Quarterly Progress Report:
Project Number and Title: 3.12—Lateral Loading of Unreinforced Rigid Elements and Basal Stability of Columns Supported Systems
Research Area: Geotechnical Infrastructure Engineering
PI: *Aaron Gallant, University of Maine*
Co-PI(s):
Reporting Period: *04/2021-06/2021*
Submission Date: *06/2021*

Overview: (Please answer each question individually)

This project goal is to assess the basal stability of column supported systems. The following activities were performed during the previous quarter:

- Calibration of the CBIS field case was completed, thus allowing a parametric study examining the influence of subsoil consolidation, load transfer platform (LTP), lateral extent of columns beyond MSE wall facing, and assumed drainage condition on basal stability.
- The primary focus of the previous quarter was completing a final report to be submitted to the Deep Foundations Institute.
- A journal article was accepted for publication during the reporting period.

Table 1: Task Progress

Task Number	Start Date	End Date	% Complete
Task 1: Assess stresses in subsoil.	06/2018	06/2019	100%
Task 2: Establish a numerical approach to account for fracture in basal stability.	06/2019	09/2019	100%
Task 3: Calibrate models with field measurements that include lateral and vertical deformations.	06/2019	12/2020	100%
Task 4: Perform parametric study for fill embankments.	01/2020	04/2020	100%
Task 5: Perform parametric study for MSE walls.	06/2020	06/2021	30%
Task 6: Recommended design guidance for industry.	03/2020	06/2021	70%
Overall Project:	*06/2018*	*06/2021*	90%

Table 2: Budget Progress

Project Budget	Spend – Project to Date	% Project to Date*
$33,380	$33,380	100% (3/2021)

Include the date the budget is current to.

Table 3: Presentations at Conferences, Workshops, Seminars, and Other Events

Title	Event	Type	Location	Date(s)
2020 TIDC annual Conference	Conference	Annual conference	University of Maine	August 12,2020

45th Annual Conference on Deep Foundations	Online conference	Annual conference	Online	October 27, 2020

Table 4: Publications and Submitted Papers and Reports

Type	Title	Citation	Date	Status
Journal	Field Observations and Analysis of the Subgrade Response beneath GRCS Embankments at the Council Bluffs Interchange System	Gallant, Aaron, Ehab Shatnawi, and Danilo Botero-Lopez. 2019. "Field Observations and Analysis of the Subgrade Response beneath GRCS Embankments at the Council Bluffs Interchange System." Journal of Geotechnical and Geoenviromental Engineering.	2020	Accepted
Journal	Lateral Spreading of Embankments supported on Fractured Unreinforced high-modulus columns over Soft Soil	Gallant, Aaron, and Danilo Botero-Lopez. 2019. "Lateral Spreading of Embankments supported on Fractured Unreinforced high-modulus columns over Soft Soil." DFI Journal.	2020	Accepted

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
Aaron Gallant	aaron.gallant@maine.edu	Civil	PI

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
Danilo Botero-Lopez		Ph.D	Civil Engineering	Research Assistant

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**
Deep Foundations Institute (DFI)	Hawthorne, NJ	X				
Jacobs Engineering	Herndon, VA		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.

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.)

Table 9: Other Collaborators			
Collaborator Name and Title	**Contact Information**	**Organization and Department**	**Contribution to Research**
N/A			

Who is the Technical Champion for this project?
Name: Tanner Balckburn
Title: Chief Geotechnical Engineering
Organization: Hayward Baker
Location (City & State):
Email Address: jtblackburn@keller-na.com

Changes:

N/A

Planned Activities:

Future work will be focused on developing a simplified design methodology for the column-supported embankments based on the lateral spreading and basal stability of these systems. This would be part of a Phase II effort.