



MINUTES

Clear Roads 2015 Technical Advisory Committee Fall Meeting:
 Pooled Fund Project #TPF-5(218)

Monday – Tuesday, September 21-22, 2015
Crowne Plaza – Bloomington, MN

Attendees:

Michael Coffey, Alaska DOT	Tom Peters, Minnesota DOT	Joe Bucci, Rhode Island DOT
Mark Trennepohl, Arizona DOT	Amiri Farideh, Minnesota DOT	Brandon Klenk, Utah DOT
David Frame, California DOT	Joe Huneke, Minnesota DOT	Todd Law, Vermont DOT
Kyle Lester, Colorado DOT	Ryan Otte, Minnesota DOT	Bruce Nichols, Vermont DOT
John DeCastro, Connecticut DOT	Kathy Schaefer, Minnesota DOT	Allen Williams, Virginia DOT
Alastair Probert, Delaware DOT	Tim Chojnacki, Missouri DOT	James Morin, Washington DOT
Ron Wright, Idaho DOT	Justun Juelfs, Montana DOT	Jeff Pifer, West Virginia DOT
Tim Armbrecht, Illinois DOT	Tom Renninger, Nebraska DOT	Mike Sproul, Wisconsin DOT
Craig Bargfrede, Iowa DOT	Caleb Dobbins, New Hampshire DOT	Cliff Spoonemore, Wyoming DOT
Clay Adams, Kansas DOT	Mike Lashmet, New York DOT	Pat Casey, CTC & Assoc.
Brian Burne, Maine DOT	Larry Gangl, North Dakota DOT	Greg Waidley, CTC & Assoc.
Paul Brown, Massachusetts DOT	Patti Caswell, Oregon DOT	Rick Nelson, AASHTO/ SICOP
Justin Droste, Michigan DOT	Vincent Mazzocchi, Penn DOT	John Scharbillig, APWA
		Gabe Guevara, FHWA

Materials Distributed

Meeting Attendees	Implementation Forms
Clear Roads Budget Overview	Research Briefs
Operating Procedures	Product Experience Survey Results
Research in Progress Update	Google Analytic
	PDH Certificate

Monday, September 21, 2015

Welcome and Meeting Objectives

Chairperson Justin Droste kicked off the day with introductions of all attendees. New states in attendance included Alaska (Michael Coffey), Delaware (Alastair Probert) and Arizona (Mark Trennepohl). New representatives of current member states included Tim Armbrecht (Illinois) and Joseph Bucci (Rhode Island).

Justin covered Clear Roads and its mission and purpose and the meeting objectives for the day.

- To review proposals received for new research projects; and
- To update each other on the status of research and partnership projects.

As the host agency, MnDOT visiting staff provided brief welcomes and overviews of MnDOT's maintenance activities and research program.

- Steve Lund – State Maintenance Engineer
 - Average spending of \$85M/yr on winter maintenance in MN but spent \$137M in 2014-2015. MnDOT's goal is to spend what is necessary to meet targets, which they're reaching 70% of the time.

- Working towards a legislative change that will allow Trunk Highway funding to be used for maintenance activities.
 - Delivering services can be difficult in MN, not so much because of the snow, but rather the cold.
 - Emphasized the importance of implementation. Extended a challenge to the Clear Roads group: pooled funds are tight, so are we using the products from CRs and if not, then why?
- Farideh Amiri provided an overview of her Office of Research Services.
 - \$10M/year. 185 projects this past year.
 - Discussed her role with the Clear Roads program.

Proposal Discussions

Clear Roads received proposals for the following 4 projects. The group discussed the pros and cons of the proposals to help the subcommittees prepare for their formal evaluation of the proposals:

1. Developing Test Bed Software to Qualify Plug & Play Technology
 - Response from Parsons
2. Synthesis of Material Application Methodologies for Winter Operations
 - Response from Montana State University
 - Response from Washington State University
3. Identification and Recommendations for Correction of Equipment Factors Causing Fatigue in Snowplow Operators
 - Response from Virginia Tech.
4. North American Study on Contracting Snow and Ice Response
 - Response from Montana State University

Winter Maintenance Data Statistics

As of September 10th, an amendment is in place for the additional \$50K total, which will cover all add-on synthesis work, including this project.

