

Oceaneering Enables ROV Operations in Extreme Sea States and Currents in South Africa

Innovative bend restrictor design supports project execution in severe currents and wave heights



Project Overview

The Agulhas Current flows south along Africa's east coast and forms the western boundary of the southwest Indian Ocean. It is narrow, swift, and strong. It is often identified as the second swiftest current in the world, reaching more than 6 knots surface speed. Further complexities are added by combining the currents with significant wave heights of up to 6 m.

Remotely Operated Vehicles (ROVs) often struggle to perform in this geographic region and are subject to operational downtime due to the environmental conditions. They are also continually at risk of being damaged during operations. Oceaneering leveraged its extensive ROV and Engineering expertise to design a bend restrictor solution to enable operations in severe currents and wave heights.

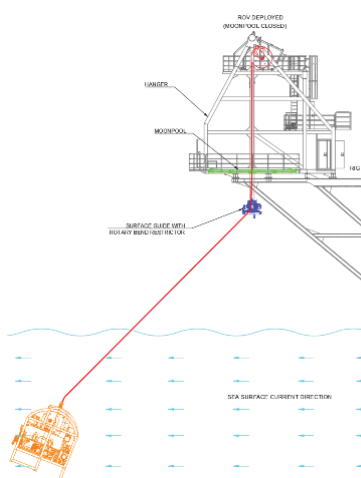
Challenge

Drilling operations in the area are performed by a vessel equipped with a harsh environment ROV hangar system. Despite specialized infrastructure on the vessel, a significant challenge during high current operations is the ROV system drift-off during launch and recovery. The drift-off creates severe side loadings on the ROV's control umbilical through the surface guide system. Side loading causes damage to the umbilical's steel armoring and internal conductors and could risk the umbilical coming out of the sheave groove.

The Oceaneering Solution

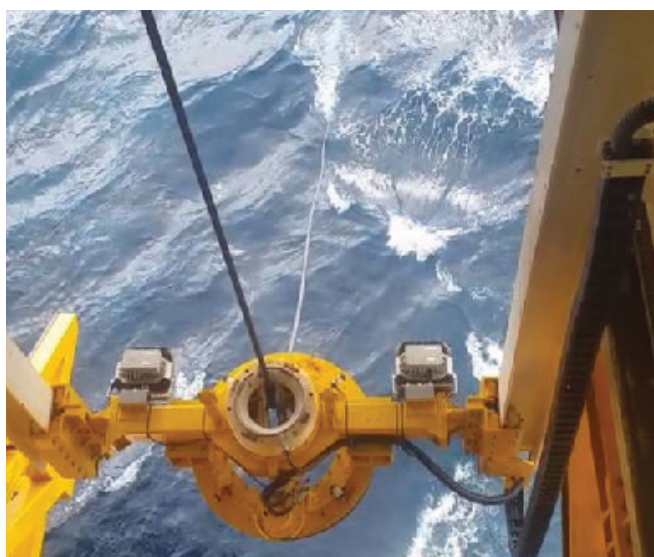
To mitigate damage to the ROV umbilical, Oceaneering designed an innovative rotary bend restrictor solution capable of adapting to the direction of the current. Designed using field-specific metocean data and our experience with ROV operations in harsh conditions, a global team collaborated to develop the hardware.

A common misconception is that cursor-based systems can enhance operational capability in both high current and high wave conditions. In fact, these types of systems are limited to helping in high wave conditions. Our engineering team was able to convince stakeholders of the benefits of the proposed retrofit solution and its ability to mitigate risk introduced by high current conditions.



Execution Plan

The bend restrictor was designed, prefabricated, and tested onshore before installation onboard the rig. Operational testing, including acceptance testing, was completed before the bend restrictor was approved for operations. The development process was completed in three months and the modification to install the bend restrictor was completed during the full winterization of the Oceaneering Magnum® 229 ROV facilities onboard the vessel.



Results

Oceaneering proactively worked with the customer to safeguard ROV operations by studying the environmental conditions from metocean data, identifying the specific operational risks, and designing a solution to successfully mitigate the risk. The customer had previously experienced ROV-deployment system failures on the rig and we were able to engineer a solution to overcome these issues, enabling them to eliminate ROV downtime and consequent rig downtime. The campaign was completed successfully in two successive summers.