MINUTES

Clear Roads 2016 Technical Advisory Committee Spring Meeting:

Pooled Fund Project #TPF-5(218)

Tuesday – Thursday, April 12-14, 2016
Radisson Hotel Providence Airport, Warwick, Rhode Island

Attendees:

Todd Hanley, Alaska DOT
Mark Trennepohl, Arizona DOT
Chris Smith, California DOT
Mike O'Neill, Colorado DOT
John DeCastro, Connecticut DOT
Alastair Probert Delaware DOT
Ron Wright, Idaho TD
Ruben Boehler, Illinois DOT
Phillip Anderle, Indiana DOT
Craig Bargfrede, Iowa DOT
Clay Adams, Kansas DOT
Brian Burne, Maine DOT
Sam Salfity, Massachusetts DOT
Justin Droste, Michigan DOT
Tom Peters, Minnesota DOT
Tim Chojnacki, Missouri DOT
Tony Strainer, Montana DOT
Tom Renninger, Nebraska DOR
Mike Lashmet, New York State DOT
Caleb Dobbins, New Hampshire DOT
Brad Darr, North Dakota DOT
Scott Lucas, Ohio DOT
Patti Caswell, Oregon DOT
Jon Fleming, Pennsylvania DOT
Joe Bucci, Rhode Island, DOT
John Mehlhaff, South Dakota DOT
Brandon Klenk, Utah DOT
Wayne Gammell, Vermont AOT
Allen Williams, Virginia DOT
James Morin, Washington State DOT
Jeff Pifer, West Virginia DOT
Mike Sproul, Wisconsin DOT
Cliff Spoonemore, Wyoming DOT
Mark DeVries, Vaisala
Wilf Nixon, Salt Institute
Rick Nelson, AASHTO
Anne Brown, Delaware DOT
Paul Brown, Massachusetts DOT
David Gray, New Hampshire DOT
Todd Law, Vermont DOT
Greg Waidley, CTC & Associates

Materials Distributed

Attendees List
TAC Contact List
2016 Research/Synthesis Proposals
Clear Roads Budget Overview
Project Subcommittee Members
Project Mgmt – Roles/Responsibilities
Research/Synthesis Ranking Sheets
Clear Roads Pooled Fund Proposal (2009)
Research In-Progress
Project Closeout Form (CR 13-04 sample)
Google Analytics for Clear Roads Website

Tuesday, April 12, 2016

Welcome

Peter Alviti, Director of RIDOT, provided opening remarks and a welcome to Rhode Island.

Introductions and Meeting Objectives

Chairperson Justin Droste kicked off the day with introductions of all the attendees, a brief re-cap of the changes in TAC membership since the fall meeting, and a review of the objectives for day 1.

Changes in TAC membership:

States Added
- Alaska – Mike Coffey
- Arizona – Mark Trennepohl
- Delaware – Alastair Probert
- Indiana – Tony McClellan

TAC Members Replaced
- California – Chris Smith replaces David Frame
- Illinois – Ruben Boehler replaces Tim Peters
- Montana – Douglas McBroom replaces Justun Juelfs
- New Hampshire – David Gray replaces Caleb Dobbins
- Pennsylvania – Jonathan Fleming replaces Daryl St. Clair
- Rhode Island – Joe Bucci replaces Joe Baker
- Vermont – Todd Law replaces Wayne Gammell

Clear Roads TAC Vice Chair

The group needs a new Vice Chair due to Justun Juelfs leaving Clear Roads. Brian Burne had been nominated at the 2015 Spring Meeting to be the next Vice Chair.

Justin Droste re-opened the nomination process for Vice Chair. The following three TAC members were nominated:
- Brian Burne
- Patti Caswell
- James Morin

Brian Burne was elected Vice Chair via a paper vote.

Brian Burne will hold the position of Vice Chair for one year – until after the spring 2017 meeting. At that time, Brian will become the Chair.

Options for Submitting and Selecting Synthesis Projects

The TAC approved $50k for CTC synthesis projects in spring of 2015. These are smaller than full research projects and typically only take a few months to complete. The goal is to compile existing literature and state practices on priority topics identified by the TAC. The approximate cost for each synthesis is $4-$8k per.

The only synthesis conducted to date is the winter data statistics project. No other topics had been identified yet, and the TAC needed to establish a process for submitting and selecting synthesis projects. When synthesis ideas are approved by the TAC, a Clear Roads subcommittee works with CTC to develop a scope of work and oversee the project.

Two options were proposed for submitting and selecting new synthesis projects:
1. Submit and vote on synthesis topics on a rolling basis through email and/or conference calls.

2. Submit synthesis topics in the winter (January/February) and summer (July/August) and vote for approval during the spring and fall meetings.

Justin Droste also proposed a hybrid approach, which includes submitting the synthesis idea (by emailing the form to CR Administrator, Chair, and Vice Chair) at the time it is developed (rolling basis) and voting on it at the next (spring or fall) meeting. Synthesis ideas must be presented in the request form template for review at spring or fall meeting. This approach was approved by the TAC.

The synthesis project descriptions and deliverables will be posted on the public portion of the Clear Roads website.

The TAC also showed an interest in posting informal email surveys by TAC members on the members-only portion of the Clear Roads website. Scott Lucas inquired as to whether or not a query-based database could be created from these survey responses.

ACTION ITEM: CTC will post the results of the informal TAC surveys on the members-only portion of the Clear Roads website.

Discussion and Ranking of Research Proposals

The group presented and discussed 14 research proposals submitted by TAC members. The notes detailing the proposals and the discussions that followed can be found at the end of the minutes. After all the proposals were presented, each voting member of the TAC submitted rankings for each proposal, based on each project's own merit, using a 1-5 scale (5 being the greatest need). Those votes were tallied after day 1 of the meeting and presented at the beginning of day 2.

