



ACCELERATED BRIDGE CONSTRUCTION
UNIVERSITY TRANSPORTATION CENTER

UTC Project Information	
Project Title	Accelerated Repair and Replacement of Expansion Joints
University	ISU
Principal Investigator	Dr. Brent Phares
PI Contact Information	bphares@iastate.edu
Funding Source(s) and Amounts Provided (by each agency or organization)	ABC-UTC Fund: \$120,092 Match Fund: \$60,046
Total Project Cost	Total Fund: \$180,138
Agency ID or Contract Number	Accelerated Bridge Construction University Transportation Center (ABC-UTC) 69A3551747121
Start and End Dates	01/01/2019-12/31/2020
Brief Description of Research Project	<p>Bridge deck expansion joints allow for the movement of bridge decks exposed to thermal expansion and dynamic loading. These joints are often one of the first components of a bridge deck to fail, and there is a need for accelerated replacement options, especially in areas with high traffic volumes. Extensive research is being conducted on accelerated bridge construction (ABC) initiatives to reduce lane closure time. However, less attention has been devoted to accelerated repair and replacement of bridge deck expansion joints. This project developed methods for the accelerated replacement of bridge deck expansion joints, beginning with a literature review. The combination of a stainless steel railing and ultra-high-performance concrete (UHPC) header with hydrodemolition was evaluated for its effectiveness as an accelerated option. A life-cycle cost analysis with a sensitivity study compared the proposed replacement to current practices and two alternative methods. This analysis revealed that, for bridges with a life of greater than 50 years, the proposed replacement was the most cost-effective option. The proposed replacement joint also underwent bonding, static, and fatigue testing. Hydrodemolition was also used in the replacement process of the testing. These tests indicated that the joint system utilizing hydrodemolition produces an excellent bond with the existing concrete. The static and fatigue testing revealed the joint system meets department of transportation (DOT) standards and would likely have a long service life.</p>

Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	The outcomes will be tracked and reported once they are identified.
Impacts/Benefits of Implementation (actual, not anticipated)	The impacts will be tracked and reported once they are identified.
Web Links <ul style="list-style-type: none">• Reports• Project website	https://abc-utc.fiu.edu/research-projects/isu-research-projects/accelerated-repair-and-replacement-of-expansion-joints/