

Clear Roads Pooled Fund Research Program Final Report

CTC & Associates LLC

Final Report No. TPF-5(092)

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Wisconsin Department of Transportation Research & Library Unit

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<p>16. Abstract</p> <p>The Clear Roads pooled fund project began in 2004 as a collaborative effort among five state DOTs: Illinois, Indiana, Iowa, Minnesota and Wisconsin. Formally called Test and Evaluation of Materials, Equipment and Methods for Winter Highway Maintenance, Clear Roads responded to a need for real-world testing in the field of winter highway operations.</p> <p>From 2004 to 2009, Clear Roads funded and delivered results on 10 research projects. By conducting structured field testing and evaluation across a range of winter conditions and highway maintenance organizational structures, Clear Roads projects delivered immediately useful data and recommendations on the effectiveness, ease of use, optimum application rates, durability, and more, of many advanced winter operations technologies.</p>			
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Executive Summary

The Wisconsin Department of Transportation (WisDOT) established the Clear Roads pooled fund project in 2004 in collaboration with four other state DOTs (Illinois, Indiana, Iowa and Minnesota). Formally called Test and Evaluation of Materials, Equipment and Methods for Winter Highway Maintenance, Clear Roads responded to a need for real-world testing in the field of winter highway operations.

From 2004 to 2009, Clear Roads funded and delivered results on 10 research projects. By conducting structured field testing and evaluation across a range of winter conditions and highway maintenance organizational structures, Clear Roads projects provided immediately useful data and recommendations on the effectiveness, ease of use, optimum application rates, durability, and more, of many advanced winter operations technologies.

Clear Roads also initiated technology transfer efforts with other national research organizations, Federal Highway Administration (FHWA) and American Association of State Highway and Transportation Officials (AASHTO), including two winter maintenance peer exchanges, a winter driving safety campaign and the development of computer-based training modules for winter operations staff.

As a multi-year/multi-project pooled fund, Clear Roads attracted more members every year. By the time the project ended, 15 state DOTs were contributing \$25,000 annually to Clear Roads (Colorado, Illinois, Indiana, Iowa, Massachusetts, Minnesota, Missouri, North Dakota, New York, Ohio, Utah, Virginia, Wisconsin and Wyoming). Total contributions to the project were \$1,430,000.

Pooled Fund Objectives

WisDOT established the Clear Roads pooled fund project in 2004 in collaboration with four other state DOTs (Illinois, Indiana, Iowa and Minnesota). Formally called Test and Evaluation of Materials, Equipment and Methods for Winter Highway Maintenance, Clear Roads responded to a need for real-world testing in the field of winter highway operations. By conducting structured field testing and evaluation across a range of winter conditions and highway maintenance organizational structures, Clear Roads projects aimed to deliver immediately useful data and recommendations on the effectiveness, ease of use, optimum application rates, durability, and more, of many advanced winter operations technologies.

Primary activities included:

- Evaluating winter maintenance materials, equipment and methods under real-world conditions.
- Developing specifications and recommendations.
- Studying and promoting innovative techniques and technologies that will save agencies money, improve safety and increase efficiency.
- Making results quickly available to interested agencies.

Membership and Administration

The Clear Roads Technical Advisory Committee, consisting of representatives from each of the member states, was responsible for developing and voting on research ideas, evaluating research proposals, overseeing research projects and reviewing final deliverables. Membership grew to include 15 state DOTs: Colorado, Iowa, Illinois, Indiana, Massachusetts, Michigan, Minnesota, Missouri, North Dakota, New York, Ohio, Utah, Virginia, Wisconsin, Wyoming. Each state contributed \$25,000 per year, which covered the costs of funding research projects, travel to the face-to-face meetings and project administration. Refer to the Clear Roads Operating Procedures (Appendix A) for details regarding membership eligibility and voting procedures.

Technical Advisory Committee Meetings

The Clear Roads Technical Advisory Committee met twice each year in person (three times during 2004) and held additional conference calls as needed to review specific research project progress and committee activities. Below are the dates of all face-to-face meetings. See the Clear Roads website at <http://www.clearroads.org/meetings.html> for the agendas, minutes and other supporting documents.

