

Virginia Tech
Center for Geotechnical Practice and Research
Annual Lecture Program
April 1st, 2021 (via Zoom)

12:00 PM **“Coronavirus and Engineers – Impacts and Opportunities**
Jaco Esterhuizen, *Jacobs Engineering Group*

After having lived now a year with COVID-19, it is clear that the impacts on workers and workplaces have been intense. This presentation will cover the various implications for engineers and engineering companies, including the adverse effects that the pandemic had on engineers, design offices, and construction sites. Emerging trends and opportunities triggered or accelerated by COVID-19 will be discussed. Whereas the negative impacts to workers such as isolation from working from home and the loss of community and networking are obvious, working from home and utilizing a virtual work environment have also resulted in positive outcomes including higher productivity, less traveling, and more flexible work arrangements. COVID-19 has unexpectedly accelerated the speed of changes associated with working outside of a conventional office setting, as companies discovered the benefits of virtual work practices. Engineers had to adapt rapidly to this new reality and will continue to be challenged in the future to adapt even more.

1:00 PM **“Onshore Wind Turbine Foundation Performance Through Frequency**
Analysis of the Accelerometers Installed at the Hub”
Yazen Khasawneh, *Terracon*

The current practice in designing the foundation for the onshore wind turbines (WT) relies on the use of rotational stiffness to size the foundation such that the serviceability requirements are met. A rotational stiffness is considered acceptable, if it provides the right boundary (foundation) rigidity to ensure a non-amplified dynamic response of the dynamic excitations from the WT operation. The common method used to verify acceptable foundation performance is through direct measurements of applied moment due to wind loading and direct measurement of tilt. The accuracy of the tilt measurements is questionable due to the small tilt magnitude, and the required high frequency of tilt measurements. his presentation presents an alternative method to evaluate foundation stiffness from the dynamic response of the WT by estimating the WT fundamental frequency (f_n). A numerical model is then calibrated by changing the boundary rigidity until the f_n from the model matches the f_n obtained from the WT dynamic response. The rigidity from the calibrated numerical model is then compared to the design intent for the foundation, which allows for the evaluation of the foundation performance.

2:00 PM **“Wall Design for a Waterfront Container Terminal”**
Alex Reeb, *Burns Cooley Dennis, Inc. (presenter)*
George Filz, *Virginia Tech & Billy Camp, S&ME*

A large bulkhead wall was designed for a waterfront container terminal by a structural engineer. The design approach was so severely flawed that the engineer calculated a maximum bending moment that was only equal to about 13% of the actual value. The result was a wall design that could not be constructed. This led to a mess of remediation, redesign, and litigation in the midst of construction. In this presentation, we discuss the lessons learned, as well as practical guidance and recommendations for how bulkhead walls can be analyzed correctly.

