

An aerial photograph of a winter landscape, showing a snow-covered road winding through a valley. In the background, a bridge spans across a river or stream. The scene is hazy and overcast, with snow covering the ground and rooftops.

Summary of the 2023 International Conference on Road Weather and Winter Maintenance

Paul Pisano

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Winter Maintenance Committee

Agenda: The Triple Play

Three events that brought together members of the winter maintenance and road weather communities to identify best practices and research needs to improve safety, operations and the environment.

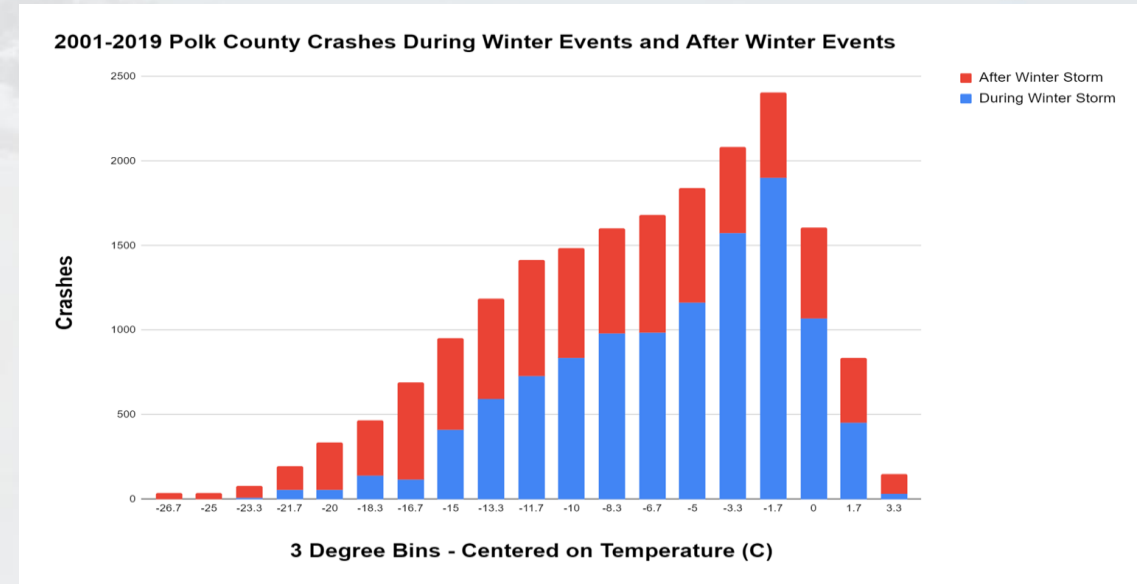
- **Webinar:**
 - Managing Severe Storms and Environmental Impacts
 - November 2022
- **Workshop:**
 - Resilient and Sustainable Approaches for Road Weather and Winter Maintenance
 - January 2023 (at the Transportation Research Board Annual Meeting, Washington DC)
- **Conference:**
 - International Road Weather and Winter Maintenance Conference
 - May 2023, Washington DC

Webinar Highlights

- Three engaging presentations:
 - *Predicting Road Weather Emergencies: Advancements in Storm Forecasting and Risk Communication*, Chad Hahn, National Weather Service
 - *The loss of salt from the road surface – a coin with two sides: environmental implications*, Göran Blomqvist, VTI
 - *Leveraging Technology for Better Materials Management and Cost Savings at MassDOT*, Mark Goldstein, Massachusetts DOT
- 300 participants
- Slides are here: <https://onlinepubs.trb.org/onlinepubs/webinars/221129.pdf>