2004

February 5, 2004 (Dubuque, Iowa)
April 8, 2004 (Decorah, Iowa)
August 16, 2004 (Cedar Rapids, Iowa)

2005

February 16-17, 2005 (Minneapolis, Minnesota)
July 13-14, 2005 (Madison, Wisconsin)

2006

February 21-22, 2006 (Minneapolis, MN)
June 20-21, 2006 (Madison, Wisconsin)

2007

January 9-10, 2007 (St. Louis, Missouri)
July 31-August 1, 2007 (Madison, Wisconsin)

2008

January 28-30, 2008 (Denver, Colorado)
July 29-30, 2008 (Madison, Wisconsin)

2009

January 27-29, 2009 (Worcester, Massachusetts)
July 29-30th, 2009 (Madison, Wisconsin)

Administration and Technology Transfer Support

Clear Roads contracted with CTC & Associates LLC under Project ID 0092-04-20 to provide administration of the pooled fund, along with a range of marketing and information services to support Clear Roads research and technology transfer activities. Below is a summary of the range of services and deliverables provided.

Administration

- Provide financial administrative support of the pooled fund, assisting with commitments and transfers, tracking contract expenditures and invoices and maintaining the overall budget.
- Schedule, attend and facilitate conference calls and face-to-face all meetings, organize and prepare meeting materials, document the discussions and facilitate travel reimbursements.
- Serve as the primary contact for the Clear Roads Project and its sponsors (State DOTs), partner organizations, Technical Advisory Committee (TAC) members, prospective and selected investigators, and others.
- Coordinate the review, approval and payment of investigator invoices.
- Create, maintain and host the Clear Roads pooled fund website at www.clearroads.org.

Research Support

- Facilitate discussion of problem statements submitted by the TAC members, including developing summary tables of project ideas and facilitating conference calls or face-to-face meetings to discuss and rank the ideas.
- Assist with research problem statement development, proposal review and contract development.
- Track project progress and deliverables, coordinate TAC review of deliverables, and schedule and facilitate conference calls and final webinars regarding project progress and results.
- Support implementation follow-up activities identified by the TAC for completed research projects. Track and report on implementation activities.

Information Services

- Draft two-page briefs for completed research projects.
- Develop Clear Roads brochures as requested.
- After the Transportation Research Board Annual Meeting each January, search the meeting CD-ROM of papers for research related to winter maintenance. Briefly summarize and link to each relevant entry and post the results on the Clear Roads website. See <http://www.clearroads.org/resources.html>.
- For every research project completed by Clear Roads create a two-page plain-English summary that outlines the research objectives, findings and plans for implementation.
- Publish an electronic winter maintenance e-newsletter every three months on the Clear Roads website featuring the latest news, best practices, research and publications related to winter maintenance. See <http://www.clearroads.org/winter-maintenance-news.html>.
- Organize and facilitate webinars related to Clear Roads projects and activities to support implementation of research results and awareness of Clear Roads resources.
- Develop and submit articles for publication to a transportation-related periodical. The articles will feature new or successful Clear Roads research projects or committee initiatives.
- Solicit feedback from states on their experiences with selected winter maintenance materials and equipment and compile this feedback at the end of each winter season for posting on the Clear Roads Web site. See <http://www.clearroads.org/product-experience.html>.
- Support efforts of TAC members in recruiting new members and talking about Clear Roads at conferences, including developing and maintaining PowerPoint presentations and handouts on Clear Roads activities.
- To support development of research project ideas and scopes, compile citations of current and completed research on the research topics selected by the TAC.

Completed Research Projects

The Clear Roads Technical Advisory Committee proposed new research projects for funding at the beginning of every year. (See all proposed projects at <http://www.clearroads.org/research-projects.html>.) From 2004-2009, the following projects were funded and completed. Final reports and deliverables for all projects are available on the Clear Roads website at www.clearroads.org.

Calibration Accuracy of Manual and Ground-Speed-Control Spreaders (Project 0092-06-21)

Investigator: Blackburn and Associates

Problem : Although ground speed control has been used on snow plow and salt spreader trucks in place of manual spreaders since the mid-1990s, the accuracy of the equipment has never been determined.

Objective : Document controller settings, actual salt usage and prewetting rate information from trucks with various types of controller units during winter storm events.

