During Incidents.

Evaluation of Various ITS Technology Deployments on Utah's I-15 and I-215 Revealed Safety Benefits and Customer Satisfaction.

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Summary Information

This study evaluated the effectiveness of commonly deployed ITS treatments on Utah's Interstate freeway as of February 2022, with a focus on Variable Message Signs (VMS), traffic cameras, and Road Weather Information Systems (RWIS), from mobility and safety perspectives. Utah and Salt Lake counties were selected as study areas due to the high

number of crashes and wide coverage of VMS. Three primary analyses were conducted: a diversion rates analysis to assess the effectiveness of VMS on Utah freeways during incidents; a weather analysis to evaluate the effectiveness of VMS messages on driver speeds in Utah canyons during winter weather; and an ITS attitudes survey to help plan any potential improvements to the existing system. The survey was distributed to Utah DOT employees over about a 3-month period between November 2022 and January 2023. Overall, 435 complete responses were collected, with 186 partial responses, corresponding to a 30 percent response rate.

METHODOLOGY

In this study, the researchers first performed a before-and-after study to measure the effect of VMS on Utah freeway diversion rates during incidents, focusing on the freeway I-15. After collecting data on crashes, volumes, and speeds, and using a mathematical model, the changes in diversion rates at ramps immediately before an incident were investigated due to the presence of an upstream VMS indicating a crash had taken place or providing information about the congestion caused by the crash. Second, to understand driver behavior in response to VMS messages about weather conditions, vehicle speeds before and after the position of a VMS sign were measured at locations near Provo Canyon, Sardine Canyon, and Weber Canyon in Utah. Observations were sourced from seven different VMS and 47 different messages with unique phrasing and intent across two different winter seasons and used in a mathematical model.

FINDINGS

- The findings of the diversion rates analysis indicated that the activation of VMS messages increased diversion rates by 18 percent.
- The diversion rates analysis also revealed that an approximate decrease in speeds by ten percent corresponds to an increase in diversion rates by approximately 7.8 percent.
- The results from the weather analysis revealed a negligible increase of speed by 0.2 mph due to the presence of VMS conveying weather related information to drivers.
- Survey results were largely positive with a high level of ITS usage and benefits reported by UDOT employees. Specifically, users felt that traffic cameras were “extremely useful” for the purpose(s) they selected. In addition, regarding RWIS, nearly 60 percent of all respondents claimed that for the purpose(s) they use RWIS, it is “extremely useful”. In terms of VMS, users of VMS generally found them to be “moderately” or “extremely useful” for specific purposes they are utilized.

Effectiveness of ITS on Utah Roadways

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Taxonomy (ARC-IT) Traffic Management » Integrated Decision Support and Demand Management (TM09) , Traffic Management » Dynamic Roadway Warning (TM12) , Weather » Weather Data Collection (WX01)

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