

<b>UTC Project Information</b>	
Project Title	MPC-402 – Seismic Performance of SCC Bridge Columns
University	South Dakota State University
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Funding Agencies	USDOT, Research and Innovative Technology Administration
Agency ID or Contract Number	DTRT12-G-UTC08
Project Cost	\$152,976
Start and End Dates	2012 –2013
Project Duration	18 Months
Brief Description of Research Project	<p>Self-consolidating concrete (SCC) is a specially proportioned hydraulic cement concrete that enables the fresh concrete to flow without segregation. Because of its high workability, SCC flows into narrow spaces and form corners, and around closely-spaced steel reinforcement without the need for mechanical vibration.</p> <p>In seismic regions such as Utah and part of Colorado in Transportation Region 8, the need for a large amount of confinement reinforcement to provide the required ductility often results in columns regions with excessive steel congestion. Steel congestion hinders the placement and proper consolidation of conventional concrete. There are also cases when concrete repair and/or replacement are needed to fix localized damage in bridge structural elements following a seismic event. Highly flowable, yet non-segregating, concrete would be needed to perform the repairs. The high flowability and robustness of SCC make it ideal for the construction and repair of bridge columns and joints designed to meet seismic detailing.</p> <p>There is an evident lack of research to investigate the ductility and shear strength of SCC bridge columns under seismic loads. In this proposed study, experimental and analytical work will be performed to evaluate the ductility and shear strength of columns under reversed inelastic deformations.</p> <p><b>Research Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Develop a stress-strain model for SCC under uniaxial compressive stress</li> <li>2. Evaluate the ductility and shear capacity of SCC bridge columns under inelastic load reversal</li> </ol>

	3. Evaluate the ductility and shear capacity of SCC bridge columns-beam joints under inelastic load reversal
Describe Implementation of Research Outcomes (or why not implemented)  Place Any Photos Here	The experimental results of the material tests showed that for the same concrete strength, SCC has higher strain at strength and ultimate strain, lower material ductility, and lower elastic modulus than conventional concrete. The results of the column specimens showed that SCC bridge columns provide adequate performance under high inelastic lateral load reversals. Compared to CC columns, SCC columns exhibited lower displacement ductility, higher drift ratio, and lower energy dissipation.
Impacts/Benefits of Implementation (actual, not anticipated)	Self consolidating concrete can be specified for the construction of bridge columns in seismic areas. The use of self consolidating concrete will expedite the construction process and will eliminate construction deficiencies arising from steel congestion in bridge columns.
Web Links <ul style="list-style-type: none"> <li>• Reports</li> <li>• Project Website</li> </ul>	<a href="http://www.ugpti.org/resources/reports/details.php?id=883">http://www.ugpti.org/resources/reports/details.php?id=883</a>