Results : The report provided guidelines to help snow plow operators establish and maintain accurate calibration of ground speed controllers, resulting in reduced salt usage and improved efficiency.

Synthesis of Best Practices for Eliminating Fogging and Icing on Winter Maintenance Vehicles (Project 0092-06-22)

Investigator: CTC & Associates LLC

Problem: Windows and mirrors on snow plow trucks often become covered with snow, ice, frost and other precipitation during winter storms, raising visibility and safety concerns for the operators.

Objective: Conduct a comprehensive survey to identify effective methods for combating or preventing moisture on windows and mirrors while maintaining the comfort and safety of the plow operator.

Results: This report compiled a range of solutions, both long-term and short-term, for keeping snow plow glass and mirror surfaces clean of winter precipitation inside and out.

Determining Effectiveness of Deicing Materials and Procedures (Project 0092-06-23)

Investigator: Edward Fleege

Problem: State DOTs spend millions of dollars per year on snow removal and deicing activities. In order to meet level of service requirements under increasing budget and environmental constraints, DOTs need to be able to determine the "best value" for both chemical and mechanical snow/ice removal practices.

Objective: Develop testing guidelines for evaluating the performance of various winter road chemicals. These guidelines will specify the minimum equipment and data required to effectively evaluate winter chemical performance and will describe the ideal test location.

Results: A Field Guide for Testing Deicing Chemicals. Note that after numerous attempts, the TAC was unable to get the desired final report from the investigator and canceled this project. The field guide did provide usable information that the committee shared with others.

Development of Standardized Test Procedures for Carbide Insert Snowplow Blade Wear (Project 0092-08-31)

Investigator: Braun Intertec Corporation

Problem: State DOTs use several thousand carbide blades in a single winter season. Carbide inserts used in snow plow blades are often replaced too early or too late during snow removal operations, resulting in wasted materials and money and possible plow damage.

Objective: The goal of this project was to develop testing procedures for carbide inserts that would give agencies a better ability to predict performance of the carbide inserts used in snowplow blades for snow removal operations.

Results: The project identified lab tests that demonstrated that inserts showing flaws in the lab also had the poorest performance in the field. The final report also included recommendations for developing a national standard for everyone to use, so that manufacturers can focus on making one type of carbide blade and shape. It also included a purchasing approval framework and specification, which has the potential to save DOTs money.

Development of Standardized Test Procedures for Evaluating Deicing Chemicals (Project 0092-08-32)

Investigator: Western Transportation Institute

Problem: Every year manufacturers introduce new deicing chemicals, additives or mixtures for use in snow and ice operations. Users do not currently have a comprehensive methodology for evaluating the performance of these new products prior to purchasing.

Objective: The goal of this project was to establish laboratory tests that could be applied to all deicing chemicals, additives and mixtures to measure performance. Manufacturers could be required run these tests on their products at independent laboratories before marketing or selling them to Clear Roads states.

Results: The report identified standardized tests and procedures that may help states identify the relative performance of deicers.

Development of a Toolkit for Cost-benefit Analysis of Specific Winter Maintenance Practices, Equipment and Operations (Project 0092-09-08)

Investigator: Western Transportation Institute

Problem: Agencies for the last fifteen years have reduced budgets or have had budgets that remained flat. As a result every new purchase has to have a cost/benefit analysis to justify its dollar value. The current situation requires an effective method for determining the cost/benefit of incorporating new products and methods into their operations.

Objective: The goal was to develop a practical tool (such as a spreadsheet or computer program) that could be used by Clear Roads states and other agencies to calculate the cost/benefits and justify expenditures for specific new practices, equipment and operations used in winter maintenance activities.

Results: The project team developed a user-friendly, Web-based tool that provides support for cost-benefit analysis (based on available research) for ten practices, equipment and operations. The tool is expandable, so it can include additional areas for cost-benefit analysis as needed in the future. A training guide was also included.

Development of Interface Specifications for Mobile Data Platforms on DOT Vehicles (Project 0092-09-09)

Investigator: Thompson Engineering

Problem: Sensors and other devices used on DOT vehicles are often provided by different vendors, each with their own proprietary communication protocols and data formats. It is costly and time intensive to integrate the different systems into one data stream. The adoption of standards or specifications would simplify the process of adding new components and reduce the overall costs to develop and maintain a mobile data platform.

