



ACCELERATED BRIDGE CONSTRUCTION  
UNIVERSITY TRANSPORTATION CENTER

<b>UTC Project Information</b>	
Project Title	Alternative Materials and Configurations for Prestressed-precast Concrete Pile Splice Connection
University	FIU
Principal Investigator	Mehrabi, Armin
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Funding Source(s) and Amounts Provided (by each agency or organization)	ABC-UTC Funds: \$60,000 Match Funds: \$30,000
Total Project Cost	Total Funds: \$90,000
Agency ID or Contract Number	Accelerated Bridge Construction University Transportation Center (ABC-UTC) 69A3551747121
Start and End Dates	01/01/2020 – Active
Brief Description of Research Project	<p>Driving prestressed-precast concrete piles (PPCP) is one of the options among various types of piles and installation methods that conforms to the principals of Accelerated Bridge Construction since it employs pile segments prefabricated in precast plants and delivered to the site for installation. This option provides in many cases an economic and rapid alternative to other types, therefore reducing the construction time overall in line with the benefits promised by ABC methods. However, traditional prestressed piles that use carbon steel strands and bars are prone to corrosion, especially when they are in marine environment. There have been attempts and investigations into the use of alternative prestressing strand and reinforcing material that are corrosion resistant. The use of Carbon Fiber Reinforced Polymers (CRFP) and High Strength Stainless Steel (HSSS) for strands and other reinforcement in concrete piles have shown great improvements in the resistance against corrosion.</p> <p>It often happens that shipping and transportation constraints or other reasons limit the length of PPCP segments that can be delivered to the bridge site. Variable and unforeseen soil conditions may also require longer piles than anticipated. Hence, splicing of pile segments has to be performed at the site to achieve longer lengths using various types of joints. FDOT has used splicing methods and has undertaken efforts to develop more effective and corrosion resistant joints for their marine environment. Because of lack of understanding of the structural behavior and sometime associate complexity and cost, their use has been very</p>

	<p>limited and scarce. On the other hand, much has been done in relation with ABC connections and details for sub- and super-structure joints and connections, and a variety of new and effective joints have been developed and are in use. The aim of the proposed study is to build upon the experiences gathered in general for ABC connections and develop an effective yet simple splice connection for PPCP using alternative configuration and new materials. The focus will be on connection types that are easy to implement, provide adequate strength, and reduce interruption to operation.</p> <p>The objective of this project is to explore alternative pile splice connection configurations and materials, and to investigate the feasibility of these connections in comparison with the existing epoxy dowel splice for prestressed-precast concrete piles.</p> <p>This research project focuses on the use of analytical modeling and computational means for investigation on the structural behavior for newly developed conceptual designs. Future activities, within a separate project, will include performing experimental verification of the newly developed details.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here</p>	<p>Florida DOT and Louisiana DOTD have expressed interest in outputs including specifications.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>This is an active research project. Upon completion, impacts/benefits will be reported.</p>
<p>Web Links</p> <ul style="list-style-type: none"> <li>• Reports</li> <li>• Project website</li> </ul>	<p><a href="https://abc-utc.fiu.edu/research-projects/fiu-research-projects/alternative-materials-and-configurations-for-prestressed-precast-concrete-pile-splice-connection/">https://abc-utc.fiu.edu/research-projects/fiu-research-projects/alternative-materials-and-configurations-for-prestressed-precast-concrete-pile-splice-connection/</a></p>