

<b>UTC Project Information</b>	
Project Title	MPC 477- Characterizing the ductility of Portland cement stabilized soil
University	Utah State University
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Project Duration	September 30, 2013 to September 30, 2018
Brief Description of Research Project	<p>Portland cement, lime, and fly-ash stabilized soils are often used as base materials in pavement. The ductility of these materials has a large impact on the performance and life of the pavement. Increasing the ductility of these materials, without decreasing the stiffness will result in materials that will experience less degradation over time, resulting in better performance and longer life. However, unlike bitumen cemented materials (D113-07), there is not currently any method to characterize the ductility of Portland cement, lime, or fly-ash cemented materials (Portland Cement Association, 1992), (NCHRP, 1976). Cementitious materials such as soil-cement and plastic concrete are also used for groundwater cutoffs and excavation support in many transportation applications as well as dam and levee mitigation. Material ductility is also important in many of these applications to deal with post-construction deformation of these structures (Kahl et. al, 1991), (Rice and Duncan, 2010).</p> <p>The first step to evaluating the effect of ductility in cemented base is to have a measure of ductility. Ductility and brittleness in cementitious materials is</p>

	<p>controlled by the presence or absence of cracks or fissures during straining. Cracks, micro-cracks and fissures also have a large effect on other easy to measure engineering properties. Two of these properties are damping and permeability. A ductility index can be developed by measuring changes in damping or permeability with strain. With an easy to measure and replicate ductility index, comparisons can be made between the ductility of different materials, and the effect of ductility on long-term behavior can be studied.</p> <p><b>Research Objectives:</b>  The objective of this research is to develop one or more testing method to give indices of ductility for Portland cement, lime, or fly-ash stabilized soils. These indices will provide a relative characterization of the ductility of different materials, and that can be used to compare the ductility of different materials. This index will provide a tool that can be used in subsequent research to quantify effects of ductility on long-term performance, and to compare ductility of different materials or mix designs.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	

Web Links <ul style="list-style-type: none"><li>• Reports</li><li>• Project Website</li></ul>	