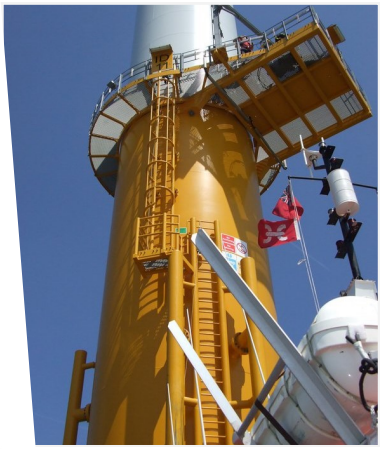
James Fisher and Sons plc
Marine Services Worldwide

Strainstall

Offshore Wind Turbine Structural Monitoring

Case Study



Strainstall embarks upon a programme of monitoring to investigate the displacement and potential fatigue problems arising from wind turbine foundation structures.

In January 2010 a fundamental flaw in the design of offshore wind turbine foundation structures was publicised. The problem was identified on certain structures, where grout failure and consequential slippage of the transition piece was discovered. This had caused the turbine tower structure to slip down by up to 25mm, until jacking brackets used during construction came into contact with the top of the monopile.

By April 2010, Strainstall had worked for six different organisations at eight separate offshore wind farms and had fitted monitoring systems to 13 turbine foundations, with a further 22 ordered and to be installed. Using a team of specially trained staff, Strainstall installed arrays of strain gauges, displacement sensors and accelerometers, along with bespoke PC-based monitoring equipment.

Each wind farm had a different requirement for data collection and transfer, with some facilitating a communications connection to land via the existing networks. Others relied upon local collection using removable hard drives. Strainstall has also set up an office-based server to receive and process data collected by these monitoring systems and to automatically send it on to the client and their engineers.

Who

Numerous wind farm developers

Summary

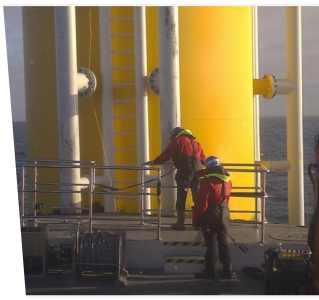
Strainstall addresses wind turbine foundation issues concerning the connections between turbine structures and their monopile foundations

Services provided

- Sensors include: strain gauges, displacement transducers, accelerometers
- Instrumentation includes: industrial standard PC and signal conditioning equipment on site; connection to turbine communications network; remote access to data; automated processing and reporting to suit each client's requirements
- Experienced offshore trained and certified installation engineers

Benefits delivered

- Sensors and instrumentation approved for long term performance in harsh environments
- Information received for the stresses present at the specified strain gauge/sensor positions
- A record of the variations in stress peaks
- A record of the cumulative fatigue damage
- Data stored and reported in pre-defined customised format



James Fisher and Sons plc
T: +44 (0) 1229 615 400
E: enquiries@james-fisher.com
W: www.james-fisher.com

Strainstall
T: +44 (0) 1761 414 939
E: enquiries@strainstall.com
W: www.strainstall.com

Strainstall