

Research in Progress

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

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

The proposed project will explore AM innovations and their capabilities related to transportation infrastructure and as a potential future resource to assist MassDOT Highway Division's ongoing rehabilitation of bridge, tunnel, and highway structures, as well as classic recurring maintenance activities.

The project's main research objective will be to connect the additive manufacturing research community with MassDOT, to explore additive repair techniques, as well as individual component manufacturing for the highway and construction sector purposes. The project will also aim at drafting MassDOT business process recommendations for AM technologies. The recommendations will focus on identifying the organizational processes that would be needed to support successful procurement services and resulting quality assurance review of received AM products that have been created using the AM techniques.

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.

Principal Investigators:

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Performing Organization:

UMass and MIT

Project Champion:

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Project Start Date:

June 1st, 2020

Expected Project Completion Date:

September 15th, 2021

Methodology

1. Engage with MassDOT's six District maintenance and engineering sectors to build an exemplary inventory of possible candidate objects for test printing using AM.
2. Survey colleagues in the transportation industry to learn more about their experience with AM.
3. Assess the advantages and disadvantages, and cost efficiencies to compare using AM to produce actual replacement parts.
4. Test application of additive repair technology for deteriorated steel bridges.
5. Develop an initial set of draft internal MassDOT business process recommendations.

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