Analysis of motion on FPSO in shallow water with a non-collinear environment

Abstract:

The ship-shaped floating structures like FPSO has an ability to produce, storage and offloading the oil but it is does not have the drilling capability. Usually the FPSO in shallow water is connected with the single point mooring systems such as Vertical Anchor Leg Mooring (VALM) buoy systems. The objective of this paper is calculate the response amplitude operators (RAO) of spread moored FPSO with two mooring configuration and with the effect of non-collinear environment of wave and current. The analyses done by using ANSYS AQWA (version 14) software with runs two types of analysis which is hydrodynamics diffraction and hydrodynamics time response. The analysis also focuses to calculate the RAO and normalized hawser line force of FPSO and VALM systems. The result from the software has been compared with the experiment result to validate it. The different in meshing elements size also are taken into account. The analysis also focuses to compare the RAO between single leg mooring FPSO and spread moored FPSO with the same loading condition. From the analysis, the RAO for 4 mooring FPSO is higher compared than 8 mooring FPSO but the 8 mooring FPSO shows high value of cable forces than 4 mooring FPSO. It also shows the value of RAO of single leg mooring FPSO is higher compared to the spread moored FPSO.