UTC Project Information	
Project Title	MPC-595 – Mechanically Spliced Precast Bridge Columns
University	South Dakota State University
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Start and End Dates	April 11, 2019 to July 31, 2022
Brief Description of Research Project	Mechanical bar splices, which are commonly referred to as bar couplers, have been utilized mainly in laboratories to connect precast columns to footings or cap beams. Nevertheless, bar couplers are currently banned in seismic bridge design codes for the incorporating in the plastic hinge regions of either cast-in-place or precast columns. This is mainly because the coupler behavior and the seismic performance of mechanically spliced columns are largely unknown. A recent study at South Dakota State University attacked the first problem by testing more than 160 bar couplers including nine products from six manufacturers, and established a comprehensive database of the coupler behavior. Furthermore, they proposed standard test methods to systematically quantify the coupler performance and also proposed acceptance criteria for couplers to be incorporated in bridge columns. The acceptable mechanical bar splices were categorized as "seismic couplers". Nevertheless, test data regarding the performance of mechanically spliced bridge columns is scarce and the available data is for columns with different geometries, confinement levels, and testing procedures. To better understand the seismic performance of mechanically spliced bridge

	columns, testing of large-scale precast columns spliced with different bar couplers is proposed. Establishing a comprehensive precast column experimental database will allow to verify or further modify the current design methods and might provide a justification to relax current coupler ban for bridge columns. Furthermore, the experimental study will identify new and feasible detailing for mechanically spliced precast columns to promote the accelerated bridge construction for bents.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	The findings of the study will be presented to AASHTO and FHWA to relax the current ban on using bar couplers for bridge columns.
Impacts/Benefits of Implementation (actual, not anticipated)	The benefits of accelerated bridge construction have been emphasized in recent publications. As part of this project, new precast column connection details were developed incorporating mechanical bar splices, which can potentially reduce the bridge bent construction time by a factor of three to four, depending on the splice type. Furthermore, a new column detailing was developed and proof-tested in which the column bars are exposed for a quick access and replacement.
Web Links • Reports • Project Website	• MPC Research Report – Mechanically Spliced Precast Bridge Columns • SDSU Project Website – Mechanically Spliced Precast Bridge Columns • Technical Paper – Experimental Studies on Seismic Performance of Mechanically Spliced Precast Bridge Columns • SDSU Master's Thesis – Seismic Performance of Mechanically Spliced Precast Bridge Columns with New Couplers • SDSU Master's Thesis – Mechanically Spliced Precast Bridge Columns • SDSU Master's Thesis – Seismic Performance of Mechanically Spliced Bridge Columns through Analytical Studies