CLEAR ROADS
research for winter highway maintenance

RESEARCH BRIEF

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TRAINING FOR USING WINTER WEATHER SEVERITY INDEXES

RESULTS SUMMARY

Three training modules, each tailored to a specific management audience, will inform transportation agency leaders about winter weather severity indexes and support management in implementing the indexes in winter maintenance operations.

PROJECT DETAILS

Project Title: Training Module Development for Evaluation of Storm Severity Index (SSI)/Winter Severity Index (WSI) Variables

Project Number: CR21-04

Project Cost: $31,585

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Project Co-Champions:
James Morin
Washington State Department of Transportation
morinj@wsdot.wa.gov

Paul Denkler
Missouri Department of Transportation
paul.denkler@modot.mo.gov

Investigator: Randeep Kaur
Focus EduVation
randeepkaur.s@focusedusolutions.com

Need for Research

Many factors and variables contribute to the severity of both an individual winter storm and entire winter seasons. If agencies can translate the information from these variables into a single severity value, or index, they can calculate the severity of a winter storm and season. The severity index then becomes an effective tool for maintenance staff to estimate the impact of weather on roadway maintenance resources and manage its assets between winter storms and seasons.

The Storm Severity Index (SSI) and Winter Severity Index (WSI) use an algorithm that considers many factors and variables of winter storms and winter seasons to calculate this single value. Once the index is calculated, agencies can use it to perform comparative analyses across these values to improve decision-making and evaluate budgets. For example, this type of analysis could identify optimal amounts of road salt to apply for each given level of winter storm severity.

Creating a process to calculate these indexes is complex, and transportation agency management needed training to better understand the benefits of these indexes and support their implementation in winter maintenance operations.

Objectives and Methodology

The goal of this project was to synthesize the research and guidance about winter weather severity indexes provided in a previous Clear Roads project and use this information to develop training modules tailored to the needs of staff at three levels of winter weather management: upper management, snow and ice managers, and supervisors.

Each of the modules, which range from 30 to 60 minutes, contains similar information that provides a foundational understanding of SSI and WSI and the required data for calculations. For example, agencies need to determine what resources and weather data are available to help them choose a specific approach and design to calculate these indexes. Beyond these topics, the training focuses on the specific needs of each level of winter weather management to successfully implement and use the information.

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Informing transportation agency management about the benefits of winter weather severity indexes will support their implementation in winter maintenance operations and enhance level of service to travelers.

Results

The training modules present definitions, measurements, benefits and applications for winter maintenance. The emphasis of each module is summarized below:

- **Upper management module:** Contains higher level material such as the agencywide benefits of implementation and resource needs.
- **Snow and ice manager module:** Addresses all aspects of SSI/WSI, including program creation, implementation and maintenance. This module is the most detailed of all of the modules.
- **Supervisor module:** Targets effective uses for the indexes, identifying key variables and data sources and assessing results to make recommendations.

The trainings use audiovisual materials, discussion topics and required interactive knowledge checks to ensure managers thoroughly understand the material. Viewers receive immediate feedback based on their answers. Additionally, the trainings provide many real-life examples that highlight the usefulness of using both the SSI and WSI. For increased interactivity, the trainings task snow and ice managers with identifying the data and resources available to determine the most appropriate methodology for calculating the indexes for their agencies.

To guide agencies through the decision-making process, the training provides up to 10 different methods for calculating the SSI and WSI. Each method uses a unique set of parameters and data points. Agencies must then determine the best set of parameters for their specific use.

Implementation and Benefits

This project developed detailed guidance and training for staff at three levels of winter weather management regarding the implementation and use of the SSI and WSI. These trainings will assist each agency in deciding the specific approach and design to use to calculate these indexes based upon the resources and weather data available.

Once implemented, these indexes create expanded opportunities for analyzing issues such as severe weather storm responses and resource allocation. Additionally, the WSI will allow agencies to compare the overall severity of winter seasons from year to year to analyze larger-scale winter management practices and strategies.

"These indexes are important to managing a winter program. The training modules will allow staff to better implement the indexes and create opportunities for analyses to improve planning and allocate resources."

Project Co-Champion James Morin
Washington State DOT
morinj@wsdot.wa.gov

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