

UTC Project Information	
Project Title	MPC-392 – Evaluation of Spliced Sleeve Connections for Precast Reinforced Concrete Bridge Piers
University	University of Utah
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Funding Agencies	USDOT, Research and Innovative Technology Administration
Agency ID or Contract Number	DTRT12-G-UTC08
Project Cost	\$179,148
Start and End Dates	January 1, 2012 – December 31, 2013
Project Duration	2 Years
Brief Description of Research Project	<p>Connections between precast concrete elements must be able to withstand significant stresses and deformations in earthquakes. The splice sleeve connection is being considered for connecting such elements in Accelerated Bridge Construction (ABC). There is limited data for use of this connection in bridges located in moderate to high seismic regions. The proposal aims at performing cyclic tests to verify the capacity of the splice sleeve connection for precast concrete elements such as columns connected to footings or bent cap beams. A recent study has developed a different connection than the one proposed for bent cap systems in seismic regions (Restrepo et al. 2011). A recent state-of-the art review has determined that there is an urgent need for research that would provide substantiation of the design, construction, and seismic performance of bar coupler systems such as grouted sleeves (Marsh et al. 2011).</p> <p>Research Objectives: The objectives of this proposal are: (1) to perform quasi-static cyclic tests of precast concrete column to footing connections using a splice sleeve connection, and precast concrete column to bent cap beam connections using a mechanical sleeve connection, and (2) to evaluate to what extent the sleeve connections behave in a manner consistent with the earthquake resisting elements that would be expected with traditional construction methods, as described in the AASHTO Guide Specification for LRFD Seismic Bridge Design (AASHTO 2011).</p>

<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>Grouted splice sleeve (GSS) connectors were placed in the column base for the first test alternative, whereas they were located in the footing or cap beam for the second test alternative. A cast-in-place specimen was tested for each category to provide a control test for comparative studies. Experimental results showed that the performance of the precast specimens was satisfactory. The report compares the performance of the precast to monolithic joints for both the GGSS and FGSS categories. The presence of the GSS connectors in the column base of the precast test models caused a disruption in the natural stress transfer between the connecting components, hence, a different cyclic performance was observed compared to the control tests. A slight improvement was observed when the GSS connectors were incorporated outside the column base. A reduced displacement ductility capacity was achieved for the precast specimens compared to the cast-in-place ones.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>UDOT and other DOTs are considering splice sleeves as a major part of their effort to put in place accelerated bridge construction in seismic regions. This research is contributing to efforts for constructing bridges using accelerated bridge construction in seismic regions.</p>
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project Website 	<p>http://www.ugpti.org/resources/reports/details.php?id=870</p>