The goal was to focus on larger projects, combining projects as able - ideally 3-4 projects per year. Discussions of funding also took place to ensure adequate funding for any modifications to the project scopes.

While time did not allow at this meeting, the fall meeting will include an agenda item on a process for generating project ideas.

ACTION ITEM: CTC will include an agenda item on the fall meeting agenda to discuss innovative ways to generate research and/or synthesis ideas.

Discussion of Synthesis Projects

The group presented and discussed four synthesis project proposals submitted by TAC members. The notes detailing the proposals and the discussions that followed can be found at the end of the minutes. Votes were submitted by the end of day 1, tallied, and presented at the beginning of day 2.

The process for approving synthesis projects at this meeting included reviewing research project ideas and then synthesis ideas, as there is potential overlap between the two discussions. The TAC then voted on synthesis projects with the same 1-5 scale. The TAC voted yes or no for each synthesis after research projects were selected.

Potential Scope Changes in Preparation for a New Pooled Fund Number

The Clear Roads Pooled Fund will be transitioning to a new transportation pooled fund number in FFY 2017. Prior to that transition, the scope of work for the pooled fund needs to be reviewed and revised as appropriate based on the needs and growth of the Clear Roads program. The new scope will then be submitted to FHWA through MnDOT for review and approval.

Some potential ideas for expanding the scope of the Clear Roads proposal might include activities related to:

- sustainability,
- performance measures,
- training,
- quicker turnaround synthesis projects
- enhanced coordination with the Aurora Pooled Fund

ACTION ITEM: Tom Peters will review the suggestions of the TAC and the project objectives for possible areas of revision. Tom will prepare a revised scope based on the previous scope and any additional feedback he receives.

Things to keep in mind as we move towards the new pooled fund number:

- Approximately ten states need to commit funds to new pooled fund (solicitation) for FHWA to approve and activate the pooled fund number.
- We cannot fund the spring '17 meeting until a new TPF is in place.
- Do not transfer FY 2017 contributions to the current TPF. Funds that remain not yet under contract will need to be re-dispersed to the states, as they cannot be rolled into the new pooled fund.
- The goal is to have new solicitation in place by mid-summer and enough commitments for FHWA to approve the new pooled funds number by late-summer.

South Dakota State Report

- Warmer temperatures across the state caused more ice (freezing rain and refreeze) and frost conditions statewide.
- Far above normal snowfall in the southeastern region of the state.
- Weather Information Systems
    - RWIS sites, camera-only sites, and message boards.
    - IRIS – conditions are uploaded by maintenance crews.
    - ClearPath 511 – free service providing up-to-the-minute official road closure alerts.
    - Safe Travel USA – collected info on road conditions, 24 hour forecasts, and commercial vehicle restrictions is viewable by the public.
    - 511 Travel Info
- Winter Driving Program
    - Give 'Em a Brake
    - Don't Crowd the Plow
- Winter Performance Measures – new system (done in-house) was implemented this year.
- South Dakota will be testing and evaluating bi-directional tow plows and squeegee blades.
- Other developments and research planned:
    - Non-Intrusive Pavement Sensors for variable speed advisory – test pilot at Tilford in 2016.
    - Incident response travel information (Safe Travel)
    - Winter Safety DMS locations study

- Optimizing MDSS in South Dakota DOT Winter Maintenance Operations
- Reuse of Aqueous Waste Streams in Transportation – water treatment plant, ethanol plants, and food processing.
- Salt storage facility study – partnering with cities or counties; near railway with spur; and contract with grain elevators or ethanol plants.

- The following Clear Roads projects are being followed and considered for implementation within South Dakota.
  - ***Synthesis on Winter Data Statistics***
  - ***CR 14-08 Weather Severity Mapping Enhancement***
  - ***CR 14-03 Developing a Video for Clearing Different Interchange Configurations*** for the purpose of determining how to best plow roundabouts currently being constructed.
  - ***CR 13-04 Best Practices for the Prevention of Corrosion to DOT Equipment***
  - ***Plug and Play Initiative***
  - ***CR 12-04 Snowplow Operator and Supervisor Training***
  - ***CR 12-02 Establishing Effective Salt and Anti-Icing Application Rates***
  - ***Pacific Northwest Snow Fighters (PNS) specifications***

Wednesday, April 13, 2016

Clear Roads Budget

Greg provided an overview of the Clear Roads budget, including amounts committed and obligated by the states, as well as the expenses from research, meetings, and administration. Clear Roads has $614,789 to spend on new research projects and $30,238 on new synthesis projects this year.

Selection of FY 2016 Research Projects

Based on the rankings received, the TAC approved the following six projects with total funding estimated at $530,000. Subcommittee members were also assigned. The names underlined below will serve as chairs for the subcommittees.

Utilization of AVL/GPS Technology: Case Studies

- Increased the project funding amount initially proposed to account for the need to conduct more involved interviews as opposed to simple surveys.
- Subcommittee: Tim Chojnacki, Patti Caswell, Craig Bargfrede, Mike Lashmet, Mark Trennepohl, Todd Hanley*, David Gray, Scott Lucas
- Funding: $125,000

Aurora WSI Update/Enhancement Partnership

- Subcommittee: Brian Burne, Ruben Boehler, Jon Fleming
- Funding: $20,000

Identification of Technologies for the Assessment of Winter Roads Conditions

- Combined this proposal with the proposal entitled, ***Friction and Temperature Sensors - Mobile and Stationary Weather Stations*** and added funds to cover the aspects of both in one project.
- Subcommittee: Phillip Anderle*, Kyle Lester, Cliff Spoonemore, Ruben Boehler, James Morin, Allen Williams, John Mehlhaff

- Funding: $200,000

Emergency Operations Methodology for Extreme Winter Storm Events

- Subcommittee: Mike Lashmet, John DeCastro, Joe Bucci, Rick Nelson*, Jon Fleming, Mike Sproul, Todd Law
- Funding: $75,000

Weather Event Reconstruction & Analysis Tool

- Subcommittee: Brian Burne, Patti Caswell, Alastair Probert, Tim Chojnacki, Tom Renninger, Jeff Pifer, Joe Bucci, Todd Law
- Funding: $60,000

Training Video for the Implementation of Liquid Only Plow Routes

- Increased the project funding amount initially proposed by $20k to allow for a synthesis as part of this project.
- Subcommittee: Jeff Pifer, Scott Lucas, Phillip Anderle*, Brandon Klenk, Paul Brown*, Anne Brown*, Clay Adams
- Funding: $50,000

*Denotes that a subcommittee member is a non-voting member.

