ARDOT TRC TRANSPORTATION RESEARCH COMMITTEE

PROBLEM STATEMENT
No. 1

RESEARCH PROBLEM STATEMENT

DATE: 09/06/2019	**PROJECT AREA:** Construction

TITLE: Mixture Design and Testing Requirements for Drilled Shaft Concrete

PROBLEM STATEMENT:

Drilled shafts are often used for bridge foundations in Arkansas. In a drilled shaft, concrete has to be placed deep below the ground surface, often in a cross section congested with steel reinforcement. Consolidation is not easy in these conditions, thus self-consolidating concrete is preferred. Common issues with this kind of placement include segregation of aggregate and paste and improper consolidation around rebar and edges of the drilled shaft cross section. Heat of hydration is also an important concern. There are principles that have been established in the past about best practices for mixture designs, mixing, placing, and testing drilled shaft concrete, but this work has not been implemented in Arkansas. What is proposed in this problem statement is development of local self-consolidating concrete mixtures for Arkansas. These will lead to draft specifications for drilled shaft mixture designs. Additionally, specialized field testing is needed to verify the quality of drilled shaft concrete, therefore consolidation and segregation test specifications will be drafted as quality control (QC) and acceptance(QA) for drilled shaft concrete.

OBJECTIVES:

1. Design non-segregating, self-consolidating mixtures using common Arkansas materials to be used in drilled shafts.
2. Draft mixture specifications for drilled shaft concrete.
3. Cast drilled shafts in the field using conventional mixes and with self-consolidating mix. Remove the shaft from the ground and observe the quality of in-place consolidation.
4. Draft specifications for required testing for QA and QC of drilled shaft concrete.

FORM OF RESEARCH IMPLEMENTATION AND RETURN ON INVESTMENT:

New specifications will be drafted to improve the in-place quality of drilled shaft concrete in Arkansas. Better bridge foundations will result in safer, longer lasting bridge structures.

Estimated Project Duration: 24 **Months**

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PHONE: (479) 575-6028 **REVIEWER:**

Standing Subcommittee Ranking	Advisory Council Ranking	Statement Combined with Statement Number(s)
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