



# MINUTES

## Clear Roads 2013 Technical Advisory Committee Fall Meeting:

Pooled Fund Project #TPF-5(218)

**Monday and Thursday, September 9 and 12th, 2013  
Red Lion Hotel – Vancouver, WA**

### Attendees:

- |                              |                                  |                                   |
|------------------------------|----------------------------------|-----------------------------------|
| David Frame, California DOT  | Tim Chojnacki, Missouri DOT      | Lynn Bernhard, Utah DOT           |
| David Wieder, Colorado DOT   | Justun Juelfs, Montana DOT       | Wayne Gammell, Vermont DOT        |
| Philip Anderle, Colorado DOT | Jon Swartz, Montana DOT          | Bob Faley, Vermont DOT            |
| Ron Wright, Idaho DOT        | Mike Mattison, Nebraska DOT      | Allen Williams, Virginia DOT      |
| Tim Peters, Illinois DOT     | Mike Lashmet, New York DOT       | Monty Mills, Washington DOT       |
| Tina Greenfield, Iowa DOT    | Caleb Dobbins, New Hampshire DOT | Kyle Stollings, West Virginia DOT |
| Clay Adams, Kansas DOT       | Mike Kisse, North Dakota DOT     | Mike Sproul, Wisconsin DOT        |
| Randy Gray, Maine DOT        | Scott Lucas, Ohio DOT            | Cliff Spoonemore, Wyoming DOT     |
| Justin Droste, Michigan DOT  | Patti Caswell, Oregon DOT        | Gabe Guevara, FHWA                |
| Tom Peters, Minnesota DOT    | Rich Roman, Pennsylvania DOT     | Colleen Bos, CTC & Assoc.         |
|                              | Joe Bucci, Rhode Island, DOT     |                                   |

### Materials Distributed

- Clear Roads Budget Overview
- Clear Roads Projects and Subcommittee Members
- Implementation Survey Summary and Recommendations
- Implementation and Tech Transfer List of Projects
- Product Experience Survey Results
- Scope of Work: Best Practices for the Prevention of Corrosion to DOT Equipment: A User's Manual
- Snowplow Operator and Supervisor Training Matrix
- Scope of Work: Cost Benefit Analysis of Various Winter Maintenance Strategies
- Scope of Work: Understanding the Effectiveness of Non-Chloride Liquid Agricultural By-Products and Solid Complex Chloride
- Scope of Work: Snow and Ice Control Environmental Best Management Practices Manual
- Comparison of Material Distribution System Survey Responses
- Clear Roads 2013 GPS/AVL Survey Results

## Monday, September 9, 2013

### Welcome and Meeting Objectives

Chairperson David Wieder kicked off the day with introductions of all attendees and a review of objectives:

- To coordinate regarding research ideas that result from the 2013 Peer Exchange;
- To review proposals received for new research projects;
- To update each other on the status of research and partnership projects.

David welcomed Joe Bucci from Rhode Island DOT, Mike Kisse from the North Dakota DOT, Rich Roman from Pennsylvania DOT, Wayne Gammell, Vermont DOT, Bob Faley, Vermont DOT and Jon Swartz,

Montana DOT, who were all attending for the first time. Tina Greenfield, Iowa DOT, and Patti Caswell, Oregon DOT, also attended for the first time as Clear Roads TAC members.

## Sharing Clear Roads Resources

The group discussed the question of whether to share Clear Roads materials and resources with non-member agencies and the public.

- The consensus was that Clear Roads is here for the good of everyone and deliverables should be shared publicly.
- Inquiries by non-Members to the Clear Roads distribution list will be answered according to each member's workload and sense of obligation.
- The benefit of membership in Clear Roads is voting on and guiding the projects that are funded.
- The group did voice concerns about copyright and patent issues that result from making Clear Roads materials publicly available.
- The Cost-Benefit Toolkit was a particular concern, because Clear Roads would not like to see a private entity file for a patent on the design. At a minimum, they would like to have a click-through agreement to access the tool that protects the intellectual property.
- The group voted unanimously to establish a subcommittee (David Wieder, Justin Droste, Tom Peters and Kyle Stollings) to work with MnDOT's legal department regarding the appropriate measures to take for copyright and patent concerns. Gabe Guevara, FHWA, may also join these conversations when he is available.