Selection of Spring 2016 Synthesis Projects

Based on the rankings received from the TAC, two projects seemed to garner more interest. The TAC approved the following two synthesis projects, by a "yes/no" vote, to be completed by CTC & Associates. The subcommittees will work with CTC & Associates to scope and complete the projects.

Best Management Practices for the Accurate Reporting of Salt Stockpiles

- Subcommittee: James Morin, Cliff Spoonemore, Tony Strainer*, Alastair Probert, Brandon Klenk
- Funding: TBD

Finding the Most Cost Effective Wash Bay

- Subcommittee: Brandon Klenk, Jon Fleming, Ruben Boehler, Cliff Spoonemore
- Funding: TBD

*Denotes that a subcommittee member is a non-voting member.

Role of Project Champion and Subcommittee Members

Per the document entitled Project Management – Roles and Responsibilities, Justin Droste emphasized the important role of a project champion and a co-champion in terms of keeping the project on track and the importance of selecting 5-7 committee members that are highly interested and fully engaged in the project. If a TAC member rotates off of Clear Roads, his or her replacement should fill the exiting member's role on the project subcommittee. Champions and subcommittee members are also responsible to complete project closeout and implementation surveys. At each meeting, subcommittees will be reviewed by the AC and replacements will be assigned.

Next Steps in the Project Development Process

Greg briefly reviewed the next steps involved in developing the RFPs, including project scoping; posting RFPs; receiving, reviewing, and voting on the proposals submitted; and awarding the projects.

Paul Brown wants to ensure that all subject matter experts (whether or not they are TAC members) are involved in the development of projects, as appropriate. The group discussed how best to handle communications with those subcommittee members who are not the official TAC representatives from Clear Roads member agencies.

- The subcommittees for each funded project can include one or more representatives from Clear Roads member agencies and representatives from non-member agencies, such as FHWA, APWA, or the private sector. Participation in the subcommittees is not limited so as to take advantage of available expertise both within and outside of Clear Roads. However, the only voting members on the subcommittee are representatives from Clear Roads member agencies. Although a member agency can have more than one individual participate on a project subcommittee, only one representative from a member agency is able to vote.
- All subcommittee members will be included in the process of scoping the goals and tasks for a new research project and in reviewing the proposals received in response to an RFP for that project. However, only voting members of the subcommittee will serve on the designated evaluation committee for MnDOT's procurement process. The evaluation committee scores the proposals received to help MnDOT determine which vendor is selected.
- Project subcommittee participants who are not current members of the Clear Roads TAC (such as someone who left their DOT or rotated off the TAC within their agency) will be included on all email communications regarding their project. However, only the officially designated TAC members for Clear Roads (one per agency) will receive communications about all Clear Roads business. It is up to the TAC members to pass appropriate information on to their DOT colleagues.

ACTION ITEM: All emails regarding general Clear Roads business will be sent to current voting TAC members only. Those members will be responsible for forwarding those emails along to appropriate personnel within their agency.

Research In-Progress Project Updates

For each active project, the TAC reviewed subcommittee members and assigned new members as necessary. Non-TAC members will be kept on the list, but names will include an asterisk. They will still receive project communications at their DOT emails, if appropriate.

- ***Understanding the Chemical and Mechanical Performance of S&I Control Agents on Porous or Permeable Pavements*** (Mike Lashmet)
    - Contractor: WTI.
    - Subcommittee members: Mike Lashmet, Tim Chojnacki, Paul Brown*, Tim Croze*, Cliff Spoonemore, Clay Adams
    - End Date: February 2017
    - The research team is obtaining cores from MassDOT to create slabs for final testing (first set of cores just came in and expect to receive the second set next week), which will include

both optical and rubber-bottomed friction measurements and pictures for an analysis of snow remaining on the pavement after plowing.

- ***Snowplow Operator and Supervisor Training*** (Mike Sproul)
  - Contractor: University of Minnesota.
  - Subcommittee members: Sproul, Justun Juelfs*, David Wieder*, Clay Adams, Mike Lashmet, Cliff Spoonemore, Monty Mills*, Dave Frame*
  - Losing Justun Juelfs and David Frame. Add Phillip Anderle.
  - All 18 modules are complete and the research team is receiving comments from TAC. An amendment has been processed for 6 additional modules, including one on winter driver education.
  - How do we incorporate the comments in the future?

  ACTION ITEM: CTC will set up conference call for how to deal with comments.

- ***Synthesis on GPS/AVL Equipment Used for Winter Maintenance*** (Patti Caswell)
  - Contractor: SRF.
  - Subcommittee members: Patti Caswell, Cliff Spoonemore, Tim Peters*, Tom Renninger, Scott Lucas, James Morin, Joe Schmit* (WS DOT)
  - The research team submitted a revised Literature Review, Equipment Guide, and Synthesis of Policies. Those deliverables are being reviewed by the subcommittee.

