

UTC Project Information	
Project Title	MPC-610 – Impact of Regulatory Hybrid Changeable Message Sign on Traffic Safety under Different Freeway Geometric Designs
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Start and End Dates	February 18, 2020 to July 31, 2023
Brief Description of Research Project	The Utah Department of Transportation (UDOT) has implemented a Variable Speed Limit (VSL) zone on a section of I-80 using regulatory hybrid Changeable Message Signs (CMSs). In the current systems, the CMSs have been operated with white LED numbers on the black background. However, it has been found that the visibility of those numbers that indicate speed limits has become a problem during both winter and summer seasons. Hence, UDOT is now in the process of installing a new CMS system which replaces the color of white CMS LED by yellow. In the literature, although many recent studies have studied the impacts of CMS’s visibility on improving safety, limited efforts have studied such impacts under different freeway geometric designs. By collecting historical crash locations in the VSL zones, our research team will further discuss how the new CMS can help to prevent crashes in various geometric design scenarios. By comparing the visibility of yellow-legend and white-legend CMS systems, the results will be discussed for the legend color selection for CMS. The collected safety data will be used to analyze the impacts of CMS on potential crash rate and severity using surrogate safety evaluation method.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	Dynamic traffic management is a solution intended to boost the flow’s operation functionality due to its ability to adapt to continuously changing conditions. Road driving condition is variable in traffic network and requires dynamic control to assure safety for drivers. One of the systems used in dynamic driving environments is VSL which adjusts the speed limit considering the road conditions. Due to the exposure to frequent inclement weather in Parley’s canyon, UDOT has implemented VSL signs on I-80 from MP 128 to 141. This study helped

	UDOT evaluate the benefits of using yellow legends to replace the original white legends in their VSL systems.
Impacts/Benefits of Implementation (actual, not anticipated)	The purpose of using amber legend is to improve visibility and alert drivers of the unusual driving conditions downstream. Driver's compliance rate and average speed of flow are the VSL system's most common performance indicators on a road. Moreover, studies apply drivers' 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 ML methods have outperformed other numerical methods.
Web Links <ul style="list-style-type: none"> • Reports • Project Website 	<ul style="list-style-type: none"> • MPC Research Report – I-80 Hybrid Regulatory Speed Limit Signing Design and VSL System Evaluation