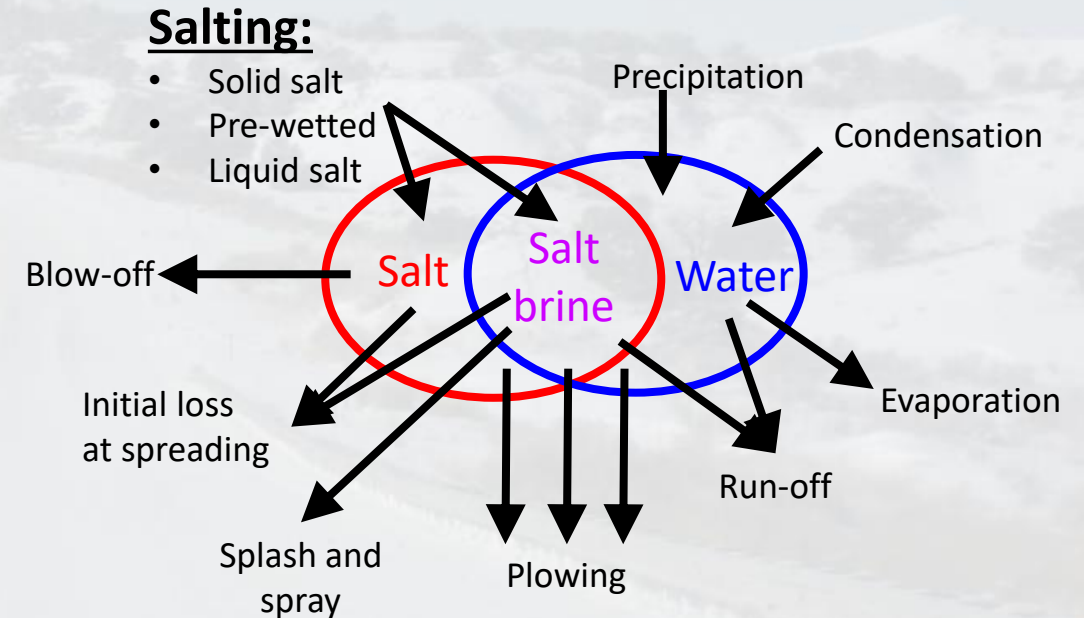
Webinar Highlights - Chad Hahn

- Post-storm crash analysis
- Communication is vital:
 - Messaging amplification through cross-agency coordination (i.e., Pathfinder)
 - Conveying possibilities & uncertainty
 - Snow squall warning (reaching motorists in winter)
 - Winter storm severity index



Webinar Highlights - Göran Blomqvist

- It's essential to understand what happens to salt after it's applied
- Also need to understand ice characteristics (e.g., how much salt is present, degree of bonding, thickness)
- He spoke about an extensive field test to study salt
 - Splash and spray are the biggest impact, but also wind played a role



Webinar Highlights – Mark Goldstein

- The solution isn't just one action...
- Technology is vital:
 - RWIS
 - Mobile detection
 - Integration with spreader controllers
 - Decision Support Tools
- Expanding the use of:
 - Friction/grip in decision making
 - Weather Severity Indices



Success Through Innovation:

- Pre-treatment
- Pre-wetting
- Closed-loop Controllers
- Pavement Friction Sensors/Meters
- RWIS Stations w/ cameras
- Tow Plows
- Segmented Plow Blades
- GPS/AVL Devices
- Loader Scales
- Reconfiguring Equipment Routes to do More with Less

Workshop Highlights

- Open and engaging discussions on 4 topics:
 - Resilience
 - Friction/Grip Data
 - Crowdsourcing
 - Environmental Issues
- 50 participants

Workshop Highlights – Key Comments (1/4)

- Resilience
 - Agencies must prepare for different types of winter events due to changes in climate (e.g., more freezing rain)
 - Interagency Agreements can be a critical way to manage resources
 - Staffing challenges make it harder to achieve levels of service. Consider subcontracting
 - Workforce changes are an unintended benefit – especially expanded abilities to work from home
 - Open and frequent communication is crucial – within an agency and across jurisdictional boundaries (esp. road conditions); Pathfinder
 - Better flood management highlights the need for decision support tools

Workshop Highlights – Key Comments (2/4)

- Friction/Grip Data
 - Rapidly changing area with many new ways to measure friction/grip
 - But still some uncertainty on how best to utilize the data
 - Some states are using friction data as an improvement metric (e.g., Idaho is using it to incentivize plow drivers and reduce salt usage)
 - A study in Idaho showed a 40% material use reduction and 50% accident reduction by applying intelligence from friction sensors into operations
 - Further research in underway (e.g., MDSS Pooled Fund Study) which will help resolve the lack of clarity and confidence in using the data