- ***Quantifying the Impact that New Capital Projects Will Have on Roadway Snow and Ice Control (RSIC) Operations*** (Wayne Gammell)
  - Contractor: Univ. of Vermont.
  - Subcommittee members: Wayne Gammell*, David Wieder*, Joseph Baker*, Brad Darr*, Larry Gangl, Caleb Dobbins
  - Losing Joe Baker and David Wieder. Adding Joe Bucci and Kyle Lester. Todd Law will take over as champion for Wayne Gammell.
  - The survey of AASHTO's snow and ice community to determine the 6 to 10 roadway configuration changes that are common across snowbelt states is complete. The research team also used STIPs of states that completed the survey and nearby states to supplement the survey results. Currently developing a methodology to assess impacts. From the survey results and the STIPs, a total of 8 case studies were selected in Minnesota, New Hampshire, and Vermont. Each of these case studies is a project that is expected to be completed or substantially completed in 2016. Detailed second-by-second GPS data was collected from the plow trucks in New Hampshire and Minnesota that cover these project areas to examine the effort that it takes currently to service these routes. This data collection will be repeated next winter. In Vermont, the 4 case studies will be investigated using the statewide RSIC simulation to assess the more far-reaching impacts of these projects. Work on the RSIC simulation model is ongoing.
  - A couple of projects aren't getting done until the 2016 construction season, so adding time to project to accommodate another winter season for data.

- ***Developing a Training Video and Manual for Best Practices and Techniques in Clearing Different Interchange Configurations and Other Geometric Layouts*** (Justin Droste)
  - Contractor: Southern Illinois University, Edwardsville.
  - Subcommittee members: Justin Droste, Mike Sproul, Sam Salfity, Dave Weider*
  - Losing Dave Weider. Adding Jeff Pifer, Scott Lucas, Phillip Anderle*.

- The research team, working with the project subcommittee, developed 9 intersection/ interchange diagrams and gathered common practices for clearing snow from these geometries. The subcommittee approved the survey and it was emailed to the TAC and Snow/Ice List Serve on March 22. Survey closed early April. Should have some video by July 2016.

- ***Plug and Play Phase II*** (Allen Williams)
  - Contractor: SRF
  - Subcommittee members: Allen Williams, Paul Brown*, John Scharffbillig* (City of Minneapolis), Craig Bargfrede, Scott Lucas, David Wieder*, Gabe Guevara
  - Losing David Wieder.
  - The PI sent out the agency survey on March 11.

- ***Snow Removal Performance Metrics – Phase I: Synthesis*** (Allen Williams)
  - Contractor: WSU.
  - Subcommittee members: Allen Williams**,** Mike Lashmet, Clay Adams, Tim Chojnacki, Brian Burne, Craig Bargfrede, Lee Smithson*, Rick Nelson*
  - The research team developed a survey to send to the snow and ice states to gather information about their use of performance measures. They have ~45 responses and are currently trying to get additional responses from Europe and Japan.

- ***Snowplow Route Optimization*** (Clay Adams)
  - Contractor: WSU.
  - Subcommittee members: Clay Adams, Brad Darr*, Jon Fleming, Larry Gangl, Mike Lashmet, Douglas McBroom*
  - Added Mark Trennepohl and Tony Strainer*
  - A draft literature review and survey questions have been submitted to the subcommittee for their review. The subcommittee met with the PI prior to the meeting and have him feedback on the lit review and survey questions. The survey questions will be revised first to get the survey out as soon as possible.

- ***Synthesis of Material Application Methodologies for Winter Operations*** (Jeff Pifer)
  - Contractor: WSU.
  - Subcommittee members: Paul Brown*, Jeff Pifer, John DeCastro, Justun Juelfs*, Tom Peters, Monty Mills*, Rick Nelson*, Max Perchanok*
  - Currently under contract negotiations.
  - Add Wilf Nixon* and James Morin

- ***Identification and Recommendations for Correction of Equipment Factors Causing Fatigue in Snowplow Operators*** (Allen Williams)
  - Contractor: Virginia Tech
  - Subcommittee members: Allen Williams, Cliff Spoonemore, Patti Caswell, Tim Chojnacki, Tom Renninger, Wayne Gammell*
  - Currently under contract negotiations.

- ***North American Study on Contracting Snow and Ice Response*** (Justin Droste)
  - Contractor: WTI.
  - Subcommittee members: Paul Brown*, Justin Droste, Tim Armbrecht*, Daryl St. Clair*, Caleb Dobbins*, Joe Baker*, Allen Williams, Mike Lashmet
  - Add Rueben Boehler, Jon Fleming, and Joe Bucci
  - The literature review has been submitted to the subcommittee for their review.

- ***Pacific Northwest Snowfighters*** (Ron Wright)
    - Subcommittee members: Ron Wright, Justun Juelfs*, Lynn Bernhard*, David Wieder*
    - Add Kyle Lester, Tony Strainer*, Brandon Klenk, Patti Caswell, James Morin
    - PNS provides third party testing on the QPL list. Send some testing to an independent laboratory in addition to what they do in-house. 8 products waiting for evaluation. About 10K left in the coffers. This amount would fund testing for about 3 more years.
    - Many states rely on the QPL. And the QPL has identified some vendor fraud. This just validates what the vendors are already reporting themselves. A safety net.
    - EPA offers a "green endorsement" – called Ron Wright about how these products fit into the PNS QPL.
    - Conference June 7-8, 2016 in Portland. Wilf Nixon (Salt Institute) will be a keynote speaker. Hoping to do a conference every other year. Will highlight some of the Clear Roads research.
    - PNS Pooled Fund will also be re-starting for FY 2017.

