



Effects of mooring line hydrodynamic coefficients and wave parameters on the floating production storage and offloading motions

Zhiyang Zhang^a, Haitao Wu^{b,*}, Weixing Liu^a

^a*School of Ocean Engineering, Jiangsu Ocean University, Lianyungang 222005, China*

^b*School of Naval Architecture, Ocean & Civil Engineering, Shanghai Jiao Tong University, Shanghai 200240, China, email: wuhaitao19960912@163.com*

Received 17 August 2021; Accepted 23 September 2021

ABSTRACT

As the main facility for offshore oil and gas development, floating production storage and offloading (FPSO) has received great attention from researchers and engineers. This paper relies on a time-domain analysis code to investigate the effects of mooring line hydrodynamic coefficients and wave parameters on the FPSO motions. In order to verify the reliability of this code, the hydrodynamic software AQWA is used for comparison. Under the irregular wave, it can be found that the results calculated by these two numerical tools are in good agreement. After that, two cases concerning the hydrodynamic coefficients and wave parameters are created. Finally, the sensitivity of the FPSO motions to mooring line hydrodynamic coefficients and wave parameters are discussed. The results show that the mooring line hydrodynamic coefficients and wave parameters have a significant influence on the FPSO dynamic behavior. However, among the results, it can be found that the wave-frequency motions are not affected by the hydrodynamic coefficients of the mooring line due to the turret-moored configuration. In general, they are of great help for the initial design of the FPSO system.

Keywords: Floating production storage and offloading motions; Mooring line hydrodynamic coefficients; Wave parameters; Standard deviation; Response spectrum

* Corresponding author.