

State Planning and Research Program Quarterly Report

PROJECT TITLE: *Determining the Migration of Chloride-Based Deicers through Different Soil Types*

OBJECTIVES: This project aims to achieve a clear, quantitative picture about the physicochemical properties of various types of soils (texture-based, commonly used in the areas of interest) and migration behavior of selected deicers through these soil types.

PERIOD COVERED: April 1 – June 30, 2024

PARTICIPATING AGENCIES: Minnesota Department of Transportation, Clear Roads Technical Advisory Committee, Washington State University – Prime, and Roadtech, Inc. – Subcontractor

PROJECT MANAGER:

Hafiz Munir / Tom Peters

SP&R PROJECT NO:

MnDOT No. 1047792

PROJECT IS:

 Planning

 X Research & Development

LEAD AGENCY: MnDOT

Federal Project No.

TPF-5(353)

PRINCIPAL INVESTIGATOR:

Xianming Shi, Ph.D., P.E., WSU

ANNUAL BUDGET:

\$99,978

PROJECT EXPENDITURES TO DATE:

\$87,049

WORK COMPLETED:

Project Management: The PI submitted the quarterly progress report in Jan. 2024. A six-month no-cost time extension was approved by MnDOT, which extended the project end date to Nov. 30, 2024.

Task 1. Literature Review and Survey (100% complete).

Task 2. Developing the Testing Plan (100% complete).

Task 3: Execution of the Testing Plan (80% complete). We submitted a summary of experimental testing results thus far, in April 2024. Please see the status info below.

SUMMARY OF ACTIVITIES EXPECTED TO BE PERFORMED NEXT QUARTER:

Work in the coming quarter will consist of project management as well as the completion of Task 3b (Execution of Specific Tests) and the initiation of Task 3c (Compiling Results).

STATUS AND COMPLETION DATE:

The updated project timeline is as follows. We are significantly **behind schedule** in the execution of the laboratory experimental plan, due to underestimated complexity of soil column tests, unexpected delay in reconfiguring the horizontal column tests, and delays in fabricating additional soil columns (to greatly increase the number of soil column tests we could run concurrently, because each test needs 5 replicates). With the addition of new soil columns, we estimate that it would take **another six months** before we can conclude all the laboratory tests, i.e., Task 3 (draft deliverable on Sept. 31, 2024 instead of Feb. 28, 2024). To accelerate the lab testing, we'd like to seek approval by the project panel for us to proceed with Task 4 without waiting for the completion of Task 3, i.e., additional lab testing using the beet juice/salt brine blend.

| Task | Current Task Start Date | Current End Date for Task Approval | Revised Task Start Date | Revised Due Date to Submit Draft Deliverables | Revised End Date for Task Approval |
|------|-------------------------|------------------------------------|-------------------------|---|------------------------------------|
| 1 | 06/01/2022 | 03/31/2023 | No Change | 01/31/2023 | No Change |
| 2 | 12/01/2022 | 03/31/2023 | No Change | 01/31/2023 | No Change |
| 3 | 04/01/2023 | 10/31/2023 | 04/01/2023 | 02/28/2024 | 04/30/2024 |
| 4 | 10/01/2023 | 01/31/2024 | 03/01/2024 | 04/30/2024 | 06/30/2024 |
| 5 | 09/01/2023 | 01/31/2024 | 04/01/2024 | 05/31/2024 | 07/31/2024 |
| 6 | 01/01/2024 | 05/31/2024 | 05/01/2024 | 08/31/2024 | 10/31/2024 |