- ***Winter Data Statistics*** (Justin Droste)
    - Contractor: CTC & Associates
    - Subcommittee members: Justin Droste, Scott Lucas, Brian Burne, Allen Williams, James Morin, Jay Wells*
    - Year 2 survey approved to proceed.
    - Publish on public site – approved.
    - Brian Hirt presented the interactive map feature via webinar. Taking final feedback prior to completing the year one effort.
    - Discussions included
        - What are costs to add data columns?
        - Can you format map to show multiple fields at the same time (2-3)?
        - Show "*" on map for quantities that need more explanation.
        - Format map to print.
        - Want ability to group more data from spreadsheet so it can be mapped.
        - What is the plan for getting data for current season? -> New survey this June.
        - How to handle calculated field in map (i.e. sand use per lane mile)?
        - Can we copy map and spreadsheet and manipulate on our own? -> Yes

Project Evaluation and Implementation/Technology Transfer

Scott Lucas provided an overview of the Post Project Closeout Form, which is typically completed by the project champion and reviewed and revised by the project subcommittee. How might it be used moving forward? As this is more of a project evaluation form, can this be used as a point of reference when considering principal investigators for future projects?

> A "vendor ranking index" that would give an evaluation of principal investigators for use in the future. Tom Peters considers this acceptable. Will consider placing on members only portion of the website.

Scott and Greg presented the results of three research project use surveys (CR 10-03, 11-03, 11-05). TAC members would like to see the results from survey shared/included (in some way) on the CRs project page and/or on the members only site (with demographic info included) and linked to the results on the project page.

SICOP and PIARC Report

Rick Nelson presented on the SICOP and PIARC organizations and their activities. The primary discussion coming out of this presentation was, "How do we make sure that we minimize the overlap in research projects/activities between Clear Roads, Aurora, SICOP, and others?"

Potential solutions may include:

- Emails from Rick Nelson to the impacted organizations keeping them apprised of each other's activities,
- SICOP has regional members who are also members of Clear Roads and Aurora who could serve as liaisons, and/or
- A subgroup (Rick, Greg, and Neal) coordinating activities.

State Reports

Washington: James Morin

- Very different climatic regions in Washington (Eastern, Central, and Puget Sound regions), which have different winter maintenance challenges.
- Trying to improve their performance measures. The current system – Highway Activity Tracking System (1200 iPads with wifi in sheds to download data) is operator driven (subjective) with incomplete picture and lack of detail. Evaluating Speed Recovery and Grip systems.
- 24 maintenance areas in 6 regions (decentralized).
- 500 plow trucks, 400 equipped with AVL. Do not share data with public.
- Transportation Avalanche Research Pool (pooled fund) with UT, CO, AK, CA, and WA.
    - Also can use iPad to map/track avalanche program.
    - Citizen reporting? – not yet.
- 2016 PNS Snow Conference in early June.
- PNS research – following up with JM.

Alaska: Todd Hanley

- 63 RWIS installations
- 11 new enhanced salt brine units
- 9 tow plows
- Automated bridge deicing
- Alaska-specific MDSS
    - Integrates fixed RWIS sites and mobile operations
    - Algorithms customized for Alaska
- Everyday Ideas and Innovations
    - The Yeti, an ice-breaking technology was developed in-house.
- Alaska developed training videos are available on DVD, which Todd can provide.
    - Anti-icing/De-icing
    - Snowplow Orientation
    - Equipment Operations & Maintenance
    - Tie Down Program
    - Sidedump
    - Contractor Orientation

- Airport Lighting System

Thursday, April 14, 2016

Future Meetings

Fall 2016 – Omaha, NE (Old Market Area); September 20-21, 2016

- Facility tours if possible. NE has a traffic operations center with state patrol. Tours – wrap up around 3 or 4 pm. State can bring equipment in at end of day.
- Tours can count as a state report for the host state.

Spring 2017 – Looking to western U.S. Arizona, Alaska, Utah, Montana, and Oregon.

Arizona – Aurora stayed at the Sheraton by the airport.
Flagstaff – High Country Conference Center
Sedona – a long trip from airport

Alaska – March or April in Anchorage is good.

Alaska received a 2/3 vote from the TAC as the approved location for the 2017 spring meeting. Arizona was approved as a backup location.

CR TAC priorities for future meetings:

Some suggestions/comments/questions included:

- Old travel budget was based on approx. 20 states (we now have 33, and it costs more to travel), plus we need larger hotels and spaces to meet.
- Can we decide on the location more than a year ahead of time?
- Planned excursion/facility visit? – Up to the host state.
- Stay at a hotel and shuttle to a government (free) meeting space.
- Suggestion to conduct every other fall meeting remotely.
  - TAC decided that Face-To-Face is important at fall meetings for project updates, along with CTC synthesis project approval.
- Implementation should be an agenda item of focus moving forward.
  - Fall would be an excellent time to take a project-by-project approach to implementation.

Suggested and approved rules of thumb for future CR meetings:

- Spring or fall Clear Roads meetings can cost as much as $1,500/member state/per meeting. With 33 current members, this comes to $49,500.
- Stay within a half mile of downtown or with convenient access to transportation.
- Our meetings can accommodate about a half dozen invitees per day. This includes additional host state attendees and neighboring states.
- Inviting State DOTs that are not already members (aim for those within proximity to meeting location): TN, KY (perhaps KY doesn't have available funds), Maryland, Nevada (Fall meeting: invite Anita Bush (Nevada DOT (pavements) but the person to start with is Mylin, assistant maintenance engineer). Following up with RN on name.
- Planning committee for 2017 PE – Allen Williams, Mark Trennepohl, Paul Brown, Tony McClellan.
- Host state helps coordinate logistics and travel arrangements for meeting.

