

Gjøa Power Cable Installation

The Gjøa semi-submersible platform in the North Sea will be the first floating production platform to be supplied with electricity from the shore. This will mean a reduction in emissions to the environment of 250,000 tonnes of carbon dioxide per year. The platform is being provided with electrical power via a submarine power cable running from the Norwegian mainland, near Mongstad. It is the world's longest alternating current cable to be installed in one piece.

The Project

Global Marine Systems completed the installation works for the submarine power cable, involving the lay of 99 km of static cable and 1.5 km of dynamic cable. Global Marine System utilised the cable lay vessel NorthOcean 102 to install the power cable, using a horizontal lay reel system supplied by Oceanteam AS. Installation and final lay down of the power cable was successfully completed on 17th May 2010. Following hook-up, the cable finally went live on 11th July 2010.

Global Marine Systems was responsible for the complete installation of the cable in one section. This included static and dynamic cable sections, vortex-induced vibration (VIV) strakes, permanent buoyancy units on the lazy wave riser, cable anchors and various heavy joints. Due to the requirement for a one piece installation, systems had to be developed to enable installation to be continued in greater than 4.0m Hs significant waves and to survive the worst sea conditions likely to be encountered.



Challenges

The scope of Global Marine Systems cable installation work on the Gjøa project presented a number of challenges, including:

- (a) Laying the cable down the underwater cliff at Mongstad, including cable anchoring and installation of Vortex-Induced Vibration (VIV) suppression strakes;
- (b) Routing of the cable through an exposed area of sea. This required use of a novel Heave-Compensated (HC) Overboarding Chute and a buoy-based Mid-Water Survival System (MWSS) to mitigate the risks of adverse weather.
- (c) Cable lay in water depths of up to 540m, including continuous Touchdown Monitoring (ROVs).
- (d) Safe handling & overboarding of heavy cable fittings.
- (e) Installation of permanent buoyancy modules to create a 'lazy wave' riser to the platform.
- (f) Development of an omega joint spread design capable of completing a cable repair at any point in the cable throughout the guarantee period.

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Resources

Vessel:

All cable installation work was completed using the Cable Lay Ship NorthOcean 102. Delivered from its build yard in early 2009 as an offshore construction vessel, the ship was taken on charter and converted into a cable lay vessel specifically for the purposes of the Gjøa project. This major conversion work, which was managed and supervised by Global Marine Systems, included installation of a 7,000 tonne capacity horizontal reel carousel system and associated lay spread equipment.



Before Conversion



After Conversion

Submersibles:



Two independent QUATUM work class ROV systems, supplied by MODUS Ltd, were mobilised onboard NorthOcean 102 for the cable installation, to meet the requirement for continuous Touch Down Monitoring (TDM) of the lay cable.

Ship-side team:

The offshore project team was led by Captain Klaus Lundrup and included several technicians experienced in working with the horizontal reel system.

Shore-side team:

The project was managed by Bruce Manning with a small team of engineers working out of Aberdeen. All concepts, procedures and equipment specification were completed in house and subcontracts let for detailed design and fabrication of items such as the heave compensated chute. The mobilisation of the vessel was managed by a dedicated team based at the shipyard in Newcastle.

For more information on Global Marine's capabilities please contact Ian Gaitch, Director of Sales for Global Marine Systems, Energy, ian.gaitch@globalmarinesystems.com

For further information on Global Marine Systems, Energy projects, please visit our website: globalmarinesystemsenergy.com