Boskalis

PROJECT SHEET

CONSTRUCTION OF MOG, BELGIUM
CLEARING OF UNEXPLODED ORDNANCE (UXO)
EOD SERVICES

BOSKALIS

Royal Boskalis Westminster is a leading global marine contractor and services provider. With safety as our core value, we offer a wide variety of specialist activities to the oil & gas and renewables sectors. These activities include marine installation and decommissioning, seabed intervention, marine transport and services, subsea services and marine survey. In addition, Boskalis is a global dredging contractor, provides towage and terminal services across the globe and delivers marine salvage solutions.
By understanding what drives our clients we are able to provide the solutions that enable them to meet their specific business goals. For this reason we are constantly looking for new ways to broaden and optimize our offering and are committed to expanding our proposition, supported by our financial strength.
With our committed professionals in engineering, project management and operations, 900 specialized vessels and an unprecedented breadth of activities in 90 countries across six continents we help our clients in the offshore industry push boundaries and create new horizons.

INTRODUCTION

The project foresees the construction of a high voltage Modular Offshore Grid (MOG) in the Belgian part of the North Sea. This will connect four planned offshore wind farms to the onshore grid connection point at Zeebrugge.
Boskalis' project assignment was the clearing of unexploded ordnance (UXO), ahead of construction of a subsea power infrastructure for offshore renewable energy generation.

Boskalis Hirdes, was contracted by Elia for the identification of potential UXO(pUXO) on the Final Master Target List (FTML), as well as the removal of non-UXO and the handover of UXO for disposal, prior to the installation of the submarine cables for the MOG project.

SCOPE OF WORK

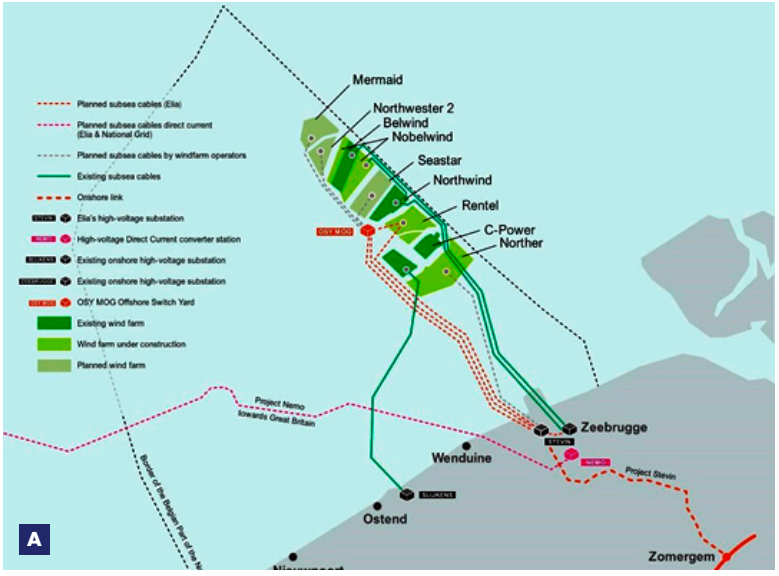
The scope of work can be spatially divided as follows:

- Yellow: Beach
- Green: Nearshore - Very Shallow - Divers
- Red: Nearshore - Shallow - Manu Pekka
- Purple: Offshore - Smit Kamara

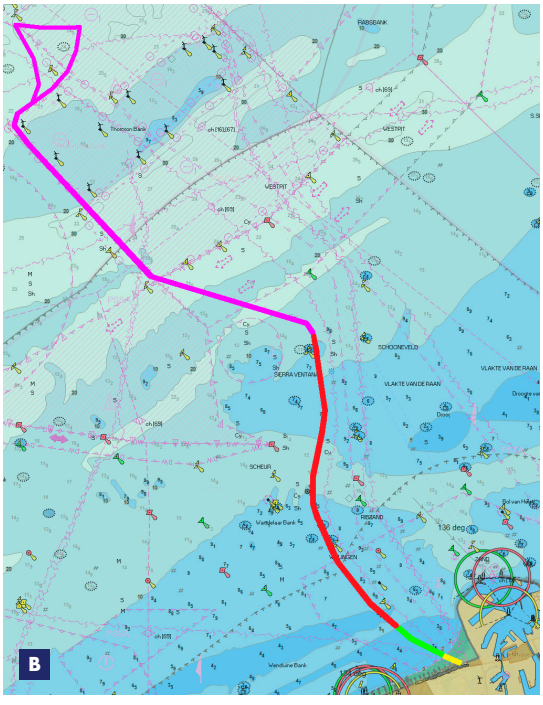
Confirmed non-UXO was to be recovered and disposed. Confirmed UXO was to be disposed by the Belgian Navy: DOVO