### >>Action Items

- CTC & Associates: Follow up with members of the subcommittee to begin discussing what steps to take to protect Clear Roads intellectual property.

## Operating Procedures: Vote on Subcommittees

The group reviewed the members of the subcommittees and voted unanimously to approve the existing subcommittees with the following corrections and updates:

- Add an asterisk next to the name of all non-TAC members on the subcommittees.
- Developing Test Bed Software to Qualify Plug and Play Technology and the Plug and Play Initiative: Add Justin Droste.
- Establishing Effective Salt and Anti-icing Application Rates: Add Wilf Nixon.
- Determining the Toxicity of Deicing Materials: Add Bob Edstrom and Monty Mills.
- Environmental Factors Causing Fatigue in Snowplow Operators: Add Scott Lucas.
- Development of a Totally Automated Spreading System: Remove Charlie Goodhart and add Mike Mattison.
- Aurora Knowledge Base: Add Tina Greenfield and Patti Caswell.

### >>Action Items

- CTC & Associates: Talk to the Plug and Play Initiative about making David Wieder an official "co-Project Champion."
- CTC & Associates: Talk to the Understanding the True Costs of Snow and Ice Control Operations about making Brian Burne an official "co-Project Champion."

## Clear Roads Budget

Colleen Bos provided an overview of the Clear Roads budget, including amounts committed and obligated, amounts contracted, and estimated planned expenses. Clear Roads has an available balance of \$58,314 going into 2014.

### >>Action Items

- CTC & Associates: Check on the status of Oregon's 2013 Clear Roads dues, which Patti thought had already been paid.

## **Joint Meeting with Aurora and Clear Roads**

Lee reviewed the agenda for the 2013 Peer Exchange to ensure everyone understood the goals of the agenda.

- The goal for much of the agenda is to help winter maintenance professionals understand the role of each of the consortia.
- Another goal was to engage the attendees and get them to share experiences and ideas.
- The group also reviewed the plan for vendor participation.
- Lee emphasized the value of picking a planning committee now for the 2015 Peer Exchange.

## **Thursday, September 12, 2013**

### **Peer Exchange Follow Up**

The TAC reviewed the Maintenance Operations Research Needs Statements (RNS) and assigned the most highly ranked statements to an appropriate research consortium. For items assigned to Clear Roads, the group assigned project champions. David Wieder consulted with Lee Smithson and with Aurora to confirm the assignments.

See the table at the end of this document for details on the Maintenance Operations RNS and assignments.

### **>>Action Items**

- CTC & Associates: Get the RNS lists from the RWIS and Management break-out sessions from Tina Greenfield and Curt Pape.

### **Status of Implementation and Technology Transfer Efforts**

Scott Lucas led a discussion regarding implementation of Clear Roads projects and how Clear Roads can engage in better technology transfer efforts.

- Scott reviewed the results of the Clear Roads project implementation survey that was conducted this summer.
- The group suggested some additional ways to communicate Clear Roads project results:
  - Remind people of the results of some of the older projects when Clear Roads sends out the monthly news and announcements.
  - Hold a Clear Roads education track in conjunction with an APWA or other conference to present on the results of multiple projects.
  - Develop a Clear Roads video that could be used at conferences and other events.
  - Consider having a generic Clear Roads business card that any member can take to conferences and meetings.
  - Try to get on the AASHTO Subcommittee on Maintenance agenda to talk about Clear Roads research results.

### **>>Action Items**

- Scott Lucas: Scott will submit an idea for a presentation at the APWA Conference in Cincinnati.
- Kyle Stollings: Kyle will follow up on getting Clear Roads listed on the SCOM agenda.
- Technology Transfer Subcommittee: Continue meeting and identifying technology transfer opportunities, especially at upcoming conferences. Recruit from the membership to get presenters for speaking opportunities.

