

Fiber Rope Deployment System and Rope Management Process

Sverre Torben, Per Ingeberg and Øyvind Bunes
ODIM Alitec AS
Hareid, Norway

Per Teigen
StatoilHydro
Trondheim, Norway

ABSTRACT

Fiber rope used as substitute for steel wire for ultra deep water installation operations has been successfully used since September 2006 in Gulf of Mexico and West Africa. More than 300 installations in water depths up to 2750 m have been completed using a 46Te handling system. A Rope Management System is part of the winch control system which assures higher utilization and risk mitigation. Scaling of the technology up to 125 Te and 250 Te lifting capacity is no ongoing.

KEY WORDS: Fiber Rope; CTCU; Handling system; Active Heave Compensation; Field Pilot; Rope Management System; Rope Management Process.

NOMENCLATURE

AHC: Active Heave Compensation.
BOBTM: Braid Optimized for Bending.
CTCUTM: Cable Traction Control Unit.
FRDS: Fiber Rope Deployment System.

INTRODUCTION

The industry trend of more oil and gas exploration in deep and ultra deep water has put focus on finding faster and cheaper methods for installation and construction work at these water depths. One significant driver in this picture is the weight of the lifting line. The weight penalty of steel wire is increasing rapidly with depth, and is becoming a significant cost driver for depths beyond 2000 meters.

A solution to this is to avoid the weight penalty by using lifting line that is close to neutrally buoyant in water. Using fiber rope as substitute for steel wire for deep water installation is an attractive solution. However, several challenges with regards to handling of fiber rope must be solved and a corresponding handling system must be available in order to take advantage of this opportunity. This has been the purpose of the development and field demonstration of the patented CTCU technology through several Joint Industry Projects since 2002. The backgrounds for the development and the status and results so far as well as future plans are presented in this paper.

Comparison between steel wire and fiber rope

Traditionally, steel wire is used as lifting lines in offshore lifting operations. These lifting lines have limitations, particularly in deep water, primarily due to their self weight. Utilizing high strength, low weight synthetic fiber ropes instead of steel wire for the lifting line substantially reduces the weight of the lifting line and consequently the needed pulling force of the handling system. This in turn will reduce the needed power supply from the vessel and open up for using smaller vessels for heavy lift operations in deep water. Smaller vessels and less power full handling systems for the same job, inherently makes fiber rope technology an environmentally friendly solution.

Comparisons between steel wire and fiber rope with regard to weight of lifting the line, required working load for a winch system and power consumption for installation of a 125 Te payload is shown below. A factor of safety of 4 has been used both for steel wire and fiber rope on the calculations.

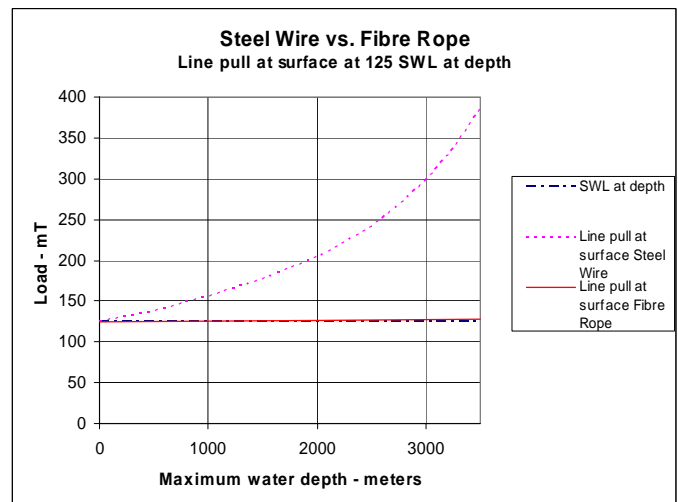


Fig. 1: Line-pull at surface.