APWA Report (Mark DeVries)

- North American Snow Conference
  - Location – Hartford, CT
  - Dates – May 22-24, 2016
  - Theme – Changing the Conversation (public's perception of Public Works and Snow Fighters)
  - 43 education sessions
  - 2017 conference in Des Moines, IA on April 23-26

- APWA Public Works Expo (PWX)
  - Location – Minneapolis, MN
  - Dates – August 28-31, 2016

- Winter Maintenance Supervisor Certificate
  - 2016 workshops
    - Hartford – May 22
    - South Carolina – August 7
    - Wisconsin – September 6
    - Loveland – September 28-29
    - Red Deer – October 3
    - Vancouver – October 4-5
    - Kansas City – October 11
  - Certificate updates
    - S & I modules have been combined into a single section that focuses on what to do when your normal practices don't work.
    - Equipment module has been updated
    - Policy module also updated
    - Presentations are undergoing full redesign

- APWA Reporter – reaches full APWA membership and would be a great idea for an avenue of dissemination for Clear Roads articles or briefs.

Outcomes of Recently Completed Projects

- ***Understanding the Characteristics, Benefits, and Mechanisms of Commonly Used Agricultural and Mineral By-Products in the Deicer Industry*** (Ron Wright)
  - Agricultural derived products blended with salt brine significantly reduced the freezing point of water compared to salt brine but did not melt more ice than salt brine.
  - Agriculturally derived products produced more ice melt than salt at all temperatures tested and reduced the freezing point of water much better than salt brine.
  - Tested complex chloride mineral blends (CCMs) did not significantly reduce the freezing point of water compared to salt, but they did melt more ice than salt at 15°F, suggesting that CCM products may offer better performance than road salt at temperatures between 10°F and 25°F.
  - All of the agriculturally derived products tested stayed on pavement longer than salt brine alone, possibly due to their higher viscosity.
  - Under ultraviolet light, darker agricultural-based products had a higher ice-melting capacity than lighter products at lower temperatures, although further testing is necessary to determine the precise level of sunlight intensity where product color has an impact.

- All products with an agriculturally derived component had lower corrosion scores than CCM products and salt brine.

- ***FHWA Salt Management BMP*** (Mark DeVries)
  - Project looked at the road salt lifecycle, which includes:
    - Procurement
    - Storage
    - Application
  - Aspects of note:
    - Compile best practices in one place.
    - Designed to be 21 stand-alone documents for quick reference.
    - Not every best practice will be implementable by every agency.
    - Not every best practice will result in lower costs in every situation.
    - Best practices can and should be applicable to all kinds of agencies, not just state.
  - Other notables:
    - Gabe Guevara wanted a handbook to sit on a supervisor's desk.
    - More was learned through interviews than by surveys.
    - Should we include the CR logo on each page of the manual? Tom Peters explained the funding process of this project which is USDOT through FHWA and MnDOT. So adding the logos may not be necessary/appropriate.

FHWA Report (Gabe Guevara)

- FHWA and USDOT were very happy with the Salt Management BMP project.
- Notice of Funding Opportunities
  - Connected Vehicles/Cities
  - Grants.gov
  - GPS-AVL can be eligible for funding.
- Virtual stakeholder meetings
  - 6 regional meetings
  - Completed in March 2016
- Next Road Weather Management Stakeholder Meeting
  - Location – Atlanta, GA
  - Date – June 28-29 or 28-30
- 2016 TRB International Conference and Workshop on Winter Maintenance and Surface Transportation Weather
  - Location – Fort Collins, CO
  - Date – April 25-27

State Reports

Indiana: Phillip Anderle

- Presented the report in the format of an InDOT pre-storm briefing
  - Included an in-depth look at their MDSS system
  - Weather forecasting system
  - Status of road friction

    - Tank Link system
    - Plow tracking
    - Material usage reporting
    - Storm status updates
    - Roadway status
- Status report on statewide winter maintenance statistics

Delaware: Alastair Probert

- Route Optimization – Using C2 Logix
- Equipment age becoming an issue, so replacing single axle dumps with dual axle dumps and right wings
- Following a statewide survey of operators, installed new lighting packages at a cost of $5800/truck
- report on brine-making and salt storage facilities
    - How do we determine salt volumes inside buildings?
        - Designed, built, and tested a salt "robot" which follows a PVC track inside the salt building while taking pictures with a Go-pro.
        - Pictures create a 3-D surface file
        - Data was compared to 3-D laser scanning and was within 2%.

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Est. Cost	Est. Duration	Project Summary	Presented by
1	Stockpile Reports, Stockpile Measurement and Volume Calculation Application	$150,000	18 months	Evaluate the usability of the Stockpile measurement technology to asses a more accurate inventory of current stockpile volumes. **Overview**: Very similar to S1, which PA proposed. Can include S1 into this project. **Questions**: Can in measure sheds? Tank measuring technology? **Discussion**: AP developed a robot on PVC track that takes massive amount of pics. Sonar is another technology being used for stockpile inventorying. AW said Virginia used LoadRight which tracks salt based on weight of bucket – even how much went into each truck. Doesn't include what material is coming back. MS noted that this might be a two part project – Lit Search, then based on what comes back, a research project. ML said that vendors note their success with measuring stockpiles but no one has said they can handle salt stored in sheds. PC sees this as two different needs – what do I have (inventory) or verify what you're using – two different things. TR and MO thinks that there are plenty of things going on with states that can be discovered through a synthesis project.	Tom Aguilar/ Kyle Lester/Mike O'Neill Colorado DOT

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Est. Cost	Est. Duration	Project Summary	Presented by
2	Friction and Temperature Sensors - Mobile and Stationary Weather Stations	$150,000	18 months	Determine mobile and stationary road weather stations that will provide an accurate measurement of the presence of ice, water, snow, relative humidity, visibility, wind speed, atmospheric pressure, surface air and depth temperature, and road grip or friction. **Overview**: This project focuses on friction (in the mobile sense) ITD is at stationary locations. **Questions**: Can Utah's system help with decision making? Yes. **Discussion**: Utah is developing a real-time road weather index which is tracking all this info. RW – ITD is using Vaisala to measure roadway friction for after a storm event. Aurora completed a report Field Testing and Evaluation of Winter Road Condition Monitoring Technologies - similar to this. Was not able to do field testing. PA submitted R3 which is similar to this. This project can be combined with #3, ***Identification of Technologies for the Assessment of Winter Roads Conditions***.	Tom Aguilar/ Kyle Lester, Colorado DOT

