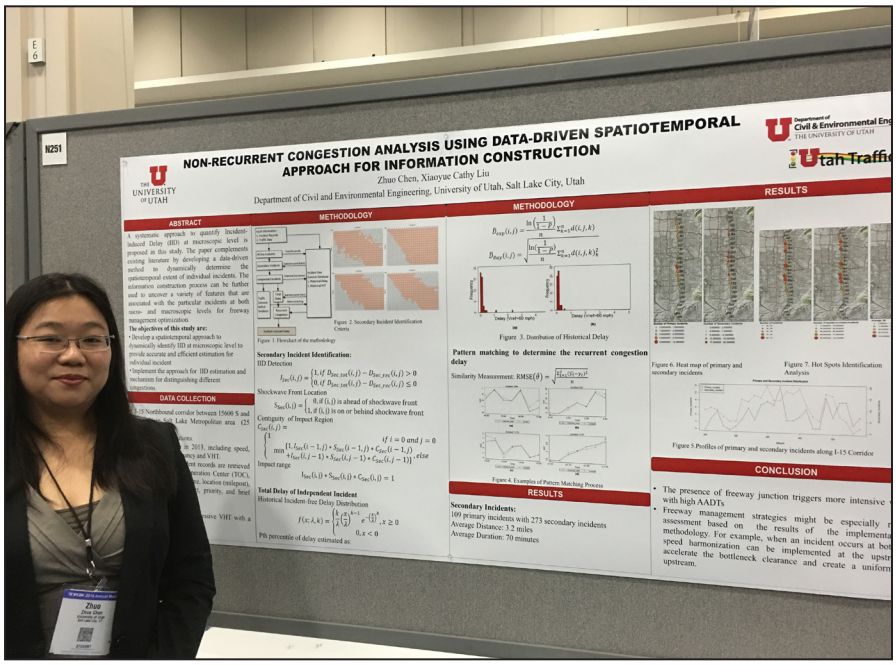
MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 17-316 (project 444) | January 2017

Data-Driven Freeway Performance Evaluation Framework for Project Prioitization and Decision Making



the **ISSUE**

Researchers sought to quantify the impact of nonrecurring congestions, including incidents and adverse weather. The project also strives to provide a linkage between performance measures and decision making by using interpretative indicators to inform decisions.

the **RESEARCH**

The major tasks completed for the research can be broken down into three major components: freeway performance metrics development, incident-induced delay (IID) modeling and secondary incident identification, and weather impact evaluation. Specific tasks included:

- Developed performance measures that can be used to describe the day-to-day variation of traffic conditions and is easily understandable by both practitioners and the general public;
- Developed a data-driven algorithm for secondary incident identification;
- Designed an empirical methodological framework to quantify the IID on freeways, providing reference for incident management; and
- Used pattern recognition to estimate non-recurrent congestion and demand reduction caused by adverse weather.

MOUNTAIN-PLAINS CONSORTIUM REGION 8

A University Transportation Center sponsored by the U.S. Department of Transportation serving the Mountain-Plains Region. Consortium members:

Colorado State University
North Dakota State University
South Dakota State University
University of Colorado Denver
University of Denver
University of Utah
Utah State University
University of Wyoming

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Project Title

Data-Driven Freeway Performance Evaluation Framework for Project Prioitization and Decision Making

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the **FINDINGS**

- Congestion Frequency is presented as the measurement of performance reliability. We identified the hotspots on the I-15 corridor in Salt Lake City during morning and evening peak hours during May to August 2013.
- The IID is not only determined by the severity of incident, but also dependent on the location and time of day. The locations with high incident frequency generally suffer from higher IID than the locations with low incident frequency.
- The results of adverse weather's impact analysis indicate that under the influence of adverse weather travel demand decreases. This is the case for more than 50% of the scenarios. We conclude that in 2013, the adverse weather forecasting system succeeded in alerting the public and preventing severe traffic breakdowns. As roadway condition gets worse, the traffic demand shows a more significant reduction pattern.

the **IMPACT**

The data-driven performance-based approach presented in this study is effective in quantitatively evaluating the freeway mobility/reliability, incident and adverse weather impact. The objectives of this project align well with the goal set forth by MAP-21, which is to establish performance-based transportation programs to guide the transportation capital investment and development. The algorithm developed can be integrated into the operational analysis to identify hotspots along freeway corridors, and assist with project prioritization and decision making.

For more information on this project, download the entire report at http://www.ugpti.org/resources/reports/details.php?id=863

For more information or additional copies, visit the Web site at www.mountain-plains.org, call (701) 231-7938 or write to Mountain-Plains Consortium, Upper Great Plains Transportation Institute, North Dakota State University, Dept. 2880, PO Box 6050, Fargo, ND 58108-6050.