



PROJECT TITLE

Risk-based Construction Inspection

STUDY TIMELINE

December 2015 – January 2019

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FURTHER RESOURCES

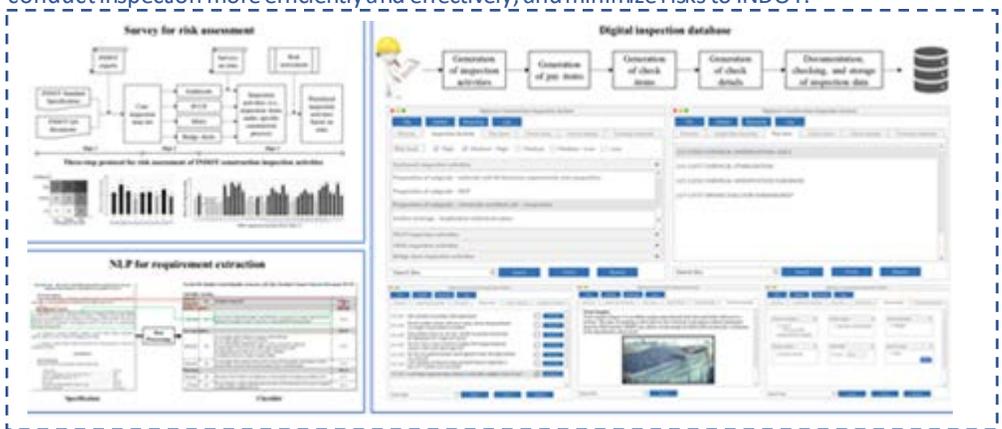
- [<https://doi.org/10.5703/1288284316916>]
- [<https://doi.org/10.1177/0361198118782025>]
- [<https://doi.org/10.1177/0361198118823499>]

FACT SHEET

Risk-based Construction Inspection

Introduction or Problem Statement

State transportation agencies (STAs) nationwide are challenged by the lack of resources for construction inspection to effectively inspect critical construction elements such as pavement, soil embankment, and bridge structure to ensure both near-term and long-term performance, attributed to the retirement of experienced employees, increasing complexity of infrastructure construction, and emerging technologies. The Indiana Department of Transportation (INDOT) is not an exception and has adopted a risk-based construction inspection program to optimize resource allocation to the riskiest areas, equip construction inspectors with necessary knowledge and technology tools to conduct inspection more efficiently and effectively, and minimize risks to INDOT.



Methodology or Action Taken

The objective is to develop 1) a risk-based construction inspection guide to provide answers regarding what, when, how, and how often to inspect, and 2) computer tools to implement the guide and provide on the fly access to inspection knowledge. The risk of a comprehensive set of construction activities was assessed via expert surveys and advanced data analytics. Inspection priority and frequency were determined based on risk and nature of the work being checked. Various natural language processing and artificial intelligence techniques were explored to automatically extract check questions from textual specifications. A digital, risk-based inspection system is the main deliverable, a one-stop tool for inspectors to plan, conduct, and document inspections.

Conclusions or Next Steps

Risk-based, digital inspection system allows INDOT to focus on the riskiest areas, eliminate the manual and subjective efforts on gathering and interpreting construction requirements, easily navigate across various construction activities, inspection forms, and training materials. Advanced computational tools, especially natural language processing and artificial intelligence techniques, can convert construction quality requirements in textual documents into straightforward check questions.

Potential Impacts and Benefits

The resulting digital inspection system is a complete system to be used alone. It is also being incorporated into the e-Construction field app at INDOT. It allows inspectors to plan, prepare, and train before a construction project starts and document inspection results directly. A pilot implementation has proved the value of the risk-based, digital inspection system. It can save inspection time up to 50% as gathering requirements manually is no longer needed and duplicate documentation efforts are eliminated. It also saves cost in both near- and long-term with the more consistent and higher quality infrastructure. Besides providing an immediate solution to the resource

shortage in construction inspection, the digital inspection system is a structured and evolving knowledgebase for STAs to record the complete history of infrastructure, learn from experience, train new employees, and determine best practices.