Objective: The goal was to develop specifications that would support a “plug and play” approach to integrating sensors and other devices.

Results: The report provided communication and data format specifications that support a standardized approach to integrating sensors and other devices with mobile data platforms used by State DOTs as well as recommendation on how to implement the specifications.

Developing and Evaluating Safe Winter Driving Messages (Project 0092-09-21)

Investigator: thembcgroup

Problem: Many states have created their own winter driving safety campaigns at substantial cost to each state. With limited agency budgets, the members of the Clear Roads pooled fund would like to ensure that future investments target the most critical audience in the most effective format possible.

Objective: The objectives of this project were to produce winter driving safety messages aimed at high-risk drivers. Researchers were asked to identify the target audience and develop safe driving messages and formats for distribution nationwide with the goal of reducing crashes, injuries and deaths related to winter driving.

Results: The project produced public service announcements and Internet banner ads aimed at high-risk demographics to change their winter driving behavior.

Correlating Lab Testing and Field Performance for Deicing and Anti-icing Chemicals (Phase I) (Project 0092-10-17)

Investigator: Western Transportation Institute

Problem: A new laboratory test, tool or method is needed to evaluate the performance and friction coefficient of de-icing chemicals in conditions that replicate the actual roadway. Laboratory tests have been developed to measure eutectic curves, environmental effects, corrosion and other chemical characteristics of deicing chemicals and blends, but none have been developed to effectively and consistently replicate the real world. Decision makers need better information about the influence of traffic (i.e., volume, speed and type), humidity, deicing chemical particle size, application rates and methods, wind speed, precipitation, long and short range radiation, effective time (chemical activation to end of useful life), pavement temperatures and other applicable variables on the performance and friction coefficient of de-icing chemicals.

Objective: A multi-phase research project is needed to develop a test method that identifies the effects of many factors and variables on performance and friction and can also be correlated to field performance. Phase I started with a comprehensive literature search to develop recommendations on how to proceed with laboratory testing methods and design.

Results: The findings included relevant parameters for both lab and field testing as well as recommendations for future phases on testing methodologies, statistical analysis using available technology, and managing precipitation (snow/ice pack) and uniform tracking.

Identifying the Parameters for Effective Implementation of Liquid-only Plow Routes (Project 0092-10-18)

Investigator: EVS Inc.

Problem: More information is needed on the use of liquid-only routes for snow and ice removal. The focus of this study was to identify parameters for the safe and effective use of liquid-only routes during winter storm events and to assess the viability of and make recommendations for field-testing.

Objective: The objectives of this project were to conduct a literature search and survey to identify public agencies (state DOTs, Provinces, cities, countries, etc.) with experience using liquid routes. Researchers were also expected to follow up with the most experienced agencies to collect additional observations based on the 2009-10 winter season. Using these resources, the researcher was able to identify what circumstances and methods had proven most effective for using liquid routes during winter storm events.

Results: This project identified the circumstances and most effective methods for using liquid routes during winter storm events. The researcher produced a quick-reference guide for practitioners that outlined the safe and effective parameters at a glance. The final report also included recommendations on how to field test and verify the recommended practices.

Partnership Projects

Beyond the traditional research projects, the Clear Roads pooled fund led or contributed to technology transfer and other activities to support the advancement of winter highway operations. Below is a brief overview of these efforts.

National Winter Maintenance Peer Exchange

In collaboration with the Aurora pooled fund, Snow and Ice Pooled Fund Cooperative Program, FHWA, and the Pacific Northwest Snowfighters, Clear Roads helped to organize and host a national winter maintenance peer exchange conference dedicated to information sharing and research coordination among winter maintenance professionals in 2007. Thirty-five states plus Washington D.C. attended, and work continues on the 70 research problem statements developed. A second peer exchange took place August 24-26, 2009 in Madison, Wisconsin. For reports, related documents and updates on follow-up activities for both peer exchanges, see the Montana State University website at <http://www.westerntransportationinstitute.org/professionaldevelopment/peer-exchange/default.aspx>.

