

JOINT TRANSPORTATION RESEARCH PROGRAM

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INDOT Construction Inspection Priorities

Introduction

In the last decade, the Indiana Department of Transportation (INDOT) increased the number of construction projects funded by capital made available through the leasing of the Indiana Toll Road. However, during the same time period, the level of personnel available for construction inspection either remained the same or declined. Insufficiency of inspection resources could lead to reduction in inspection and, thus, increased occurrence of potential risk consequences such as short- and long-term functional failures (Figure 1), reduced design life, increased maintenance costs, and reduced safety. The objective of this study was to (1) evaluate the current inspection practices of INDOT and (2) develop a risk-based inspection protocol to facilitate efficient allocation of available inspection resources to minimize the risks associated with reduced inspection.

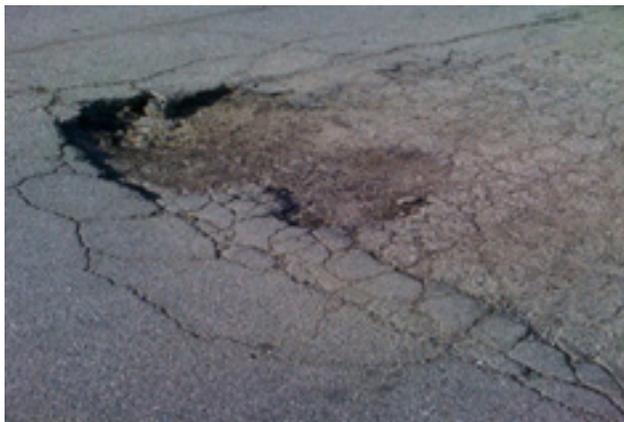


Figure 1 Functional failure in asphalt pavement.

Findings

To develop a risk-based inspection protocol, first, the risk consequences associated with reduced inspection were identified for different transportation construction activi-

ties, based on the data collected from 20 site visits to INDOT projects. These risk consequences include short- and long-term functional failures, reduced design life, reduced safety, and increased maintenance cost. Based on data collected from surveys administered to 23 State Departments of Transportation (DOTs), 58 engineers and inspectors from INDOT, and 20 inspection consultants in the Midwest, the subjective perceived probabilities associated with the occurrence of each risk consequence were encoded, and risk analyses were performed. The findings from the study indicated the following:

- Different state DOTs pursue different inspection practices. The results of the survey showed that that 74% of the DOTs that responded had experienced changes in their inspection staffing level over the last five years.
- The lack of experience and the differing expertise of the maintenance workforce have reduced the efficiency of construction inspections.
- Forty-four percent (44%) of the DOT respondents do not consider their current inspection practices to be “efficient,” implying that inspection resources are not necessarily allocated appropriately to the most critical activities.
- Seventy-four percent (74%) of the state DOTs indicated that they do not have a protocol for prioritizing the inspection of construction activities.
- Seventy-five percent (75%) of the INDOT inspectors who responded to the survey tend to implement full inspection for high-risk activities and random inspection for low-risk activities.
- The lack of training for new inspectors, limited overtime, and the current system for payment documentation were recognized to be the main causes of the inefficiency of current INDOT inspection practices.
- INDOT’s inspection practices are more conservative

than those of other DOTs for some activities. Activities whose inspection is implemented more conservatively include bolting structural connections, post-tensioning, pipe placement, sub-grade treatment (Figure 2), retaining walls, aggregate base course, and embankment.

- The level of resources allocated for inspection of an activity is affected by the sequence of the work in a project, as well as the project schedule. In some cases, all available inspection staff may be allocated if there is only one activity in progress. This does not imply that the activity is a necessarily a high-priority activity.



Figure 2 Sub-grade density test.

Implementation

The deliverables of this study include the following:

1. A protocol for inspection of construction activities
2. An inspection staffing guide
3. A list of pay items to enhance the documentation process

The inspection protocol could be used as a checklist for providing guidance to new inspectors. Using the inspection staffing guide, INDOT could enhance the current inspection practices by modifying the documentation requirements for the pay items whose contract value does not warrant the time required for documentation.

Recommendations

1. The list of pay items for enhancement of inspection documentation could be used as a guide for allocation of inspection staff. Project engineers could use the inspection staffing guide to estimate the minimum number of inspectors for their projects.
2. The current documentation platform (SITEMANAGER) could be enhanced to reduce the required effort for inspection documentation.

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