

RESEARCH PROBLEM STATEMENT

DATE: 09/25/2020 **PROJECT AREA:** Materials

TITLE: Low Shrinkage Concrete Mixtures for Arkansas

PROBLEM STATEMENT:

Bridge decks in Arkansas have often been observed to have early age cracking affecting their long term durability. This early age cracking in concrete is commonly related to dimensional changes in the concrete due to shrinkage. This shrinkage can be reduced by changing the mixture design, improving placement procedures, and using adequate curing. TRC1602 proved that a reduced cement content can be safely used to reduce shrinkage without detriment to other concrete properties. Some DOTs (Virginia for example) have a special "low shrinkage" mixture specification. The purpose of the proposed research is to develop a similar specification for ARDOT verified by testing mixture designs of locally available materials. Importantly, the mixtures in this project will include lightweight aggregate (to reduce concrete modulus), shrinkage reducing admixture, and/or fly ash to cause the lowest amount of shrinkage. The resulting mixture design specification can be used for bridge deck concrete to ensure long-lasting bridges.

- OBJECTIVES:**
1. Comprehensive literature review of low-shrinkage concrete best practices including past work for ARDOT
 2. Incorporating and comparing to the results of TRC1602, develop a range of low-shrinkage concrete using a variety of mixture design techniques
 3. Based on literature review and laboratory investigations, recommend specification language for low-shrinkage concrete
 4. If possible in consultation with ARDOT, place a low-shrinkage bridge deck in state to monitor long-term performance

FORM OF RESEARCH IMPLEMENTATION AND RETURN ON INVESTMENT:

The resulting specifications developed for this project can be used to prevent cracking in ARDOT bridge decks. This development furthers the work in TRC1602 and would result in bridge decks that need fewer repairs and replacements and will last longer on average.

Estimated Project Duration: 36 Months

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Standing Subcommittee
Ranking
3/8

Advisory Council
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3

Statement Combined with
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