RUTGERS
Center for Advanced Infrastructure and Transportation

PROJECT OVERVIEW REPORT

1. UTC Identifying Number
   DTRT13-G-UTC28

2. Center Identifying Number
   CAIT-UTC-NC51

3. Project Title
   Bond Performance of 1.125 Inch Diameter Prestressing Strands

4. Principal Investigator & Contact Information
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7. Project Description
   The public desires less disruption to highway services in addition to cheaper and more aesthetically pleasing structures. To meet these needs, engineers are continuously pushing the limits of current designs. One way to decrease the costs of an expensive structure is to limit the number of supports, provide longer span lengths, reduce the amount of materials and decrease construction time. In recent years, concrete bridges have benefited from larger diameter prestressing strands. Strands have gone from 0.5 in. to 0.6 in., mostly adopted as standard in the 1990s. In the mid 2000s research was underway to investigate larger strands and high strength strands (0.6 in. special, 0.7 in. and Grade 300). The largest available strands in the United States are 7-wire 0.7 in. diameter strands and are used sparingly in some early adoption states, despite several researchers finding that they can provide longer spans and more efficient structures with their use. The overarching goal of the proposed research is to investigate the use of 19-wire 1.125 in. diameter prestressing strand, purchased internationally, which has the potential

to leapfrog several strand sizes. To accomplish this goal, the following more specific objectives have been identified:

1. Determine the level of cover required to ensure no splitting and bursting of 1.125 in. diameter strands.
2. Estimate the transfer length of 1.125 in. diameter prestressing strands.
3. Estimate the development length of 1.125 in. diameter prestressing strands.
4. Ensure the AASHTO LRFD specifications can predict the behavior of 1.125 in. diameter prestressing strand reinforced concrete members.

8. Implementation of Research Outcomes (or why not implemented)

The results from this project will be the first steps to getting designers and precasters familiar with and accepting of the challenges for using these large diameter strands. The research team will disseminate the data collected with multiple DOTs through committee presentations and workshops with DOT engineers. Furthermore, the external project manager (Insteel) will have the opportunity to see the promise and uses of such large strand prior to making it a widely available product. The authors will develop several workshop for each stake holder in an effort to make engineers aware and comfortable with such a significant leap forward.

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

To Be Determined

10. Dates and Budget

Start date: 12/15/2017
End date: 9/30/2018
UTC (CAIT) Dollars: $140,000
Cost Sharing: $140,000
Total Dollars: $280,000

11. Keywords

Prestressing strand, transfer length, development length

12. Web Links (Reports and Project Website)

http://cait.rutgers.edu/cait/research/bond-performance-1125-inch-diameter-prestressing-strands