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information systems technology**

RESEARCH PROJECT TITLE

Evaluation of the Utah DOT
Weather Operations/RWIS Program
on Traffic Operations –
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Montana State University Western
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Aurora is an international
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Evaluation of the Utah DOT Weather Operations/ RWIS Program on Traffic Operations

project summary

Problem Statement

The transportation community has been aware of the impacts of adverse weather on the roadway system and that the use of weather information can be beneficial in improving traffic operations. Many traffic management centers (TMCs) have integrated weather information into traffic operations. However, studies that provide comprehensive evaluations of how weather information will affect TMC operations have not been conducted.

Objectives

The purpose of this Phase II research study is to evaluate the impacts of the Utah Department of Transportation (UDOT) Weather Operations/Road Weather Information Systems (RWIS) Program on Traffic Operations Center (TOC) operations. Survey results were analyzed to discover how the weather information was used and the benefits achieved.

Background

Phase I of the evaluation focused on developing an internal business case for the Program's utility, based on its effects on winter maintenance. Building on the success of Phase I, Phase II focused on TOC users, such as the incident management team, traffic signal group, and traveler information personnel, who could benefit from the Weather Program.

Research Methodology

The first step in this study was to conduct an extensive literature review on the impacts of adverse weather on traffic operations and safety. Following this literature review, a survey of TOC users was conducted to learn about the effects of the Weather Operations Program on five TOC divisions' operations. The Program's benefits were also analyzed.

Key Findings

Together, the analysis of tangible benefits in Phase I and intangible benefits in Phase II provided a complete picture of how the Program has benefited the agency and helped establish a nationwide prototype of the unique Program with stationed meteorologists who provide year-round and area-specific weather forecasts to various users.

The findings and conclusions of this study are summarized on the next page of this project summary.

- The literature review found that adverse weather had extensive impacts on traffic flow. The degree of impact depended on many factors, such as precipitation intensity, time of day, day of week, and so forth. The effects of weather on traffic flow are summarized in the report.
- The literature review also found that adverse weather affected arterial operations by reducing speed, traffic volume, and saturation flow rate. Using simulations, studies showed that the performance of arterial operations could be improved by implementing weather-responsive signal timing plans, including a more than 10 percent reduction in travel time. Existing studies also showed that adverse weather increased traffic crash risks. A Canadian study revealed that urban crashes increased by 70 percent during precipitation.
- The interviews of TOC users found that the frequency of providing weather forecasts (twice per day, and more when weather situations coming in) met the needs of divisions. The station of meteorologists in the control room made it convenient for communications and update of weather information.
- The weather elements and the time scales of weather forecasts that divisions were most interested in varied, as described in the report. Long-term forecasts (>5 days) were less important to TOC users, than other forecasts.
- The interviews with TOC users showed that the interviewees were very satisfied with the weather service provided by the Program. The divisions relied heavily on the Program for weather information. Most of the divisions did not use other weather information resources. All of the responses indicated that TOC users will continue or increase using weather forecasts.
- The interviews revealed that the use of the Program's weather forecasts was beneficial for TOC users. The benefits to each of the five divisions are illustrated in the following figure. In general, the Program helps divisions organize their staffs more effectively so they can be better prepared for forthcoming weather situations.

