

<b>UTC Project Information</b>	
Project Title	MPC-523 – Methodology for Load Rating Double-Tee Bridges
University	South Dakota State University
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Project Cost	\$74,245
Start and End Dates	September 30, 2013 to September 30, 2018
Project Duration	September 30, 2013 to September 30, 2018
Brief Description of Research Project	The most common type of bridge on South Dakota (SD) local roads is double-tee (DT) prestressed girders. More than 700 DT bridges are currently in-service in SD. Structural detailing, aging, traffic volume, and environmental conditions such as a high number of freeze-thaw cycles and use of de-icing agents may significantly affect the structural performance, integrity, and capacity of bridges. These factors are critical for DT bridges located in SD since (1) more than 75% of SD DT bridges are 20 years or older, (2) a recent study by Wehbe et al. (2016) showed that the typical DT girder longitudinal joint detailing is not adequate for long-term performance, and (3) there are more than 100 freeze-thaw annual cycles in SD on average (Haley,

	<p>2011), which may expedite the deterioration of this type of bridges. When a bridge is affected by one or more of these parameters, the evaluation and rating of load carrying capacity of the bridge is necessary to ensure the safety of the traveling public and to prevent excessive bridge damage and collapse. Load rating of a bridge requires reliable estimation of actual capacities of the affected members as well as the knowledge of live load distribution and demands. Due to a lack of specific load rating for South Dakota double-tee bridges, the “posting” of these type of bridges is challenging.</p> <p>This proposed project will develop a guideline to accurately load rate DT bridges located in South Dakota. To achieve this objective, both field and laboratory testing are recommended. Field tests will provide sufficient information to understand the live load distribution and dynamic load allowance specific to DT. The laboratory testing of full-scale salvaged DT girders will provide information to accurately calculate the actual capacity of deteriorated bridges. A load rating guideline based on visual identification of damage in DT bridges will be developed to further help engineers to rate those bridges in a timely and accurate fashion.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>A new load rating methodology was proposed for South Dakota double-tee bridges, which relates the visual damage to the load rating parameters. Bridge engineers now can determine the safe live load capacity of damaged double-tee girder bridges and can better decide on posting, repairing, or replacement of double-tee girders or bridges.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<ol style="list-style-type: none"> <li>1. Development of visual load rating method for double-tee bridges,</li> <li>2. Maximizing the use of existing double-tee bridges while providing safe travel to the public and preserving the bridge investment,</li> <li>3. A final report to disseminate the findings to DOTs, bridge engineers, local governments, and bridge owners,</li> <li>4. Education of two MS students.</li> </ol>
<p>Web Links</p> <ul style="list-style-type: none"> <li>• Reports</li> <li>• Project Website</li> </ul>	<p><a href="https://www.ugpti.org/resources/reports/details.php?id=956">https://www.ugpti.org/resources/reports/details.php?id=956</a></p>