Case Study

Oceaneering Refurbishes Offshore Pipe Handling Crane in Cost-Effective Manner

Engineering and restoration effort conducted at 50% of the cost of buying a new crane

Project Overview
Oceaneering was asked to review and provide a redesign and upgrade for an offshore pipe handling crane. Our customer had received a quote for a replacement crane, but wanted to see if it would be commercially viable to refurbish the crane rather than purchase a new one.

The overall condition of the crane was poor, with many parts requiring full replacement to meet current industry standards. To refurbish the crane, Oceaneering sandblasted and painted the crane’s equipment and facilities, including the telescope cylinder, bandura-bolts, slewing ring, HVAC, electrical installations, gratings, railings, oil cooler/oil pump and cabin. Oceaneering also conducted a failure mode, effects, and criticality analysis (FMECA) test, and updated the crane’s user manual and document packages.

Issues
Both cost and schedule were priorities for our customer. Any potential cost savings achieved through refurbishment could not outweigh the urgency of having the new crane and lifting equipment ready for the project.

The Oceaneering Solution
Oceaneering deployed a specialist team of integrity engineers to assess the viability of refurbishing the crane. We were confident that we could save our customer time and money, but to be absolutely sure, we required the decommissioned crane to be dismantled and shipped onshore for further evaluation.

Our specialist team prepared all procedures for dismantling the crane and for lifting operations to transport the crane safely and efficiently. We also performed a GAP analysis to verify the differences between old and new standards, and provided a report to ensure any deviations were recorded in case the client chose to refurbish the crane.
FMECA analysis was performed to identify the crane’s maintenance routines and to ensure its safety and operational reliability. We then provided our customer with a full scope of work for refurbishment, which was accepted.

**Execution Plan**

The crane was shipped to our equipped workshop at Forus, Norway, so we could dismantle and refurbish it. We performed shot-blasting on the boom’s pedestal and crane cabin, and conducted full non-destructive testing (NDT) on all the critical parts, including thickness measurement, faced array, eddy current, and magnetic particle inspection.

All cylinders were refurbished, and all the instrumentation and the cabin’s interior was removed. New flooring, walls and roof plates were installed, and all electrical cabling was replaced. To ensure compliance with new regulations regarding ergonomics, a new chair was installed, as well as a new HVAC to improve the cabin’s air environment.

The flanges for the slewing ring were machined to ensure they met the required tolerances, and a new slewing ring was mounted with replacement bolts and refurbished gears. All hydraulic piping and electrical cables were replaced, the electrical motor for the high pressure unit was refurbished, and a new oil cooler was installed. We assembled the crane and provided full factory acceptance testing.

The user manual, the tag lists, and the maintenance plan were all updated to match current standards. Oceaneering also conducted operator training on the updated standards.

**Challenges**

The biggest challenge during the project was the test mounting onshore of the crane to its pedestal. The procedure for applying the correct torque on the bolts proved insufficient, resulting in discussions that led to the development of a new procedure, including a special tool to apply the correct tension in the bolts to achieve the correct clamping force.

**Equipment Highlights**

We provided a fully functioning refurbished crane that not only met our customers’ needs, but achieved significant cost savings compared with purchasing new equipment.

**Results**

The result was a crane fully refurbished at 50% of the cost of buying a new crane.

**Project Highlights**

» Reduced costs by 50% compared to purchasing a new pipe handler crane
» Delivered project on an accelerated schedule, safely and cost effectively
» Prolonged the crane’s asset life by an estimated 10 years