



0-6996: Increasing Safety of Winter Weather Operations

Background

Winter weather maintenance operations for TxDOT maintenance crews is an extremely dangerous job. Despite every precaution taken by the maintenance operators, winter operations vehicles have been hit in the rear, causing injury to the operators as well as the travelling public. Synthesis of successful methods and technologies was needed to recommend the best practices that will improve the safety of TxDOT winter operations, as well as save cost and time. The objectives of this synthesis research project were to (1) synthesize and critically evaluate existing methods and devices used by various TxDOT districts for enhancing the safety of winter weather operations; (2) identify and evaluate the applicability of innovative methods and devices used by other U.S. States; and (3) recommend appropriate practices for TxDOT maintenance crews for utilizing the best methods and devices during winter weather operations considering the conditions of different TxDOT districts.

What the Researchers Did

The research findings were obtained through an extensive literature review, fact-finding surveys, structured follow-up interviews, and case studies. A thorough review of the literature was conducted to obtain a detailed understanding of methods used to increase the visibility of winter operations vehicles in Texas and in states other than Texas. The findings of the literature review were used to develop two surveys, one for all TxDOT districts and another for all states other than Texas to capture the current state of safety

practices in winter weather operations. Responses were collected from 15 TxDOT districts and 10 states other than Texas. Figure 1 shows the locations of survey respondents. Based on the survey responses, structured follow-up interviews were performed with the individuals with the most experience in successful winter weather operations. Overall, the research team conducted six detailed follow-up interviews. The interview participants were asked to provide detailed information on safety methods for winter operations that has been presented as case studies.

What They Found: Recommendations

To ensure the most effective methods for winter operations in Texas, the researchers recommend that:

- Winter operations vehicles have a consistent appearance (for lighting, message signs, markings, etc.) in all TxDOT districts.

Research Performed by:

The University of Texas at Arlington

Research Supervisor:

Mohsen Shahandashti, Ph.D., P.E.

Researchers:

Stephen Mattingly, Ph.D.

Seokyon Hwang, Ph.D.

Wasiq Ameen

Ferika Farooghi

Project Completed:

08-31-2019

- Warning lights be “amber and blue colored” LED lights with “flashing pattern”, which could be dimmed and turned on/off by the operator.
- Message signs have “black text over orange background”, with messages saying “Stay back 250 feet”.
- Retroreflective markings be “red and white colored” and in chevron stripe pattern.
- A Winter Operations Management System (WOMS) be implemented to obtain the current conditions of roads and maintenance crews.
- Each TxDOT district have a dry shed to ensure efficient loading of salt and/or brine.
- Each TxDOT district office in urban areas have a plan for maintenance personnel to be able to shower and rest.

What This Means

According to Clear Roads (a national research consortium for winter highway maintenance), TxDOT has 628 winter operations vehicles. Assuming 9 percent of those winter operations vehicles are involved in accidents annually, occurrence of at least 56 accidents are expected. By improving the visibility of winter operations vehicles, at least 41 of such accidents can be prevented. By utilizing the KABCO scale of injury severity caused by crashes (a scale used by the Federal Highway Administration (FHWA)), it is estimated that preventing 41 winter operations vehicle crashes will save TxDOT seven million dollars per year.

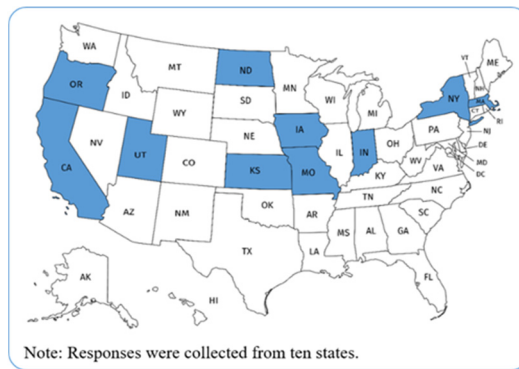
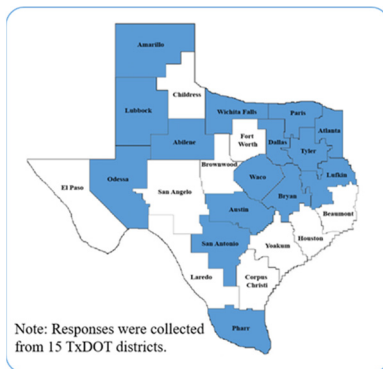


Figure 1 Locations of survey respondents in Texas (left) and in states other than Texas (right)

For More Information

Project Manager:
Joanne Steele, RTI (512)-416-4657

Research Supervisor:
Mohsen Shahandashti, UT Arlington, (817) 272-0440

Technical reports when published are available at
<http://library.ctr.utexas.edu>.

Research and Technology Implementation Office
Texas Department of Transportation
125 E. 11th Street
Austin, TX 78701-2483

www.txdot.gov
Keyword: Research

This research was performed in cooperation with the Texas Department of Transportation and the Federal Highway Administration. The contents of this report reflect the views of the authors, who are responsible for the facts and accuracy of the data presented here. The contents do not necessarily reflect the official view or policies of FHWA or TxDOT. This report does not constitute a standard, specification, or regulation, nor is it intended for construction, bidding, or permit purposes. Trade names were used solely for information and not for product endorsement.