

Wind Farms in Thailand

Geotechnical Calculations for the Final Design of the Shallow Foundations

Client

General Electric International, Thailand

Project

In 2018 and 2019 three wind farms with each 30 wind turbines with a hub height of 156.5 m were erected in the Nakhon Ratchasima Province in Thailand, using the Hybrid Tower of Max Bögl. Each Hybrid Tower consists of precast concrete elements up to a level of about 75 m with a 78 m high steel tower on top of it. The almost 8,000 precast concrete elements were mainly produced in a mobile factory of Max Bögl in Thailand.



Fig. 1: Hybrid Tower

The towers have shallow foundations. Each tower was erected on an annular base plate with an inner diameter of approx. 8 m, an outer diameter of 20 or 21 m and a height of 3.7 m. In total 63,000 m³ of concrete were used for the foundations.

In addition to the soil investigations provided by the owner trial pits and laboratory tests were carried out in the autumn of 2017. These geotechnical investigations were planned by Kempfert + Partner Geotechnik and carried out by a Thai subcontractor on behalf of Kempfert + Partner Geotechnik.

Based upon the results of the geotechnical investigations soil parameters and soil profiles for geotechnical foundation calculations were determined.

By means of geotechnical calculations (bearing capacity calculations, calculation of settlements) the required thickness of the soil improvement underneath each shallow foundation was determined. Furthermore, it was verified that all limit states (ULS and SLS, for instance Bearing Resistance Failure, Failure by Overturning and Rotational Stiffness) according to the European/German Codes were not exceeded.



Fig. 2: Building Pit for Shallow Foundation



Fig. 3: Erection of Concrete Tower

Project Period

2017 till 2019

Scope of Works

- Evaluation of soil investigations carried out on behalf of the owner
- Planning of the required additional geotechnical investigations
- Supervision of the additional geotechnical investigations
- Modelling of sub soil for geotechnical calculations
- Geotechnical calculations for the final design of the shallow foundations
- Supervision of the earth works for the foundations incl. recommendations for the hard stands and crane pads