

UTC Project Information	
Project Title	MPC-492 – Early-Age Fiber-Reinforced Concrete Properties for Overlays
University	University of Utah
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Funding Agencies	USDOT, Research and Innovation Technology Administration
Agency ID or Contract Number	DTRT13-G-UTC38
Project Cost	\$37,434
Start and End Dates	September 30, 2013 to September 30, 2018
Project Duration	September 30, 2013 to September 30, 2018
Brief Description of Research Project	<p>Maintenance management is very critical to the efficient allocation of resources and greater efficiencies in work processes. State DOTs need to continuously plan maintenance activities to monitor and maintain their highways, bridges, and other transportation infrastructures. Considering the limited budget and resources, maintenance activities need to be carefully planned and deployed such that the field inspections for measured conditions are conducted appropriately and statistically representative. It is thus necessary to develop a standardized statistical method to determine the samples (frequency and amount) to be collected to streamline productivity and ensure maintenance quality. This project will also develop a methodological framework for compiling, processing and statistically analyzing the data from sampled field inspections. Resampling statistical method might be used here in case the collected data are not significantly representing the “true” measurement. The framework will be able to determine the overall conditions of the system based on the collected sample data.</p> <p>It is critical to streamline the process of sampling field inspection sites through developing a statistical framework. An effective sampling method ensures that the items chosen to be measured from the entire “population” is statistically represented. Instead of inspecting all the sites available, the sampling method can identify a limited number of sites for inspection yet accurately represent the conditions of the overall system. The proposed statistical method would be</p>

	<p>effective to achieve the satisfying accuracy with significantly less resource and funding.</p> <p>Upon the collection of measured items, it is of great importance to report the finding in a manner that all maintenance levels are fully aware of the quality of maintenance of the areas that are pertinent to them. The proposed methodological framework will achieve this by generating a transferable analytical procedure to determine the overall conditions of the system, which provides references for senior leaders to prioritize the maintenance activities.</p> <p>Research Objectives: The main objective of this research is to perform experimental tests to determine the hardened properties of fiber-reinforced concrete as they change with time at early-ages. These properties and their function with time can be implemented into finite element modeling to improve overlay prediction at early ages.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>At least one journal reports will be created by the completion of this project. It is anticipated that a journal such as “Early-Age Properties of Fiber-Reinforced Concrete for Overlays” will be submitted to Transportation Research Board, International Journal of Pavement Engineering, or American Society of Civil Engineering Journal of Materials.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>This proposed project and outcomes are directly related to the “State of Good Repair” strategic goal. This research will look at incorporating combined environmental loading and early-age effects on thin overlays or patch repair mixtures using fiber-reinforcement. It is not well understood what saw-cut joint spacing is needed or the net deflection or de-bonding effects can be expected when utilizing fiber-reinforcement in the top overlay material. Measurements will provide knowledge on how the FRC properties change at these early ages in which cracking is typically started.</p> <p>At least one University of Utah graduate course will be influenced by the project. The testing procedure will be covered in a lecture associated with a special topics course CVEEN 7290 Advanced Testing of Materials in the Spring of 2016. The technology transfer from the research findings will also be attempted at the</p>

	local/regional level by asking to participate in presenting this research at the Fall 2016 Annual Utah Department of Transportation Conference.
Web Links <ul style="list-style-type: none">• Reports• Project Website	https://www.ugpti.org/resources/reports/details.php?id=912