



# Transportation Consortium of South Central States

## Key Points

**Project Number:**

18TTNMS02

**Start Date:**

03/15/2018

**End Date:**

09/15/2019

**Principal Investigator(s):**

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**Lead Institution:**

New Mexico State University

**Funds Requested to UTC:**

\$28,600

**Funding Source(s):**

Tran-SET

New Mexico State University

**Total Project Cost:**

\$57,200

## Workforce Development Symposiums for UHPC

### Brief Project Description

This study is intended to provide two workforce development symposiums on ultra-high performance concrete (UHPC) for New Mexico Department of Transportation personnel, practicing engineers, contractors, and other transportation related organizations and practitioners. Each of the full-day symposiums is expected to provide extensive coverage of UHPC topics including: (1) a review of past and current UHPC projects in the United States; (2) UHPC materials and mixture development including coverage of testing methods and procedures; (3) potential modifications to testing procedures; (4) engineering design with UHPC; (5) experiences of batch plant and precast plant operators in batching, mixing, and placing UHPC; and (6) a hands on demonstration of batching, mixing, and placing UHPC produced with local materials.

### Problem Statement

UHPC is an attractive material for use in transportation infrastructure projects because it has superior strength and exceptional durability properties that can substantially reduce maintenance activities, maintenance costs, and life-cycle costs of concrete structures. These properties also provide the potential to greatly extend the service lives of concrete structures.

It is important to distinguish between prepackaged, commercially available UHPC mixtures and non-proprietary mixtures produced with local materials. Commercially available UHPC mixtures require less effort by an agency to develop the mixture. However, commercial mixtures have greater material costs than non-proprietary mixtures and are often shipped long distances for use on a specific project. The sustainability of higher material and shipping costs is questionable, but non-proprietary mixtures also have drawbacks. Research has shown that when UHPC is produced with local materials, excellent durability is still achieved and materials costs can be decreased by as much as 70 percent. However, there is a small reduction (10 to 15 percent) in compressive strength of UHPC when using local materials in comparison to strengths obtained with commercially available UHPC mixtures.



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## Objectives

This project will provide engineers and construction personnel with a knowledge base related to UHPC that will prepare them for work on projects that might specify the use of UHPC. Attendees will be exposed to instruction that cover the development of UHPC mixtures using local materials, practical production techniques that include batching, mixing, and placing methods, testing methods for assessing UHPC, and design methods that can be used to design new UHPC structures.

## Intended Implementation of Research

The goal of the research team is to ensure that results of this study are published in archival form to provide lasting impact on the transportation industry. The research team intends to disseminate the products of this study to the engineering and research communities, state DOTs, and other transportation related organizations by:

- Presenting the symposiums to the target audiences of engineers, contractors, and other transportation professionals.
- Archiving the presentations and other products of the project on Tran-SET's archival website.
- Publication of the bi-annual and final reports on Tran-SET's archival website
- Development and dissemination of presentation slides that can be used for education or workforce development activities. This presentation will be submitted to Tran-SET for archival purposes.
- Incorporating presentations into regular course offerings at New Mexico State University (such as capstone design courses taught) to ensure that transportation graduates have state of the art knowledge in their field.

## Anticipated Impacts/Benefits of Implementation

This study is expected to produce meaningful contributions by providing workforce development opportunities for engineers, contractors, and state DOT personnel. A more knowledgeable workforce should be expected to have the ability to better ensure that the nation's transportation infrastructure is built and maintained in a manner that results in longer lifespans and lower life cycle costs.

## Weblinks:

<http://transet.lsu.edu/research/research-in-progress/>

<https://rip.trb.org/View/1505431>