

**NEW ENGLAND TRANSPORTATION CONSORTIUM
QUARTERLY PROJECT PROGRESS REPORT**

A. PROJECT NUMBER AND TITLE:

NETC 13-1: Development of High Early-Strength Concrete for Accelerated Bridge Construction Closure Pour Connections

B. PRINCIPAL INVESTIGATOR(s) & UNIVERSITY(s):

Sergio F. Breña (PI) – University of Massachusetts Amherst
Scott A. Civjan (Co-PI) – University of Massachusetts Amherst

C. WEB SITE ADDRESS (If one exists):

D. START DATE (Per NETC Agreement): September 01, 2014

E. END DATE (Per NETC Agreement): April 02, 2016; January 31, 2018 (amended)

F. ANTICIPATED COMPLETION DATE: January 31, 2018

A request to extend the project (cost and time) was discussed with the Project Technical Advisory Committee as described in Section J. Their positive recommendation was sent to NETC for approval and the formal extension request process was initiated with NETC on June 2017. The amendment to the project contract was issued in early August 2017, and project activities restarted in September 2017.

G. PROJECT OBJECTIVES:

To develop and validate concrete mixtures capable of developing high early strength without detrimentally affecting their long-term durability. The mixtures are for use in projects using accelerated bridge construction methods.

H. REPORT PERIOD: July 1, 2017 – September 30, 2017

I. ACCOMPLISHMENTS THIS PERIOD:

Task 1: Literature Search

- Task Complete.

Task 3: Develop Mix Design

- Task Complete

Task 4: Test Mixture

Most activities for this task have been completed. Freeze-thaw testing and panel tests are the only two activities missing that will be conducted during the extension granted for the project.

J. PROBLEMS ENCOUNTERED (If any):

The PI (Sergio F. Breña) and representatives from the Project Technical Advisory Committee had an online conference on 23 March 2017 to discuss the status of NETC 13-1. The PI presented the tasks conducted to date and explained the reasons for not being able to conduct three tasks listed in the original proposal (freeze-thaw testing, chloride ingress testing, and large-scale panel testing) within the contract time period that expired on 14 January 2017. The two primary reasons discussed during that conference call were: (1) larger number of trial concrete batches that had to be developed in order to achieve the desired performance objectives of the concrete mixture; and (2) the longer duration that shrinkage ring tests took (in general, over 3 weeks instead of the 10-14 days estimated from past literature) compared with traditional concrete mixtures. The Project Technical Advisory Committee

requested that Prof. Breña provide them with three options to continue testing. Of these three options the Committee chose the option of continuing with freeze-thaw testing and testing of two panels using the selected concrete mixtures. The necessary resources (time and budget) required to complete these tasks were sent to the Project Technical Advisory Committee and NETC for approval.

K. TECHNOLOGY TRANSFER ACTIVITIES:

No technology transfer activities were performed.

L. STATUS BY TASK:

Task 1: Literature Search – 100% complete

Task 2: Develop Mixture Design Specification – 100% complete

Task 3: Develop Mix Design –Trial batches –100% complete

Task 4: Test Mixture –Laboratory specimen and test rig for panel tests is being designed. Freeze-thaw specimens will be fabricated at the same time as closure pours for panel tests (85%)

M. PERCENT COMPLETION OF TOTAL PROJECT: 90%

N. ACTIVITIES PLANNED FOR NEXT QUARTER:

- Fabricate freeze-thaw specimens using concrete from trial batches to be sent to DOT lab to be tested (ASTM C666)
- Fabricate and test two panel tests in laboratory

O. FINANCIAL STATUS:

As of: September 30, 2017

Total Project Budget: \$ 174,923; \$191,320 (Amended)

Total Expenditures: \$ 173,366

Note: This report should not require more than 2-3 pages & should be e-mailed to the NETC Coordinator so as to arrive no later than three (3) working days after the end of each calendar quarter.