Research in Progress

Feasibility of 3D Printing Applications for Highway Infrastructure Construction and Maintenance - Phase II

Research Need

In recent years there has been a significant increase in interest in additive manufacturing, yet AM is largely unexplored within infrastructure projects, although it can provide unprecedented new design capabilities.

Goals/Objectives

O.1. Explore the feasibility of additive repair technologies for real corroded steel beams ends. Different additive manufacturing solutions and repair technologies will be examined in the lab and on-site. Repaired beams will be tested for their strength, fatigue, and corrosion resistance.

O.2. Research the key factors related to the different repair technologies and equipment investigated that can impact the success of an attempted repair (Example: velocity of material being deposited). Use the research to develop a list of suggested options for equipment and facilities that seem well suited for handling 3D printing applications and the associated qualifications testing of 3D printing repaired steel bridge beams.

Project Information

This project is being conducted as part of the Massachusetts Department of Transportation (MassDOT) Research Program with funding from Federal Highway Administration (FHWA) State Planning and Research (SPR) funds.

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Performing Organization:
UMass and MIT

Project Champion:
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Project Start Date:
April 22, 2022

Expected Project Completion Date:
November 30, 2023

Methodology

1. Recommended methods for improving repair techniques of deteriorated transportation infrastructure elements, including deteriorated bridge ends, using 3D printing technologies.
2. Analyses and recommendations of cost effectiveness practices within 3D printing solutions, including in the field.
3. Scheduled seminar to disseminate the 3D printing findings to MassDOT personnel.
4. Final Presentation.
5. Final Report summarizing research activities, results, and recommendations.

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