

Adaption of 3D Scanning Technology for High Precision Bridge Inspection

PROJECT TITLE

Adaptation of 3D Scanning Technology for High Precision Bridge Inspection

STUDY TIMELINE

January 2018 – June 2020

INVESTIGATORS

Arash E. Zaghi, PhD, PE, SE, University of Connecticut, PI
Alexandra Hain, PhD, University of Connecticut, Co-PI

AGENCY CONTACTS/CHAMPIONS

Armin Kamali, PE, Transportation Engineer III Bridge Safety & Evaluation
Robert P. Zaffetti, PE, Principal Engineer Bridge Safety & Evaluation, Retired
Edgardo D. Block, PE, Transportation Supervising Engineer CTDOT Research and Performance Management
Andrew J. Mroczkowski, PE, Transportation Engineer III CTDOT Research and Performance Management

For more information on the research, please contact Arash E. Zaghi and Alexandra Hain at arash.esmaili_zaghi@uconn.edu, alexandra.hain@uconn.edu

For more information on CTDOT applications, please contact Armin Kamali at armin.kamali@ct.gov

FURTHER RESOURCES

TRR journal publication:
<https://journals.sagepub.com/doi/abs/10.1177/0361198119832887>

Video presentation on the research:
<https://www.youtube.com/watch?v=6LOdXGbdFpM> (Start 46:06, End 1:05:08)

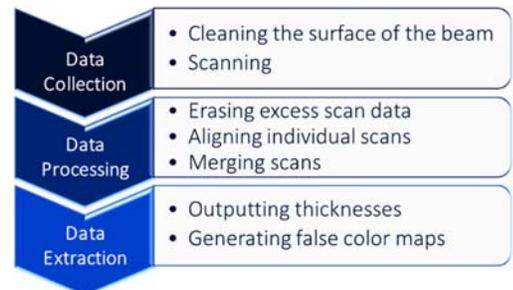
Introduction or Problem Statement

Current bridge evaluation methods are labor intensive and dependent on subjective assessments by inspectors. Inspection outcomes have a substantial impact on the safety assessment of bridges and prioritization of repairs. The goal of this research was to use commercially available 3D scanning technology to provide high-accuracy, objective data for key inspection applications such as section loss assessment for steel beam ends.



Methodology or Action Taken

1. Identified scanner suited to application in bridge inspection and conducted lab trials to develop workflow.
2. Conducted five field trials on bridges in CT.
3. Currently finalizing training materials (videos & manuals) for use by CTDOT.



Conclusions or Next Steps

3D scanning can be used to produce accurate 3D models that represent current conditions. CTDOT has immediate plans to use the technology and methodology from the research to:

- Perform quality assurance checks on inspections
- Obtain section loss measurements for load ratings & critical bridges that face closure or posting

In the future, CTDOT plans to evaluate additional use cases including:

- Using scans from subsequent inspections to determine rate of corrosion
- Investigating 3-D scanning for crack mapping
- Documenting bridge hits & preserving/recreating historically significant details

Potential Impacts and Benefits

Improving the accuracy of the underlying measurements from bridge inspections will help inform decisions regarding load postings, prioritization of rehabilitation projects, and the allocation of retrofit funds.