Workshop Highlights – Key Comments (3/4)

- Crowdsourcing
 - Crowdsourced data can be manual reports from people or electronic reports from vehicles/sensors
 - Many states are collaborating with private crowdsourced vendors such as WAZE and INRIX to provide as well as receive mutually beneficial data
 - Long term commitment to a crowdsource system must be made to make it work (requires constant oversight, which can be labor intensive)
 - Indiana is using probe data from Connected Vehicles, overlaying plow data and camera images
 - Messaging is key. You can get the data, but the real work is getting the right message out

Workshop Highlights – Key Comments (4/4)

- Environmental Issues

- Safety risks must be balanced with environmental risks. There is really no cost-effective alternative to the use of chlorides, however there are significant safety costs when chlorides aren't used
 - Related to this is the need to manage level of service expectations of the public
- The use of brine and pre-wet salt reduces overall chloride use while providing the same risk mitigation benefits
- Minnesota DOT has developed a Salt Sustainability program which includes a dashboard which analyzes sources of salt contamination
- Environmental issues go beyond just salt – Total carbon footprint measurement should be understood for maintenance operations and reduced where possible

An aerial photograph of a snow-covered road winding through a hilly landscape. The road is the central focus, curving from the bottom left towards the top right. The surrounding hills are covered in a thick layer of snow, with some darker patches of vegetation visible. The sky is a pale, overcast blue. The overall scene is serene and wintry.

2023 International Road Weather and Winter Maintenance Conference

Overview & Highlights

Conference Objective

The objective of the conference was to provide a forum for the exchange of information on the state-of-the-art and state-of-the-practice in research and technology applications to Road Weather and Winter Maintenance Operations.

Conference Structure

- Plenary Speakers
 - John Scrivani, Virginia Department of Transportation
 - Laura Fay, Western Transportation Institute
- Lightning Round Sessions
 - 39 presentations, posted online at:
 - <https://trb.secure-platform.com/a/solicitations/102/sessiongallery/schedule/items/1625>
 - <https://trb.secure-platform.com/a/solicitations/102/sessiongallery/schedule/items/1630>
- Breakout Sessions
 - TOPIC A: Advancements in Winter Maintenance – Equipment and Materials
 - TOPIC B: Performance Improvement in Winter Maintenance and Road Weather Management
 - TOPIC C: Resiliency and Weather-Responsive Transportation Management
 - TOPIC D: Advancements in Winter Maintenance – Information Management & Decision Support
- Report Outs from the Breakout Sessions



Conference Highlights

- Excellent presentations, engaged participants and in-depth discussions
- Some emerging Needs Statements:
 - **Research:** Compare and contrast grip data from non-intrusive sensors versus floating car data
 - **Research:** Develop standard rules of practice for mobile friction measurement (device mounting, etc.)
 - **Research:** Better integration of road weather and work zone management – improve road weather management efforts in work zones (e.g., flooding)
 - **Synthesis:** Document how agencies communicate road condition and related information to the public (but also communication within the agency and across agencies)
 - **Synthesis:** Explore employment concerns, challenges and solutions in the maintenance area

Presentations Profiled at TRB 2024

- **Correlation Between Floating Car Data and Road Weather Information Implemented for Winter Maintenance Follow-Up by Monitoring the Road Friction**
 - Sofia Sollén, Lulea University of Technology
- **Performance of a Winter Road Maintenance Decision-Support System**
 - Shawn Truelson, DTN
- **Performance Metrics for Winter Operational Planning**
 - Greg Jones, FHWA
- **Artificial Intelligence and Roadway Friction Modeling**
 - Curtis Walker, National Center for Atmospheric Research
- **Use of Probe Speed Data to Assess Winter Maintenance Effectiveness**
 - Dave Huft, South Dakota Department of Transportation
- **Salt Sustainability: An Effort in Operational Performance Monitoring at the Minnesota Department of Transportation**
 - Ben Hershey, DTN
- Abstracts from conference: <https://annualmeeting.mytrb.org/OnlineProgramArchive/Details/20888>

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