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Est. Cost	Est. Duration	Project Summary	Presented by
3	Identification of Technologies for the Assessment of Winter Roads Conditions	$150,000	18 months	Identify, compare, and evaluate technology that can objectively assess and report roads conditions. **Overview**: Some of the big players are fixed/mounted sensors which sometime ran contrary to MDSS recommendations. Comparing and evaluating these products including field testing. **Questions**: JF - Is this just looking at friction or are you looking at video output? PA – can MDSS handle this increased amount of data? TP does this run into Aurora's area? Aurora has two projects and there is a little overlap but there is still more to do. **Discussion**: JF said that Carnegie Mellon is using video output to classify road condition that works during day and night. Did proof of concept. JD – if we can give MDSS this input, it would enhance the MDSS result. AW said Viasala is really good at determining film thickness on the road but maybe less so with grip/friction. Should develop a better connection with Aurora so as not to duplicate research. Can be combined with #2, ***Friction and Temperature Sensors - Mobile and Stationary Weather Stations***.	Phillip Anderle, Indiana DOT

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Est. Cost	Est. Duration	Project Summary	Presented by
4	Weather Event Reconstruction & Analysis Tool	$60,000	12 months	The purpose of this research project would be to build a weather event reconstruction tool that can pull together various pieces of official information to help agencies conduct after-action studies and prepare after-action reports. **Overview**: Occasionally storms need to be analyzed for improving response. So, what if we put together a project to standardize the data such that we could look at a particular area over time. What can be pulled together and standardize and posted on the CR website? BB to understand their own experiences and to assist in contracting measures. Can also be used to explain to leadership. **Questions**: Route-level analysis? No, more state/regional-level. **Discussion**: TC could lead to a severity index. AW MDSS does have a playback mode. BB requests tools to be sent to him.	Brian Burne, Maine DOT
5	Aurora WSI Update/Enhancement Partnership	$20,000	12 months	The goal of this project would be to partner with Aurora to update the programming for the Winter Severity Index (WSI) System, discuss the possibility of a WSI estimator tool, and to develop a strategy for ongoing operation. **Overview**: CRs would like to be involved in re-programming and estimator tool. Would like both and not a black box. **Questions**: Who owns the code? **Discussion**: Aurora has a 2013 project to make it available to all. Ten states are currently using it. Aurora would like to partner with CRs on this. Accuweather expired in December 2015. Need to activate and support for a few years.	Brian Burne, Maine DOT

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Est. Cost	Est. Duration	Project Summary	Presented by
6	Effectiveness of Residual Salt on the Roadway	$150,000-$200,000	18 months	Provide timeframes that residual salt remains effective for various application rates, road types, and weather conditions. Evaluate sensors that detect salt levels. **Overview**: Lots of variables, so perform testing and develop a scenario-based table to assist in planning for storm events. Another component could be to evaluate and compare technologies. **Questions**: **Discussion**: JD-European products/studies to reference. PB – also a researchers in MA working on something similar. Perhaps this should be renamed using “mobile salinity measurement.” RN – said this is exactly an Aurora project, including gathering European data.	Justin Droste, Michigan DOT

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Est. Cost	Est. Duration	Project Summary	Presented by
7	Utilization of AVL/GPS Technology: Case Studies	$50,000	12 months	The goal of the project is to document case studies of agencies that have implemented an automatic data collection system for winter maintenance. Document lessons learned, the key factors that influenced the decision to pursue AVL/GPS, at what level it was implemented, and how to share the data internally and externally. **Overview**: The intent of the case studies is to get detailed information (**via interviews**) from a handful of states and answer a lot of questions about how they got started, what they are using, how they decided what to do, what is working for them, what's not, lessons learned, cost to run, cost savings, how savings realized, use of data, staffing resources needed to support, internal and external reporting, etc. **Questions**: **Discussion**: Need more funds to get what you want on this. Likely to include more time for interviews than simply a survey in order to put together a synthesis of what hardware set up states are using. PC – this is a good follow up study to 14-01. To develop an implementation plan, you need the three aspects of hardware, communications, and reporting. The logical next step is to look at case studies.	Tim Chojnacki, Missouri DOT

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Est. Cost	Est. Duration	Project Summary	Presented by
8	Emergency Operations Methodology for Extreme Winter Storm Events	$75,000	12 months	The goal of this project is to identify how states currently handle pre-storm and during-storm planning and execution of plans to improve the management and response to severe and extreme winter weather events, as well as provide guidance to develop comprehensive response plans. **Overview**: How states are handling prep work for storm events. Guidance for plan development – statewide or regional. Closures, shifting of resources, etc. **Questions**: PB – isn't this a state by state preference/procedures? **Discussion**: JF - I-95 Corridor Coalition has some of this info but nowhere this info is really contained. PA – situational awareness and work flow tool? About 9 states have a written plan for EOM plans.	Mike Lashmet, New York State DOT
9	Study to Identify the Complexities on Winter Levels of Service	$80,000	12 months	To identify the complexities that are involved in setting and achieving winter maintenance Levels of Service. **Overview**: **Questions**: Are we identifying factors that affect LOS? **Discussion**: N/W Passage is conducting a study on this right now (synthesis of best practices). TH – AK is getting less funds, so need to justify lower LOS.	Brad Darr, North Dakota DOT

