

Subsea Distribution Solutions in Rosyth Completes Milestone Project

Successful delivery of more than 41 km of complex umbilicals to project in the North Sea

Project Overview

In May 2022, Oceaneering successfully delivered the final piece of hardware on a multi-item project scope for a major operator in the North Sea. Starting with a front end engineering and design (FEED) study in 2017, the project included major milestones and an industry first. The team supplied more than 41 km of umbilicals, flying leads, and ancillary hardware to meet the client's requirements.

Challenge

The project presented several significant challenges. The dynamic umbilicals included a 2 ½ inch steel tube in their cross section design, prompting the need to transform the manufacturing capabilities at the Rosyth site with the installation and commissioning of a purpose-built, large bore tube welding line.

There was also a design requirement to include a direct current/fiber optic (DC/FO) cable in the dynamic umbilicals, and, as the Oceaneering team understands, this marked an industry-first. The complexity surrounding this delicate component demanded precision and advanced engineering.



The Oceaneering Solution

Planning was essential to the project's successful completion. Process engineers developed the design for the large bore tubing welding line using input from team members at our Panama City site who have significant experience with this type of equipment. The Manufactured Products team in Houston would be responsible for many of the larger pieces of ancillary hardware, and technical solutions engineers in Rosyth worked to optimize the cross section designs of the various umbilicals.

All umbilical manufacturing was completed in Rosyth, and extensive engineering and robust project management was required at every stage to address the more than 100 interfaces created by such a complex scope.



Execution Plan

From February to July 2017, the technical engineering team completed a complex and thorough FEED study for the client. The FEED study demonstrated Oceaneering's extensive understanding of subsea umbilicals and hardware, manufacturing capability, and experience working on complex scopes. Oceaneering was awarded the project's contract in December 2017.

Upon award, preparations to transform the manufacturing capabilities at the Rosyth

facility were started. Drawing on lessons learned and using equipment previously installed at the Panama City umbilical manufacturing site, the local team designed and installed a large bore tube welding line. The project schedule was built to meet the staggered delivery dates required by the customer.

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Ancillary equipment, flying lead termination heads including Oceaneering M1 junction plates, and subsea umbilical termination assemblies were manufactured at Oceaneering's Manufactured Products facility in Houston and shipped to Rosyth for integration with the umbilicals.

Specialist technicians completed the umbilical cross section testing on site at Rosyth's Testing, Qualification, and Reliability Laboratory. Samples of product underwent bend stiffness, combined tension with bend, crush, and flex fatigue testing to prove their performance factors met the required design criteria.

On the 29th of May 2021, the Oceaneering team in Rosyth delivered the first two dynamic umbilicals. The final deliverable, a dynamic spare, left quayside in late May 2022, marking the culmination of the project.

Highlights

The team successfully delivered 41.64 km of product made up various cross sections manufactured into:

- » 3 Dynamic umbilicals (inclusive of 1 spare)
- » 7 Production umbilicals
- » 1 Production umbilical incorporating DC/FO cables
- » 2 Water injection umbilicals
- » 2 Water injection umbilicals with DC/FO cables
- » 5 Infield cables
- » 6 Hydraulic flying leads
- » 2 Fiber optic flying lead
- » 12 Low voltage electrical flying leads
- » 4 SA DC/FO cables
- » 2 PRM FO cables

An array of ancillary hardware was also supplied as part of the contract. This included, but is not limited to, flying lead termination heads incorporating Oceaneering M1 junction plates, umbilical termination assemblies, mudmats, pulling heads and hang off collars, dynamic bend stiffeners, buoyancy modules, tie back collars, tie down collars, free-issued umbilical termination heads, and a variety of repair kits and spare parts.



Results

The final spare umbilical delivery in May 2022 marked the last milestone in a transformative project for the Rosyth site. From commissioning a large bore tube welding line to completing the industry's first integration of DC/FO cables into an umbilical design, the project provided the global and local teams with significant opportunities for lessons learned and demonstrated the Oceaneering can-do attitude.

The project was completed during the challenging circumstances of the Covid 19 pandemic and relied heavily on Oceaneering's positive relationship with both the client and suppliers.

The client is now equipped with the infrastructure required to achieve first oil. They, too, have improved their understanding of the complexities involved with such challenging umbilical cross sections, but have been reassured and encouraged by the successful, safe completion of the project scope.



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