RUTGERS
Center for Advanced Infrastructure and Transportation

PROJECT OVERVIEW REPORT

1. UTC Identifying Number
   69A3551847102

2. Center Identifying Number
   CAIT-UTC-REG75

3. Project Title
   Mitigating Cracks in Concrete Members for Durable Bridge Construction

4. Principal Investigator & Contact Information
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6. Customer Principal
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7. Project Description
   The primary goal of this proposal is to investigate the use of steel wool in concrete to increase its crack resistance (fracture toughness and flexural strength) and enable durable, crack-free bridges. Unlike the majority of research efforts that have focused on higher compressive strength (common ultra-high performance concretes), the focus of this project will be on the tensile strength. This research will develop a concrete mix that has high tensile strength suitable for precast concrete bridge applications to support accelerated bridge construction.

8. Implementation of Research Outcomes (or why not implemented)
   The intended outcome of the project is to provide recommendations for implementing the newly developed concrete mix in field applications. Relevant documentation, along with the detailed report, will be provided to guide the adoption of the new material. For facilitating the adoption of the new concrete mix containing steel wool, demonstrations of mixing, curing, handling, and placement of the mix will be performed for DOT and industry representatives. Furthermore,

an example of prestressed concrete girder design with the new concrete mix will be documented for implementation in bridge-related projects.

9. Impacts/Benefits of Implementation (actual, not anticipated)
   To Be Determined

10. Dates and Budget
    Start date: 10/1/2022
    End date: 9/30/2023
    UTC (CAIT) Dollars: $75,000
    Cost Sharing: $75,000
    Total Dollars: $150,000

11. Keywords
    durability, fiber reinforced concretes, fracture toughness, high tensile strength, prestressed concrete, reinforced concrete, crack, high performance concrete, micro-reinforcement.

12. Web Links (Reports and Project Website)
    https://cait.rutgers.edu/research/mitigating-cracks-in-concrete-members-for-durable-bridge-construction/