

MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 22-488 (project 610) | September 2022

I-80 Hybrid Regulatory Speed Signing Design and VSL System Evaluation



the **ISSUE**

Changeable message signs are designed to have a white legend on a black background based on the Manual on Uniform Traffic Control Devices. However, signs with white legends during winter seasons are less visible in snowstorms and direct sunlight due to the specific road's landscape. Under these conditions, the Utah Department of Transportation transforms variable speed limit (VSL) signs to have amber lettering on a black background. There was a need to document the effectiveness of this strategy.

the **RESEARCH**

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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

Impact of Regulatory Hybrid Changeable Message Sign on Traffic Safety under Different Freeway Geometric Designs

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Utah Department of Transportation

USDOT, Research and Innovative Technology Administration

the FINDINGS

Based on study results, the corridor's average speed and speed variation are reduced after the implementation of new signs. In addition, drivers tend to drive closer to the speed limit, and the compliance rate, which is the critical indicator of the VLS system performance, has improved. The new signs have resulted in significantly lower crash rates and severity. A crash severity decrease is detected mostly during inclement weather such when roads are icy and visibility is reduced, which proves the effectiveness of the new signs in road safety. Also, the safety model shows with high accuracy that road crashes will be reduced using the amber legend for VSL signs.

the IMPACT

The purpose of using an amber legend is to improve visibility and alert drivers of unusual driving conditions downstream. The driver compliance rate and average speed of flow are the VSL system's most common performance indicators on a road. Moreover, studies apply driver reactions and road conditions to evaluate safety. Safety appraisal studies either describe safety qualitatively by analyzing road design policies or numerical equations determining crash rates and their features. Quantitative methods have shown more precise results in road safety areas, and recently, machine learning methods have outperformed other numerical methods.

For more information on this project, download the main report at <https://www.ugpti.org/resources/reports/details.php?id=1108>

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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