ACCELERATED BRIDGE CONSTRUCTION
UNIVERSITY TRANSPORTATION CENTER

UTC Project Information	
Project Title	Exploring Fiber-Reinforced Polymer Concrete for Accelerated Bridge Construction Applications
University	University of Washington
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Funding Source(s) and Amounts Provided (by each agency or organization)	$70,000 (ABC-UTC) $35,000 (UW)
Total Project Cost	$105,000
Agency ID or Contract Number	69A3551747121
Start and End Dates	2/1/2021 – Active
Brief Description of Research Project	The use of precast concrete superstructure elements can expedite project delivery, improve work-zone safety, and reduce overall project cost. To accelerate construction, the precast elements must be connected quickly on-site, ideally using as little additional material as possible. While the excellent tension and bond strengths of ultra-high performance concrete (UHPC) make it ideal for this purpose, the time at which UHPC achieves its design strength is directly proportional to the rate of hydration of the cementitious binder. While UHPC may provide the best solution in many instances, alternative joint materials that utilize polymer binders, instead of cementitious ones, may be more suitable if rapid strength gain is needed. This project explores a potential alternative closure joint material, fiber-reinforced polymer concrete (FRPC), which displays levels of the two critical characteristics (bond and tension strength) that are comparable to, or potentially better than, those of UHPC. FRPC has the advantage of requiring shorter closure windows (approximately 4 hours versus 72 hours of UHPC) due to the very rapid strength gain of the polymer, which could be ideal for overnight construction or rehabilitation projects, and provides an additional option to the engineer and contractor when choosing a closure joint material for a given circumstance. The objectives of the research are to: · Review the most promising FRPC materials, · Assess the temperature dependent properties of FRPC behavior, · Characterize the mechanical properties (tensile, flexural, and compressive strength) of FRPC, and

	· Characterize the splice performance of deformed bars embedded in FRPC materials. Based on the results of this experimental investigation, recommendations for the use of FRPC in ABC applications will be developed to maximize the benefit of this relatively new material for different ABC project applications.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	Proposal in to WSDOT for follow-on research (report when funded) - may be funded in 2023
Impacts/Benefits of Implementation (actual, not anticipated)	The impacts will be tracked and reported once they are identified.
Web Links • Reports • Project website	https://abc-utc.fiu.edu/research-projects/exploring-fiber-reinforced-polymer-concrete-for-accelerated-bridge-construction-applications/