### **Update on Funded Projects Not Yet Under Contract**

Colleen reviewed the status of each of the funded projects that are not yet under contract:

#### *Best Practices for the Prevention of Corrosion to DOT Equipment: A User's Manual*

- The RFP for this project was posted and responses are due on September 19<sup>th</sup>.

#### *Snowplow Operator and Supervisor Training*

- Mike Sproul had one of his engineers sort the training materials that the membership has assembled into the categories on the training matrix that the subcommittee developed.
- The subcommittee each received a DVD with the sorted materials and will meet via teleconference to divide up modules.
- The next step will be to flag the best quality materials for each module.
- After that Clear Roads will hire a consultant to package the materials effectively.

#### *Developing Test Bed Software to Qualify Plug and Play Technology*

- The subcommittee, including the vendor participants, recently met via teleconference, and Eric Cowger of Location Technologies offered to draft the scope of work to be included in the RFP.
- The RFP will go out this fall.

#### *Cost-Benefit Analysis of Various Winter Maintenance Strategies*

- The project has been scoped and the RFP has been drafted and sent to MnDOT. It should be posted shortly.

#### *Understanding the Effectiveness of Non-Chloride Liquid Agricultural By-Products and Solid Complex Chloride*

- This RFP was just posted by MnDOT and the responses are due on October 11<sup>th</sup>.

### **Proposal Discussions**

Clear Roads received 6 proposals for the project to develop a Snow and Ice Control Environmental Best Management Practices Manual. The group discussed the pros and cons of all the proposals to help the subcommittee prepare for their formal evaluation of the proposals on September 17, 2013.

Proposals were received from the following:

- Minnesota State University-Mankato
- Montana State University-WTI
- Michigan Tech University
- Momentum
- Professional Engineering Services
- SRF Consulting Group

### **Update on Projects in Progress**

The project champions for the Clear Roads projects in progress provided an update regarding the status of each project:

#### *Establishing Effective Salt and Anti-icing Application Rates*

- Blackburn & Associates is working on this project to update TE-28.
- They have completed the literature search.
- They are nearly finished with conducting surveys, although they are awaiting responses from a couple more Clear Roads states.
- The subcommittee would really like to see all the members participate.

#### *Understanding the Chemical and Mechanical Performance of Snow and Ice Control Agents on Porous and Permeable Pavements*

- WTI is working on this project to better understand different types of porous and permeable pavements.
- The literature search is complete.
- They have identified the following categories of pavement to study:
  - Dense graded pavements

- Open graded pavements
  - Ultrathin Friction Course
- They are in the process of conducting interviews and are beginning preparations for the lab experiments.
- Utah, Missouri and New York are contributing pavement samples for the lab work.

#### *Comparison of Material Distribution Systems*

- Thompson Engineering is conducting this project to develop a catalog of material spreader systems.
- The literature search is complete and the survey is underway.
- The subcommittee is concerned that the response to the survey may not be as substantial as was hoped and they have asked Thompson to extend the survey.
- The survey also did not yield as many pictures as needed for a thorough catalog.
- The subcommittee would like CTC to send the survey out to the whole Peer Exchange attendee list.

#### *Developing a Totally Automated Spreader System*

- Thompson Engineering is conducting this project to develop guides to various ways of developing a totally automated spreading system.
- The subcommittee has received 3 draft guides.

#### *Environmental Factors Causing Fatigue in Snowplow Operators*

- VTTI is working on this project to understand ways to mitigate fatigue in snowplow operators.
- The literature search is complete.
- They recently concluded a survey of supervisors and operators and got a very robust response.
- They are currently analyzing the data they have gathered.

#### *Determining the Toxicity of Deicing Materials*

- Barr Engineering is conducting this research project to understand the toxicity of different types of deicing materials.
- The project is nearly complete.
- The final report appears to do a good job analyzing a tremendous amount of data.
- A two-page summary document did not reflect the deliverable the subcommittee had requested, so they are awaiting a revised version, which should be available soon.

#### *Understanding the True Costs of Snow and Ice Control Operations*

- PB Americas is working on this project to better understand and to better make comparisons regarding the true costs of snow and ice control.
- The project is nearly complete, although it was determined that state agencies do not collect the data needed in order to assess the “true costs” of winter operations.
- The subcommittee had asked for more direction in the final report on how to collect the data that is needed to really be able to assess “true costs” of snow removal.
- The updated final report is expected soon.