- A scoping call for the winter data statistics project was conducted on May 12 with the subcommittee to discuss specific data needs and scale of effort. The group discussed a range of potential approaches, from detailed data gathering and mapping to more modest efforts that could be expanded in future years. The group leaned toward a modest approach that would give the Clear Roads members the key information they need without the expense of more sophisticated tools. The subcommittee agreed that this project would involve two key deliverables:
 - An updated salt map (working from the map and contacts provided by Jay Wells).
 - A spreadsheet showing winter maintenance data based on a survey to be conducted of the states. The spreadsheet will be updated each year with new data to enable comparison of state statistics over time. It will also include additional tabs for viewing the results of key data analysis requested by Clear Roads. For example, the subcommittee would like to see a tab that presents cost per lane mile per state beginning in year two of data collection.

CTC is drafting a proposal for the work to discuss with the subcommittee after the Clear Roads meeting. A mocked-up spreadsheet with multiple tabs has been created to show how we could use the data output from a survey to compare and analyze in key areas requested by the group.

New ideas for CTC synthesis projects

1. How are we optimizing the use of a tow plow?
 - o How many is optimal? What does your network look like?
 - o Would it be advisable to conduct a research study on the efficiency/effectiveness/B-C of using a tow plow?
 - o Michigan is conducting a project similar to this.
 - o We know many of the cons but what are the pros? Even some informal info.
 - o MN has most of the tow plows in the Metro District. Has had positive results but this is in the context of an urban environment and multiple lanes.
2. What are your state's best service providers (counties/districts) and what are your worst? Idea is that if you can identify them, you can train the worst and save money. Michigan has recently started work on this. Massachusetts does some passive analysis post storm.

Clear Roads needs to formalize a process for the quick turnaround synthesis projects.

- Should use the research proposal form for synthesis projects for CTC as well.
- Have states write down the top 3 problems. Some will be research projects and other will be synthesis reports.
- Be clear that the CTC synthesis projects are not cost benefits or research.
- Volunteers to work with Justun Juelfs: James Morin, Brandon Klenk, Kyle Lester, and Mike Lashmet.

>>Action Item: CTC will work with the volunteer members to develop a process for identifying CTC synthesis projects.

Update on Projects in Progress

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

12-03: Understanding the Chemical and Mechanical Performance of Snow and Ice Control Agents on Porous or Permeable Pavements (Mike Lashmet)

- Different types of asphalts require different snow and ice control.
- The PI is back in the lab with samples from NY, MO, UT, MA.
- What's remaining level of salt on the roadways after plowing? After initial results, the team is looking at the packed snow on the roadway using pixel analysis of digital pictures and optical friction tester.
- Working on the white paper (end of Task 5).

12-04: Snowplow Operator and Supervisor Training (Mike Sproul)

- Mike Sproul quickly walked the TAC through one of the modules.
- Afterwards questions arose as to if and how we might share these materials, will we charge for their use, will we allow the modules to be modified, who might host the materials?
- Might explore AASHTO partnership (TC3 program) so long as CR states don't get charged.
- There is a possibility CR could contract with UMN (vendor for 12-04) to be the keeper of the materials. Then as needed, UMN can modify and re-distribute them as appropriate.
- Will add the Winter Driver Education module.

13-02: Understanding the Characteristics, Benefits, and Mechanisms of Commonly Used Agricultural and Mineral By-Products in the Deicer Industry (Ron Wright)

- Some inconsistencies with lab results, which the team is going back to clear up.
- Otherwise, all other tasks are complete except for video (Task 7).

14-01: Synthesis on GPS/AVL Equipment Used for Winter Maintenance (Patti Caswell)

- Consumer Reports-type guide on the different products out there.
- Recently completed the analysis of survey results and now developing the equipment guide.

14-02: Quantifying the Impact that New Capital Projects Will Have on Roadway Snow and Ice Control (Caleb Dobbins)

- PI is collecting prioritized list of capital projects to be included in the study.
- Will be discussing this list with the project team next month.

14-03: Developing a Training Video and Manual for Best Practices and Techniques in Clearing Different Interchange Configurations and Other Geometric Layouts (Justin Droste)

- Decided on ten different geometries.
- Will have video on each layout for training purposes.
- Two states provide techniques for each layout. Will then get feedback from broader audience through a survey.
- Based on right and left wings and front plows.
- Do we want to add this to the AASHTO Computer-based Training?

14-04: Plug & Play, Ph2 (Allen Williams)

- Completing the Lit Review and should have survey to the committee very soon.
- Need additional TAC members on committee. No volunteers.

14-05: Snow Removal Performance Metrics, Ph1 (Allen Williams)

- Will have survey (Task 2) out soon following second round of comments by the project committee.

14-07: Snowplow Route Optimization (Clay Adams)

- Still contracting. Waiting on University of Vermont.

