DATE: 09/25/2020  PROJECT AREA: Pavements

TITLE: Hybrid Plain-Fiber Reinforced Concrete for Pavements and Overlays

PROBLEM STATEMENT:
It is important for a portland cement concrete pavement or overlay to have adequate tensile strength to withstand repeated traffic loadings over its lifetime. One way to improve the tensile strength is to add macro-fibers (steel or composite) to the concrete, holding the concrete together if cracks form. This tends to be more expensive however, and the highest tensile stresses only occur on the bottom of the pavement. One alternative is to design a hybrid wearing section with plain (unreinforced) pavement on top, and fiber reinforced concrete on the bottom. The proposed project will design fiber reinforced concrete to meet ARDOT requirements to be used for a reinforced bottom layer for overlays and pavements. Improvements in the tensile strength of this layer could lead to longer design lives with minimal changes to current practice.

OBJECTIVES:
1. Design fiber reinforced concrete mixtures conforming to ARDOT spec with a variety of fibers
2. Cast scale hybrid plain-fiber reinforced concrete samples and test for fatigue performance and toughness
3. Cast full-scale panel with the best mixture(s) and examine potential performance

FORM OF RESEARCH IMPLEMENTATION AND RETURN ON INVESTMENT:
This project would result in a potential pavement design option that would be especially suited to eastern Arkansas where subgrade materials often deteriorate resulting in increased tensile stresses on the bottom of pavement slabs.

Estimated Project Duration: 24 Months

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