

VTrans Research - <https://vtrans.vermont.gov/planning/research>

Access past Symposiums & Newsletters - <https://vtrans.vermont.gov/planning/research/learn>

2022

Symposium Logistics

SEPTEMBER 14, 2022

EMILY PARKANY, RESEARCH MANAGER, VERMONT AGENCY OF
TRANSPORTATION

Annual September Research and Innovation Symposium

- Held in September since 2017
- Initially motivated as a way to share what we are doing with Research
- Wanted to combine with annual STIC Stakeholders meeting because that's who we wanted to learn about our research
- Hybrid this year. More Details (27 projects): <https://vtrans.vermont.gov/planning/research/2022-symposium>



Each Project has a Web Page

- Fact Sheet
- Poster
- Recording from Technical Sessions
- Additional links
- All web pages are found here: [2022 Hybrid Research and Innovation Symposium | Agency of Transportation \(vermont.gov\)](https://2022.HybridResearchandInnovationSymposium|AgencyofTransportation.vermont.gov)



Jonathan Dowds and James Sullivan
University of Vermont Transportation Research Center

Introduction

Planning for snow and ice control (SIC) activities is a persistent challenge for VTrans due to variability in winter severity and limited understanding of the relationship between severity and SIC costs. The purpose of this project is to develop an implementation-ready tool for estimating the cost of achieving the Agency's SIC performance targets across a range of weather conditions.

To create this tool, the research team utilized a decade of SIC cost data from VTrans' Maintenance Activity Tracking System (MATS) database and weather data from the National Oceanic and Atmospheric Administration (NOAA), the investigators explored the relationship between SIC costs and winter severity. The locations of VTrans garages in the MATS database and NOAA stations used for the project are shown in Figure 1.

Winter Severity Metrics

The research team explored a variety of winter severity measures and determined that the Accumulated Winter Season Severity Index (AWSSI) was best suited for analyzing the relationship between severity and SIC cost. The AWSSI is calculated from daily snowfall, snow depth, and minimum/maximum temperature at NOAA stations and has several desirable features:

- Good coverage across the state
- Long accurate historical data record
- Daily, storm-level (multi-day) and season-level scoring are all feasible
- Independent of SIC activities because NOAA stations are not on the road network



Figure 1. VTrans garages and NOAA weather stations

Correlation Between SIC Costs and Winter Severity

After aggregating SIC costs and daily AWSSI scores into multi-day storm events, cost and severity were highly correlated with an R^2 of 0.74 across ten years of data (see Figure 2). This relationship was also robust at the individual garage level for all garages in the state. Table 1 shows the range of storm severity scores for the central garage in each maintenance district.

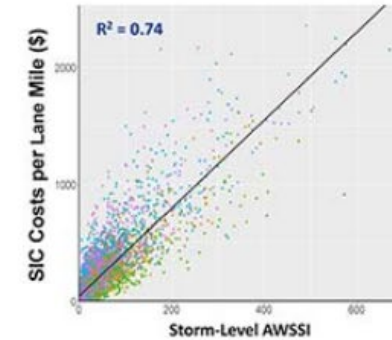


Figure 2. SIC cost versus storm severity

Table 1. Historical storm severity

Garage	Storms Per Season		Storm AWSSI	
	Mean	Max	Mean	Max
Bennington	25	30	20	502
Durhamston	19	23	24	324
Mendon	25	29	26	330
White River	20	24	22	336
Colchester	22	25	27	322
St Johnsbury	24	29	34	421
St Albans	20	25	32	367
Derby	20	26	46	575

Next Steps

Friction data collected at Road Weather Information System (RWIS) stations are being used in conjunction with the NOAA data to create a new SIC performance measure that captures the Grip loss on the roadway relative to the storm severity. This performance measure will be used to stratify historical SIC performance. The final tool will use performance levels to provide a range of cost estimates for seasonal SIC activities when presented with a winter forecast. This tool will enable VTrans to make data-driven decisions about appropriate levels of investment in SIC for a given winter.

Acknowledgments

The research team is grateful for the support of Project Champion Ken Valentine and the active participation of the Technical Advisor Committee.

[Fact Sheet](#) [Video](#) [Other](#) [Q&A](#)

Presenter: Jonathan Dowds, UVM

[VTrans Project Page](#)

Research and Innovation Newsletter

Volume 17 | August 22, 2022 [View as Website](#)

RESEARCH & INNOVATION

VERMONT
AGENCY OF TRANSPORTATION

2022 HYBRID RESEARCH & INNOVATION Poster Symposium

Hybrid September Research and Innovation Symposium!

