

Key Points:

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DEVELOPMENT OF EARTHQUAKE-RESISTANT PRECAST PIER SYSTEMS FOR ACCELERATED BRIDGE CONSTRUCTION IN NEVADA

PROBLEM

The development of accelerated bridge construction (ABC) techniques and connection details has become a national research focus. Due to aging of the national bridge inventory, many of the bridges in the United States have significant deterioration, often centered on the bridge superstructure. Therefore, concrete deck replacement projects are becoming increasingly common, and can be expedited efficiently with minimal disruption to traffic using ABC.

OBJECTIVE

Nevada is interested in the application of full-depth and partial-depth concrete deck panels. A variety of details for precast deck panels have been implemented by various states and through research, details that would be most compatible with current design practices in Nevada can be found. However, issues specific to Nevada also need to be considered.

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METHODOLOGY

The research tasks to be performed are divided into six tasks. Task one will consist of gathering information from previous studies as well as the experiences and lessons learned from states who have already implemented precast deck panels. Based on task one findings, interim design guidelines for partial and full-depth precast panel will be developed by selecting details that would work well in Nevada for task two. Task three will be to create an implementation plan for Nevada. The project team and NDOT will work to identify which bridges are suitable to implement the project on. Based on the developed guidelines, task four will include selecting a series of superstructure configurations for further investigation using finite element analysis. Task five will consist of updating the design guidelines based on the results found using the finite element analysis for task four. The last task will be to prepare the final report and present the findings to NDOT staff.

IMPLEMENTATION POTENTIAL

The anticipated benefits of the research will accelerate construction of new bridges that will save the state money and minimize inconvenience to state residents. The deck panels can then be site cast by local contractors to keep labor in-state. By only replacing the bridge deck, the life of the existing bridge can be extended at a fraction of the cost of a complete bridge replacement.