#### *Pacific Northwest Snowfighters*

- Monty Mills and Ron Wright provided an update on PNS activities.
- CTC & Associates updated the PNS website and are hosting now it as well.
- Ron is testing a number of new chemicals.
- Monty would like to talk at the next meeting about doing a PNS conference in conjunction with another event such as an APWA meeting.
- The TAC discussed getting the specifications or contracts for deicing materials from all members on the PNS website, but determined that it would be challenging to keep that updated.
- Ron would like to have the TAC let him know which products they are using on the QPL list so that he can determine which ones require re-examination.
- Ron is adding a couple of new categories to the QPL list.
- PNS still has funding available for additional testing.

### *Plug and Play Initiative*

- David Wieder provided an update on this project, which is making good progress now.
- The AVL and spreader vendors are collaborating together very effectively.
- Additional AVL vendors have requested to participate, but the TAC unanimously agreed that they did not want to disrupt the momentum of the current vendor consortium by adding additional members at this stage in the development of the protocol.
- They have drafted a protocol and the next steps will be to review the protocol with the AVL experts at the various state agencies.

David Wieder made a motion to go into executive session at 2:15 pm. The motion was passed unanimously. The executive session ended at 2:45 pm.

### **>>Action Items**

- CTC & Associates: Colleen will send the Comparison of Material Spreaders survey to the Peer Exchange attendees.

### **Product Experience Feedback**

Colleen reviewed the 2012-13 Product Experience Feedback survey results.

- She asked for feedback on the results before they are posted publicly.
- The TAC indicated that they would like to continue the project for the 2013-14 winter season.

### **>>Action Items**

- All: Review the Product Experience Feedback survey results and send comments to Colleen.

### **AVL/GPS Discussion**

Justin Droste led a discussion regarding the results of the GPS/AVL survey conducted over the summer. Some highlights of the discussion were:

- GPS/AVL equipment lifecycles are much lower than a truck lifecycle.
- States can save money by doing a Wi-Fi for less critical trucks where more passive reporting is acceptable. Limit the use of cellular access for critical reporting.
- Washington gets data every 30 seconds and they are discussing whether that could be lengthened. Nebraska and Colorado get updates every 10 minutes.
- Nebraska recommends a 100% warranty for equipment.
- Calculating return on investment can be challenging, but Michigan DOT has calculated they can recover their costs in 2 years.
- Some improvements and savings may come simply because of the focus on usage, regardless of the available technology.
- Supervisors and managers with access to camera images are able to spend more time in the office managing and less time on the road.
- Giving PIOs access to camera images allows them to share images with the media and encourage people to make informed winter travel decisions.
- Maintaining data can help agencies with managing claims and litigation.
- Wisconsin has let staff go due to misconduct due to data collected from the GPS/AVL.

### **Next Meeting**

The next Clear Roads meeting is scheduled for March 25-27, 2014 in Portland, Maine. The Fall 2014 meeting will be hosted by the Missouri DOT in either Kansas City or St. Louis. The meeting will be held the third week in September with the second week in September as a backup if any conflicts are identified.

### **>>Action Items**

- All: Review the RNS lists from the previous peer exchanges to see if there are any ideas worth submitting as research proposals for 2014 funding.

- CTC & Associates: Add an agenda item to the Spring 2014 meeting to talk about the 2015 Peer Exchange.

## **State Reports**

### **Utah State Report**

Lynn Bernard shared an overview of his agency's activity for the last year and plans for the coming season. Highlights included:

- Utah had attempted to cross-train construction staff to augment their winter maintenance staffing; the result was approximately 15 additional drivers.
- They are engaged in GIS Route Optimization using Route Smart. Results are not available yet.
- They are adding more tow plows to their fleet.
- Utah is "right-sizing" vehicles based on the geographical location and resulting power needs.
- Salt use has declined by 10% as lane miles have increased by 15%, due to the use of weather forecasts, calibration, and close-loop controllers.
- They have an extensive anti-icing and pre-wetting program.
- Utah has engaged in an aggressive program of building salt storage buildings.
- They purchase different classes of salt for different locations, based on needs.
- Utah is engaged in testing ten different blades and systems to determine which ones perform the best.

