

Oceaneering Removes CALM Buoy Offshore Angola

Oceaneering successfully evaluated buoy's state to design a plan to lift buoy and transport it to scrap yard



Project Overview

A major operator requested that Oceaneering create a solution to recover a Catenary Anchor Leg Mooring (CALM) buoy structure. The buoy, which had been decommissioned and wet parked offshore Angola since 2004, had corroded over time. Further, it was moored with only one mooring line, and was flipped upside down and flooded. Oceaneering was able to evaluate the buoy and design the equipment and operation for its successful disposal.

Issues

The corroded buoy couldn't be towed or lifted until its integrity, weight and center of gravity were confirmed, and no design data for the buoy was available. To remove the buoy, Oceaneering would need to design lifting and sea fastening equipment specifically to fit the buoy. The client's tight decommissioning budget also posed a challenge for Oceaneering.

The Oceaneering Solution

Through the engineering phase, Oceaneering evaluated many potential solutions, including towing the buoy with a specially designed net. Finally, Oceaneering opted to design a basket configured from dyneema ropes to lift the buoy. The plan called for spray foam to be injected into the buoy's flooded compartment to level the buoy and reduce its weight by displacing water. Then, the buoy would be moved to deeper water, where the basket configuration used to lift the buoy onto a boat would be installed. To reduce costs and align schedules, Oceaneering planned to hire the offshore supply vessel SBM Installer, which was already working in Angola, and piggyback onto an existing Angolan project.



Oceaneering also created a contingency step in its plan in case the spray foam didn't work. The contingency plan involved drilling holes at the bottom of the buoy to allow water to drain while the buoy was lifted. Air would then be pumped into the buoy to temporarily displace water until the lifting operation started.

Execution Plan

The project was conducted in the following sequence over a three-week period. First, divers inspected the buoy to gather data needed to engineer the recovery. Next, the foam was injected. However, it failed to work, so Oceaneering decided to perform



the contingency step just before the lifting operation, which succeeded with no impact on the budget or schedule. Then, the buoy was towed eight miles (13 km) to a deeper location in 65 ft (20 m) of water, where it was moored. Oceaneering then prepared the rigging and recovery mooring lines and lifted the buoy. The buoy was sea fastened on board the vessel so it wouldn't move while the vessel travelled to an Angolan scrapyard to dispose of the buoy.

Equipment Highlights

- » Dyneema ropes
- » Modified frames to support the buoy on deck
- » Timber stacks to support the buoy on deck
- » Diving equipment
- » Diving saws, hydraulic cutters and burning gear used to cut buoy's auxiliary accessories to make it easier to lay buoy down on the vessel and reduce its weight

Results

Oceaneering was able to accurately determine the weight and condition of the buoy. As a result, Oceaneering succeeded in removing the buoy and the liability it presented while meeting the client's budget and schedule needs.

Project Highlights

- » Meeting the client's schedule and budget
- » Accurately engineering and designing the lift and the methodology