National Winter Safety Campaign

Clear Roads initiated a national multimedia campaign designed to educate drivers about the importance of driving safely in winter conditions. The TAC worked with volunteer public information officers around the country to develop a logo, slogan and campaign materials that could be used to promote safer winter driving. All materials, photos and videos are available for download on the Clear Roads Web site at <http://www.clearroads.org/driver-safety-resources.html>.

Computer-Based Training

Clear Roads supported the efforts of the Snow and Ice Pooled Fund Cooperative Program in developing computer-based training modules related to winter maintenance, such as Mitigating Blowing Snow, Deicing Chemicals, and Snow and Ice Management. Clear Roads contributed expertise and \$45,000 to these efforts.

Snowplow Design

Clear Roads worked with the Winter Concept Vehicle Pooled Fund to conduct research on optimum snowplow design. Although Clear Roads provided no new funding to the project, several Clear Roads states guided the project and piloted new snowplow designs. The report for this project is available on the Clear Roads website at <http://www.clearroads.org/multiple-blade-plow-prototypes.html>.

Funding and Expenses

Each Clear Roads member state contributed \$25,000 per year (with the exception of a prorated amount for Illinois in 2006) for a total of \$1,430,000 in contributions over the life of the pooled fund. Total expenses for all research projects, administration, travel expenses and technology transfer activities totaled \$1,204,251.13, leaving \$225,748.87 in unused funds. (See details on the following page).

The Clear Roads Technical Advisory Committee voted unanimously to transfer remaining funds in this project to the new Clear Roads pooled fund, TPF-5(218), established under the leadership of the Minnesota DOT.

Contributions

State	Total Paid	Contribution Years (FFY)
Colorado	\$50,000	2007, 2008
Illinois	\$80,000	2006 (only \$5K), 2007, 2008, 2009
Indiana	\$125,000	2005, 2006, 2007, 2008, 2009
Iowa	\$150,000	2004, 2005, 2006, 2007, 2008, 2009
Massachusetts	\$50,000	2008, 2009
Michigan	\$100,000	2006, 2007, 2008, 2009
Minnesota	\$150,000	2004, 2005, 2006, 2007, 2008, 2009
Missouri	\$125,000	2005, 2006, 2007, 2008, 2009
New York	\$75,000	2007, 2008, 2009
North Dakota	\$25,000	2009
Ohio	\$100,000	2006, 2007, 2008, 2009
Utah	\$100,000	2007, 2008 (2), 2009
Virginia	\$50,000	2008, 2009
Washington	\$25,000	2009
Wisconsin	\$150,000	2004, 2005, 2006, 2007, 2008, 2009
Wyoming	\$75,000	2007, 2008, 2009

\$1,430,000

Expenses

Description	Amount
Correlating Lab and Field Testing for Deicing and Anti-icing (Phase 1) (contract)	\$43,882.49
Liquid Snow Removal Routes (contract)	\$42,370.32
Development of a Toolkit for Cost-benefit Analysis of Winter Practices (contract)	\$149,500.00
Test Procedures for Carbide Insert Blade Wear (contract)	\$74,690.00
Computer-based training 2006-2008 (agreement/check through Iowa DOT)	\$20,000.00
Computer-based training 2010 (agreement/check through Iowa DOT)	\$25,000.00
2007 Winter Maintenance Peer Exchange (agreement /check through Iowa DOT)	\$11,000.00
Development of Interface Specifications for Mobile Data Platforms (contract)	\$49,500.00
Developing and Evaluating Safe Winter Driving Messages (contract)	\$97,709.00
Test Procedures for Evaluating Deicing Chemicals (contract)	\$100,000.00
De-icing performance project (Fleege contract that was cancelled early. Original award was \$49,980, but only \$41,521.93 was paid out.)	\$41,521.93
2009 Winter Maintenance Peer Exchange (sole source payment)	\$30,000.00
Calibration Accuracy of Controllers (contract and amendment for guide/presentation)	\$209,250.00
Best Practices for Eliminating Fogging and Icing (contract)	\$24,430.00
Admin. & Info. Services 2005-2010 plus travel and supplies for the TAC (contract)	\$285,397.39
Total	\$1,204,251.13