The Vermont Agency of Transportation (AOT) September Research and Innovation Symposium is hybrid this year! We will be hosting the Symposium on September 14th at AOT's Dill Building at 2178 Airport Road, Barre. Stop by for one or two sessions and to talk with our researchers and innovators. For those who cannot join us in person, we will broadcast the breakout sessions and the plenary session live online. We are planning four breakout sessions featuring short presentations of each Symposium project, a plenary session with a climate change keynote speaker, tours of the Materials Lab and the Transportation Management Center (TMC), project poster and demonstration stations manned by the Project Researcher/Champions, and some light refreshments! New this year, we are including People's Choice Awards so you can vote for your favorite posters and demonstrations.


If you can't fit any participation into your schedule, do not worry! Similar to other years, we will make the 2022 Symposium website available before, during, and after the Symposium so you can review all the posters, fact sheets, and presentation videos or the 27 projects featured this year.

More Symposium details, registration, and virtual links are available here:

[Find Out More and Register](#)

Featured Projects


are just five of the projects that will be featured in our September Research and Innovation Symposium. Project descriptions, fact sheets, and linkings for all of our projects can be found [here](#). Web pages for previous Symposiums can be found [here](#). Project pages for AOT-funded Research Projects are found [here](#).



Determining Deleterious Crushed Recycled Glass

Processed glass aggregate (PGA) has the potential to replace sand borrow glass out of landfills.

[More Info Here](#)



Field Metalizing a Steel Bridge

Metalizing could present a cost-effective alternative to painting as a protective coating for steel bridge structures.

[More Info Here](#)

- Uses Symposium projects as “Featured Projects” in the Newsletters
- Points to Symposium Project Pages, External Research Project Pages
- Expect Newsletters in November (Soliciting Research Ideas and Qualified Researchers), February, May, and August (Symposium 2023!)

Research and Innovation Newsletter



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2022 Project List



Session A: Materials (8:30-9:30, Dill A Room 135)

- A1- Evaluating the Dynamic Cone Penetrometer for Reclaimed Stabilized Base Characterization, Jacob Wimett, GEODesign +
- A2- Determining Deleterious Content in Crushed Recycled Glass, Mandar DeWoolkar, UVM
- A3- Properties of Asphalt Binder after Extended Aging in a Pressure Aging Vessel, Laura Behymer, VTrans +
- A4- Evaluation of Stripping Potential Tests for Bituminous Concrete, Bijay K-C, UVM
- A5- Balanced Mix Design (BMD) Benchmarking of Asphalt Mixtures, Aaron Schwartz, VTrans +
- A6- Stone Matrix Asphalt (SMA), Ian Anderson, VTrans +

Session B: Structures, Construction and Concrete (8:30-9:30, Dill A Room 126)

- B1- Parametric Study of the Impact of the Variation of Stiffness at the Abutments and the Span Length on the Displacement and Moment Profiles of Steel Piles in Non-Skew Integral Abutment Bridges under Thermal Expansion, Susan Faraji, UMass Lowell
- B2- Field Metalizing A Steel Beam Bridge, J.B. McCarthy, VTrans
- B3- Achieving a Smooth Ride by Automated Machine Guidance, Ryan Darling, VTrans +
- B4- Stainless Steel Coated Rebar for Chloride Resistant Concrete Highway and Bridges, Sam McAlpine, Allium Engineering Inc. +
- B5- Laboratory Evaluation of VTrans Rapid Setting Concretes (RSC) used in Accelerated Bridge Construction Projects, Spencer McKinnon, UNH +
- B6- Performance Testing of Low Carbon Footprint Concrete Mixes, Anna Casavant, UVM +

