

<b>UTC Project Information</b>	
Project Title	MPC-497 – Compaction Testing of Granular Materials
University	South Dakota State University
Principal Investigator	Allen L. Jones
PI Contact Information	Department of Civil and Environmental Engineering South Dakota State University Brookings, SD 57007 Phone: (605) 688-6467 Email: allen.jones@sdstate.edu
Funding Agencies	USDOT, Research and Innovative Technology Administration
Agency ID or Contract Number	DTRT13-G-UTC38
Project Cost	\$65,000.00
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	<p>The South Dakota Department of Transportation (SDDOT) and many other state DOT's have used the Ohio Department of Transportation's (ODOT) Typical Moisture Density Curves for the compaction of granular soil materials. However, the ODOT Materials Manual states "Moisture-Density proctor curves and controls were originally developed to be used on cohesive (clays and silts) soils. Errors or complications arise when trying to extrapolate these principals to granular materials." Therefore, additional information is needed by the SDDOT in assessing compaction of these materials. SDDOT is also using more materials recycled from PCC pavements and asphalt concrete pavements as subbase and base courses. Recycled materials are placed using the test strip method to determine how much effort is needed to achieve acceptable levels of compaction. Test strips work well for large areas but become problematic for small areas.</p> <p>SDDOT has identified a need to reevaluate how they determine whether granular material has been compacted to the desired density. Most compaction testing has been performed using the nuclear gauge or sand cone methods, and the in-place density standard is determined by either the use of a test strip or a moisture density relation curve (Proctor). Some DOTs have started using newer methods such as the lightweight deflectometer (LWD), dynamic cone penetrometer (DCP), proof rolling and the use of intelligent compaction. The SDDOT wishes to examine how other DOTs determine the in-place density of granular materials. The SDDOT also wishes to determine whether the current Ohio curves are adequate for their needs or should be updated</p>

	<p>and whether the SDDOT needs to use different test methods to ensure adequate compaction.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>This research has been utilized in a second phase of research to prove the concept in the field. Field studies are being conducted to see if the methods presented can result in cost savings in both quality control methods and reduction in compaction time in the field for the contractor.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>The developed curves may decrease the time required to obtain target density and the OMC associated with assessing compacted granular materials. This may lead to better approximations in achieving acceptable percentages of the target density when conducting in-situ field testing. This would also likely reduce the process of over compaction, reduce considerable time to the compaction process and save project budget.</p>
<p>Web Links</p> <ul style="list-style-type: none"> <li>• Reports</li> <li>• Project Website</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">MPC Research Report</a></li> <li>• <a href="#">SDSU Thesis</a></li> </ul>