Funds remaining in TPF-5(092): Clear Roads

Description	Amount
Funds contributed through 2009	\$1,430,000.00
Expenses	(\$1,204,251.13)
Balance	\$225,748.87



OPERATING PROCEDURES

Pooled Fund Project TPF-5(092), Test and Evaluation of Test and Evaluation of Materials, Equipment and Methods for Winter Highway Maintenance

The Clear Roads pooled fund research group was established in 2004 to carry out rigorous testing of winter maintenance materials, equipment and methods for use by highway maintenance crews. This document outlines the administrative makeup and practices of the pooled fund, which consists of Technical Advisory Committee (TAC) representatives from each of the member agencies. Close collaboration with the Federal Highway Administration and other related research organizations is also a crucial component of a successful pooled fund effort. See the Clear Roads Web site at www.clearroads.org for the most current project and TAC activity information.

This pooled fund launched with the Wisconsin Department of Transportation as the lead agency. In this role, WisDOT is responsible for contracting with research investigators and handling payment of invoices. Another agency may fulfill this role upon agreement by the TAC.

Paul Brown is currently the designated chair of the Technical Advisory Committee. Cliff Spoonmore is the vice chair. The suggested term for these roles is two years, but the TAC may elect a new chair as needed.

Membership

Each organization that has made at least the minimum annual commitment to Clear Roads of \$25,000 may appoint a technical expert to serve as a member of the Technical Advisory Committee. In-kind commitments are not accepted to achieve membership in Clear Roads. At the discretion of the TAC, reduced funding contributions may be considered in exchange for limited membership benefits. If a member becomes unable to serve on the TAC, the project partner will appoint a new TAC member within 30 days of the vacancy.

TAC members participate in all project-related meetings and briefings. The roles of the committee will include the following responsibilities and others that the committee decides are appropriate:

- Develop an annual work plan
- Approve research project work statements
- Select the best-qualified investigators to conduct projects
- Approve investigator contracts
- Review project progress reports and annual reports
- Approve invoices and reimbursement requests
- Accept project deliverables and final reports
- Complete implementation activities

In order to maintain member status (including paid travel expenses and voting privileges) at the winter meeting, the organization must be paid up through the previous federal fiscal year. For example, membership for continuing partners at the January 2009 meeting requires payment of FFY 2008 funds.

To maintain member status at the summer meeting, the organization must have committed funds for the current federal fiscal year prior to the meeting and must have plans to transfer those funds to WisDOT before the federal

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fiscal year ends. For example, an agency must officially commit funding for FFY 2009 on the TPF Web site by June 2009 in order to participate as a member at the summer meeting.

For states unable to contribute the full \$25,000, a temporary contributing membership status will be granted for a minimum of \$15,000. The roles and responsibilities will be the same as those outlined above for members, with the following exceptions:

- Contributing members will not have voting rights
- Contributing members must serve on at least one project subcommittee

The chair or vice chair may invite a member whose agency has not maintained timely commitments if the person is needed for a meeting due to a particular project or subject. This can be determined on a case-by-case basis. Organizations that lose membership status can still send in proposals for consideration.

Administration

The Clear Roads pooled fund will contract with an Administrator to support the efforts of the Technical Advisory Committee and the research conducted through the pooled fund. Below is a summary of the Administrator's functions:

1. Serve as primary contact for the project with the Transportation Pooled Fund Program and its sponsors (FHWA, TRB and AASHTO), partner organizations, Technical Advisory Committee members, prospective and selected investigators, and others.
2. Post the project solicitation to the TPF Web site, monitor partner commitments, request FHWA approval for use of 100 percent SP&R funds and assure obligation forms are received by FHWA from partners.
3. Establish and maintain regular communication with Technical Advisory Committee members via e-mail, phone and meetings.
4. Schedule and coordinate meetings and teleconferences of the Committee.
5. Prepare and distribute meeting agendas, minutes and other materials needed to conduct Committee business.
6. Disseminate RFPs for individual research projects; receive, review and distribute proposals to TAC members.
7. Facilitate issuance of investigator contracts through WisDOT's standard purchasing processes, including communication with WisDOT purchasing personnel and prospective investigators.
8. Track and report on (via posting to TPF Web site) all aspects of ongoing research projects based on investigator quarterly reports and other milestones.
9. Receive and coordinate review, approval and payment of reimbursement requests from investigators and Technical Advisory Committee members.
10. Receive and distribute (via Web posting and other means as needed) interim and final research reports and other deliverables.
11. Track and report on implementation activities related to completed research.
12. Support other Technical Advisory Committee activities as needed.

