FATIGUE STRENGTH ANALYSIS OF SOFT YOKE MOORING SYSTEM DUE TO CYCLIC WAVE LOADS ON FSRU

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Abstract

Floating Storage Regassification Unit (FSRU) is floating structure as vessel from new build or LNG carrier conversion. FSRU has function to receive, store, process regassification, and send out gas to onshore terminal by pipeline. FSRU need mooring system such as spread mooring or single point mooring during operation. Selection of mooring system for FSRU in this final project is Soft Yoke Mooring System. Soft Yoke Mooring is mooring structure functioned as mooring tower that is set in front of the FSRU which connected by yoke arm and it has turntable which can make FSRU move following wave movement. This final project to analyze FSRU motion characteristic in operation condition, displacement of critical points in deck and also fatigue analysis to find out fatigue life of yoke arm. FSRU model has dimension: long perpendicular (LPP) 270 m, width 52 m, height 27 m, draft 7.16 m, displacement 240.000 m3, has design life 30 years and yoke arm is made from steel type A36 which has yield stress 250 MPa. This study observe the movement of the vessel due to load waves with various wave height in Java sea using Jonswap wave spectrum that can effect tension/stress in yoke arm. Highest nominal stress in connection yoke arm is 119.3 MPa at Hs = 2.185 m. Nominal stress from the result is smaller than yield stress. It is can be conclude that yoke arm safe for use. Calculation of ship motion using fatigue deterministic methods on yoke arm it is found that the fatigue life is 59.124 years which is greater than the design life.

Keywords : Soft Yoke Mooring System, yoke arm, fatigue, fatigue deterministic method