

Quarterly Progress Report:

Project Number and Title: 3.10 Assessment and Optimization of Double CT Bridge Girder Sections with Longitudinal Precast Decks

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: 12/31/2020

Overview: (Please answer each question individually)

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

During the reporting period, we fatigue tested both shear connector specimens that had been delivered in the prior period. Both specimens withstood the specified 6 million fatigue-cycle threshold for AASHTO Fatigue 1 loading. The data collected from these tests were processed with the results investigated to determine any changes in load-slip behavior over the course of testing. The forms used to cast these specimens were returned to AIT for fabrication of subsequent specimens, which were subsequently returned. Testing of the first of these specimens is underway, and is predicted to have reached around 3 million load cycles by the end of the reporting period. The two double CT girder specimens have been fabricated and shipped to a precaster for pouring of the precast deck sections.

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

The results of fatigue testing will help to characterize the performance of different shear connection methods for use in double CT girder sections. This will help improve our understanding of the system and contribute to further development and optimization. Fabrication of the test girder is vital to initiation and completion of Tasks 3-5 which aim to further our understanding of the system and enhance our ability to optimize its design.

Describe any accomplishments achieved under the project goals...

The first two of the five shear connection specimens have been successfully fatigue tested and additional specimen design and fabrication are progressing. From the results of testing to-date, AIT has decided to investigate stainless steel shear connectors in subsequent specimens, rather than continuing to investigate FRP connectors. The first of two specimens utilizing these connectors is currently being tested.

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:	7/1/2020	8/30/2020	50
Task 2:	9/1/2020	12/30/2020	35
Task 3:	9/1/2020	11/31/2020	0
Task 4:	9/1/2020	2/28/2020	0
Task 5:	3/1/2020	8/31/2021	0
Overall Project:	3/2019	8/31/2021	15

Table 2: Budget Progress		
Project Budget	Spend – Project to Date	% Project to Date*
\$240,376	????	????

***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.

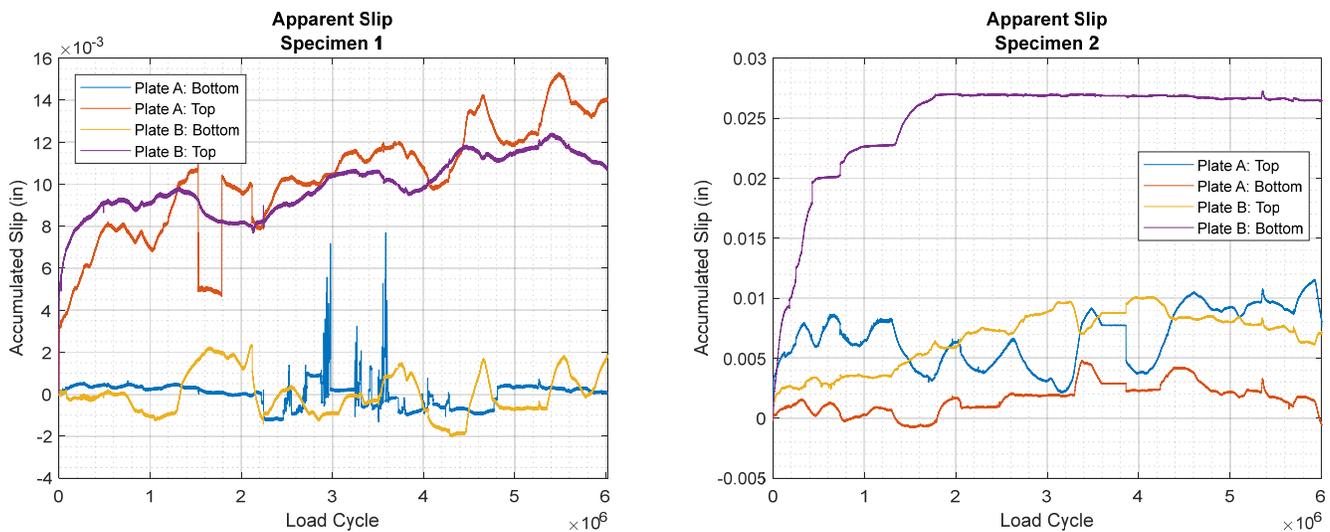
*Describe any activities involving the dissemination of research results (be sure to include outputs, outcomes, and the ways in which the outcomes/outputs have had an impact during the reporting period. Please use the tables below for any Publications and Presentations in addition to the description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



Accumulated Slip Recorded from Fatigue Specimens 1 and 2

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
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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, report results

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	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.)

Who is the Technical Champion for this project?

Name: Ken Sweeney

Title: President

Organization: AIT Bridges

Location (City & State): Brewer, Maine

Email Address: ken@aitbridges.com

Changes:

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

No problems have arisen that have required significant remedial action.

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

The project has been delayed due to challenges in fabrication as well as slowed lab activity caused by COVID-19. No changes in approach are planned for the foreseeable future.

Planned Activities:

Description of future activities over the coming months.

In the coming months, we anticipate finishing a minimum of 2 additional shear block fatigue tests, and hope to complete the fifth, final test provided the specimen can be manufactured. Ideally, creep testing will also begin at AIT's Brewer facility and preparations can commence for strength testing.