MODULE HANDLING SYSTEM

SEISMIC AND SUBSEA

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When the contract was signed to deliver our complete subsea module handling system to the Aker Wayfarer, it ensured the continuation a system that allowed more than 600 operations carried out offshore of Brazil between 2009 and 2014.

The module handling system onboardthe AKOFS Offshore-operated subsea support vessel Skandi Santos in 2009. It has since been on contract with Petrobras, installing and retrieving subsea xmas trees and modules in depths up to 2,200 metres.

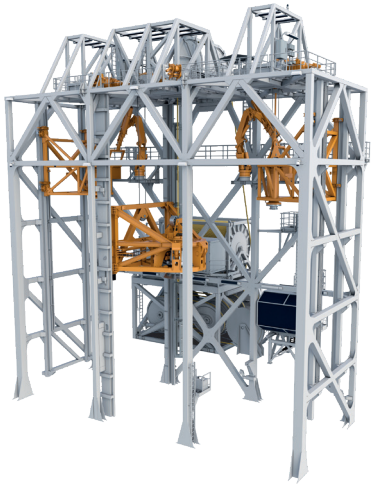
Between 2010 and 2014, several hundred operations were completed using the fibre rope system, a far higher level of productivity than any other solution. In 2014, the number of installations of this type made by Skandi Santos increased from 28 per cent to 44 per cent of Petrobras's total. It found the vessel to be one ofthe most efficient and reliable in its fleet, reducing installation time by 50 per cent, with 98 per cent availability. The work can be done with a subsea equipment support vessel such as Skandi Santos equipped with the Kongsberg Maritime module handling and fibre rope system, with the time saved approximately ten days, worth about US$5m (£3.2m) per well.

The handling system is key to this. A typical subsea xmas tree is made up of a number of elements for the safety and control of the well. Before the complete tree can be lowered and mated with the well, two or three heavy sections have to be assembled into a vertical stack, weighing 60-80 tonnes. Sections are secured until needed to pallets on skidways on the aft deck. Then a section on its pallet is shifted along or across the deck and placed in one side bay of the tower. A winch and cursor allows it to be hoisted and the next module moved in. With a similar station on the other side of the tower, two trees can be built up and tested simultaneously.

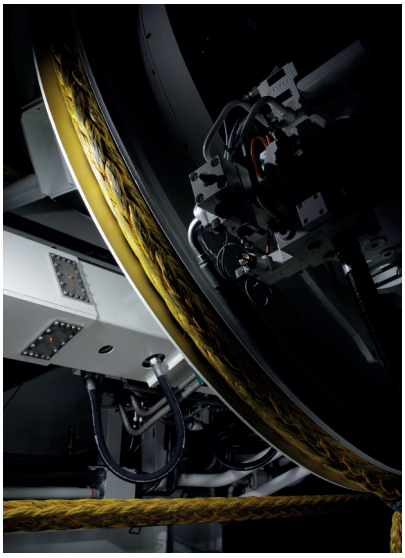
Once ready for installation, the completed stack is moved over the moonpool. The tree is then lowered with the fibre rope deployment system (FRDS), based on the Kongsberg Maritime-patented Cable Traction Control Unit (CTCU) technology, and guided by the main cursor system until clear of the ship. Then the FRDS deploys it safely to the seabed, where mating of xmas tree and well is carried out in active heave compensation mode, assisted and supervised by remote operated vehicles (ROVs). Skandi Santos manoeuvres using its dynamic positioning system and the subsea orientation equipment system (SOES) to ensure the tree lands precisely and at the correct heading.

GOING DEEPER WITH FIBRE

- The supply of a complete module handling system for the AKOFS Offshore-operated subsea construction vessel Aker Wayfarer marks the next step in deepwater operations using fibre ropes



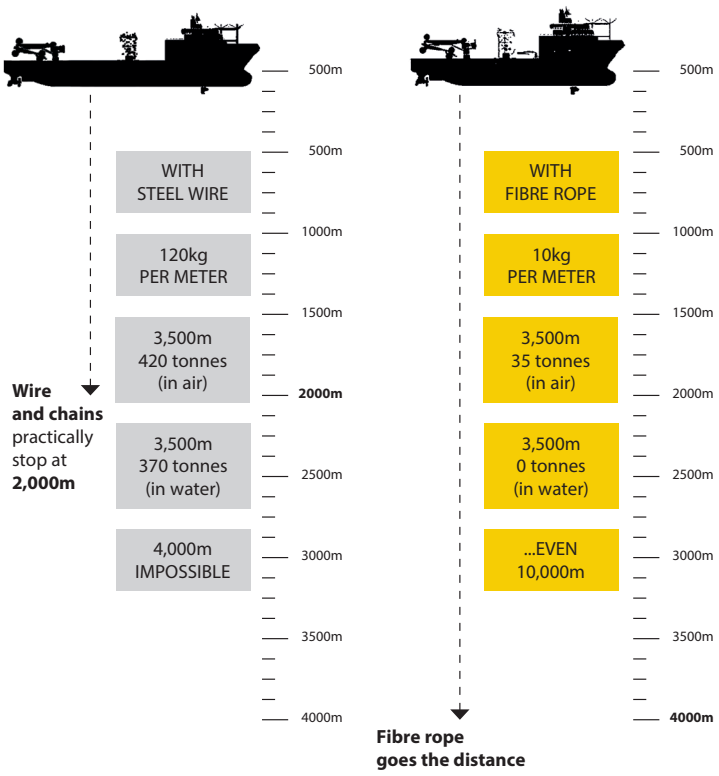
The tower and its integrated equipment is normally customised to the vessel or application.



A typical fibre rope with a 12x12 BOB construction.

FRDS comprises eight individually driven and controlled sheaves that work together, increasing the pull on the rope at each sheave, to give a final pull of five to 125 tonnes, depending on the frame size. The CTCU is a traction winch and is synchronised with a storage reel with capacity suited to the water depth. With fibre rope neutrally buoyant, there is no intrinsic limit (see graphic above). The capacity of the Aker Wayfarer system is 7,000m of 88mm diameter rope.

Petrobras has renewed its charter agreement with AKOFS offshore vessel Skandi Santos for five more years. Aker Wayfarer will be deployed on a five-year charter, carrying out subsea intervention services offshore Brazil.



The benefits of fibre rope

Traditional steel wire rope becomes less and less attractive as water depth increases. The prime reason is the weight of the wire itself. The high specific gravity of steel means that as the wire is paid out, its own weight in water becomes a significant part of the load on the winch. At a depth of 3,000 metres, the wire accounts for about half the load, leaving a limited useful payload compared with the rope diameter.

By its very nature, synthetic fibre rope avoids this limitation. The chosen fibre material has a specific gravity close to that of water, so its hanging weight is negligible, it is light to transport and its full strength is available for handling payload.

A mixture of synthetic polymer fibre types, a typical braided rope construction, is used to give the desired combination of strength, elasticity, bending fatigue resistance and friction. The used rope is known as BOB – braid optimised for bending. This construction provides a rope that can repeatedly be taken over sheaves, and it has no tendency to twist.

Subsea cranes are now available with fibre rope technology.

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