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Manual for Bridge Rating Through Load Testing

This NCHRP digest describes the research findings from NCHRP Project 12-28(13) A, "Bridge Rating Through Nondestructive Load Testing," conducted by A.G. Lichtenstein and Associates, Inc. The project developed and documented processes for performing load tests and using the test results to calculate bridge ratings. The research results are presented in the form of a manual, which provides guidelines for integrating the load testing of bridges with their load rating. The manual is supplemented with a technical report, which presents detailed data on two major technical areas—evaluating unintended composite action and establishing target proof load levels.

FOREWORD

This manual presents the results of a study on the use of nondestructive load testing to evaluate the carrying capacity of bridges. Recommended procedures for performing load tests and for using the results to calculate load ratings are included. The contents of this manual will be of immediate interest to bridge and structural engineers, bridge inspectors, traffic engineers, and others interested in bridge safety and the movement of traffic across bridges.

Nondestructive load testing of bridges has been used primarily as a research tool to provide better understanding of the way in which loads are carried by, and distributed through, the bridge structure. In some cases, load testing has been used to assist in the determination of bridge load-carrying capacity. From such tests, some structures have been found to possess greater load-carrying capacity than predicted by conventional analytical load rating procedures. Load-rating procedures that incorporate load test results have potential for demonstrating higher load capacity for many structures that would otherwise be determined to require load-posting based on conventional analysis alone.

NCHRP Project 12-28(13), "Nondestructive Load Testing for Bridge Evaluation and Rating," was initiated in 1987 with the objective of developing guidelines for nondestructive load testing of highway bridges to augment the analytical rating process. A 1990 follow-on project, NCHRP Project 12-28(13)A, "Bridge Rating Through Nondestructive Load Testing," developed and documented processes for performing load tests and using the test results to calculate bridge ratings. Project 12-28(13)A is the basis for this manual. The research was performed by A.G. Lichtenstein and Associates, Inc., of Paramus, New Jersey.

The research results are presented in the form of a manual that introduces the concept of nondestructive load testing (including the two major types of tests: diagnostic tests and proof tests), describes the appropriate selection of candidate bridges, provides detailed procedures for load testing, and describes how to use load test results to develop a load rating for a bridge. The manual also includes illustrative examples of both diagnostic-load-test and proof-load-test procedures. Finally, information on special topics, including evaluations for live load impact; fatigue life testing of steel bridges; and unintended composite action of bridges

Manual For Bridge Rating Through Load Testing

Katrin Zwirgmaier



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