Oceaneering SCAR System Benefits Site Set to Become Scotland's Largest Offshore Wind Farm

Seabed system provides boulder clearance for array cable routes

Project Overview

A wind farm located off the Moray coast of Northeast Scotland will become Scotland's largest offshore wind farm, once it is fully operational in 2019. The wind farm will consist of 84 wind turbines and is expected to power approximately 450,000 homes.

The Oceaneering Renewables And Special Projects (RASP) team operated its 49.2-ft-wide (15m-wide) SCAR Seabed System throughout the wind farm array, clearing lay and trench corridors between turbine locations for future cable installation and trenching activities.

The Oceaneering SCAR system is a well-established, highly efficient, and economic method of clearing and preparing the seabed as the first stage of major wind farm construction projects.

Issues

Previously acquired survey data had identified significant boulder fields within the wind farm array lay and trench corridors, which would

impact many of the planned cable routes. To allow the cable installation and jet trenching campaign to be performed, these boulders had to be removed.

Each wind turbine location was protected by an exclusion zone in which the SCAR system was unable to enter. This created a potential issue from the frontal berm on the SCAR system, which includes a mixture of moved boulders and seabed material that would be deposited at the intersection of the design route centre line and exclusion zone on completion of the boulder clearance run, given there was no "run-off" area.

The lay and trench corridors within the array were a pre-existing design based on the minimum bend radius (MBR) of the cable to be laid and the turning circle of the small tracked jet trenching system to be used. A number of tight bends (> 164-ft / 50m radius) had been included within the array design, which the towed SCAR system would have to negotiate.

The Oceaneering Solution

To ensure that no frontal berm would be left within the lay and trench corridors, the RASP team proposed a "double first end" solution to the client. This solution relied on the ability to accurately land the SCAR vehicle on the design route, slightly outside the first exclusion zone area, with a heading corresponding to the design route center line.

The SCAR system would then be towed along the design route to a suitable point near the end of the route and purposely driven off the design route centre line, knowingly creating a berm across the lay and trench corridor.

Next, the SCAR system would be lifted clear of the seabed and moved toward the second exclusion zone on the same route. The SCAR system would again be landed accurately on the design route just outside of the exclusion zone, with a heading corresponding to the design route center line. The SCAR system would then be towed a short distance back along the design route, clearing boulders as it progressed up to the berm wall of the initial clearance run, now crossing the route.

Utilizing ultra-short baseline (USBL) positioning, installed attitude sensors, and high-resolution sonar, as well as support from a work class remotely operated vehicle (WROV), the SCAR system would break through the created berm, clearing the contents out to the edges of the required corridor, locating itself within the berm of the initially cleared corridor. The SCAR system would then progress along the design route for a suitable distance to ensure that no boulders remained within the required corridor.

The tight bends present in the lay and trench corridors were assessed by the RASP team and, following a review of previous operations and test data along similar bends, the RASP team was able to assure the client that it was possible to tow the SCAR system to the tolerances required in these areas.

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