



ACCELERATED BRIDGE CONSTRUCTION  
UNIVERSITY TRANSPORTATION CENTER

<b>UTC Project Information</b>	
Project Title	Investigating the Potential Applications of Elastomeric Polymers (Such As Polyurea And Polyurethane) For Accelerated Bridge Construction And Retrofit
University	UNR
Principal Investigator	Hamed Ebrahimiian
PI Contact Information	hebrahimiian@unr.edu
Funding Source(s) and Amounts Provided (by each agency or organization)	ABC-UTC: \$50,000 Match fund: \$25,000 from UNR and Bridge Preservation LLC
Total Project Cost	\$75,000
Agency ID or Contract Number	69A3551747121
Start and End Dates	March 2020-present
Brief Description of Research Project	Elastomeric polymers such as polyurea and polyurethane are nonlinear elastic materials with high tensile strength and strain capacity, adhesiveness, and resistance to permeability and environmental conditions. They have been used commercially as waterproofing and anti-blast coating for reinforced concrete components. While the elastomeric polymer is an interesting material with unique characteristics, there has been limited research on its potential structural applications. A number of research studies have shown the remarkable increase in flexural and shear strength of polyurea coated reinforced concrete beams. Further research is needed to explore the application of polyurea coating system as a new structural material in the bridge industry. This project takes the first step of a long-term research vision to examine and investigate the innovative applications of elastomeric polymers and specifically polyurea coating in accelerated bridge construction. The focus of this project is on the application of elastomeric polymer coatings for design and retrofit of side bridge girders. There are three aspects that can be considered for this application: (i) enhancing the flexural and shear strength of the beam through the application of a spray coating, (ii) enhancing the weather resistivity, which is especially important for side beams, and most importantly, (iii) overheight vehicle collision impact resistance. This project only focuses on the flexural and shear strength of polyurea coated RC beams. This simple step is taken to start gaining

	<p>experience and knowledge on this relatively new material, and incrementally examine other aspects of the applications and other potential applications through future funding opportunities. We plan for an experimental-analytical research effort, to develop simple phenomenological material models for the polyurea coating system and to investigate the potential cost vs. benefit of the coating in design and retrofit of side girders.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here</p>	<p>In-kind donation from Bridge Preservation LLC</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>Bridge Preservation LLC is utilizing UNR for product proof testing</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/unr-research-projects/investigating-the-potential-applications-of-elastomeric-polymers-such-as-polyuria-and-polyurethane-for-accelerated-bridge-construction-and-retrofit/">https://abc-utc.fiu.edu/research-projects/unr-research-projects/investigating-the-potential-applications-of-elastomeric-polymers-such-as-polyuria-and-polyurethane-for-accelerated-bridge-construction-and-retrofit/</a></p>