

MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 22-448 (project 534) | June 2022

Traffic Performance Assessment of Disrupted Roadway Networks Following Hazards



the **ISSUE**

Lack of appropriate models for partially blocked roads leads to inaccurate travel time estimates. Unrealistic travel performance assessments of partially blocked roads affect traffic planning, emergency response, and other critical decisions.

the **RESEARCH**

A new approach to develop travel time functions for partially blocked roads in urban areas is proposed to close this gap based on microscopic traffic simulation. First, an improved model for simulating traffic on partially blocked roads is developed by extending the existing cellular automaton model. Second, the improved traffic model is validated at microscopic and macroscopic levels with measured traffic data from an urban road. Third, traffic simulations under various scenarios with different demand flow rates, truck ratios, and blockage ratios are conducted through microscopic simulation experiments. Finally, a set of continuous traffic time functions are further developed for disrupted traffic flow with parameters estimated from the generated traffic data.

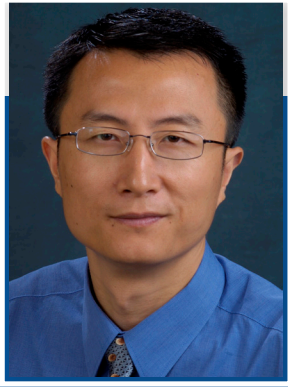


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Project Title

Traffic Performance
Assessment of Disrupted
Roadway Networks Following
Earthquakes

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the **FINDINGS**

The developed travel time functions for a typical urban arterial road are then compared with the standard Bureau of Public Roads function. The comparison suggests that the standard Bureau of Public Roads function considerably underestimates the travel time on partially blocked roads, and the proposed travel time functions offer a more realistic prediction.

the **IMPACT**

This study provides an important tool and methodology for assessing traffic performance after some disruptions with improved accuracy and fidelity.

For more information on this project, download the Main report at <https://www.ugpti.org/resources/reports/details.php?id=1084>

For more information or additional copies, visit the Web site at www.mountain-plains.org, call (701) 231-7767 or write to Mountain-Plains Consortium, Upper Great Plains Transportation Institute, North Dakota State University, Dept. 2880, PO Box 6050, Fargo, ND 58108-6050.



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