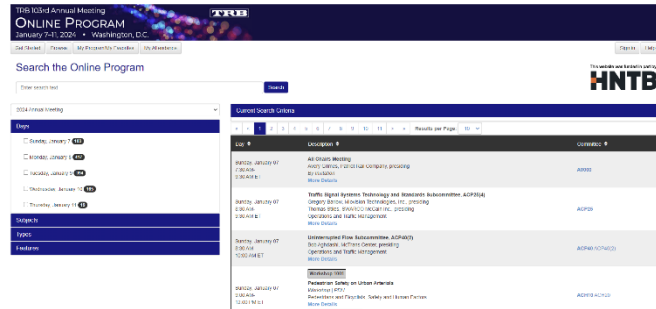




# Winter Maintenance at the 2024 TRB Annual Meeting

## Resource Spotlight: TRB Annual Meeting Online Portal

If you're searching for the latest research on a transportation topic, be sure to visit the [TRB Annual Meeting Online Program](#). The program includes papers, posters and presentation materials from the 2024 Annual Meeting as well as the previous three meetings.



Below we've compiled selected links to the posters, presentations and papers related to winter maintenance presented at the 2024 Annual Meeting. **Registration, attendance and access to materials are free for employees of state DOTs and other TRB Sponsor organizations.** Sign in to the Online Program to access all the resources shown here.

If you have trouble accessing this information, check with your DOT or other transportation library.

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## Equipment and Facilities

### **24-01731 Model-Scale Investigation of Snow Flow Dynamics and Cast Characteristics of Snowplows**

[Lectern Session](#)

Alex Klein-Paste, Oda Aspevold

*Norwegian University of Science and Technology (NTNU)*

## Materials

### **24-00680 Dilution Rate of Solid NaCl Anti-Icers Under Freezing Rain Conditions**

[Lectern Session](#)

Scott Koefod

*Cargill Salt Group*

### **24-04140 Implementation of Salt Stockpile Inventory Using LiDAR Measurements**

[Poster Session](#)

Justin Mahlberg, Haydn Malackowski, Mina Joseph, Yerassyl Koshan, Raja Manish, Zach DeLoach, Ayman Habib, Darcy Bullock

*Purdue University, Indiana Department of Transportation*

### **24-20222 Salt Sustainability: An Effort in Operational Performance Monitoring at the Minnesota Department of Transportation**

[Lectern Session](#)

Ben Hershey

*DTN, LLC*

### **24-04150 Winter Maintenance Multi-Spectral Performance Evaluation: Salt Brine Versus Solid Salt Applications**

[Poster Session](#)

Boris Claros, Cesar Andriola, Madhav Chitturi, Andrea Bill, David Noyce

*University of Wisconsin, Madison*

## Infrastructure, Pavements and Bridges

### **24-20220 Artificial Intelligence and Roadway Friction Modeling**

[Lectern Session](#)

Curtis Walker

*National Center for Atmospheric Research (NCAR)*

### **24-20203 Correlation Between Floating Car Data and Road Weather Information Implemented for Winter Road Maintenance Follow-Up by Monitoring the Road Friction**

[Lectern Session](#)

Sofia Sollén

*Lulea University of Technology*

**24-02270 Design and Implementation of a Full-Scale Shallow Geothermal Bridge De-Icing System in North Texas**

[Lectern Session](#)

Aditya Deshmukh, Alireza Fakhrabadi, Gang Lei, Xinbao Yu, Anand Puppala  
*Texas A&M University, The University of Texas at Arlington, Texas A&M University College Station*

**24-02450 Enhancing Winter Road Maintenance with Explainable Artificial Intelligence: Shapley Additive Explanations Analysis for Interpreting Machine Learning Models in Road Friction Estimations**

[Poster Session](#)

Xueru Ding, Tae Kwon  
*University of Alberta*

**24-20093 The Future of Road Weather: Transportation Perspective**

[Lectern Session](#)

Richard Nelson  
*American Association of State Highway and Transportation Officials*

**24-04855 Multi-Functionalization of Rumble Strips for Improving Snowplow Resistance of Retroreflective Pavement Markers**

[Poster Session](#)

Savitha Srinivasan, Md Al Amin, Mike Rung, Raissa Ferron  
*University of Texas, Austin; Texas Department of Transportation*

**24-02960 Predicting Winter Road Surface Conditions Using a Data-Driven Approach**

[Poster Session](#)

Jeswin Wilson, Bo Yuan, Ali Amadeh, David Orr, Ke Zhang,  
*Cornell University, Cornell Local Roads Program*

**24-01414 Unveiling the Black Box Through Explainable Artificial Intelligence for Winter Road Surface Conditions Prediction**

[Lectern Session](#)

Mingjian Wu, Tae Kwon  
*University of Alberta*

**24-02117 A Winter Pavement Temperature Prediction Model Based on Transfer Learning and Long- and Short-Term Memory Neural Networks**

[Poster Session](#)

Shumin Bai, Bingyou Dai, Zhen Yang, Wenchen Yang, Yuwei Fang, Feng Zhu  
*Tongji University, Kunming University of Science and Technology, National Engineering Laboratory for Surface Transportation Weather Impacts Prevention, Nanyang Technological University*

## Technology, Information Systems and Performance Management

### **24-04940 Developing a Prototype of a Digital Twin for Winter Road Maintenance**

[Poster Session](#)

Yasuhiro Nagata, Toru Hagiwara, Sho Takahashi, Masahiro Yagi, Genki Ooi  
*Hokkaido Development Engineering Center, Hokkaido University*

### **24-20218 Performance of a Winter Road Maintenance Decision-Support System**

[Lectern Session](#)

Shawn Truelson  
*DTN, LLC*

### **24-20219 Performance Metrics for Winter Operational Planning**

[Lectern Session](#)

Gregory Jones  
*Federal Highway Administration (FHWA)*

### **24-20221 Use of Probe Speed Data to Assess Winter Maintenance Effectiveness**

[Lectern Session](#)

Dave Huft  
*South Dakota Department of Transportation*

### **24-02888 Using Connected Vehicle Data to Assess the Impact of Winter Road Maintenance Operations on Traffic Safety**

[Lectern Session](#)

Minsoo Oh, Jing Dong-O'Brien  
*Iowa State University*

### **24-01390 Using Explainable Artificial Intelligence for Enhanced Understanding of Winter Road Safety: Insights with Support Vector Machines and Shapley Additive Explanations**

[Poster Session](#)

Zehua Shuai, Tae Kwon, Qian Xie  
*University of Alberta*