

Quarterly Progress Report:

Project Number and Title: C7.2018: Alternative Cementitious Materials (ACMs) For Durable and Sustainable Transportation Infrastructures

Research Area: New Materials for Longevity and Constructability

PI: Professor Eric N. Landis, Ph.D., University of Maine

Postdoctoral Research Associate: Hosain Haddad Kolour, Ph.D., PE, University of Maine

Reporting Period: Oct 2020 to Dec 2020

Submission Date: 30 Dec 2020

Overview: (Please answer each question individually)

Summary of activities during the reporting period:

- Casting all specimens for both carbonation tests and alkali activated slag (AAS) concrete tests. Conducting almost all compressive strength tests, shrinkage tests, bulk and surface resistivity tests.
- Zoom Meeting with MaineDOT engineers and presenting the results (Friday, November 20th 2020)
- Literature review
- Attending various conferences (zoom) related to this project

During last three months, based on previous literature review, we designed and conducted almost all tests for concrete carbonation. Tests include compressive strength at different ages (3, 7, 28, and 56 days). Free shrinkage tests, bulk and surface resistivity tests. Three different curing procedures have been used for curing specimens. Some literature review has been done for alkali activated slag (AAS) concretes. Based on that, all test has been designed and conducted. Also, we had a Zoom meeting with MaineDOT engineers and we presented our results. Now, we are almost done with all tests and we are working on interpreting the results.

Table 1: Task Progress			
Task Number	Start Date	End Date	% Complete
Task 1: Selection of ACM with desired workability and strength	06/01/2019	12/31/2019	100%
Task 2: Shrinkage	01/01/2020	Continue	90%
Task 3: Durability performance	10/01/2019	Continue	90%
Task 4: Life cycle analysis	10/01/2020	Continue	10%

Table 2: Budget Progress		
Project Budget	Spend Amount	Spend Percentage to Date
\$83,238 (from UTC)	Information is coming soon	

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

One postdoctoral research associate is working in this project. It will be a great opportunity for him to learn about writing proposals, preparing reports, participating in meeting, attending conferences, and working with professionals in UTC, UMaine Advanced Structures and Composites Center, and MaineDOT.

Four undergraduate students have been involved in this project. It will be a great experience for them to be familiar with ASTM tests and standards. They will learn how to conduct the experiments, how to follow the standards, and how to work in a team in a real project.

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
<i>Professor Eric N. Landis</i>	<i>landis@maine.edu</i>	<i>Civil and Environmental Engineering</i>	<i>PI</i>
<i>Dr. Hosain Haddad Kolour</i>	<i>hosain.haddad@maine.edu</i>	<i>Civil and Environmental Engineering</i>	<i>Perform the experiments and analysis the results</i>

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
Parry Seddiqi		freshman	Civil and Environmental Engineering	Help in performing the experiments
Kelsey Weir		freshman	Civil and Environmental Engineering	Help in performing the experiments
Madison Ala		freshman	Civil and Environmental Engineering	Help in performing the experiments
Nicholas Tiner		freshman	Civil and Environmental Engineering	Help in performing the experiments

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				
		Financia l Supp ort	In- Ki nd Su pp ort	Facil it ie s	Collabora tive Resea rch	Person nel Exch ange s
University of Maine	Maine	X	X	X		

Who is the Technical Champion for this project?
Name: Michael.Redmond

Title: Concrete *Quality Specialist at MaineDOT Bridge Program*

Organization: *MaineDOT*

Location (City & State): *Augusta, Maine*

Email Address: *Michael.Redmond@maine.gov*

Changes:

Professor Eric N. Landis is the new PI of this project since January 1st 2020. Both old PI (Dr. Warda Ashraf) and her graduate student (Mohammad Rakibul Islam Khan) moved to a different university.

Planned Activities:

Interpreting the results.