As of February 2005, CTC & Associates LLC is the contract administrator for this pooled fund. For more information, contact Kim Linsenmayer at kim.linsenmayer@ctcandassociates.com or 608-628-3806.

Voting Procedures

Each TAC representative from the member agencies will have voting privileges on all Clear Roads matters. Each member agency may have no more than one voting representative. Formal votes are not necessary on all issues. The TAC may establish an accepted consensus through meeting discussions, phone calls, and e-mail exchanges.

For research project selection and other matters requiring a more formal approach, votes may be cast by voice, a show of hands, or a written proxy. Any voting member may request a roll call vote if desired. To ensure that the diversity of the member agencies is being represented, consensus decisions require general agreement of at least

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two-thirds of the members. Without a quorum of two-thirds of the members, members who are absent from the meeting will be polled. Decisions will be delayed until all members have had sufficient opportunity to respond.

Annual TAC Meeting Calendar (2009/2010)

The calendar below represents the tentative timing of the Clear Roads Technical Advisory Committee meetings and research project milestones. The TAC may meet more frequently, either in person or by conference call, to review and approve research project interim deliverables or to hold joint meetings with other winter maintenance research organizations. The location of face-to-face meetings will vary to best accommodate members from around the country and to keep costs down.

January	Face-to-face TAC meeting <ul style="list-style-type: none">• Discuss new project proposals• Share state experiences and new ideas• Plan for year's activities• Review progress of current research projects
March	Conference calls with project subcommittees <ul style="list-style-type: none">• Discuss and finalize draft RFPs for new projects• Review Clear Roads annual work plan, action items
April	Post RFPs for new research projects
June	Responses to RFPs due
July	Face-to-face TAC meeting <ul style="list-style-type: none">• Interview researcher candidates for new projects, if desired• Discuss and score all RFP responses• Select researchers and discuss next steps for new projects• Review progress of current research projects
August/September	Award contracts, finalize work plans
October	Conference calls with project subcommittees <ul style="list-style-type: none">• New projects get underway

Research Project Lifecycle

The primary goal of the Clear Roads pooled fund group is to fund and oversee research projects and technology transfer activities that advance the field of winter highway operations. To achieve this objective, TAC members will work closely together to identify and prioritize needs, develop and review project problem statements, disseminate Requests for Proposal, select research investigators, oversee the research projects, and promote implementation of research results.

Below are the steps taken to propose, rank, and select projects to be funded on the annual Clear Roads cycle:

Proposing and Selecting Research Projects

Prior to the annual TAC meeting in January:

1. TAC members submit written problem statements (no more than three per member unless there are a number of states that opt not to propose projects) describing the proposed research project to the Administrator.

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2. The Administrator conducts a brief literature search for all proposed projects to identify existing identical or complimentary research.

At the annual TAC meeting:

3. TAC members present and discuss their research proposals. Additional project ideas may emerge during these discussions and are recorded for consideration.
4. TAC members complete a preliminary project ranking based on a scale of 1 (no need) to 5 (absolute need). These rankings serve to eliminate from consideration projects that are not universally supported by members. The remaining projects are again discussed.
5. TAC members make a final selection of projects to fund. Selected projects should address the objectives of Clear Roads, focus on implementation opportunities, represent the variety of interests of the member organizations, and be financially possible within the constraints of the pooled fund budgets.
6. A Project Champion and Technical Advisory Subcommittee will be assigned to each project that is selected. The Champion will work with the Technical Advisory Subcommittee and the Administrator to develop a Request for Proposal and will serve as the primary contact throughout the project lifecycle.
7. Projects may emerge that would lend themselves to joint funding with other research organizations. TAC members will discuss appropriate steps for pursuing such projects.

