

Lincs Offshore Windfarm Substation



Installation of a substation jacket for the Lincs OWF

In January 2011 Fugro Seacore Ltd (FSCL) was awarded a £2.5m contract by Centrica Renewable Energy Ltd (CREL) to assist with the installation of the electrical substation as part of the Lincs Offshore Wind Farm. The 250MW wind farm is situated 8km east of Skegness and covers 35km² all within one of the UK's more environmentally sensitive coastal regions.

FSCL's work scope was to secure the substation's supporting jacket structure to the seabed after it had been lifted into place by Scaldis using the heavy lift barge *Rambiz*. Working from FSCL's jack-up barge *Excalibur*, the 850t jacket was initially secured by driving four 1370mm OD x 35mm WT tubular steel lead piles through the jacket's legs using a 92t S600 impact hammer. Follow-on sections were then welded in-situ to the lead piles before driving resumed through the chalk seabed. Driving analyses were carried out by Fugro France with results available for the client to study in real time, allowing decisions to be made in the field as to when driving should be terminated.

The jacket and piles underwent regular measurement for position, verticality and alignment using a combination of survey tools. Fugro's Starfix Global Positioning System allowed efficient manoeuvring of *Excalibur* to within 250mm of her target whilst total stations were used to monitor the inclination of the jacket during pile driving, resulting in a post installation inclination of 0.1° from vertical. After installation works were complete, FSCL was also able to rapidly deploy another sister company, Fugro Survey, to conduct a bathymetric survey of the site to determine the impact of *Excalibur's* legs and the elevation of the jacket's J-tubes above the seabed.

Once the piles were driven to depth, they were welded to the jacket via a set of crown shims placed around each pile, creating the structural joint between the jacket and its foundations. Pre-heating, welding and non-destructive testing were carried out in accordance with EEMUA 158 by a highly skilled 10 person team, all to the satisfaction of Centrica's onboard welding inspector.



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Because of the site's location and the seasonal timing of the fieldworks, the team had to be self sufficient and able to execute the works irrespective of the weather conditions. *Excalibur* was mobilised in Great Yarmouth with the piling hammer, welding plant, piles, shims and a team of 40 people in 5 days, an excellent achievement considering the piles were transported by sea from South Shields and the hammer was delivered from the Netherlands. Bespoke sea fastenings enabled the piles to be transported to site and upended from horizontal to vertical using an innovative space-saving frame, all designed by FSCL's in-house design team. All neighbouring ports were tidally restricted and therefore careful planning of site operations was required to allow regular transfer of personnel and supplies between site and shore.

In short, the project was planned and executed to an exceptional standard by the FSCL team, resulting in the works being completed ahead of programme and under budget. Such effective communication and planning culminated in *Excalibur* being joined by Centrica's chartered jack-up *Resolution* for a simultaneous lifting operation using both vessels' cranes.

Coupled with no lost time injuries and no environmental incidents the project was a resounding success.

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