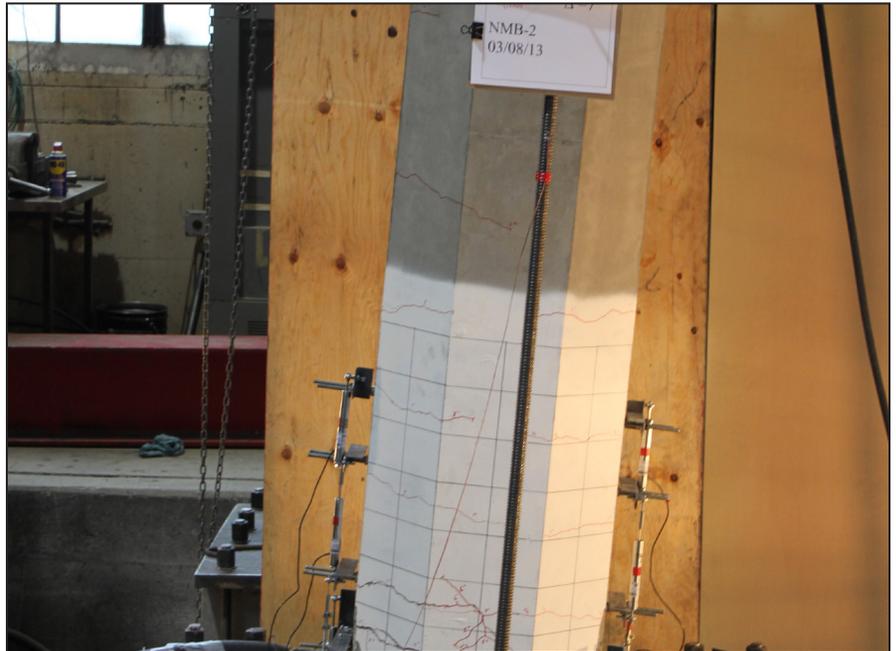


MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 17-320 (project 392) | April 2017

Evaluation of Grouted Splice Sleeve Connections for Precast Reinforced Concrete Bridge Piers



the **ISSUE**

Connections between precast concrete elements must be able to withstand significant stresses and deformations in earthquakes. The grouted splice sleeve connector is being considered for connecting footing, column and cap beam elements in accelerated bridge construction. There is limited data for this connector in bridges located in seismic regions.

the **RESEARCH**

Cyclic quasi-static loading was used to test column-to-footing and column-to-cap beam half-scale specimens. One control specimen and two precast specimens were constructed for each category for a total of six specimens. The precast column-to-footing joint incorporated one type of Grouted Splice Sleeve (GSS) connector for which the bars were grouted at both ends (GGSS); the precast column-to-cap beam joint used a different GSS connector type for which one bar was threaded into one end and the other bar was grouted into the opposite end (FGSS). Experimental results showed that the performance of all test specimens was satisfactory compared to current bridge seismic codes. Compared to control specimens, a reduced displacement ductility capacity was obtained for the precast specimens in both categories.



A University Transportation Center sponsored by the U.S. Department of Transportation serving the Mountain-Plains Region. Consortium members:

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University of Denver
University of Utah

Utah State University
University of Wyoming



Lead Investigator(s)

Chris P. Pantelides
c.pantelides@utah.edu
University of Utah

Project Title

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Co-Investigator(s)

Lawrence D. Reaveley

Research Assistant(s)

M.J. Ameli

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the FINDINGS

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.

the IMPACT

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.

For more information on this project, download the entire report at <http://www.ugpti.org/resources/reports/details.php?id=870>

For more information or additional copies, visit the Web site at www.mountain-plains.org, call (701) 231-7938 or write to Mountain-Plains Consortium, Upper Great Plains Transportation Institute, North Dakota State University, Dept. 2880, PO Box 6050, Fargo, ND 58108-6050.



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