

Quarterly Progress Report:

Project Number and Title: 3.4 Testing, Monitoring and Analysis of FRP Girder Bridge with Concrete Deck

Research Area: Thrust Area 3

PI: W. Davids, UMaine

Co-PI(s): H. Dagher, UMaine

Reporting Period: 10/1/2020 – 12/31/2020

Submission Date: 9/31/2020

Overview: (Please answer each question individually)

*Provide **BRIEF** overview and summary of activities performed during the reporting period.*

During the reporting period, observation of construction of the Hampden bridge has continued (Task 1) which most notably includes the placement of the FRP tub girders and pouring of the reinforced concrete deck. Prior to its opening, the bridge was instrumented and tested under a high degree of applied live-load with the resulting base-line strains measured (Task 2) [Note: this occurred too late in the reporting period to thoroughly describe, and will be detailed in the next quarterly report]. Analysis of the resulting data is ongoing. Finally, development of the 3D finite element model has continued (Task 3). The project team has continued to coordinate with partners at UMass-Lowell who will be monitoring the Hampden bridge during Task 2 testing and will continue to monitor periodically over time.

Provide context as to how these activities are helping achieve the overarching goal(s) of the project...

Live-load testing of the Hampden Grist-Mill Bridge is vital to improving our understanding of this novel structure’s behavior, specifically its flexural behavior and live-load distributive properties, as well as assessing the effectiveness of the girder-deck connection system and ensuring composite action. Creation of a detailed, calibrated finite element model will enable a more fundamental understanding of the bridge’s behavior, allowing in-depth assessment of individual components’ individual contributions to overall behavior.

Describe any accomplishments achieved under the project goals...

Observations were made of the remaining significant portions of the construction process, including girder placement and deck pouring. This effort toward monitoring construction effectively closes out Task 1 of the project. Live-load testing fulfills a significant portion of the goals for Task 2 and allows additional goals to be met in the coming months.

Complete the following tables to document the work toward each task and budget (add rows/remove rows as needed, make sure you complete the Overall Project progress row and include all tasks even if they have ended or have not been started)...

Table 1: Task Progress			
Task Number	Start Date	End Date	% Complete
Task 1:	3/2019	12/2020	100
Task 2:	1/1/2020	1/2021 (anticipated)	90
Task 3:	1/1/2020	5/2021	45
Overall Project:	3/2019	5/2021	70

Table 2: Budget Progress		
Project Budget	Spend – Project to Date	% Project to Date*
\$161,747	????	????

**Include the date the budget is current to.*

Describe any opportunities for training/professional development that have been provided...

The project PI regularly provides input to the AIT engineers on design details and provides feedback on design assumptions and procedures employed by AIT.

Describe any activities involving the dissemination of research results (be sure to include outputs, outcomes, and the ways in which the outcomes/outputs have had an impact during the reporting period. Please use the tables below for any Publications and Presentations in addition to the description of any other technology transfer efforts that took place during the reporting period.)... Use the tables below to complete information about conferences, workshops, publications, etc. List all other outputs, outcomes, and impacts after the tables (i.e. patent applications, technologies, techniques, licenses issued, and/or website addresses used to disseminate research findings).

Table 3: Presentations at Conferences, Workshops, Seminars, and Other Events				
Title	Event	Type	Location	Date(s)
	UMaine ASCC Center Wide Meeting	Presentation	Virtual	12.22.2020

Table 4: Publications and Submitted Papers and Reports				
Type	Title	Citation	Date	Status
N/A				

No results have been disseminated due to the project’s current scheduling.

Encouraged to add figures that may be useful (especially for the website)...



Left: First Girder Being Placed; Right: Preparation for Deck Pour

Participants and Collaborators:

Use the table below to list all individuals who have worked on the project.

Table 5: Active Principal Investigators, faculty, administrators, and Management Team Members			
Individual Name	Email Address	Department	Role in Research
William Davids	william.davids@maine.edu	Civil and Environmental Engineering	Principal investigator
Habib Dagher	hd@maine.edu	Civil and Environmental Engineering	Co-Principal investigator

Use the table below to list all students who have participated in the project during the reporting. (This includes all paid, unpaid, intern, independent study, or any other student that participated in this project.)

Table 6: Student Participants during the reporting period				
Student Name	Email Address	Class	Major	Role in research
Andrew Schanck		Ph.D	Civil Engineering	Manufacture/construction observation, modeling

Use the table below to list any students who worked on this project and graduated during this reporting period.

Table 7: Student Graduates			
Student Name	Role in Research	Degree	Graduation Date
N/A			

Use the table below to list organizations have been involved as partners on this project and their contribution to the project.

Table 8: Research Project Collaborators during the reporting period						
Organization	Location	Contribution to the Project				
		Financial Support	In-Kind Support	Facilities	Collaborative Research	Personnel Exchanges
Advanced Infrastructure Technologies	Brewer, Maine	x		x		x

List all other outputs, outcomes, and impacts here (i.e. patent applications, technologies, techniques, licenses issued, and/or website addresses used to disseminate research findings). Please be sure to provide detailed information about each item as with the tables above.

No technology transfers have occurred within the reporting period.

Have other collaborators or contacts been involved? If so, who and how? (This would include collaborations with others within the lead or partner universities; especially interdepartmental or interdisciplinary collaborations.)

Collaboration has been on-going with researchers at UMass Lowell to coordinate installation of sensors for long-term monitoring of the Hampden bridge.

Table 9: Other Collaborators

Collaborator Name and Title	Contact Information	Organization and Department	Contribution to Research
Tzuyang Yu, Associate Professor	TzuYang_Yu@uml.edu	UMass Lowell, Civil and Environmental Engineering	Sensor installation coordination

Who is the Technical Champion for this project?

Name: Joshua Hasbrouck

Title: Civil Engineer

Organization: Maine Department of Transportation

Location (City & State): Augusta, Maine

Email Address: Joshua.p.hasbrouck@maine.gov

Changes:

Discuss any actual or anticipated problems or delays and actions or plans to resolve them...

The bridge's construction schedule has experienced numerous delays, which have in turn caused delays in completion of the project. The project's schedule has been updated to reflect these changes.

Discuss any changes in approach and the reasons for the change...

The bridge's construction schedule has become less definite, due largely to the COVID-19 global pandemic, which has also caused the aforementioned delays in project work.

Planned Activities:

Description of future activities over the coming months.

Over the next months, the data collected during live-load testing will be processed and analyzed, closing out Task 2 and progress will be made into the completion of Task 3