Floating Unit Inspections by Mini-ROV Increasing Capability

Project Overview

In 2016, Oceaneering was contracted to provide ultrasonic thickness measurements (UTMs) on side-shell wind and water strakes (hull side shell plates at ship's normal draft) within the water ballast tanks (WBT) of a floating production, storage, and offloading (FPSO) unit in the North Sea. This was to enable the asset to meet requirements for class certificate renewal. Oceaneering proposed the use of a mini remotely operated vehicle (mini-ROV) to execute the job.

Issues

The client had a surveyor on board for the purpose of class renewal survey; the surveyor had performed general visual inspections (GVIs) and close visual inspections (CVIs) in the subject ballast tanks, but no required UTMs could be completed at the time. This lack of UTMs was preventing the asset from meeting the final requirements for class renewal.

The Oceaneering Solution

After studying the layout of the water ballast tanks, Oceaneering confirmed the feasibility of using a mini-ROV to complete the UTMs. Traditionally, a three-man rope access team

would complete this type of inspection. This method, however, is considered relatively costly and time consuming due to the number of personnel involved, the tank entry preparations, and in-tank set-up required. It also introduces risk, as it is a manned operation being conducted in a confined space on an FPSO at sea. A comprehensive work pack was produced detailing the plan to take the UTM readings by deploying a mini-ROV into the fully-filled WBTs from hatches on the main deck. The mini-ROV would navigate to the identified locations for UTM, take the readings as required, and provide additional video footage. The inspection team consisted of an ROV pilot and a non-destructive testing (NDT) technician.

Execution Plan

The scope of work intended was to deploy the mini-ROV into a total of 10 water ballast tanks, taking UTM readings between each frame along the wind and water strakes of the hull while providing some video recordings and photos to identify the location of the ROV during the inspections. The team mobilized from Aberdeen, Scotland, and completed the work scope ahead of schedule, with inspections completed in eight days rather than the 10 days that were planned.

22/08/2016 11:35:11
WBT 1P FR84 - FR85

H: 325.8 °
D: 6.67 m
Temp: 19.9 °C

Challenges

The project team was faced with a slight challenge when a crude oil offload prevented access to the WBTs. The Oceaneering team was able to adjust its inspection schedule to address this whilst completing the inspections within the required timeframe, further demonstrating the time and cost efficiency of this solution compared to one requiring mobilization of a rope access team.

Equipment Highlights

A tethered mini-ROV equipped with a camera, lighting and spring-mounted thickness gauge was used for the execution of the work scope.

Results

Overall, the job provided several positives for the client, including financial savings. The scope was completed ahead of schedule and used a two-man ROV team instead of a three-man rope-access technique (RAT) team. There was risk reduction associated with eliminating manned tank entry inspection, and there was no interference with FPSO ballast operations. Finally, Oceaneering assisted our client in meeting the final requirements for class renewal of their FPSO by providing UTM readings which were accepted by the classification society.

Project Highlights

By virtue of this successful UTM inspection campaign, Oceaneering aims to highlight our capability of using novel methods to current and prospective customers and thereby increase the delivery of Floating Systems Integrity Management services.

» Mini-ROV applications for Floating Systems include:
  » Internal water ballast tank inspection; UTMs for the purpose of Structural Integrity Management and class renewal surveys
  » GVI of potable water, fresh water, and water ballast tanks
» This supplements Oceaneering's extensive capabilities to undertake:
  » External hull Underwater Inspections in Lieu of Dry-dock (UWILD)

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