

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): IOWA DOT

INSTRUCTIONS:

Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.

Transportation Pooled Fund Program Project #	Transportation Pooled Fund Program - Report Period: Quarter 1 (January 1 – March 31, 2022) Quarter 2 (April 1 – June 30, 2022) Quarter 3 (July 1 – September 30, 2022) X Quarter 4 (October 4 – December 31, 2022)	
Project Title: Building Information Modeling (BIM) for Bridges and Structures		
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Lead Agency Project ID:	Other Project ID (i.e., contract #): Addendum 644	Project Start Date: 12/1/2017
Original Project End Date:	Project End Date: 11/30/2022	Number of Extensions: Pooled fund project – yearly budgets

On schedule On revised schedule Ahead of schedule Behind schedule

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Total Percentage of Work Completed
\$189,174	\$104,371	N/A

Quarterly Project Statistics:

Total Project Expenses This Quarter	Total Amount of Funds Expended This Quarter	Percentage of Work Completed This Quarter
\$0	N/A	N/A

Project Description:

The Institute for Transportation will provide facility coordination and financial assistance for this Pooled Fund Bridge Project, "Building Information Modeling (BIM) for Bridges and Structures for the Iowa Department of Transportation (Iowa DOT), and this project is being led by Annette Jeffers from the Iowa DOT. These efforts will entail providing support for two possible meetings.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

- The team collected comments from the Pooled Fund states on the bridge element examples for the Unit Test Suite and is incorporating the comments.
- The team is developing a literature review synthesis in support of the ROI task, which has included the review of over 50 items from a range of sources, including open access journal articles, state and federally funded research, and international research.
- Development of the bridge design-to-construction MVD is in-progress. A quarterly online meeting was facilitated by the project team in August 2022

Anticipated work next quarter:

- We are planning the Pooled Fund Mid year meeting for February 22 – 23, 2023. We have selected the Hotel Indigo at the Riverwalk in San Antonio. The team will continue work on the ROI task and MVD development.
- The BIM for Bridges and Structures Roadmap infographic will be updated to reflect recent and future milestones.
- The team will continue to engage with buildingSMART and coordinate with the IFC 4.3 Program Board.
- Continuation of the work on ROI.

Significant Results:

We have the hotel for the February BIMS meeting in San Antonio, Texas. Draft agenda has been completed. Quarterly meeting held with to Pooled fund. Updates for the ROI, MVD, unit test suite and the JTCEES were provided. Recent MVD policy changes at bSI include new emphasis on an Information Delivery Specification (IDS) process. Our MVD work will still include an MVD and will also include an IDS component. This approach has been confirmed by and coordinated with the leadership at bSI.

The project team is wrapping up the IFC mapping process to support the development of the MVD.

The project team is coordinating an IFC export proof of concept/beta test with 3 software companies. Findings will be summarized in a presentation and tech memo.

The BIM for Bridges and Structures Roadmap infographic is being updated by the team and will be shared with WG3 soon for feedback.

Memo summarizing the Literature review for the Return of Investment Analysis was completed. The literature review addressed benefits, cost categories, quantification of benefits, quantifications of cost, ROI measurement challenges and maturity levels and ROI.

Conclusion from the ROI report.

The generic benefits of BIM adoption have been thoroughly explored. Studies often rely on estimating benefits and costs at the project level, regardless of which party incurs the costs and benefits, and extrapolating across an agency's program. There are many

examples from the literature of strategies to quantify benefits, but most examples of cost estimation relate to direct costs.

There are also many examples of the beneficial application of BIM on projects, but equally, there are examples where no benefits were realized, in particular when established practices are in conflict with BIM.[11] There was only one study [4] that analyzed the application of BIM (narrowly) across an agency's construction program. But while statistically significant BIM benefits were found, these empirical results did not establish causality.

The maturity and depth of BIM implementation throughout the supply chain is an important determinant of whether benefits realized at the project level can be scaled across an agency's program. The majority of the benefit streams depend upon the application of BIM in an earlier phase, typically the design phase. Benefits realization depends therefore on interoperability, but organizational issues like leadership support for data exchange and process improvement are notable benefit enablers.

The impact pathway methodology of the UK BIM benefits measurement methodology is a worthy approach to isolate benefits that apply equally to buildings and infrastructure, avoid double counting, and incorporate the enabling/amplifying effects of maturity (both for BIM use and interoperability). The UK study found that over 80% of benefits fell into the categories of time, cost, or materials savings. [2] Focusing on these benefit streams and core BIM use cases that would produce benefits over the horizon of the study, rather than the entire asset lifecycle, can provide a manageable boundary on the ROI computation framework.