Project:
Gwynt-Y-Môr offshore windfarm

Location:
13 kilometers (8 miles)
off the North Wales coast
(United Kingdom)

Project completed:
2012 – 2013

Owner/s:
RWE Innogy, in partnership with Stadtwerke München GmbH, and Siemens AG

Applicator/Contractor:
FoundOcean Ltd.

Market sector:
Offshore wind energy

Products used & amounts:
MasterFlow 9500
6,100 tons

Gwynt Y Môr

MasterFlow 9500 for a 576 MW offshore windfarm

Our reference in Liverpool Bay (UK): Monopile – transition piece foundations have been grouted with MasterFlow 9500

The background

The € 2 billion project Gwynt y Môr will consist of 160 turbines and is being built by RWE npower renewables in Liverpool Bay, off the North Wales coast. RWE Innogy is funding the project in partnership with Stadtwerke München GmbH and Siemens AG. Once operational, Gwynt y Môr will have an installed capacity of 576 MW, using Siemens 3.6 MW turbines and generators. It will be capable of generating enough energy to meet the average annual energy needs of around 400,000 homes.

Construction is now well under way in north Wales and offshore in Liverpool Bay. The wind farm is due to be fully operational by the end of 2014.

The challenge

The main challenge consists of reducing the overall installation period of the foundations by maximizing the time available for creating the grouted connection between monopiles and the transition pieces. Equally challenging is the structural design of the foundation and the capability of the grouting material to hold the heavy weight of the tower and turbine, and withstand the dynamic loads acting on the grouted connection over the planned lifetime of 25 years.

Challenging offshore operational conditions require careful consideration and planning. Difficult sea conditions, such as wind, wave and temperature, strongly determine the available weather windows for the installation of the foundations as well as the grouting works. The high cost of the specialized installation vessels, amongst others, requires optimum usage of these assets during the construction phase of the foundations. Control of the overall estimated project cost is therefore of the utmost importance to the clients.

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Gwynt Y Môr

MasterFlow 9500 for a 576 MW offshore windfarm

Our reference in Liverpool Bay (United Kingdom): Monopile – transition piece foundations have been grouted with MasterFlow 9500

Our solution

RWE recognized that the correct choice of material with the capability to grout at low temperatures was an important attribute, as the bad weather capability went hand in hand with the improved significant wave height capability of their installation vessel. The possibility to grout at temperatures as low as 0 °C with our MasterFlow 9500, made the choice of the grouting product easy.

FoundOcean, a Master Builders Solutions' Offshore Licensed Contractor, has been working with RWE on-board its vessel over the winter months, grouting the transition pieces in weather conditions at ambient temperatures as low as 2 °C. The early strength development of MasterFlow 9500 combined with the low temperature application capability allowed the construction team to step up the rate of installing the foundations and allowed the use of the vessel in a much more efficient manner.

The customer's benefit

- The use of MasterFlow 9500 has allowed the Master Builders Solutions' Licensed Contractor to execute the grouting works in far more difficult offshore conditions, such as cold temperature and short weather windows. This has proven to be a major benefit for the foundation contractor as it allowed for a far more optimized use of the installation vessels.
- Serious cost control or even cost reduction was achieved for the effective time that the installation vessels were operating in the offshore conditions.
- The overall fast construction of the foundations allowed for a timely installation of the offshore wind turbines itself.
- First turbines were effectively producing electricity and feeding it into the grid in August 2013, only approximately 6 to 7 months after the first grouting works were done.
- Guaranteed quick revenue on investment, as the electricity was already produced early on in the project.

Projects facts at a glance

- Number of turbines: 160 × Siemens 3.6 MW
- Windfarm total capacity: 576 MW
- Homes equivalent: 400,000
- Turbine tip height: up to 150 m above mean sea level
- Typical water depths: 12 – 28 m
- Area of the windfarm: 79 km²
- Construction period: December 2012 – End 2013
- Foundation type: Monopile / Transition piece
- Size of monopile: steel tube of between 50 and 70 m length, approx. 5 m diameter and weighing between 500 and 700 tons each
- Size of transition piece: steel tube 22 m long, approx. 5 m diameter and weighing 200 tons each, fitted with 4 levels of platforms and ladders
- MasterFlow 9500: 6,100 tons

Master Builders Solutions by MBCC Group

The Master Builders Solutions brand expresses MBCC Group's expertise in providing customized chemical solutions for new construction, maintenance, repair and restoration of structures.

Master Builders Solutions is built on the experience gained from more than a century in the construction industry. At the core of the Master Builders Solutions brand is the combined know-how and experience of a global community of construction experts, who connect with you to solve all of your construction challenges.

Further information is available at:
www.master-builders-solutions.com