

ABSTRACT:

This paper presents the effect of current forces on the motion of forces on Floating Production Storage and Offloading (FPSO) in irregular waves. The objective of this research is to compute the motion of FPSO in irregular waves by time domain simulation including the effect of current forces. A study is made on the slowly varying oscillations of a moored single body system in a current and waves. Linear potential theory is used to describe the fluid motion, and three-dimensional source distribution techniques are applied to obtain the hydrodynamic forces and transfer function of the wave exciting forces. OCIMF (1994) data are used for estimation of the current forces. The non-linear time domain simulations have been carried out in irregular waves. Based on it, slowly varying motion responses are examined including the effect of the current forces. Several environmental conditions, such as the current angle of attack, current velocity, significant wave height and mean wave period are considered, which may significantly affect FPSO motion in surge, sway and yaw moments. It is found that the effect of current forces is quite significant when the current velocity is increased. In this simulation, while the current velocity is increased to 3.0 meter/seconds, the impact on FPSO motion is quite significant, which should be taken into consideration from the point of view of safety, failure of mooring systems, operating responses and the dynamic positioning of the FPSO.