Evaluation of Shrinkage Cracking in Slab-Wall Systems

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INTRODUCTION

Concrete develops strength rapidly after mixing and is highly influenced by temperature and curing process. The material characteristics and the rate of property development, along with the exposure conditions influences volume change mechanisms in concrete, and the cracking propensity of the mixtures.

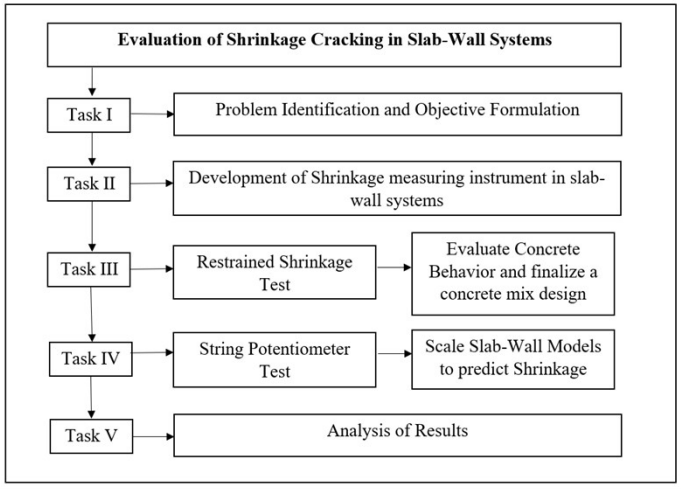
RESEARCH OBJECTIVE

Objective of this research is to better understand and predict shrinkage cracking in concrete slab-wall systems under different curing conditions. In this work, the shrinkage and cracking in the slab-wall systems will be studied using scaled models.

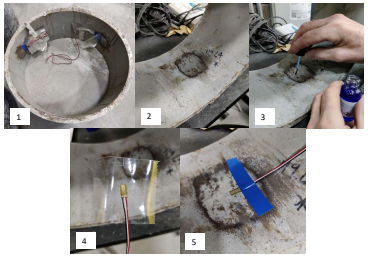
METHODOLOGY

Restrained shrinkage tests will be carried out to determine the propensity of selected mixtures to shrink and crack. The selected mixtures will be used to cast slab-wall systems with reinforcement, and string potentiometers attached to the slab will be used to examine the shrinkage strains in concrete.

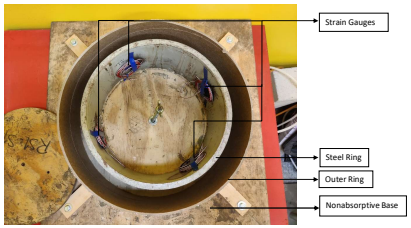
RESEARCH OUTLINE



RESTRAINED SHRINKAGE TEST



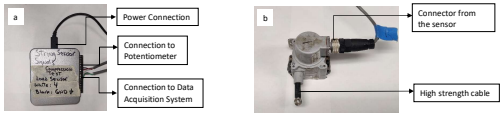
Different steps involved in preparing the ring for Restrained Shrinkage Test



Restrained Shrinkage Test setup (as per ASTM C1581)

STRING POTENTIOMETERS

An autonomous shrinkage measuring instrument has been developed, using string potentiometers, which was employed in the field to measure shrinkage in slab systems.



a) String sensor for Potentiometer, b) String Potentiometer

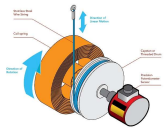
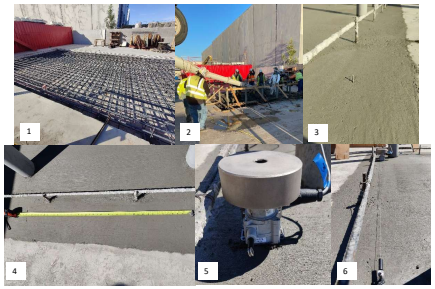


Figure: Schematic of String Potentiometer
(source: futek.com)

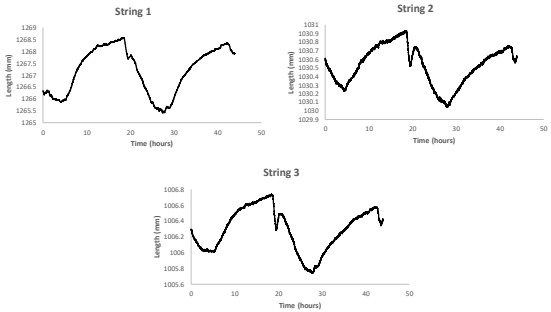
EXPERIMENTAL PROGRAM



Different steps involved in String Potentiometer Test

INITIAL RESULTS

Initial results from the string potentiometer test on slab.



FUTURE WORK

- Restrained shrinkage test: Determining the cracking propensity of the concrete.
- Measuring shrinkage from the string potentiometer test.
- Scale model of slab-wall systems: To help predict shrinkage and cracking in the systems.
- Predicting shrinkage and cracking on actual on-field slab-wall systems.

MORE
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