

Research in Progress

Development of a Salt Spreader Controller Program Using Machine-Sensed Roadway Weather Parameters

Research Need

Massachusetts treats more than 15,000 lane miles during winter. It is critical to deliver the materials efficiently and effectively so that the impacts of winter storms on road operations are minimized while the utilization of the materials is maximized to reduce potential environmental impacts.

Goals/Objectives

This proposed study aims to develop and validate an automated system that can automatically adjust the spreader controller based on the acquired mobile RWIS sensor data, such as road temperature, grip level, and surface state. The anticipated products include a hardware/software program that enables automated roadway treatment with minimum supervisor/plow driver's intervention. The program will consist of essential hardware, RWIS data acquisition software, and the spreader controlling algorithm. The research team will also provide recommendations on utilizing the developed programs through tutorials and presentations.

If successful, the outcome of this study will include a sensor-based material application decision model and the recommended configurations for sensor instrumentation so that it lays a critical foundation for seamless integration and successful implementation for a more extensive fleet of MassDOT winter operation vehicles in the future.

Project Information

This project is being conducted as part of the Massachusetts Department of Transportation (MassDOT) Research Program with funding from Federal Highway Administration (FHWA) State Planning and Research (SPR) funds.

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Performing Organization:

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Project Champion:

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Project Start Date:

April 25, 2022

Expected Project Completion Date:

April 30, 2024

Methodology

The research team proposes to develop the automated system with three sequential modules, including 1) RWIS data acquisition module (an I/O library that will acquire, organize, transfer, and store the acquired data from the mobile RWIS sensor); 2) Treatment decision-making module (an automated decision-making algorithm for determining if roadway treatment will be withheld or delivered); 3) Spreader control module and user interface (a controlling interface that can execute the decision).

The research team will calibrate the developed automated program and validate the performance through tests on actual road surfaces. The team will also prepare the tutorial and training materials for the developed program for future practice.

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