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Summer 7-1-2020

STUDY ON STABILIZATION OF SOIL FOR WIND TURBINE FOUNDATION

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ABSTRACT

Geotechnical investigation is carried out to provide necessary information required for designing structures on the soil. In this case, it involves designing foundations for Wind Turbine Generators. Wind Turbines are power generating machines of specified tower heights which consist of Nacelle (encasing gearbox, generators & transformers) and Hub holding the blades which rotate upon experiencing the wind action at the designated height to convert kinetic energy (wind) to electrical energy.

This project is aimed at analyzing the soil conditions and check for the suitability of foundations designed for the designated WTG model.

Previously, when the soil properties are identified to be very poor due to lesser safe bearing capacity or settlement etc., the following options were adopted:

- Revise the foundation design to suit site specific conditions.
- Remove the soil and replace with materials with favorable property (Mechanical soil stabilization method)
- Abandon/ withdraw the WTG location.

Withdrawing WTG locations on account of undesirable geotechnical conditions incurs liquidated damage on the customer front who is the owner of the lands. Also in the case of WTGs the lands and location patterns are fixed after the micro siting study which takes into account the wake effect and wind conditions. Hence this option is often disregarded.

Under undesirable soil conditions, the necessity for improving the soil properties by adopting soil stabilization techniques must be adopted. Analysis using software can also be used to support the calculations and understand the real time scenario.

The soil characteristics that are important and must be improved for the execution of designed foundation are – Permeability, Compressibility (settlement), and Shear Strength of soil. The safe bearing capacity and settlement of the soil are computed as per the local guidelines/standards/books. Based on the values, an appropriate method of soil stabilization is adopted.

Key Words: Geotechnical investigation, foundations, Wind turbine generators, safe bearing capacity, settlement, soil stabilization, software