

Research Project Descriptions

UTC Project Information	
Project Title	Development of Guidelines for High-Volume Recycled Materials for Sustainable Concrete Pavement
University	University of Oklahoma (OU) Oklahoma State University (OSU)
Principal Investigator	PI: Jeffrey Volz (OU) Co-PI: Julie Hartell (OSU)
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Funding Source(s) and Amounts Provided (by each agency or organization)	Oklahoma Department of Transportation
Total Project Cost	\$184,645
Agency ID or Contract Number	DTRT13-G-UTC36 OU Subaward # SPTC 15.2-18
Start and End Dates	1/1/2016 – 6/30/2018
Brief Description of Research Project	<p>PROBLEM: Concrete production uses a considerable amount of non-renewable natural resources and generates a significant amount of greenhouse gases. To obtain a more sustainable solution requires examining the two main components of concrete – aggregates and cement. Recycling concrete as aggregate for new concrete reduces construction waste, diverts material from already over-burdened landfills, and lowers demand for virgin aggregate. Using supplementary cementitious materials – such as fly ash, blast furnace slag, and glass powder – also diverts material from landfills and reduces the carbon footprint of concrete. However, no studies have examined impact on service life or performance when combining high volumes of recycled concrete aggregate and supplementary cementitious materials in concrete.</p> <p>PROPOSED SOLUTION: The main objective of this study is to produce guidance for concrete in conventional pavement construction, incorporating at least 50% recycled materials (both recycled concrete aggregate and supplementary cementitious materials) without compromising performance or service life. The study will characterize virgin and recycled aggregate sources; optimize the aggregate skeleton, binder composition, and concrete mixtures; evaluate fresh and hardened mechanical properties; evaluate durability; construct, instrument, monitor, and load test full-scale pavement test sections; perform forensic studies of existing concrete pavements in Oklahoma; and develop guidelines for material selection and mixture optimization.</p>

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	