### **New Hampshire State Report**

Caleb Dobbins shared an overview of his agency's activity for the last year and plans for the coming season. Highlights included:

- New Hampshire's budget was reduced by 8% since the last report.
- The state continues to have funding concerns and may have to lay off an additional 600 of 1600 staff and drastically change their mission.
- Calibration of every truck, every year and a huge improvement in salt usage.
- They also saved \$1.4 million on salt (projected) based on a price reduction for 2014.
- They have a future goal of finding better ways to educate their elected officials about winter maintenance.
- One of their staff developed a new design for spreader racks, which is easier-to-use, safer and has been good for equipment life.
- They are continuing their use of Joma blades, which reduced injuries because they do not need to be replaced as often.
- New Hampshire continues to build all their own trucks with the result that their staff have a good understanding of how to maintain and fix them.

### **>>Action Items**

- Caleb Dobbins: Caleb will send a copy of the design of the spreader racks to the TAC.

### **Missouri Update**

Tim Chojnacki shared an overview of his agency's activity for the last year and plans for the coming season. Highlights included:

- Missouri has 79 Tow Plows in use.
- Their performance measure is how much time it takes to meet their objectives. For example, their goal for major roads is "mostly clear."
- They are no longer trying to achieve "bare pavement," which has saved them some funds.
- Missouri has begun to use their safety-sensitive staff (environmental specialists, traffic specialists, etc) to fill in for maintenance operators. They encountered issues with some construction staff that really were not interested in doing the maintenance tasks.
- The state has launched new iPhone and Android traveler information apps.
- Missouri's program goals for 2013-2014 include:

- Evaluate their AVL pilots. They are using both Webtech Wireless and Location Technologies.
- Evaluate Call Out System pilot, which automates calling operators to report for winter events and provides detailed reporting.
- Experiment with traffic speed data to assist with measuring performance.
- Expanding their RWIS network.
- Continuing a guaranteed vacation concept, which helps boost morale by guaranteeing days off for up to 150 staff on any given day, making it easier for staff with special events on the calendar.
- Looking into an audible alert system for trucks to let other vehicles know when they are too close.

## **Colorado State Report**

David Wieder shared an overview of his agency's activity for the last year and plans for the coming season. Highlights included:

- Colorado has had steady budget decreases.
- They also had snow as late as May 31<sup>st</sup> this year and had to use emergency budget funds to pay for the resulting operations.
- They have also had the first snow of the 2013-14 winter season already.
- Some innovations and areas of research include:
  - First full season using a tow plow with plans to get eleven more.
  - Using a performance based bid for snow blowers and having vendors bid with a bond.
  - Starting a thermal mapping research project in one section.
  - Engaging in route optimization research along with the thermal mapping.
  - Analyzing traffic patterns related to snow removal efforts.
  - Using friction as a level of service measurement.
  - Making product comparisons using friction readings.
  - Assessing the cost-benefit of Fixed Anti-icing Spray Technology (FAST) sites.
  - Setting up more living snow fences.

## **Michigan State Report**

Justin Droste shared an overview of his agency's activity for the last year and plans for the coming season. Highlights included:

- MDOT has a mix of county and direct operations and a big variety in terms of the levels of snowfall around the state.
- Their salt was 16% cheaper this year compared to the previous year.
- MDOT has reduced sand usage.
- They are working on the following innovations:
  - They started to use tow plows in 2012-2013 and ordered 3 more for 2013-14.
  - MDOT conducted a bounce and scatter study 2 years in a row and found that lower speeds, treated salt, adding a boot, using Zero Velocity spreaders, and using Slurry Generators all limit bounce and scatter.
  - They conducted an MDSS Pilot.
  - They are doing some remote monitoring of assets.
  - MDOT implemented a winter severity index and a regain time performance measure.
  - They are about to announce the vendor for full-scale implementation of GPS/AVL on their directly owned vehicles.



