

2018 Research Symposium

Snow and Ice Control Performance Measurement: Comparing "Grip", Traffic Speed Distributions and Safety Outcomes during Winter Storms

& STIC Annual Meeting

RESEARCH PROJECT TITLE

Snow and Ice Control Performance Measurement: Comparing "Grip", Traffic Speed Distributions and Safety Outcomes during Winter Storms

STUDY TIMELINE

October 2017 – March 2019

INVESTIGATORS

Jonathan Dowds, UVM TRC, PI
Jim Sullivan, UVM TRC, co-PI

VTRANS CONTACTS

Todd Law, State Maintenance Engineer
Ken Valentine, Central Garage Superintendent

This fact sheet was prepared for the 2018 VTrans Research and Innovation Symposium & STIC Annual Meeting held at the State House in Montpelier, VT, on September 12, 2018 from 8:00 am– 1:00 pm.

Fact sheets can be found for additional projects featured at the 2018 Symposium at

<http://vtrans.vermont.gov/planning/research/2018symposium>

Additional information about the VTrans Research Program can be found at

<http://vtrans.vermont.gov/planning/research>

Additional information about the VTrans STIC Program can be found at <http://vtrans.vermont.gov/boards-councils/stic>

Introduction or Problem Statement

Potential issues with the ITD/Vaisala method for calculating winter performance of roadway snow and ice control (RSIC) include:

- the "black-box" computation of Grip
- the need for additional, Vermont-based validation of Grip
- the need for revisions to the measures of storm severity

Validation of the thresholds where Grip corresponds to traffic speeds and safety are also needed to relate Grip to VTrans' "safe roads at safe speeds" goal.

Methodology and Action Taken

Task completed for this project include:

- Collect winter 2016 – 2017 and 2017-2018 data
- Reverse-engineer the proprietary Grip formula
- Review all available literature on Grip and surface condition
- Compare Grip to ADD to explore whether crashes can be related to Grip and ADD
- Review storm/winter severity indices for Vermont applicability

Conclusions and Next Steps

A combined exponential / log model for calculating Grip from ice, snow and water thickness was derived that yields an R^2 of 0.96. The model was validated on the data from 2017-2018 and again it yielded an R^2 of 0.96.

Instances when ADD and Grip converge have been identified and are being cross-referenced with crashes and state-police responses, but that work is ongoing.

Potential Impacts and VTrans Benefits

This project relates directly to VTrans Strategic Goals Two (to preserve, maintain and operate the transportation system in a cost effective and environmentally responsible manner) and Three (to cultivate and continually pursue innovation, excellence and quality customer service). Since cost effectiveness cannot be evaluated without an outcome measure, effective performance measures are essential for documenting, and potentially improving upon, the cost effectiveness of SIC operations. In addition, the performance measures provide an opportunity to improve customer satisfaction through information transparency.