Structural Analytical Execution on Hull Appurtenances of a FPSO

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ABSTRACT

This paper deals with verification of the structural adequacy by 3-D local fine mesh technique and beam analysis for FPSO (Floating, Production, Storage and Offloading) hull appurtenances and adjacent offshore area structures. The FPSO was designed to satisfy the strict COMPANY’s own requirements and common Class rule requirements in in-place and towing condition. Therefore, the importance of general description note which covers objectives, design principles, design conditions, methodologies and evaluation methods at the early design stage is higher and higher. In order to investigate the structural fit for purpose of offshore structures, 3-D fine mesh analysis or beam analysis approach had been carried out by using well-recognized software.

KEY WORDS: Appurtenances; offshore area; module; rack; riser; flare; caisson

INTRODUCTION

DSME was awarded to accomplish the engineering, procurement, construction and installation of the FPSO from one of oil majors in the latter half of 2007. The FPSO has been designed and will be constructed in Okpo ship yard of Daewoo Shipbuilding and Marine Engineering Co., Ltd. In the latter middle of 2010, it will be towed to the operation site as shown in Figure 1. After arriving on site, offshore hook-up operations such as mooring campaign and riser connection works will be done for first oil. Oil field, which lies in Block 17, is located in offshore Angola, approximately 40 km to the east of Dalia FPSO and 200 km to shore. The filed is consisting of two (2) independent groups of reservoirs:

- Miocene reservoirs, in 600 m to 900 m water depth,
- Oligocene reservoirs, in 1000 m to 1200 m water depth

The purpose of the FPSO is to accommodate the various topside equipment, utilities and bulks for oil and gas processing. And it is intended to store the produced oil for a certain time until the oil is offloaded into the offloading tanker. Several phases of the FPSO such as construction, integration, transportation, and operation during its lifetime shall be encountered, and their effects shall be carefully planned, and monitored for successful project execution.

The FPSO heading will be positioned 22.5° to true north and FPSO Hull has the VERISTAR-Hull notation of BV classification. The main particulars of the FPSO are as the followings:

- **Length O.A** 325.05 m
- **Length Between Perpendicular** 325.00 m
- **Length Scantling** 315.30 m
- **Breadth Moulded** 61.00 m
- **Depth Moulded** 32.00 m
- **Draught Scantling on site** 24.58 m
- **Draught Ballast on site** 11.10 m
- **Block Coefficient** 0.984

![Fig. 1 Oil Field Location](image-url)