

# OCEANTOOLS

Innovative Products & Solutions for use in some of the world's harshest environments

## ACABS-2

### Anchor Chain and Bend Stiffener Monitoring System for FPSO Integrity



Winch with boom extended



Winch post-acceptance trials ready to be shipped

The OceanTools ACABS-2 Anchor Chain Monitoring System has been designed in conjunction with a major FPSO designer for use on a new FPSO that will operate in Norwegian waters. The unit will typically be deployed after periods of heavy weather to check the integrity of the anchor chains.

ACABS-2 is the second such system that OceanTools have designed & delivered. It is a unique, bespoke, system containing many innovative features and comprises the following items:

- Surface Control & Display Unit consisting of high resolution LCD monitor, DVD recorder and Control unit.
- Zone I Motorised Pneumatically operated winch with extendable & elevatable boom.
- I-tube deployed telescoping subsea package comprising very high quality Colour camera, LED lighting and Pan & Tilt unit.

When deployed, the subsea package reaches the bottom of the I-tube and continues to extend 1.8m beyond the base of the I-tube. The camera is then free to observe the anchor chain. As part of the product testing, the camera could read the individual millimetre lines on a tape measure suspended an impressive **7 m** away in the test tank.

## KEY FEATURES

Zone I rated winch & subsea video system

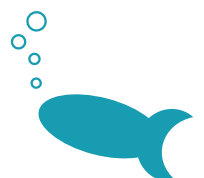
Stainless steel construction throughout

NORSOK compliant

Pneumatically powered motorised winch

EMC tested to EN60945

Records to DVD for post-operation analysis



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## Technical Overview

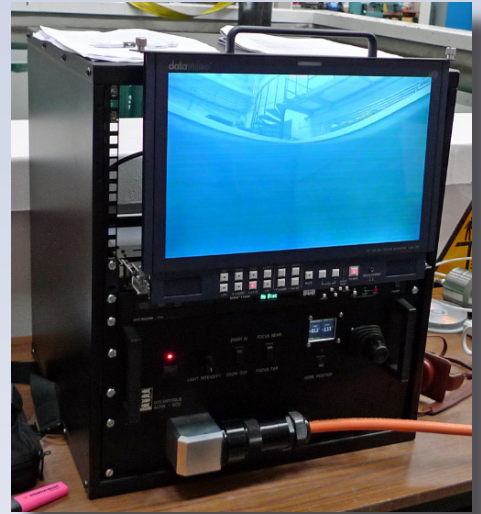
Based on our previous knowledge of Anchor Chain Monitoring Systems, OceanTools were requested to come up with an innovative solution to a problem that had several technical challenges. These challenges included designing a winch that was self-mobile and had a maximum width of only 500 mm due to plant on the deck of the FPSO.

Another major challenge was to design a system that could be deployed through an I-tube with a stopper diameter of only 202 mm. The subsea system also had to deploy an additional 1.8m below the bottom of the I-tube in order to get an unrestricted view of the anchor chains. In order not to break the rules governing Zone I operation, the subsea system is safety interlocked such that it cannot be operated until it is at a water depth of greater than 8 m.

In order to comply with NORSOK regulations governing the amount of weight an operator can carry, the winch had to be motorised. OceanTools developed a pneumatic drive mechanism that drives the front wheels of the winch with the rear wheels castoring. An Operator simply stands at the winch control panels and presses "Forward" and "Reverse" buttons to drive the winch around the FPSO deck.

Once the winch is in position, the Operator extends and elevates the boom in order to lift the subsea package above the I-tube. The subsea package is then lowered down the I-tube until the frame bottoms-out on a stopper ring. The frame is magnetically clamped to the stopper to reduce motion subsea. The inner part of the frame is free to telescopically extend another 1.8 m below the bottom of the I-tube.

A subsea pan & tilt unit, camera and LED lighting are used to view the anchor chains. The high resolution video signal is shown on a high quality monitor in a non-hazardous area of the FPSO. Video data is recorded onto DVD. In order to prevent damage to the subsea systems, OceanTools engineers developed a clever "return to home" system that commands the pan & tilt to return to its home position in order that the system may be safely retracted through the narrow 202 mm diameter stopper.

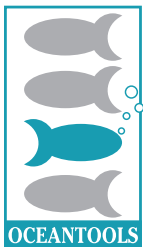


Surface control & display unit



Engineers deploying extendable boom

Camera, lights, pan & tilt, control system and fully extended deployment frame



OceanTools Ltd  
OceanTools House  
Claymore Drive  
Aberdeen AB23 8GD. UK.

Tel + 44 1224 709606  
Fax + 44 1224 709616  
Email [sales@oceantools.eu](mailto:sales@oceantools.eu)  
Web [www.oceantools.eu](http://www.oceantools.eu)

Represented by: