

## Structural Analysis of Riser I-tube Connection Details of FPSO

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### ABSTRACT

Recently, FPSO projects are becoming more popular as one of various facilities to develop offshore hydrocarbon resources, particularly for marginal fields and deepwater locations. Also, many engineering activities required the direct analysis are accompanied, and there are one of the critical path for engineering progress considering the limited design time and manpower.

Conventionally, the riser I-tube for the FPSO installed on benign environmental condition such as West Africa have arranged externally on side shell with riser protector against the ship collision, but the subject FPSO arranged the riser I-tube in double side ballast tank as one of challenges.

This paper will provide an overall introduction for strength evaluation results of riser I-tube connections which have been applied the new concept of riser I-tube arrangement.

In order to investigate the structural adequacy for the typical connection details of riser I-tubes, 3-D local F.E. analyses had been carried out using MSC software. Local design loads were presented by COMPANY with 'not to exceed' values and applied to the top and bottom flange area. We discuss the effect of hull girder bending moment considering local design forces and conclude that the ABS-DLA effect has to be verified under applying local loads for more actual approach. The stress and deformation evaluation were based on ABS requirements and also compared with global DLA results.

**KEY WORDS:** riser; I-tube; flange; DLA.

### INTRODUCTION

For Agbami facilities include all facilities necessary for the development of the Agbami field, primarily located in the OPL-216 block, offshore Nigeria. Agbami was designed for CHEVRON by DSME as EPCI Contractor. 3-D local F.E. analyses had been carried out to investigate the structural adequacy for the typical connection details of riser I-tubes. The FPSO Hull structure consists of continuous single upper deck with camber, single bottom, double sides, transverse bulkheads and two (2) central longitudinal bulkheads mainly. Table 1 summarizes the principal hull dimensions. All riser I-tubes are arranged

within double side water ballast tanks in the region of middle body. And, each riser I-tube penetrates from bottom shell to upper deck plating. This configuration makes the circumstance of inside riser I-tube and external sea environment. Figure 1 is an illustration of the Agbami Field. Figure 2 is an illustration of the FPSO.

Table 1. AGBAMI FPSO Principal Hull Dimensions

Length O.A	320.0 m
Length Scant.	310.4 m
Breadth Moulded	58.4 m
Depth Moulded	32.0 m
Draught Design	23.5 m
Draught Scant.	24.0 m

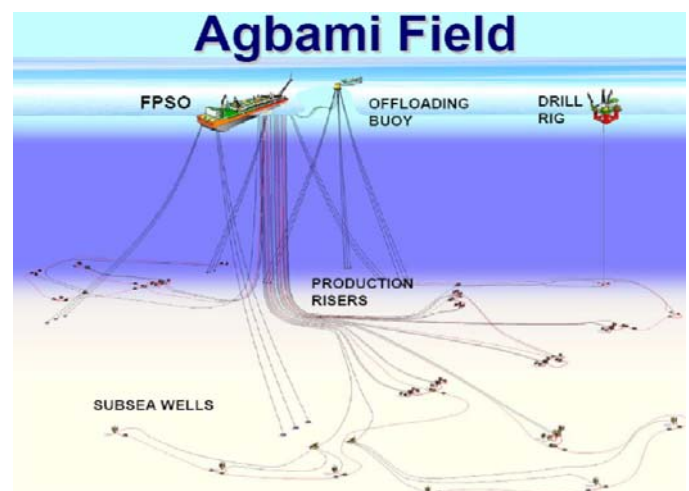


Fig.1. Agbami Field Illustration