14-10: FHWA Salt BMP (Gabe Guevara)

- Project need based on heavy winter, which required high amounts of salt, which resulted in vendors gouging states on salt prices.
- Best management practices handbook will be the result. Will be organized into sections on procurement, storage, and application.

>>Action Items

- CTC: Work with the PI and MnDOT to add the Winter Driver Education module to 12-04.
- CTC: At next meeting of 14-04, add agenda item to discuss adding new members to the subcommittee.
- CTC: Update completed/approved tasks for each active project on members' portion of site.

New Project Selection/Documentation

Justin proposed a modification to the process for discussing, prioritizing and scoring projects during the Clear Roads spring meeting each year. He suggested conducting the initial project discussions and prioritization on day 1, including some initial budget discussions. On day 2, the results of the project prioritization scores (both individual scores submitted by each TAC member and average scores for each project) will be displayed. Those projects with the highest average scores will rise to the top as in the past, but there will be a final discussion regarding project budgets and potential combining of projects, if appropriate. There will also be an opportunity to raise any questions about the scores recorded.

- Need to be careful how we question/analyze the prioritization scores, but it will be good to know that scores have been recorded and counted.
- Need two-day timeframe for processing scores, which also allows additional time for discussion of budgets.

>>Action Items

- CTC: Structure the spring 2016 meeting agenda and supporting documents to accommodate the process of recording/processing votes over two days and displaying all responses.

State Reports

Missouri State Report

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

- Moving to a smaller winter maintenance support staff.
- Average \$46M/yr in winter maintenance costs but have hit \$73M.
- Use 14' plows on 2 lane roads.
- Snow removal is third highest priority behind condition of major roads and bridges.
- Posting RFP for RWIS work to include access to data, system maintenance, and potential expansion.
- Exploring the use of Audible alerting systems on TMAs, which could prove beneficial for plow trucks.
- MODOT sponsors an Innovations Challenge, which is an internal employee competition to improve processes and customer service.
- CR Implementation
 - Shared CR 13-04 corrosion manual with district maintenance staff. Working on new truck specification, could include recommendations.
 - CR 14-05 snow removal performance metrics – looking at a potential reduction in LOS.
 - CR 14-06 equipment lighting – MO does not have a good correlation between snowplow lighting and crashes. Inattention, speed, impairment, and other factors may be contributors.

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:

- For the first time, the maintenance budget split up into summer and winter budgets.
- Performance Measures is a focus in their department
 - Balanced score cards – salt usage and grip index
 - NH tracks Winter Severity Index vs. Salt Usage
- CR Implementation
 - NH is using findings from the Spreader Calibration Guide and Safe Driving Messages.
 - Weather Severity Mapping – director uses the US map as the 2nd slide in his PPT he uses across the state to all audiences.
 - Corrosion Prevention – sent to mechanical services.
- NH has built new spreader racks that everyone really likes as they make it easy to clean equipment, provide easy access to components, keep spreaders out of snow, and parking vehicles under if needed.

Tuesday, September 22, 2015

Meeting Objectives

Justin covered the objectives for day 2, which include reviewing the budget, implementation efforts, outcomes of recently completed projects, the Clear Roads presentation, the Plug and Play Initiative, Product Experience update, FHWA and APWA updates, several state reports, and future meetings.

Clear Roads Budget

Greg provided an overview of the Clear Roads budget, including amounts committed and obligated, amounts contracted, and estimated planned expenses. Five states still need to transfer their 2015 funds.

>>Action Item:

- CTC will work with those five states to expedite the transfer of their committed 2015 funds.

Transition to New TPF Number

FHWA has requested that the current Clear Roads pooled fund project (#TPF-5(218)) be closed and the project be reestablished under a new TPF number. MnDOT will be helping Clear Roads with this transition. Linda Taylor and Deb Fick described the process.

- Commitments and transfers for 2015 and 2016 will continue to be attributed to the current pooled fund, TPF-5(218).
- Beginning with FFY2017, all commitments and transfers will need to be directed to the new TPF project.
- At this time, any commitments to TPF-5(218) for 2017 and beyond should be removed from the website.
- At the end of FFY2016, the remaining uncontracted balance in TPF-5(218) will be returned to the states to use at their discretion.
- When renewing a pooled fund, there is an opportunity to revisit the scope of work to make modifications.

>>Action Item:

- CTC: Work with MnDOT to support the transition to a new TPF number.
- CTC: Add an agenda item to the spring 2016 meeting to discuss any needed changes to the scope for the next phase of the Clear Roads pooled fund.

