Case Study

Structural Health Monitoring

Fécamp Offshore Wind Project

UBY Client
Bouygues TP

Monitoring duration
3 years

Location
France

Subcontract Value
1.9M€

PROJECT

A consortium of Bouygues Travaux Publics, Saipem, and Boskalis (BSB) was awarded the contract by EDF Renewables to supply and install Gravity-based Foundations (GBF) for the Fécamp offshore wind farm, which is sited between 13 and 22 km off the coast of Normandy, France.

The 497-megawatt (MW) wind project features 71 Siemens Gamesa Renewable Energy 7 MW turbines and will generate electricity equivalent to the power needs of more than 416,000 homes.

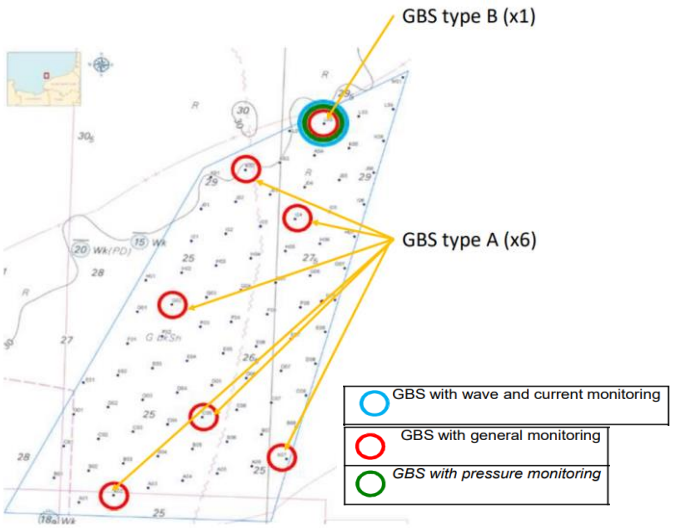
OBJECTIVES

Each concrete gravity-based foundation (GBF) provides stability for a wind turbine and is a critical component of the asset. EDF identified the need for long-term structural health monitoring to understand the behaviour and aging of the concrete structure during its operation.

UBY was engaged by Bouygues Travaux Publics to liaise with EDF and to design and install a bespoke automated monitoring system that met the client's technical requirements and considered the challenging environmental constraints.

PARAMETERS MONITORED

- Acceleration
- Tilt/rotation
- Vibration
- pH, O_2, H_2, H_2S (corrosion risk)
- Ground bearing & water pressure
- Temperature
- Strain
- Settlement



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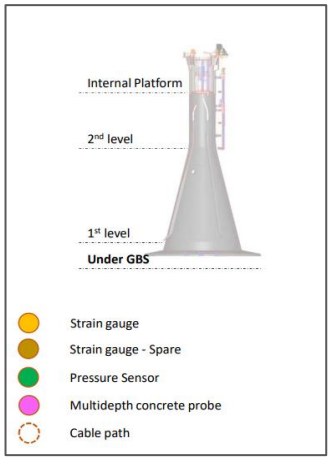
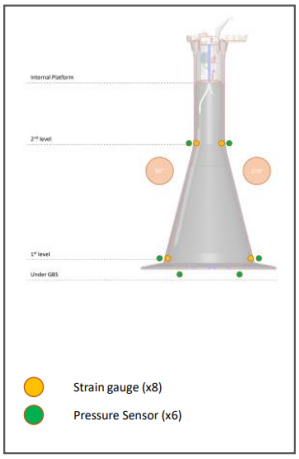
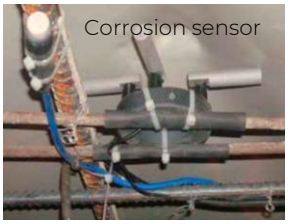
UBY'S SOLUTION

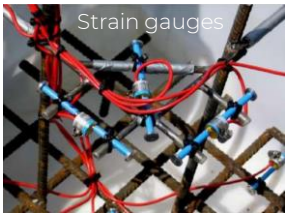
Working closely with Bouygues Travaux Publics and EDF, UBY's engineers provided advice on sensor options, sensor layout and configuration and the acquisition frequency for each parameter. Once the specification for monitoring had been agreed UBY procured, installed and fully commissioned the monitoring of seven turbine bases (10% of the total).

Furthermore, UBY's solution comprised the design of a bespoke server and software architecture to accurately and reliably capture and process data from all sensors (up to 200 Hertz). The system also included degrees of sensor redundancy for critical parameters.









Examples of sensor layout and installation

BENEFITS

Bouygues Travaux Publics' early engagement with UBY's team of experienced monitoring engineers allowed for a comprehensive support package to be provided, all via a single subcontract.

This included the development of a bespoke monitoring design and the safe and efficient installation of sensors and subsequent effective management of all data.

The provision of a wide range of sensor data is enabling EDF Renewables to accurately measure and record the operational performance of each asset. This will inform engineering assessments and subsequent decisions relating to long-term maintenance plans and budgetary requirements.

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