

**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:** 7/1/2020 – 9/30/2020

**Submission Date:** 9/30/2020

**Overview: (Please answer each question individually)**

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

During the reporting period, observations of manufacture and construction of the Hampden bridge has continued (Task 1), instrumentation and testing plans have been finalized and coordination with MaineDOT regarding testing has commenced (Task 2), and the 3D finite element model development has continued (Task 3). The project team has continued to coordinate with partners at UMass-Lowell who will be monitoring the Hampden bridge during and after its opening and initial load test.

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

The instrumentation layout and test plans were finalized with the overall objectives of testing kept paramount. These plans are specifically designed to extract data describing the bridge’s flexural behavior and moment load distribution, as well as to assess degree of composite action and relative slip between the girders and deck. The creation of a baseline finite element model of the bridge will, when test data are available, improve understanding of the bridge’s flexural and load distributive behavior, enabling better predictions to be made in the future.

Describe any accomplishments achieved under the project goals...

Plans for live-load testing have been finalized and preparations have started in anticipation of testing to maximize probability of success on testing day. The finite-element model of the bridge has also been further developed to account for the actual bridge’s geometry and mechanics, simplifying the process of analysis when live-load test data become available.

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)...

<b>Table 1: Task Progress</b>			
<b>Task Number</b>	<b>Start Date</b>	<b>End Date</b>	<b>% Complete</b>
Task 1:	3/2019	12/2020 (anticipated)	90
Task 2:	1/1/2020	12/2020 (anticipated)	45
Task 3:	1/1/2020	5/2021	40
Overall Project:	3/2019	5/2021	50

<b>Table 2: Budget Progress</b>		
<b>Project Budget</b>	<b>Spend – Project to Date</b>	<b>% Project to Date*</b>
\$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.

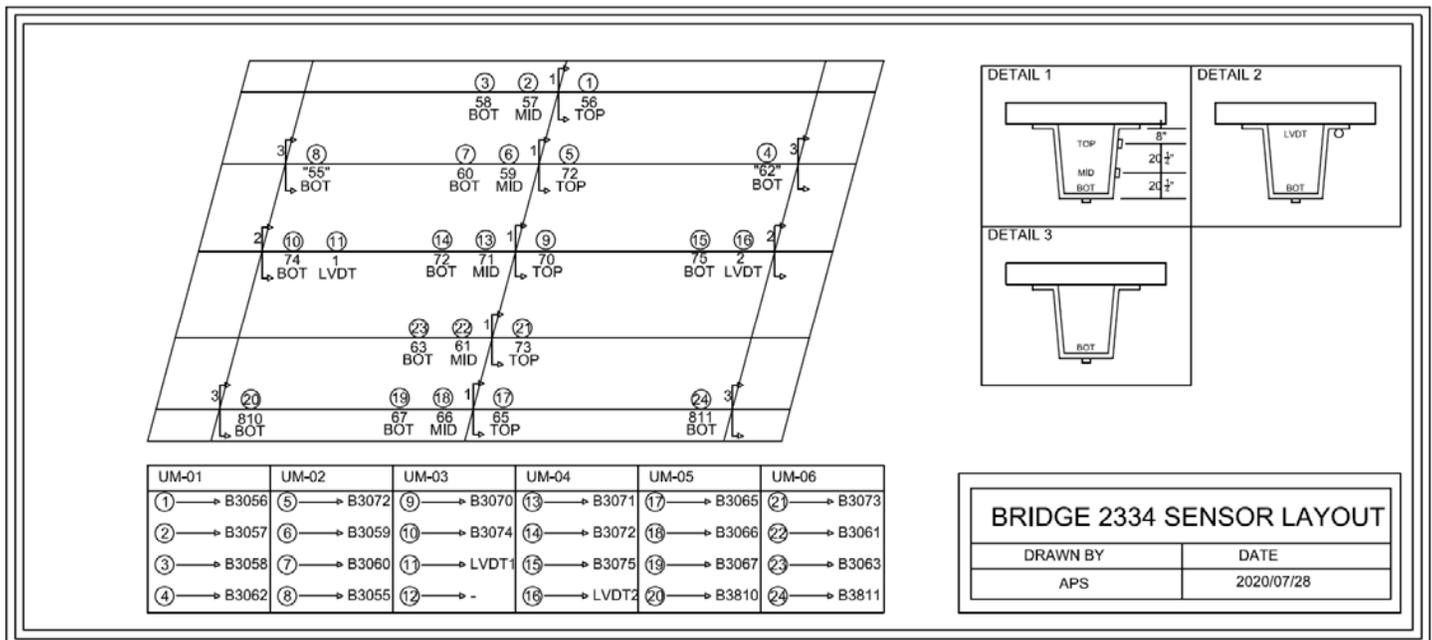
Describe any activities involving the dissemination of research results (be sure to include outputs, outcomes, and the ways in which the outcomes/outputs have had an impact during the reporting period. Please use the tables below for any Publications and Presentations in addition to the description of 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)

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)...



Live-Load Test Instrumentation Layout

**Participants and Collaborators:**

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

<b>Table 5: Active Principal Investigators, faculty, administrators, and Management Team Members</b>			
<b>Individual Name</b>	<b>Email Address</b>	<b>Department</b>	<b>Role in Research</b>
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.)

<b>Table 6: Student Participants during the reporting period</b>				
<b>Student Name</b>	<b>Email Address</b>	<b>Class</b>	<b>Major</b>	<b>Role in research</b>
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.

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

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

<b>Table 8: Research Project Collaborators during the reporting period</b>						
<b>Organization</b>	<b>Location</b>	<b>Contribution to the Project</b>				
		<b>Financial Support</b>	<b>In-Kind Support</b>	<b>Facilities</b>	<b>Collaborative Research</b>	<b>Personnel Exchanges</b>
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**

<b>Collaborator Name and Title</b>	<b>Contact Information</b>	<b>Organization and Department</b>	<b>Contribution to Research</b>
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...*

Maine DOT has expressed concern with the contractor's ability to meet the latest construction schedule, which would in turn push back the schedule for testing. If this is the case, additional work on Task 3 will be pushed forward, and the scope of the project may need to be reassessed.

*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 delays in project work.

**Planned Activities:**

*Description of future activities over the coming months.*

Provided construction continues to follow the previous, official schedule, live-load testing will take place during the next quarter, after which the data collected will be processed and analyzed, closing out Tasks 1 and 2. Some progress may also be made into the completion of Task 3, depending on the availability of time.