FEATURES

Client	Elia Asset NV (Elia)
Location	North Sea near Zeebrugge, Belgium
Period	Project preparation: April to May 2018 Project execution: June to October 2018
Contractor	Heinrich Hirdes EOD Services GmbH (Boskalis Hirdes)



A Overview of the Modular Offshore Grid for Elia.
B Overview of the different UXO identification and removal spreads, as used per section of the cable corridors.



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BEACH AREA – DRY INVESTIGATION
Beach equipment used was a combination of a CAT345 excavator with UXO Protection (in line with WSCS-OCE requirements), together with a team using hand-held detection and survey equipment.
For all target locations, the excavator excavated a layer of sand to allow deeper investigation, until the required depth was reached or the UXO found.
The UXO specialists of Boskalis Nederland executed the work in keeping with the Dutch WSCS-OCE Regime. Six pUXO targets were identified and cleared.

NEARSHORE – DIVING OPERATIONS
For the nearshore (<6 m of water depth), the Stemat 77 spud-moored barge was mobilized with a modular, IMCA-compliant, air dive system, a survey spread and a CAT 336 Excavator. The barge was handled by Boskalis' multicat Yvonne. Divers and dive supervisors were OCE-certified. Twenty-one pUXO targets were identified and cleared.


C

NEARSHORE – BACKHOE DREDGER
- BHD Manu Pekka with Swiss Knife 2.58 consisting of:
  - DOP Pump
  - Grab
  - TSS-440 electro-magnetic detector
  - ARIS Sonar Imaging Camera
- Diamond (Tug)
- Crew Tender Vessel (CTV) Bittern


D

Targets at water depths between - 5 m LAT -17 m LAT were investigated using the Manu Pekka with the Swiss Knife 2.58.
The excavator of the Manu Pekka was fitted with several UXO Identification devices. This enables operations in areas where Remotely Operated Underwater Vehicles (ROVs) experience a lot of downtime due to high tidal currents and low visibility.
1. TSS-440 used to determine the target location.
2. DOP submersible dredge pump excavated around the target location.
3. The ARIS Sonar Camera provided vision in the very turbid waters.
4. In case of confirmed non-UXO the grab was used to recover the object.

191 pUXO targets were identified and cleared.


E

OFFSHORE – WROV OPERATIONS
Boskalis' owned and managed RSV Smit Kamara with grab & HD Schilling Work Class Remotely Operated Vehicle (WROV) were used for this scope.

The WROV was equipped with a TSS-440 electro-magnetic detector, a hydraulic driven four-inch dredge pump and an ARIS sonar imaging camera. Targets in the deep-water areas were investigated using the WROV, a proven method for Boskalis Hirdes.

The TSS-440 was used to determine the exact target location. The pump and ARIS camera were used for further investigation. Confirmed non-UXO was recovered to vessel deck. Larger objects were recovered by the vessel's crane and a grab.
Ninety-six pUXO targets were identified and cleared.


F

C Stemat 77 dive barge, with multicat Yvonne, ready to commence with nearshore operations.
D BHD Manu Pekka, with tug Diamond, working on UXO Identification and removal. In the background: crew transfer vessel Bittern.
E BHD Manu Pekka, and tug Diamond working on the nearshore UXO identification and removal operations. The offshore wind farm can be seen in the background.
F BHD Manu Pekka and RSV SMIT Kamara departing from Zeebrugge Port to resume with identification and removal of potential UXOs.

Boskalis
PO Box 43
3350 AA Papendrecht
The Netherlands
T +31 78 69 69 000
offshore.energy@boskalis.com

www.boskalis.com/offshore