

Quarterly Progress Report:

Project Number and Title: 3.14 FRP-Concrete Hybrid Composite Girder Systems: Web Shear Strength and Design Guide Development

Research Area: Thrust Area 3

PI: W. Davids, UMaine

Reporting Period: 4/1/2021 – 6/30/2021

Submission Date: 6/30/2021

Overview: (Please answer each question individually)

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

During the reporting period, web shear testing was put on hold in order to reorganize and reassess the testing procedure after numerous prior setbacks near the end of the period, materials were ordered and the ASTM D8067-17 fixture and specimens were modified with the intention of improving test reliability and success. Additionally, finite element models of the specimens were created in anticipation of comparison with testing results.

A series of numerical studies have been conducted with the aim of better characterizing CT girder web strength for the design guide, the last incomplete topic to be covered. These have resulted in shear buckling curves, which can be used directly with appropriate web lay-ups, or as a model for other such curves to be created and used.

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

Preparation for testing and pre-creation on numerical models allows analysis and comparison to take place as soon as test results become available. This accelerates the characterization of web shear strength, a critical unknown in design of the CT girder system. Creation of empirical buckling curves helps to communicate the design assumptions for CT girders, facilitating their commercial use.

Describe any accomplishments achieved under the project goals...

With the inclusion of initial estimates of web shear buckling resistance, an initial draft of the design guide has been completed.

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:	6/1/2020	5/31/2021	40
Task 2:	6/1/2020	5/31/2022	70
Overall Project:	6/1/2019	5/31/2022	55

Table 2: Budget Progress		
Project Budget	Spend – Project to Date	% Project to Date*
\$98,775	???	???

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

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

No opportunities for training or professional development have yet arisen as a result of this project.

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)
N/A				

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

No results have yet been disseminated.

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

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	Conduct and coordinate testing, modeling, report results, design guide drafting

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		

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.)

No additional contacts or collaborators have been involved with the project to date.

Who is the Technical Champion for this project?

Name: Anthony Diba

Title: Engineer

Organization: AIT Bridges

Location (City & State): Brewer, Maine

Email Address: anthony@aitbridges.com

Changes:

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

No problems or delays have arisen during the current reporting period

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

No changes in approach are anticipated

Planned Activities:

Description of future activities over the coming months.

Shear testing of the remaining specimens will commence by 7/1/2021, with resulting data analyzed and compared with numerical models. The design guide will be reviewed and revised based on these results.