DRISI

Caltrans Division of Research, Innovation and System Information

Research Notes

In-Service Structural Evaluation of Box Beam Overhead Sign Structures

Bridge research to provide guidelines to designers on how to transfer inspection results of in-service box beam overhead sign structures into useful information about the remaining strength of the structure.

Geotechnical/ Structures

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Project Title:
In-Service Structural Evaluation of Box Beam Overhead Sign Structures

Task Number: 3673

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Completion Date: November 30, 2024

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WHAT IS THE NEED?

Approximately 670 Box Beam Overhead Sign Structures exist on Caltrans Right-Of-Way. Many of these structures were installed in the late 1960's and early 1970's and so are now about 50 years old. These structures have a history of problems with corrosion damage to connections of the ribbed sheet steel vertical diaphragms (see Figures 1 and 2). Structures Maintenance and Office of Design and Technical Services have difficulties in assessing the structural condition of these structures due to a lack of guidelines on how to interpret inspection results to predict the remaining strength in the degraded structure. This has safety implications as well as interferes with efficient and effective asset management. This research will develop user-friendly guidelines for transferring field inspections of box beam overhead sign structures into useful information about the remaining strength of the structures.

WHAT ARE WE DOING?

Through the PEER-Bridge Program, Caltrans is contracting with the University of California, Berkeley (PI) to investigate the structural condition of in-service box beam overhead sign structures. The research will involve experimental testing and numerical simulation of representative box beam sign components and full sign structures designed according to Caltrans Design Specifications. Parametric studies on a representative sign structure configuration subjected to various loading, environmental, and degraded conditions will be conducted after which the results will be used to correlate with field observations

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of in-service box beam sign structures. Finally, guidelines will be developed for transferring the field inspection results into useful information about the strength of in-service box beam sign structures.

WHAT IS OUR GOAL?

The primary goal of this project is to develop guidelines to interpret field inspections of degraded box beam overhead sign structures in order to assess the remaining strength of the structure.

WHAT IS THE BENEFIT?

Bridges play a critical role in our transportation system in enhancing California mobility and economy. Currently, designers don't have the tools to correlate inspection results of box beam overhead sign structures with the remaining strength of the structure. The capability of predicting the remaining strength of degraded box beam sign structures is required to determine when to replace or repair the sign structure as well as to determine if the sign structure can withstand additional loading if desired to attach additional sign elements to the structure. The aim of this research is to ensure reliability and structural integrity of aging box beam sign structures within California's transportation network.

WHAT IS THE PROGRESS TO DATE?

In-Service Structural Evaluation of Box Beam Overhead Sign Structures project will start on June 01, 2022 and last for 30 months.