

Numerical Studies on the Effects of Mooring Configuration and line Diameter on the Restoring Behaviour of a Turret- Moored FPSO

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Abstract - Restoring behaviour of a mooring system is majorly dictated by several factors including, pretension, mooring line material, azimuth angle, mooring line diameter and fairlead angle. Mooring line behaviour plays significant role in controlling the dynamic motions of floating offshore platforms. Hence, studying the parameters affecting mooring line responses is a very important aspect in the hydrodynamic analysis of FPSO. The primary aim of this paper is to investigate the influence of mooring line configurations in different wave headings and mooring line diameter on the restoring behaviour of a Turret-Moored FPSO. Force-excursion relationship of the mooring system is determined using an in-house developed MATLAB code, named MLQSC. Catenary mooring line was adopted in the study, consisting of Chain-Steel wire-Chain, and analyse using Quasi static analysis approach. Four (4) mooring configurations considered are Evenly distributed, 3x4, 4x3 and 6x2 in all cases with respect to 30,35,40 and 45-degree wave headings. The restoring behaviour of mooring configurations considered (consisting of 12 mooring lines) was observed to decrease with an increasing wave heading. Furthermore, the restoring behaviour was observed to decrease with increase in mooring line diameter which by implication increases the corresponding permissible excursion.

Keywords: Restoring Forces, Excursion, Mooring configuration, Mooring line Diameter, Turret moored FPSO