Latest Progress in Floatover Technologies for Offshore Installations and Decommissioning

Alan M. Wang, Xizhao Jiang, Changsheng Yu, Shaohua Zhu, Huailiang Li, Yungang Wei
Installation Division, Offshore Oil Engineering Co., Ltd., Tanggu, Tianjin, China

ABSTRACT

This paper presents a comprehensive overview of various floatover technologies based on the latest advancements in offshore installation and decommissioning technology. Each floatover methodology is briefed and categorized into specifically defined divisions in a system of classification, including mechanical and non-mechanical schemes, single-barge, catamaran-barge and twin-barge schemes, etc. The presentation of these various floatover technologies will reveal the floatover history and evolution, the advantages and disadvantages of different methods, as well as the promising prospect of their wide applications in installation and decommissioning of integrated topsides onto and from various fixed and floating substructures.

KEY WORDS: Floatover technology; Hi-Deck, Smart-Leg®; Strand Jack Lifting; TML®; Unideck®; Versa-Truss®.

INTRODUCTION

Various floatover technologies have been developed and successfully applied to offshore installations of integrated topsides onto different fixed and floating platform substructures since the first floatover installation was successfully adapted for the production platform topsides of 18,600 tonnes on the Phillips Maureen Project in 1983. A string of offshore facilities using the floatover concept followed, including jackets, gravity base platforms, tension leg platforms, semisubmersible platforms, and even spars lately.

The floatover technology is an offshore topsides installation method that lets large platform topsides be installed as a single integrated package without the use of a heavy lift crane vessel, i.e. modular lifting installation. This allows the integrated topsides to be completed and pre-commissioned onshore prior to loadout, thus eliminating the substantial costs associated with offshore hook-up and commissioning. For the past two decades, the floatover technology has advanced so much from the conventional “Hi-Deck” scheme with leg mating units to numerous floatover techniques with active/passive load transfer systems and different configuration of floatover barge(s), thus providing an installation solution that can accommodate a wide range of topsides sizes and seastate conditions. These floatover techniques of every hue include the use of the smart-leg technology with active hydraulic devices to neutralize vertical impact, the versa-truss boom technology with A-frame booms and multi-winchining operations, the strand jack lifting technology, or the hydraulic jack lifting technology to raise floatover decks to the required in-place elevation at offshore sites. In addition, single floatover barge, catamaran barge, or twin barges have been used to meet the different configuration of substructures, which include future floatover technology of SeaMetric’s TML technique with twin-barge configuration using TML lifting beams with ballast tanks and buoyancy tanks and Pieter Schelte’s single lifting technique with catamaran configuration using hydraulically operated lifting clamps, and so forth.

A comprehensive overview of present floatover technologies based on the latest advancements in offshore installation and decommissioning technology is presented hereinafter. The systematic category of various floatover technologies defines the two major floatover methods, that is, the mechanical method when using active load transfer system and/or separation system and the non-mechanical method when using passive load transfer system and/or separation system. In addition, the floatover technologies can be categorized into specifically defined divisions based on the configuration of floatover barge(s), namely single barge scheme, catamaran barge scheme, and twin barge scheme, respectively. The advantages and disadvantages of different floatover technologies are also addressed here.