## Maintenance Operations Breakout Session Research Needs Statements

Idea	Comments	Votes	Group	Lead
Video Training of Proper Techniques for Plowing and Maintaining Different Types of Interchanges	Best practices and procedures for how best to plow roundabouts and other types of interchanges. Include tow plows as well.	14	Clear Roads	Justin Droste
Standard Road Condition Metrics/ Descriptions for Snow and Ice (include acceptable time lag)	Consistent terminology/ nationwide standards for performance metrics, so things are reported in a standardized way that allowed better national comparisons. I80 and I95 and Northwest Passage might have some initial work. Instrumentation will help take the subjectivity out of these descriptions. There will always be concerns with lag, although instrumentation will also help with this. Consistency across boundaries is a core issue for drivers. National training may be a related issue.	13	Clear Roads/ SICOP	
Synthesis/ Best Practices/ Lessons Learned of Salt Brine Production according to Budget and Needs/ How to stage	QA/QC; storage considerations; do you need a brine maker; can you make your own, etc. Looking at brine application equipment - a comparative survey. This project may have been completed by PennDOT already.	11	Clear Roads	Justun Juelfs/ Jason Norville
Synthesis/ Database on GPS/AVL Equipment	Maybe a simple survey on price, performance, service, etc. A clearinghouse of information about GPS/AVL equipment. Small-scale consumer's report on GPS/AVL.	10	Clear Roads	Scott Lucas/ David Wieder/ Tina Greenfield
Best Methods and Practices for Sleet and Ice Storm Management	Best practices for restoring traction after the events; include forecasting.	10	Clear Roads	Allen Williams/ Lynn Bernhard
Effects of Weight on Snowplow Trucks	Impact of add-on equipment to the structure of the truck and weight limits (plows, materials, etc.). Plow vehicles and bridge restrictions also factor into this. Horsepower is another variable. Route planning is a factor.	9	Clear Roads	Tim Chojnacki/ David Wieder
Synthesis of Marketing Innovative Techniques to Management	Looking at techniques to market ideas with in your DOT to the management level.	9	Aurora	
Synthesis of Best Practices in Dual/Multi-Purpose Snow and Ice Vehicles/ Equipment	Some agencies use low-profile trucks for landscaping in the summer, and also plowing snow in the winter. Multi-purpose trucks could be a good way to save fleet dollars.	7	Clear Roads	
MAP-21 Impacts on Winter Operations	How do we respond as winter managers to MAP-21.	7	SICOP/ Clear Roads	
Fluid Dynamic Flow of Snow Off of Snow Plows/ Improved Snowplow Design	Keeping snow off the windshield as the plow operates. This is looking for an improved snowplow design.	4	TRB	

## Maintenance Operations Breakout Session Research Needs Statements

Synthesis of Regional Collaboration in Transportation and Regional Transitions	Establishing shared regional goals and measures and LOS. Tollways with big budgets get a lot of salt and are maintained to another standard. Recommendations for border transitions.	3	SICOP	
Nationwide Route Segmentation for MDSS	Inputs for the MDSS for your road network. Help get people started with MDSS and also contribute to national efforts championed by NCAR.	2	Aurora	
Nationwide Minimum Standard for Maintenance	U.S. has no minimum maintenance standards and some countries do. Whereas if you hire contractors, they are given a minimum standard. Synthesis on other nations standards.	2	SICOP	-
Looking at Alternative Fuels as Best Practices in Snow and Ice Equipment		2	unassigned	
Tracking Snow Removal Progress with Remote Sensing	Apply to snowstorms what we already apply to hurricanes. Want to see when the traffic gets going again.	1	Aurora	
"Better" Management Practices for Environmental Impacts	Better management practices; out of the box ideas for environmental optimization.	1	unassigned	
Outreach to Others (such as parking lots, local roads)	Getting parking lots and all kinds of other segments (local roads) educated about the same environmental concerns as the DOT. Outreach on sensible salting.	0	unassigned	
National Staffing and Equipment Map	Like the salt map, but with all the standard stats. Michigan was doing this and Lynn Bernhard is willing to circulate this.	0	Clear Roads	Lynn Bernhard