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Est. Cost	Est. Duration	Project Summary	Presented by
10	Use of Sacrificial Coatings to Protect Equipment from Deicer Corrosion	$150,000	12 months	Identify various sacrificial coating options and evaluate their performance and cost benefits as a function of typical equipment and exposure scenarios of interest. The goal is to develop guidelines for DOTs to adopt the cost-effective sacrificial coating treatments to reduce the corrosion effects of deicers to equipment assets and extend their service life. **Overview**: To be used on deicing equipment. In particular, Mag Chloride (PNS category 1) deicers. Specific vehicle components subject to corrosion. This is including lab testing. Field testing would have to be a phase 2. **Questions**: When is this applied? A permanent coating to be included in design specs. PC – is paint a coating? RW – No, unless it's zinc. **Discussion**: 3M developed a tape to put on trucks but an issue with dissimilar metals which resulted in a battery effect and weakening of the truck frame. AW – suggested including regular salt. PC – MgCl is more drawn to aluminum that steel.	Patti Caswell, Oregon DOT
11	Evaluating Methods for Pre-Wetting Abrasives	$125,000	12 months	Evaluate various setups to determine the most effective way to pre-wet at the chute. Factors to evaluate include: where the pre-wet comes in, how many source points are ideal, type of nozzle, for set pre-wet amounts (5-12 gallons per mile), for both cinder and ¼" minus quarry rock, and up to two additional commonly used abrasive materials (or solid salt). **Overview**: What's an effective application rate and coating rate for abrasives/cinders? **Questions**: **Discussion**: MT – cannot pre-wet cinders coming out of the chute as it causes clumping. Canada mixes Mag flake in with sand.	Patti Caswell, Oregon DOT

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Est. Cost	Est. Duration	Project Summary	Presented by
12	Accuracy of Liquid and Granular Spreaders to Apply and Record Targeted Quantities of Material	$125,000	12 months	To test various calibrated liquid and granular spreaders to determine their ability to apply targeted quantities of various materials for extended periods of time and record accurately to the controller. **Overview**: Running tests on the road and **Questions**: **Discussion**: PC suggested that your results may depend on the sensors, hydraulic system, flow system, etc. communicate and react to vehicle speed changes. Would be interested to learn which sensors work better. JP – sometimes vendors provide assemblies with the sensors in the wrong place that need to be modified. JD – Vendor will need to determine what CR states are using, find a representative cross section of assemblies, and use those for the study.	Allen Williams, Virginia DOT

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Est. Cost	Est. Duration	Project Summary	Presented by
13	Reducing Snow Plow Driver Fatigue by Modifying Human Behavior	$200,000	18 months	This project would confirm or reject the link between drivers' quality of rest and driver fatigue. If confirmed, the investigator would develop a series of training materials for managers and drivers to help improve the quality of rest for drivers, as well as practices managers can use during operations to identify and relieve the fatigue in drivers. **Overview**: Communication between supervisor and employee and training for the employees as to deal with fatigue. **Questions**: How does this project tie into the environmental project? **Discussion**: JDC – Conn is looking at quarters/rest break trailers for snowplow drivers. Rest in Conn is required. SL – Smartcaps (from TRB meeting) warned driver and sent text messages to supervisor. What does is cost per person to test? If we can figure this out many would be interested in partnering on this project and increasing the scope of testing. Should we look to partner with states or insurance companies? CA – studies have already determined what causes fatigue, instead, let's take that info and the money to provide training materials.	Allen Williams, Virginia DOT

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Est. Cost	Est. Duration	Project Summary	Presented by
14	Training Video for the Implementation of Liquid Only Plow Routes	$30,000	6 months	The goal is to be able to effectively implement liquid only plow routes utilizing experiences from agencies already using the practice. **Overview**: Take the old proposal and add a survey of current practices to distill into a video that is most useful for directing to upper management or legislatures. Brine only – of any kind. **Questions**: what products does this include? **Discussion**: $1,000 per minute. Therefore, when adding a synthesis - $50k.	Jeff Pifer, West Virginia DOT

#	Title	Information the Synthesis Will Compile	Presented by
1	Best Management Practices for the Accurate Reporting of Salt Stockpiles	Stockpile numbers are always off from manually reported numbers. This synthesis will compile policies and best practices that get the reported number closer to actual. It will identify if there is any technology that is being used, who is using it, how is it working and how do they use it. **Overview:** Very similar to R1. Continuously monitoring approach. **Questions**: Outdoor stockpiles? No. **Discussion**:	Phillip Anderle, Indiana DOT

2015 Clear Roads Project Proposals – Notes from TAC Discussion

#	Title	Information the Synthesis Will Compile	Presented by
2	Evaluation of the Use of AVL in Winter Maintenance: A Synthesis of States Perspectives and Experiences	This synthesis will provide up-to-date information on AVL, including efficiencies gained, costs savings, different uses for the technology, and what multiple states have done to implement it. **Overview**: **Questions**: **Discussion**: Lines up with R7. PC thinks there is still value in doing a synthesis even if R7 gets funded. AW – perhaps this should be continuously/annually updated - could be more of a living document.	Douglas McBroom, Montana DOT
3	Spring Road Ban Posting Criteria	Survey snow and ice states and investigate past research as to the criteria that states currently use to post load restrictions on their roads at the cessation of the winter months. The study should consider both the effect of the onset of the spring weather, as well as factors that make roads more susceptible due to the nature of their construction. **Overview**: what are states using to determine when to close down a road? **Questions**: **Discussion**:	Caleb Dobbins, New Hampshire DOT
4	Finding the Most Cost Effective Wash Bay	Identify wash bay systems used by other states and gather information about their effectiveness at reducing corrosion. The synthesis should include those systems that are self-contained or have a filtration system that allows the water to be used again. **Overview**: **Questions**: **Discussion**: Clear Roads and Ohio have done research in this area. JD – see the results of the informal TAC survey on recycled truck wash water.	Brandon Klenk, Utah DOT