

UTC Project Information	
Project Title	MPC-607 – Loading and Wetting-Induced Settlement of Bridge Approach Embankment Materials
University	University of Utah
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Funding Source(s) and Amounts Provided (by each agency or organization)	USDOT, Office of the Assistant Secretary for Research and Technology \$40,000 Utah Department of Transportation \$50,001
Total Project Cost	\$90,001
Agency ID or Contract Number	69A3551747108
Start and End Dates	February 18, 2020 to July 31, 2024
Brief Description of Research Project	It has long been recognized that the “bump at the end of the bridge” problem results from differential settlement between the abutment and the adjacent approach embankment. It is commonly assumed that settlement of the approach embankment is caused exclusively from strains and settlements that occur with the native ground underlying the approach embankment. However, research has shown that significant settlements can also result from long-term loading-induced settlement and/or wetting-induced settlement of the embankment material. In this project, both small and large-scale laboratory one-dimensional loading and wetting-induced settlement tests will be performed on ten selected embankment materials. Results from these tests will be analyzed, and those materials which have significant potential for loading or wetting-induced settlement will be identified. Based on results these tests, recommended revisions to UDOT’s current specifications for bridge approach embankments will be provided. In addition, results from small and large-scale tests on nominally identical materials and compaction conditions will be compared to determine the accuracy of small-scale laboratory tests can provide accurate estimates of loading and wetting-induced stress-strain relationships of embankment materials. Valuable information will be provided for all state DOTs regarding the types of embankment materials that are susceptible to significant loading and wetting-induced settlements.

<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>The lead Geotechnical Engineer from UDOT on the Technical Advisory Committee for this research project has indicated that some of the recommended changes to their current specifications for bridge approach embankments will likely be implemented, but some probably will not.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>It is expected that material and construction specifications for approach embankments for bridges will be revised by UDOT and possibly other public agencies. If so, there will likely be a significant reduction of settlement/heave of approach embankments for bridges, thereby mitigating problems with bumps at the ends of newly constructed bridges. Our understanding of the loading and wetting stress-strain characteristics of various types of soil has been greatly enhanced from this research. This research has provided exposure to many aspects of the transportation field to three graduate students who have worked on this project.</p>
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project Website 	<ul style="list-style-type: none"> • MPC Final Report – Loading and Wetting-induced Settlement of Bridge Approach Embankment Materials in Utah