



ACCELERATED BRIDGE CONSTRUCTION  
UNIVERSITY TRANSPORTATION CENTER

<b>UTC Project Information</b>	
Project Title	Precast Ductile End-Diaphragm System for Accelerated Construction of Slab-On-Girder Prestressed Concrete Bridges in Seismic Regions
University	University of Oklahoma
Principal Investigator	Philip Scott Harvey Jr
PI Contact Information	harvey@ou.edu
Funding Source(s) and Amounts Provided (by each agency or organization)	\$50,000(ABC-UTC) 25,464(Matching Fund)
Total Project Cost	\$75,464
Agency ID or Contract Number	69A3551747121
Start and End Dates	May 15, 2023 - May 31, 2024
Brief Description of Research Project	<p>Diaphragms connect parallel beam elements and assist with lateral distribution of load in bridge superstructures. Cast-in-place diaphragms are typically used with precast prestressed concrete beams, but time for forming and curing can be significant, which is not amenable to accelerated bridge construction (ABC). The proposed project will explore the use of <i>prefabricated</i> diaphragms for ease and rapidity of construction, incorporating novel connection detailing for use in medium to high seismic regions to achieve ductile behavior. The proposed precast concrete end-diaphragm system comprises unbonded post-tensioning diaphragm-to-beam connections and partially restricted beam-to-slab connections to achieve low damage behavior. The proposed project will extend previous work by the research team on this concept through computational modeling, experimental testing, and optimization of connection detailing, including the incorporation of ultra-high performance concrete (UHPC) based on the Co-PI's expertise. High-fidelity finite element models of a prototype bridge equipped with the proposed diaphragm system will inform the optimization of the connection detailing. The resulting connection detailing will be tested experimentally to validate the performance, calibrate and validate the computational model, and determine its feasibility in an ABC context. The primary output of the project will be a guide for modeling and designing the proposed prefabricated ductile concrete end-diaphragm system, promoting its uptake in ABC projects.</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"><li>• Reports</li><li>• Project website</li></ul>	<a href="#"><u>Precast Ductile End-Diaphragm System for Accelerated Construction of Slab-On-Girder Prestressed Concrete Bridges in Seismic Regions   Accelerated Bridge Construction (fiu.edu)</u></a>