UTC Project Information	
Project Title	Service Life Design Guidance for UHPC Link Slabs
University	OU
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Funding Source(s) and Amounts Provided (by each agency or organization)	ABC-UTC funds: $75,000 Match funds: $37,500 from ODOT
Total Project Cost	$112,500
Agency ID or Contract Number	Accelerated Bridge Construction University Transportation Center (ABC-UTC) 69A3551747121
Start and End Dates	2020/01/01- Active
Brief Description of Research Project	Design for service life rather than just for strength against potential overload and fatigue failure is becoming a more common consideration for bridges. One aspect of design, and often bridge retrofit, with potential for a large impact is minimizing the number of transverse deck joints. Bridge deterioration can often be traced to poor performance of these deck joints due to failure of the joint seal allowing chloride laden water onto bridge girder ends, bearings, and substructure elements. Using link slabs over the piers allows for eliminating some interior joints and moving expansion joints to the end of the bridge while still maintaining typical bridge behavior. Link slabs allow the simply supported behavior expected for many bridges, yet still transmit deformations and forces to expansion joints and reduce potential penetrations in the bridge deck. Advanced materials, such as ultra-high performance concrete (UHPC) can simplify link slab details and substantially improve their durability. UHPC link slabs are specifically relevant to accelerating bridge retrofit in that the short required debonded lengths can significantly reduce the required amount of demolition and the overall time required for the project. Debonded lengths for UHPC link slabs can be as small as 16 in. compared to several feet for conventional construction. While the concrete in the immediate area of the joint may be deteriorated and can be removed quickly, concrete further from the joint will often be sound and take substantial time and labor to remove. The hairline distributed cracks that form in

	a UHPC link slab limit pathways for water to penetrate to the bridge girders and substructure, and UHPC itself is inherently more durable than conventional concrete due to its very low permeability. UHPC link slabs have been used successfully in the field by several state DOTs, several research studies have been carried out focused on linkslabs, and appropriate design guidelines are available in the AASHTO LRFD Guide Specifications for Accelerated Bridge Construction (2018). However, more information is needed for quantifying the service life benefits of using UHPC link slabs compared to conventional construction. The main objectives of this project are to develop user friendly tools that will allow use of developed information specific to UHPC link slabs within the framework of SHRP2 R19A for service life design of bridges and to provide educational materials to help practitioners understand how to use those tools.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	• Contacted by FHWA Turner-Fairbank requesting outputs to include in a guide document being developed; outputs will be sent when complete. • Contacted by Quick Bond Polymers, a polymer concrete manufacturer interested in using outputs when complete. • Oklahoma DOT has requested the research team to assist them in seeking funding from USDOT for link slab project implementation
Impacts/Benefits of Implementation (actual, not anticipated)	This is an active research project. Upon completion, impacts/benefits will be reported.
Web Links • Reports • Project website	https://abc-utc.fiu.edu/research-projects/ou-research-projects/service-life-design-guidance-for-uhpc-link-slabs/