



East Anglia ONE Offshore Wind Farm

Experienced. Adaptable. Reliable.

Playing a key part in installing the 102 turbine foundations for ScottishPower Renewables' East Anglia 1 offshore windfarm.

As offshore time is money, placing your trust in the industry's longest-running offshore grouting subcontractor makes perfect business sense.





Project perspective

East Anglia ONE has an installed capacity of up to 714MW, supplying enough clean, green energy to power over 630,000 homes.

Located in the North Sea, 43km from the East Anglian coast, the windfarm is a joint venture between ScottishPower Renewables and Green Investment Group.

FoundOcean managed the onshore logistics and offshore grouting for the 102 tripod foundations.

Every offshore project is unique and brings its own set of challenges.

A fine weather window meant that during the second offshore campaign, foundation installation ramped up from 5 foundations a week to five every 48 hours. FoundOcean's long track record of working offshore meant it was prepared, with sufficient flexibility and capacity, to meet the increase in demand.

WIND FARM FACTS

OWNER/DEVELOPER



102
TURBINES

POWER GENERATION
UP TO 714MW

AREA COVERED
300KM²

WATER DEPTH RANGE
40-47.5M

MAIN CONTRACTOR



Offshore procedures

Grouting

Foundation loadout and grouting took place from separate vessels. Having a dedicated grouting vessel meant the two recirculating jet mixers, material and essential spare parts were kept close by.

Essential mixer maintenance was timed to take place during foundation re-supply and material supply runs to mitigate any potential disruption to the schedule.

Each tripod foundation was placed onto 3 pre-piled pins and required grouting within 48 hours to minimise marine growth.

After completing 37 structures in the first campaign, a fine weather window meant foundations could be loaded out faster than scheduled for the second 65-foundation campaign.

Flexibility

FoundOcean quickly modified its offshore plans to meet the increase in demand. Additional offshore personnel were mobilised so that essential equipment maintenance and grout equipment cleaning, coupled with a demanding QC schedule, could be carried out simultaneously, alongside the 24-hour shift.

A valuable lesson learned from similar long-duration projects is that maintenance and cleaning regimes are as important as grouting itself. Equipment must be kept in good condition to mitigate the risk of a breakdown which could cause unnecessary delays.

Keeping spare parts onboard and having quick-thinking engineers is critical to a project's success.

Cold weather performance

FoundOcean continued to grout the foundations over the winter months. The DNV-certified material performed well in the harsh, North Sea conditions even when temperatures plummeted.

Health and safety

FoundOcean personnel are experienced, conscientious and understand the rigorous demands offshore. Excellent communication is vital to maintaining a safe working environment. Keeping equipment and the work area clean and tidy is also important for safety. The customer praised FoundOcean personnel for both these aspects.

Onshore logistics

Onshore management

FoundOcean appointed a quayside coordinator to give all stakeholders a single point of contact. The result was effective communication between the client, the suppliers, the offshore team, onshore engineers and back-office support.

This kept the installation schedule on track as the materials were ordered efficiently, spares arrived at the quayside ready for supply runs, and grout cubes were carefully offloaded and processed.

Material supply

Grouting material was shipped from its manufacturing facility in Belgium to the quayside in Vlissingen, where it was stored before loading onto the grouting vessel.

Having the dedicated onshore storage sped up the resupply turnaround time and ensured transparent batch tracking, which reduced any potential delays to the campaign's rapid installation schedule.



GROUT VOLUME	GROUT HOURS	MEAN COMPRESSIVE STRENGTH	GROUT MATERIAL	NO. OF CUBES TAKEN	GROUTING RATE
6,363m ³	508hrs	104MPa	BASF MASTERFLOW	1224 +	2 nos.
12,730tons	36mins		9800	286 SPARE	structures/24hr

GROUTING FACTS

East Anglia ONE Offshore Windfarm, Southern area of the East Anglia Zone

Approximately 43 km (27 miles) from the shore

“

We know with certainty which batch of material has been pumped where. This gives us peace of mind and that's invaluable when you're working in an offshore environment.

”

Pieter Van Vurren, Van Oord



QA and testing

BatchTrax™

FoundOcean used its own factory-to-foundation tracking software for grouting material called BatchTrax™, which goes over and above the requirements detailed in a material's type approval certification.

The software tracks the material from the factory to the precise foundation leg, and all the steps in between. This informs the client which batch of material has been used for each connection for complete QA transparency.

Grout testing

Prior to pumping, grout density measurements were taken and checked to ensure the correct material density. Once confirmed, grouting started.

At least 4 test sample cubes were taken from each pile/annulus for compression testing. One cube was taken after 1.6m³, one at halfway and two towards the end of each annulus grouting. These cubes were then crushed at age 24 hrs, three days, seven days and 28 days. A mean compressive strength of 98.8MPa was requested, curing at 20°C, measured on 75mm x 75mm cube samples. FoundOcean achieved a 104MPa mean compressive strength across the 1,224 cubes tested.

GROUTING FACTS FOUNDATIONS 102 NOS. 3-LEGGED STEEL JACKETS



About FoundOcean

FoundOcean has more than 50 years' experience of subsea and offshore foundation grouting for the global energy construction industries. FoundOcean also provides life extension solutions for offshore structures which includes structural inspection, repair and maintenance services, freespan correction grout bags, and pipeline/cable support and protection services. This is why, to offshore installation contractors, FoundOcean is the subcontractor of choice for minimising the risks associated with completing projects safely and on time.

FoundOcean was founded in 1966 and is a privately held UK-headquartered company. Its specialist grouting equipment is located for rapid deployment in Europe, the Gulf of Mexico, South East Asia, India and the Middle East. FoundOcean is certified to ISO 9001, ISO 18001 and ISO 45001 by DNV and is an Achilles/FPAL registered company.