<table>
<thead>
<tr>
<th>UTC Project Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Title</strong></td>
<td>Torsional Safety of Highway Traffic Signal and Signage Support Structures</td>
</tr>
<tr>
<td><strong>University</strong></td>
<td>Oregon State University</td>
</tr>
<tr>
<td><strong>Principal Investigator</strong></td>
<td>Andre Barbosa</td>
</tr>
<tr>
<td><strong>PI Contact Information</strong></td>
<td><a href="mailto:andre.barbosa@oregonstate.edu">andre.barbosa@oregonstate.edu</a></td>
</tr>
<tr>
<td><strong>Funding Source(s) and Amounts Provided (by each agency or</strong></td>
<td>University of Washington PacTrans $20,000</td>
</tr>
<tr>
<td><strong>organization)</strong></td>
<td>Oregon Department of Transportation $20,000</td>
</tr>
<tr>
<td><strong>Total Project Cost</strong></td>
<td>$40,000</td>
</tr>
<tr>
<td><strong>Agency ID or Contract Number</strong></td>
<td>DTRT13-G-UTC40</td>
</tr>
<tr>
<td><strong>Start and End Dates</strong></td>
<td>September 16, 2015– September 15, 2016</td>
</tr>
<tr>
<td><strong>Brief Description of Research Project</strong></td>
<td>The goal of this research is to study the load transfer of axially loaded drilled shafts in</td>
</tr>
<tr>
<td></td>
<td>torsion and to evaluate existing methods used to design drilled shaft under torsional</td>
</tr>
<tr>
<td></td>
<td>loading. This work will provide necessary data for tuning the design methods as the</td>
</tr>
<tr>
<td></td>
<td>torsional capacity of these shafts will be evaluated, including torsional load transfer.</td>
</tr>
<tr>
<td></td>
<td>Existing design procedures will be investigated, as will some of the newer approaches</td>
</tr>
<tr>
<td></td>
<td>that have been developed but not yet validated.</td>
</tr>
<tr>
<td></td>
<td>The project focuses on traffic structures such as signal and sign poles. These structures,</td>
</tr>
<tr>
<td></td>
<td>combined with longer arm lengths, have seen an increase in the torsional to bending</td>
</tr>
<tr>
<td></td>
<td>moment forces that they support. This has led to torsion loading controlling the</td>
</tr>
<tr>
<td></td>
<td>foundation design for some of these structures, which had not been the case before for</td>
</tr>
<tr>
<td></td>
<td>these types of structures.</td>
</tr>
<tr>
<td></td>
<td>This focus means that our research is particularly relevant to PacTrans theme #3:</td>
</tr>
<tr>
<td></td>
<td>Technological Impacts of Safety.</td>
</tr>
<tr>
<td>Describe Implementation of Research Outcomes (or why not implemented)</td>
<td>A matlab-driven executable has been developed allowing design of torsionally-loaded drilled shafts within an easy to use guided-user interface. The software is freely available upon written request.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Place Any Photos Here</td>
<td></td>
</tr>
<tr>
<td>Impacts/Benefits of Implementation (actual, or anticipated)</td>
<td>The advances made in the numerical simulation of torsionally-loaded drilled shafts is exceptional, allowing for state-dependent load transfer to be accurately modeled. The parametric study conducted using the software has shed significant light on the role of softening on the large-rotation response of drilled shafts.</td>
</tr>
</tbody>
</table>
- Reports  
- Project Website |