPORTATION POOLED FUND  
PROGRAM

# TECHNICAL SUMMARY

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### TOTAL STATE CONTRIBUTIONS TO DATE:

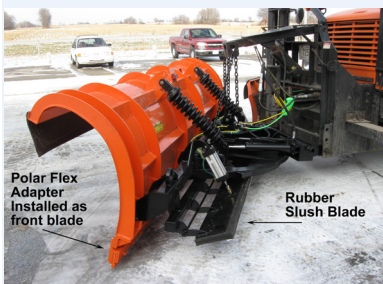
\$1,955,000

### Mn/DOT CONTRIBUTIONS TO DATE:

\$150,000

### PARTICIPATING STATES:

CO, IA, IL, MA, ME, MI, MN, MO, ND, NH,  
NY, OH, PA, VA, WA, WI, WY



Polar Flex  
Adapter  
Installed as  
front blade

Rubber  
Slush Blade

Clear Roads funded the development of [innovative prototype snowplows](#) capable of tackling a range of winter road conditions using multiple plow blades.



## 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 their effectiveness 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 winter maintenance materials, equipment and methods 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. Mn/DOT 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 projects for funding consideration and select one or two projects. To date, three projects have been completed; seven projects are under way or scheduled to begin soon.

One of the three completed research projects [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 material more effectively.

Farideh Amiri, Mn/DOT's Maintenance Operations research engineer, reports that the calibration project also proved beneficial to Mn/DOT in pursuing its own research agenda. "I used the Clear Roads project to gather background information and develop the work plan for a follow-up implementation project we completed at Mn/DOT," Amiri said. "In our project, we used Clear Roads' general calibration guide as a baseline and developed a step-by-step, user-friendly [how-to manual](#) that Mn/DOT and local governments can use to calibrate their material spreaders."

"We have a better handle on calibration now," said Joe Huneke, Mn/DOT Maintenance Operations winter coordinator. "Using the calibration guide has helped our operators to better manage the amount of material Mn/DOT uses for winter highway maintenance."

### *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 crews.*

*“Mn/DOT finds great value in Clear Roads. We have sought to demonstrate our commitment to Clear Roads by taking over as the lead state starting this year.”*

**–Tom Peters,**  
Research and Training Engineer, Mn/DOT Maintenance and Operations

*“As a researcher, I use the Clear Roads Web site all the time to ensure that we do not duplicate Clear Roads research and to find contact information for my counterparts at other Clear Roads member agencies with similar research interests.”*

**–Farideh Amiri,**  
Research Engineer, Mn/DOT Maintenance and Operations

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The Clear Roads [calibration guide](#) advises operators to raise the truck bed to an operational elevation for calibration.



Solutions identified in a Clear Roads study of [fogging and icing on truck windshields](#) include plow deflectors and flaps, heated windshields, chemical glass treatments and winter-grade wipers.

## What’s Going On Now?

Five research projects are under way (all expected to conclude in 2010), including:

- [Development of a Toolkit for Cost-benefit Analysis of Specific Winter Maintenance Practices, Equipment and Operations](#). Researchers will identify the costs and benefits associated with the top 10 winter maintenance practices, procedures and equipment. The new tool is expected to help Mn/DOT and other agencies justify new expenditures and assess overall program effectiveness.
- [Development of Standardized Test Procedures for Carbide Insert Snowplow Blade Wear](#). Researchers will develop testing procedures that could be used by an independent testing laboratory to determine life expectancy of any carbide insert snowplow blade. Replacing carbide inserts only when necessary can save money, reduce snowplow downtime and protect equipment investment.

Clear Roads activities go beyond traditional research. Other supported projects include:

- Coordinating [a national winter driver safety campaign](#), “Ice and Snow...Take It Slow,” to educate drivers about the importance of driving safely in winter conditions.
- Supporting the efforts of the [Snow and Ice Pooled Fund Cooperative Program](#) to develop computer-based training modules that help train snowplow drivers, maintenance crews and others.
- Working with the [Highway Maintenance Concept Vehicle pooled fund](#) to conduct research on optimum snowplow design.

## What’s Next?

Two research projects will begin in 2010: [Identifying the Parameters for Effective Implementation of Liquid-only Plow Routes](#) will help researchers identify elements for the safe and effective use of liquid-only routes during winter storm events and assess the viability of field testing. [Correlating Lab Testing and Field Performance for Deicing and Anti-icing Chemicals](#) will lead to recommendations for how to proceed with laboratory testing to measure performance characteristics and the friction coefficient of deicing and anti-icing chemicals.

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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/projectdetails.asp?id=446&status=4>, <http://pooledfund.org/projectdetails.asp?id=317&status=4> 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.*