CLEAR ROADS
research for winter highway maintenance

RESEARCH BRIEF

JUNE 2014

UNDERSTANDING THE TRUE COSTS OF WINTER MAINTENANCE

RESULTS SUMMARY

Researchers identified which data states need to collect to be able to directly connect costs to the work they perform and the level of service they provide. They also developed the True Cost Tool to help winter maintenance agencies make and demonstrate these connections.

Winter maintenance agencies are expected to provide adequate levels of service, but costs are increasing while budgets are flat or declining. To maintain or increase budgets, practitioners need to demonstrate to policymakers the connection between costs and levels of service.

Need for Research

Winter maintenance professionals need to understand their costs, not only for communicating with policymakers but also for day-to-day management. By comparing costs across regions or states, they can provide the best possible service at the lowest possible costs by adopting best practices from other jurisdictions that are appropriate to their own. A software tool for tracking, storing and analyzing storm and maintenance data in a consistent way that can be shared across states would be valuable for winter maintenance agencies working to identify best practices, understand cost drivers, and communicate their costs to the public and decision makers.

This research is part of a multiphase effort that began with "Mapping Weather Severity Zones," an effort to standardize the quantification and mapping of winter weather severity across the United States. That project provided a framework for comparing winter weather severity and maintenance costs in different geographic areas.

Objectives and Methodology

This project's goals were to provide tools so winter maintenance agencies could use data to better manage their maintenance activities, improve winter maintenance efficiency and effectiveness, and better understand and communicate maintenance costs to policymakers.

Researchers first analyzed the available winter maintenance data from Clear Roads member states. Because Maine's data set was relatively complete, they chose it for a case study to identify gaps in data and develop recommendations for data collection, recording and storage. Researchers then used the lessons learned from this data and the gaps in it to develop the True Cost Tool, an Excel-based model that allows users to link costs to the work performed and the level of service achieved.

PROJECT DETAILS

Project Title: Understanding the True Costs of Snow and Ice Control

Project Number: No. CR10-03

Project Cost: $150,774.60

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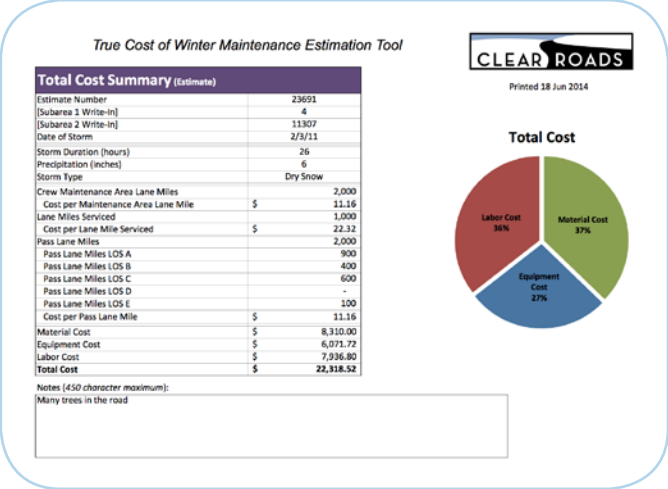

True Cost of Winter Maintenance Estimation Tool

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Total Cost Summary (Estimate)

Estimate Number		23691
[Subarea 1 Write-In]		4
[Subarea 2 Write-In]		11307
Date of Storm		2/3/11
Storm Duration (hours)		26
Precipitation (inches)		6
Storm Type		Dry Snow
Crew Maintenance Area Lane Miles		2,000
Cost per Maintenance Area Lane Mile	$	11.16
Lane Miles Serviced		1,000
Cost per Lane Mile Serviced	$	22.32
Pass Lane Miles		2,000
Pass Lane Miles LOS A		900
Pass Lane Miles LOS B		400
Pass Lane Miles LOS C		600
Pass Lane Miles LOS D		-
Pass Lane Miles LOS E		100
Cost per Pass Lane Mile	$	11.16
Material Cost	$	8,310.00
Equipment Cost	$	6,071.72
Labor Cost	$	7,936.80
Total Cost	**$**	**22,318.52**

Notes (*450 character maximum*):

Many trees in the road

Total Cost

A summary page in the True Cost Tool provides an easy-to-read summary of all winter maintenance costs for a storm and the levels of service achieved to help practitioners communicate the connection between cost and service.

Results

The data currently collected by state departments of transportation (DOTs) varies greatly, but generally falls short of what is necessary to directly link level of service to costs. Additionally, most states' financial systems are separate from their maintenance management systems, and costs are tracked separately from data about the work performed.

This project clarified what data would be needed to accurately measure and compare winter maintenance costs between storms and agencies. It also developed several general recommendations for collecting and storing data, which the True Cost Tool incorporates to guide users in data collection and entry.

The tool allows users to analyze and compare the labor, equipment and material costs of up to four storms or time periods. An additional estimate mode, with an identical but separate interface to avoid contamination of data, allows users to perform what-if testing to evaluate how changes in certain variables will affect costs.

The tool's summary tab displays all winter maintenance costs on a single page to help practitioners easily communicate the relationship between spending and winter maintenance levels of service.

Benefits and Further Research

The True Cost Tool enables what-if testing on unit costs; helps practitioners communicate cost drivers in winter maintenance to policymakers and the public; allows managers to better understand and manage costs; simplifies the comparison of costs across storms, districts or regions, and states; simplifies comparison of contracted versus state maintenance costs; and simplifies comparison of winter maintenance costs over time. It partially met the original goal of facilitating the evaluation of cost-effectiveness of winter maintenance policies: While the tool does not perform this type of analysis, it does collect the information necessary for a practitioner to do so.

While this project failed to accomplish the project's final two original objectives of directly linking assumptions regarding the number and intensity of storms to cost and directly linking levels of service to lane-mile cost, it clearly identifies what is necessary to achieve these objectives:

- Developing a uniform data collection methodology.
- Adapting the True Cost Tool to a web-based format to facilitate sharing.
- Building a comprehensive data set as states use the data collection methodology and True Cost Tool.
- Consolidating and analyzing this data.
- Comparing data to evaluate the impact of several variables, provide benchmark data for comparing an agency's costs, and identify best practices and opportunities for savings.
- Presenting the results.

As states use this tool, more powerful inter-state analysis will become possible. For example, if one state has lower costs than another's, it will be possible to determine whether those reduced costs are the result of improved practices that could be adopted in other jurisdictions.

> "It's very difficult to compare one state to another—we have different levels of service, different equipment levels, different methodologies and different demands from customers. The whole concept of this research is to try to find logical comparisons between different jurisdictions by collecting the same data and using it."

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