ANALYSIS OF SINGLE POINT MOORING MOTION
BEHAVIOR AS LOADING/UNLOADING FACILITY FOR TANKER AT PERTAMINA REFINERY INDRAMAYU
BASED ON TIME DOMAIN

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Abstract

SPM (Single Point Mooring) is a structure that supporting gas and oil production facility which has floating character at the sea surface. Furthermore this supporting production facility has another function, as a place for Tanker to lean, thus the motion of this SPM and Tanker would be able to cause the existence of laboring force (tension force, restoring force, and damping) at Mooring System and Subsea Hose. This final project was tried to study how the movement characteristic of the Tanker and SPM, specifically from the maximum tension at mooring lines and subsea hose, and also on how seastate condition that allowable for Tanker to operate. The analysis was conducted by using MOSES and Orcaflex software. The early stage of analysis for obtaining Tanker and SPM’s RAO was conducted by MOSES. The RAO later then used as an input for Orcaflex software for obtaining the mooring tension and subsea hose. According to the result of the previous analysis, it was obtained that movement response of Tanker and SPM was very significant at heave condition. The Maximum Tension for mooring line for 15,000 DWT; 35,000 DWT and 45,000 DWT Tanker tonnage variation were 232.773 kN, 478.416 kN, 499.294 kN. Based on API RP 2SK code, the minimum value for safety factor that allowable for this project condition is 1.67. So that, according to the result above, 35,000 DWT type SPM can still be operated for 15,000 DWT; 35,000 DWT and 45,000 Tanker tonnage variation. Moreover the maximum tension for subsea hose for 15,000 DWT; 35,000 DWT and 45,000 DWT Tanker tonnage variation were 27.570 kN, 31.346 kN, 34.290 kN. Referring to Yong Bai’s standart, the minimum load factor that allowable is ≤ 0.72 . Based on the results above, the 35,000 DWT type SPM can still be operated for 15,000 DWT; 35,000 DWT and 45,000 Tanker tonnage variation. Furthermore for sea state condition, 15,000 DWT; 35,000 DWT and 45,000 Tanker are safe to operate from 1 to 100 year annual wave which is has \( H_{\text{significant}} = 3.35 \).

Kata-kata kunci: tanker, SPM, tension, mooring lines, subsea hose.