

RESEARCH PROBLEM STATEMENT

DATE: 09/05/2019	PROJECT AREA: Materials
<p>TITLE: Updating ARDOT SPT Liquefaction Evaluation and Mitigation Procedures</p> <p>PROBLEM STATEMENT:</p> <p>There currently exists a significant amount of uncertainty when designing piles for bridge foundations in liquefiable soil. Currently ARDOT engineers use a liquefaction spreadsheet develop 10 years ago to evaluate liquefaction triggering. Since this spreadsheet was developed, updates to the liquefaction triggering procedures in the spreadsheet have been published making the spreadsheet out-of-date. In addition, recommendations regarding skin friction and end bearing of piles in liquefiable soils have been published providing additional guidance regarding the design of these piles. This project plans to update the ARDOT liquefaction triggering spreadsheet with the newest procedures and incorporate additional empirical liquefaction hazard estimates such as the liquefaction potential index (LPI) into the spreadsheet. Moreover, guidances on skin friction and end bearing of these piles will be provided within the spreadsheet to allow direct application of the developed guidance. This will provide ARDOT with the tools necessary to design pile foundations in liquefiable soils using the most up-to-date guidance.</p>	
<p>OBJECTIVES:</p> <ol style="list-style-type: none"> 1) Update the SPT liquefaction triggering spreadsheet with the most up-to-date triggering procedures. 2) Incorporate empirical estimates of liquefaction surface manifestation such as LPI. 3) Include guidance on skin friction and end bearing of piles in liquefiable soils. 4) Incorporate probability estimates of liquefaction in the spreadsheet for use with design values. 	
<p>FORM OF RESEARCH IMPLEMENTATION AND RETURN ON INVESTMENT:</p> <p>This project will develop an updated excel spreadsheet which contains the most up-to-date liquefaction triggering procedures and provide in spreadsheet guidance regarding the likelihood of liquefaction surface manifestations. It will also contain information regarding adjustments for skin friction and end bearing for piles in liquefiable soils. The spreadsheet is expected to provide more detailed guidance on the design of piles for liquefiable soils which will reduce the uncertainty in the designs leading to more efficient designs.</p>	
<p>Estimated Project Duration: 24 Months</p>	
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