Status of Implementation and Technology Transfer Efforts

- Justin provided an overview of current implementation practices.
- He also suggested that outgoing CR TAC members should turnover with oncoming representatives.
- During each face-to-face meeting, we should refresh subcommittees to ensure proper coverage and interest. Do our best to be sure we have at least 3-5 voting TAC members on each project.
- Project Closeout Form
 - Justin Juelfs would like to see the closeout form filled out and is even okay with the vendor seeing it in the interest of complete transparency.
- Post Project Survey Form
 - Can we segregate survey responses? Meaning, can we look at the responses from the CR TAC members and the non-TAC members, municipalities, and others?
- New members of implementation committee: J. Juelfs, B. Burne, C. Adams, M. Lashmet, C. Spoonemore, and P. Caswell. Existing members include Scott Lucas, Justin, Droste, and Tom Peters.

>>Action Items

- CTC: Add agenda item for spring '16 meeting to review committee membership for each project to ensure effective number and interest of members.
- CTC: Work with the subcommittees to ensure completion of the project closeout form for each project, beginning with the four recently completed projects.
- CTC: Distribute and compile results for the post project survey for recently completed projects and moving forward.

Outcomes of Recently Completed Projects

13-01: *Snow and Ice Control of Environmental Best Management Practices (Brian Burne)*

- Although this project collects and synthesizes a great deal of environmental info, it also provides valuable basic information about materials and application rates, which is very useful when communicating with legislators.
- We have a pretty good knowledge of what states are doing, but what are the municipalities doing to minimize the environmental impacts?
- Brian B. provided info from this project during a meeting with locals he conducted in Maine, which was well received.

13-03: *Cost Benefit Analysis of Various Winter Maintenance Strategies (Ron Wright)*

- The need for this project comes from wanting to know what the benefit is to the traveling public for various winter maintenance strategies.

- CaCl₂ proved to be more effective than MgCl₂.
- Basic: Plowing has a high B-C ratio (5.3) but abrasives comes in at .2.
- Intermediate: Rock salt and salt brine came in between 2.4 and 3.8.
- Advanced: Corrosion inhibitors came in extremely high in terms of B-C ratio.
- Bottom line: Plowing is one of the most effective methods but using chemicals is preferred.
- Should have an article done on this.
- Should we do a project on what cost data Clear Roads states should be collecting to conduct the appropriate B-C analysis? Also, the project should provide a format for presenting this data.

13-04: Best Practices for the Prevention of Corrosion to DOT Equipment: A User's Manual (Justin Droste)

- The project resulted in a best practices manual, which provides descriptions of various types of corrosion, the causes and effects of corrosion, a review of the chloride materials used, and the equipment most susceptible to corrosion.
- Several states are implementing the findings from this report, such as Michigan, Iowa, Wyoming, Missouri, and New Hampshire.

14-06: Use of Equipment Lighting During Snowplow Operations (David Frame)

- Some of the results of the this research include:
 - LED lights are preferred but don't generate enough heat, so something else is needed to melt the snow and ice from the lens.
 - Operators prefer white warning lights as they increase visibility.
 - Retro-reflective markings are very effective but keeping them clear of snow can be an issue.
 - Project findings will be presented at the 2016 TRB Annual Meeting.

>>Action Items:

- CTC: Look into writing an article related to 13-03.
- CTC: Remind TAC members of the potential research idea to investigate the appropriate cost data Clear Roads states should be collecting for B-C analysis.

Clear Roads Presentation

Justin presented and reviewed the basic presentation that CTC developed to help TAC members present on the goals, activities and accomplishments of Clear Roads. The presentation will be available to all CR TAC members on the website. The TAC was happy with the presentation.

>>Action Items

- CTC: Post the PPT on the Clear Roads members-only portion of the website.

Plug & Play Initiative

- Allen provided a chronological history of the initiative and a "roadmap" for how the projects (Plug and Play Phases 1 and 2 and the Test Bed Software) connect to the initiative.
- Allen attended the NTCIP 1204 walkthrough, which is the winter operations protocol. The one portion that NTCIP 1204 does not cover is vehicle to point, which is what the Clear Roads Phase 2 project covers.

Product Experience & Google Analytics Updates

- Greg provided a one-page overview of the analytics for the Clear Roads website and CRs projects on You Tube. Two analyses were covered – one since January 2015 and one since January 2012.
- Google Analytics
 - TAC would like to see number of hits on each project page.
 - Report out on at each face to face meeting
 - Look at visitation surrounding list serve posts.

