

Research Project Descriptions

UTC Project Information	
Project Title	Surface Resistivity Testing for Quality Control of Concrete Mixtures
University	Oklahoma State University
Principal Investigator	PI: Julie Ann Hartell, Oklahoma State University (OSU)
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Funding Source(s) and Amounts Provided (by each agency or organization)	SPTC: \$38,338 Oklahoma State University: \$38,338
Total Project Cost	\$76,676
Agency ID or Contract Number	DTRT13-G-UTC36 SPTC 17.1-07
Start and End Dates	10/15/17 - 5/30/18
Brief Description of Research Project	<p>PROBLEM: Several properties of fresh and hardened concrete are routinely tested to verify the quality of the construction material with respect to its approved mixture design. Air content, slump and compressive strength may be indicative of certain mixture ingredients or properties; however, there is still a level of uncertainty when it comes to validating water-to-cement ratio (w/c) or the presence of beneficial supplementary cementitious materials. Both these parameters are prescribed to attain a required level of durability in accordance with an exposure type (e.g. exposure to sulfate ions, deicing salts or seawater) even if the minimal mechanical properties have been met. Thus far, there is no simple utilitarian test method which can assess such parameters within a routine quality assurance and acceptance plan.</p> <p>PROPOSED SOLUTION: This project will develop a simple QC/QA tool to validate the actual mixture design parameters of concrete placed during construction. The test method is based on surface resistivity which has the added value of being low-cost, user-friendly, quick and non-destructive. Previous studies have demonstrated that the w/cm ratio, various supplementary cementitious materials and their combinations used in the concrete mixtures have their own rate of surface resistivity development. This fundamental principle is utilized for this study to develop a QC/QA tool based on specified mixture design criteria which could be used to approve and accept concrete mixtures. This means that strength would no longer be the only value that is used to accept a concrete mixture; finally, a durability requirement would be enacted. This simple tool may help to verify the quality of a placed concrete and</p>

	provide assurance that it meets the parameters of the accepted mixture design. It can help producers and stakeholders fabricate high quality concrete. As such, it would help control durability problems, prevent premature repair cost, and increase the service life of concrete structures.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	
Impacts/Benefits of Implementation (actual, not anticipated)	
Web Links <ul style="list-style-type: none"> • Reports • Project website 	