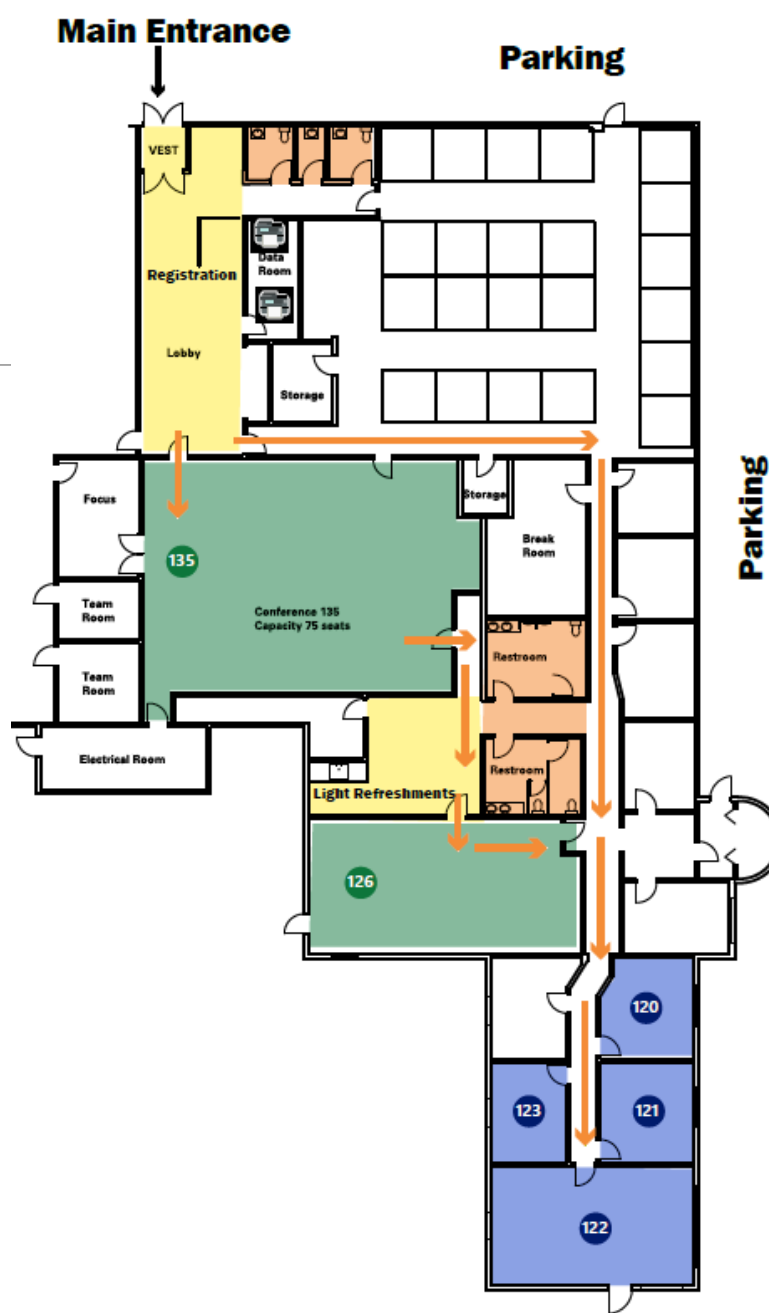
Session C: Asset Management and Condition (12:00-1:00, Dill A Room 126)

- C1- Advanced NDE Inspection of Bridge Decks Using Infratek "Insight" Solution, Amir Rezvani, Infratek
- C2- Civil Integrated Management (CIM) - A New Approach to Managing Transportation Infrastructure Information, Rick Scott, VTrans
- C3- UAS for Public Outreach and Education, Evan Robinson, VTrans +
- C4- RFID and Wireless IoT Technologies for Transportation Maintenance Operations and Asset Management, Tian Xia, UVM +
- C5- Object Tracking and Geo-localization from Street Images, Daniel Wilson, UVM +
- C6- Relationships Between Winter Severity, Pavement Condition, and VTrans' Cost of Snow and Ice Control (SIC), James Sullivan, UVM
- C7- Mobile Wireless Drive Test, Corey Chase, Department of Public Services +

Session D: Planning and Safety (12:00-1:00, Dill A Room 135)

- D1- Coordinating State Policies, Laws and Regulations for Automated Driving Systems Across New England, Greg Rodriguez, Stantec
- D2- Traffic Safety Toolbox - Addressing Speeds, James Sullivan, UVM
- D3- Vermont Smart Growth, VMT and GHG Research, Ted Mansfield, RSG
- D4- Safer and Healthier Public Transit Rides, Daniel Currier, VTrans
- D5- Effectiveness of Rectangular Rapid Flashing Beacons (RRFBs) at Mid-Block Crosswalks, Dana Rowangould and Parsa Pezeshknejad, UVM
- D6- Value of VTrans Research: Qualitative and Quantitative Analysis, Greg Rowangould, UVM
- D7- AOT Innovates! Ensuring Employees at All Levels of the Organization Can Identify a Problem or Opportunity, Develop and Implement an Innovative Solution, and Share Their Improvements with Others, Amanda Gilman-Bogie, VTrans +
- D8- Strategic Highway Safety Plan Website, Benjamin Howe and Scott Reigel, VTrans +

Symposium Layout



People's Choice Awards!



New this year!

People's Choice Awards

Four things to vote on:

1. What project has the biggest “WOW” factor?
2. What project has the most connection to your work? Or do you find most interesting?
3. What project has the best “Poster Plus”?
4. What project has the best Technical Session Highlights Presentation?

We are also asking for Symposium feedback

EXTRAS

NEW THIS YEAR! Light Refreshments! Thank you to F&A and Highways for making this happen and thank you to the staff managing the food in the break room!

TOURS! Advance sign-ups were popular! Thank you to Materials Lab and TMC staff for offering the tours. We may be able to accommodate more people for the 1:30 TMC tour.

SYMPOSIUM SUPPORT: Thank you to VHB for supporting the Symposium this year and helping with the hybrid sessions, set-up and dismantling, registrations/name badges, etc. Look out for the post-Symposium electronic newsletter (including the People's Choice award winners)

VOTE for People's Choice Awards! (In person and virtual can/should vote.)

Thank you!

QUESTIONS?

EMILY PARKANY, EMILY.PARKANY@VERMONT.GOV