>>Action Item

- CTC: Post the Product Experience update on the website.

- CTC: For the spring 2016 meeting analytics, include the data points currently covered but also hits per page for each project and page visits surrounding list serve posts and other media blasts.

FHWA Report

- Road Weather Management Program: Focused on high risk – high payoff research.
- Pathfinder Project. Goal is to develop guidance for improving collaboration between state DOTs and the weather enterprise in order to improve weather messaging to the public.
- Connected Vehicle Pilot Study (USDOT is investing a large amount of money here)
 - Three pilot study locations including New York, Wyoming, and Tampa, FL.
- Weather Data Environment (WxDE) – aggregated from point sources and connected vehicles – provides timely and accurate road weather data for traveler information and for enhancing road maintenance activities. States need to provide the data and must sign agreements to do so. Also has archived data for research.
- PIARC research project on crisis management – how Europe is dealing with climate change. Specifically, the intensity of the events and how they recover. Report due to end in November 2015.

APWA Report

- Mark Devries had been re-instated as the Winter Maintenance Chairman. Dan Schacher of Alaska has been appointed as the Vice Chair.
- Supervisors Training Course: Two hundred and fifty seven (257) people trained at the North American Snow Conference in Grand Rapids, MI in April, 2015.
- APWA is working to get its certification program in Fleet Management back on track and is currently in discussions with agencies and fleet managers to do so.

Future Meetings

- Spring 2016 meeting will be in Newport, RI. The recommended dates are the week of April 18, 2016. CTC has made initial contacts with hotels in the area and with MnDOT to begin the bid process.
- Fall 2016 meeting – Omaha, NE. Back up is Madison, WI.

State Reports

Utah State Report

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

- Challenges that Utah is facing include:
 - Lawsuit due to snow on barrier causing "launching." This is now a post storm cleanup activity that happens before the trucks are even cleaned.
 - Plow driver hours/fatigue
 - Older vehicle fleet
- Installing AVL (Verizon) equipment this year.
- Snow routes optimized in Salt Lake City. Contracted with Kevin Monroe of Spatial Matters.
- Winter Road Weather Index – a tool that Utah uses to measure the effectiveness of snow removal.

Colorado State Report

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

- Trying to reduce the fleet and increase the lifecycle of the essential equipment.
- Full corridor management with connected vehicles (part of the mission to deploy technology in all aspects of CO DOT's business).
- CO is tracking readiness of equipment, labor, and materials.
- CO is using Zonar AVL/Telematics configured for fleet management for pre and post trip inspections, diagnostics, and fuel management.

- Working to develop an operations and dispatching app; integration with truck control systems; integration with SAP Software for mobile work orders and timesheets.
- Using Tank Link to monitor tank levels.
- Developing a statewide winter operation plan.
- Setting reporting requirements for MDSS. Moving it towards a forecasting and performance documentation system.
- CO is going to provide additional staffing to meet the expected LOS on I-70 to meet a goal of not shutting down the Mountain Corridor.
- Colorado emphasized three research projects, all lead by Vaisala:
 - Snow route optimization
 - Winter Maintenance Performance Measures
 - Thermal Mapping of CDOT Roads

Connecticut State Report

John DeCastro shared an overview of his agency's activity for the last year and plans for the coming season.

Highlights included:

- Accident in 2003, resulting in NTSB report in 2005, which led to a report entitled, ***Improving Winter Highway Maintenance: Case Studies for Connecticut's Consideration***. Issued in 2006. Pointed to a transition to Anti-Icing beginning with the 2006-2007 winter season.
- In advance of a storm, Storm Monitors are called in to monitor and call out to managers with warnings and updates.
- Implementation
 - CR 07-01 Development of Standard Test Procedures for Carbide Insert Snowplow Blade Wear
 - Interested in
 - CR 14-01 Synthesis on GPS/AVL Equipment Used for Winter Maintenance, and
 - 14-07 Snowplow Route Optimization. CT plans to digitize all their roads. In beginning stages and have not yet hired a vendor.
 - Legislative study on corrosion conducted, which pointed to rinsing off trucks after use.

Nebraska State Report

Tom Renninger shared an overview of his agency's activity for the last year and plans for the coming season.

Highlights included:

- A tank monitoring system for salt brine.
- Salt storage solutions, including timber construction and fabric structures.
- Brand new maintenance facilities, which featured construction using pre-cast concrete panels and pre-engineered metal.
- A review of NDOR's procurement process for plow blades.
- A brief look into NDOR's statewide operations center and its capabilities.