Developing and Posting Requests for Proposal

The Administrator will work with the Project Champions and Technical Advisory Subcommittee to draft RFPs for the selected research projects. RFPs will conform to the standards established by the pooled fund's lead state agency. The TAC will meet by conference call to discuss and edit the draft RFPs. TAC members are responsible for submitting lists of potential investigators for the research projects. The Administrator will work closely with the lead agency's purchasing unit to finalize the RFPs, distribute them to the TAC's list of researchers, and to post the RFPs on all appropriate Web sites. RFPs will allow a minimum of 30 days for contractor response. A longer period of 45-60 days is preferable.

Awarding Contracts

A minimum of two acceptable RFP responses is required for Project Subcommittee consideration. If this minimum is not met, the Project Subcommittee has the option of canceling the project or resoliciting. If the TAC receives only one responsive proposal, it may decide by two-thirds vote to waive the minimum requirement.

The Project Subcommittee will meet in-person (or by conference call) to review, discuss and score the RFP responses for all projects. If the Project Subcommittee decides it is necessary, this meeting will include interviews and/or presentations with proposers. RFP scoring will be documented per the lead state's guidelines. Upon selection of the research investigators by the Project Subcommittee, the Administrator will work with the lead state's purchasing unit to notify the contractor of the award and develop the contract. The Project Champion and the Project Subcommittee will assist in final review and approval of the work plan and budget prior to signing the contract and to monitor the progress of the project.

Overseeing the Research

Each research investigator must submit quarterly reports for review by the TAC and posting on the Clear Roads Web site. Investigators will also be expected to provide interim and final deliverables and to participate in face-to-face meetings with the TAC regarding the project progress and results. Specific deliverables and meetings will be defined in each project work plan. The Project Champion and Project Subcommittee will provide primary project oversight and technical support. However, the entire Technical Advisory Committee will be involved in project update meetings.

The Administrator will coordinate approval of investigator invoices through the Project Champion and will submit the invoice to the lead state for payment.

Travel Expenses

TAC Members

Travel expenses for Technical Advisory Committee members related to participation in Clear Roads activities will be paid out of the pooled fund project's funds unless stated otherwise for the individual project. Such expenses include airfare, car rental, mileage, meals, lodging, etc. The majority of travel expenses will relate to Clear Roads TAC meeting participation. However, at the TAC's discretion, travel expenses associated with attending related meetings or activities will also be reimbursed. The Program Administrator is responsible for coordinating events that minimize travel costs.

When appropriate and possible, the Administrator will pay for TAC member expenses at the time they are incurred on behalf of the TAC member and then submit an invoice for reimbursement to the Clear Roads pooled fund. When this is not possible, TAC members must submit a request for reimbursement to the Program Administrator. All receipts must accompany this request for reimbursement. The Administrator will reimburse the TAC member and invoice the pooled fund for the expenses.

Program Administrator

Travel expenses for the pooled fund Administrator will be covered in the same manner as for TAC members.

Investigators

Investigators should include costs for travel related to Clear Roads research in their project budgets. Expenses incurred for travel related to presenting a proposal response are the responsibility of the investigators or submitting organizations.

Non-voting Participants

The TAC may invite non-Members to attend the Clear Roads face-to-face meetings or to participate in teleconferences. These non-Members must be from public agencies or non-profit organizations and must be proposed or nominated by a current Clear Roads member. These participants will not be allowed to vote or bid on projects, but can attend the meetings or teleconferences and receive documents. Examples of these non-voting participants include:

FHWA Representatives

Meal expenses incurred while participating in a group Clear Roads event such as a group lunch, dinner, or break item are covered. Other travel and lodging expenses are not covered.

Potential TAC Members

Are invited to one meeting to get familiar with the program before becoming a full member. All reasonable travel expenses incurred, following the same reimbursement policies as for TAC members.

Additional Member State Representatives

Full expenses will be reimbursed for only one representative for each member agency. However meal expenses incurred while participating in a group Clear Roads event will be reimbursed for additional representatives. Other meal, travel and lodging costs would not be reimbursed. Such attendance and reimbursement must be approved by the TAC prior to the event.

Other Invited Guests (such as APWA, LTAP)

Meal expenses incurred while participating in a group Clear Roads event such as a group lunch, dinner, or break item. Other travel and lodging expenses are not covered.