JOINT TRANSPORTATION RESEARCH PROGRAM

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Element Level Bridge Inspection: Benefits and Use of Data for Bridge Management

Introduction

The Moving Ahead for Progress in the 21st Century Act (MAP-21) is the cornerstone for plans to improve the U.S. highway system. With the passage of MAP-21, Congress committed to the development of a data-driven, risk-based approach to asset management in the United States. This law required the collection and submission of element level bridge inspection data for all National Highway System bridges, in addition to the National Bridge Inspection condition rating data. All states were required to begin element level inspections by 1 October 2014 and submit the first round of data on 1 April 2015.

This report includes recommendations for element level inspection techniques, data collection, and inspector training based on a survey of Indiana Department of Transportation (INDOT) peer agencies and a literature review of existing research and bridge inspection guidance. Ultimately the data collected during these

inspections must be detailed and reliable so that it can be used in INDOT's bridge management program to evaluate bridge condition, predict deterioration, and guide decision making.

Findings

- Data required by the Federal Highway Administration is sufficient for effective element level bridge inspections in the short term. This inspection program should be expanded over time to make it more useful to INDOT. Element level data is commonly used for fund allocation, deterioration modeling, and making preservation, repair, and replacement decisions. Element level data can also be used to predict upcoming maintenance or repair work.
- Many states have long profited from the collection of element level inspection data. Most of the benefits are realized in the form of more reliable methods of

setting performance goals, making decisions, and evaluating the effectiveness of those decisions in achieving the goals.

- A rigorous training program and detailed quality control procedures are necessary to ensure data consistency and reliability.

Implementation

During the initial stage of conducting element level inspections in Indiana, it is not necessary to collect more than what is required by the FHWA. With time, a collection of agency developed elements and defect data will become useful. This data can be used to simplify and focus inspections, track the conditions of elements not specified in the AASHTO Manual for Bridge Element Inspection, establish performance measures, and develop reliable deterioration models.

In order to collect consistent and reliable data, INDOT must provide inspectors with the tools to be successful, including clearly defined expectations and instructions, comprehensive training and technical support, and effective inspection equipment. Quality control measures,

such as annual or semiannual calibration meetings, inspector rotation, and visual enhancements (e.g., standardized flashlights) should be implemented. State-specific training courses should be developed to address practice and policies unique to INDOT, and periodic performance testing should be used to evaluate inspector performance and verify the adequacy of agency training and support.

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