

RESULTS SUMMARY

After a winter weather event, transportation agencies often compile available weather data to analyze and assess their response. Finding and assembling the relevant data can be a time-consuming process, but a new web-based tool brings it all together into one easy-to-use resource.

APRIL 2020

NEW TOOL COMPILES WEATHER DATA FOR POST-STORM ANALYSIS

Winter maintenance practitioners can learn a great deal from the details of a winter storm event. As no two storms are the same, each offers unique lessons, providing valuable insight into a transportation agency's strengths and helping staff identify opportunities for improvement.

Need for Research

Evaluating past performance is a critical step toward effecting change and improvement within an agency's operations. Especially for severe events, conducting post-storm studies can help agencies identify the factors—such as weather and road conditions—that impacted the effectiveness of the agency's response. This helps maintenance staff understand why a particular strategy was successful or unsuccessful and set realistic goals for the future.

Gathering the weather data required for an accurate event reconstruction, however, has not always been easy. Websites that capture this information can be difficult to find and are often geared toward meteorologists that are more familiar with the various weather codes and naming conventions. Many also lack an intuitive interface to allow the average user to easily find the information needed for a specific time and place within the United States. As a result, creating post-storm reports often requires a significant investment in staff time and resources.

Objectives and Methodology

The goal of this project was ambitious but clear: To make winter storm data retrieval faster, easier and more efficient.

To achieve this, researchers were asked to design and develop a web-based tool that would gather existing online weather data for a specific location and time and prepare the results in a single clear and comprehensive report.

Researchers began the design process by identifying a list of the data elements a transportation agency would ideally want in an after-event report and categorizing them as surface atmospheric, pavement and upper atmospheric data.

Next, they developed a catalog of online resources that supply those data elements, holding each resource to a rigorous set of standards that prioritized infor-

PROJECT DETAILS

Project Title: Weather Event Reconstruction and Analysis Tool

Project Number: CR16-05

Project Cost: \$93,223

Report Date: January 2020

Project Co-Champions:

Brian Burne

Maine DOT

brian.burne@maine.gov

Patti Caswell

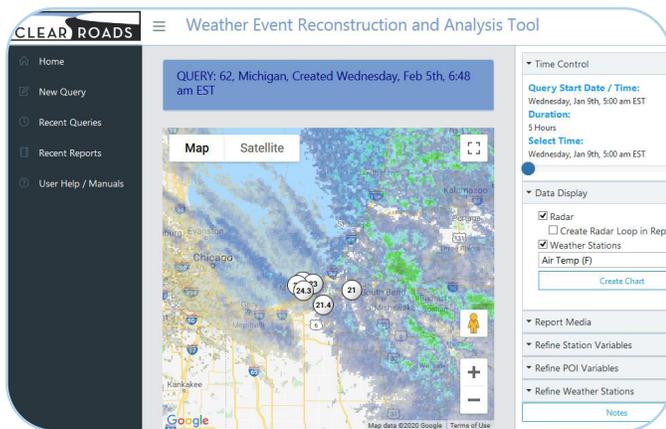
Oregon DOT

patti.caswell@odot.state.or.us

Investigator: Chris Albrecht

The Narwhal Group

calbrecht@narwhalgroup.com



The Weather Event Reconstruction and Analysis Tool developed by Clear Roads offers a one-stop resource for users searching for a variety of historical weather data.

mation completeness, speed and efficiency, and removing those resources that provided redundant or less useful data.

Finally, researchers drafted a mock version of a web-based tool that would allow users to submit their queries and receive the desired data. They took an intentionally minimalist approach to the look and feel of the tool, keeping users' needs in mind.

The Narwhal Group developed the tool according to Clear Roads' specifications, which included instructions to make it as intuitive and easy-to-use as possible; to ensure that it could be installed on the Clear Roads website; and to develop it with nonproprietary programming so that it could be updated by Clear Roads as needed.

Results

After months of testing and incorporating feedback from the Clear Roads Technical Advisory Committee (TAC), the tool went live in 2019. Although intended primarily for use by transportation agencies, it is available to the public as well. Searches are user-friendly, defined by simple parameters: location and time frame. Users can customize their searches, incorporating the following data elements:

Surface Atmospheric Data

- Air temperature.
- Relative humidity.
- Dew point.
- Wind speed (sustained).
- Wind gust speed.
- Wind direction.
- Visibility.
- Precipitation occurrence.
- Precipitation type.
- Liquid accumulation.
- Snow accumulation.
- Solar radiation (cloud cover).

Pavement Data

- Pavement temperature.
- Road surface condition/state.
- Friction.
- Subsurface temperature.

To capture upper atmospheric data, the research team reviewed several options for incorporating satellite or radar data into the tool. They decided to include radar, giving users the option to view a radar imagery loop for the selected time frame.

To help winter maintenance professionals understand the relevant forecasts that were applicable for the specific time and location of interest, the tool also allows users to view past communications from the National Weather Service, such as warnings, watches and advisories. Including forecasts in an after-storm review can help an agency assess how they prepared for the storm with the information they were given.

Search results can be exported as a spreadsheet or PDF to provide additional options for sharing and analyzing data.

Benefits and Further Research

Clear Roads' Weather Event Reconstruction and Analysis Tool is a groundbreaking resource that streamlines the process of gathering the weather conditions that occurred in a specific place, at a specific time. While useful for transportation agencies of all sizes, it will be particularly beneficial for smaller agencies and for those with limited staff resources. Available at clearroads.org/eventreconstruction/, the tool's clean interface makes it easy to retrieve historical weather data for any U.S. location.

To help users understand the tool and make the most of its capabilities, researchers created a written manual and video tutorial. As the tool becomes more widely used, Clear Roads plans to track feedback from users and make minor adjustments as necessary.

"This tool will be a great time saver, especially for smaller DOTs and municipalities that don't have a meteorologist on staff."

Project Co-Champion Brian Burne
Maine DOT
Brian.Burne@maine.gov