

JOINT TRANSPORTATION RESEARCH PROGRAM

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Probability of Detection Study for Visual Inspection of Steel Bridges: Volume 2—Full Project Report

Introduction

Visual inspection is the primary means of ensuring the safety and functionality of in-service bridges in the United States and owners spend considerable resources on such inspections. While the Federal Highway Administration (FHWA) and many state departments of transportation have guidelines related to inspector qualification, training, and certification, an inspector's actual capability to identify defects in the field under these guidelines is unknown. This research aimed to address the knowledge gap surrounding visual inspection performance for steel bridges in order to support future advances in inspection and design procedures. Focusing primarily on fatigue crack detection, this research also considered the ability of inspectors to accurately and consistently estimate section loss in steel bridge members.

Findings

Inspection performance was evaluated through a series of simulated bridge inspections performed in representative in-situ conditions. First, this research describes the results from 30 hands-on, visual inspections performed on full-size bridge specimens with known fatigue cracks. Probability of Detection (POD) curves were fit to the inspection results and the 50% and 90% detection

rate crack lengths were determined. The variability in performance was large, and only a small amount of the variance could be explained by individual characteristics or environmental conditions.

Implementation

Based on the results, recommendations for improved training methods, inspection procedures, and equipment were developed. Above all, establishment of a performance-based qualification system for bridge inspectors is recommended to confirm that a satisfactory level of performance is consistently achieved in the field.

Recommended Citation for Report

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