FATIGUE RISK BASED ANALYSIS ON ETB JACKET PLATFORM FOR SERVICE LIFE EXTENSION

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ABSTRACT

To meet the demand for oil and gas domestically, PHE ONWJ ETB intends to extend the operating life of Jacket Platform for the next 20 years. Initially ETB jacket platform designed for operation over the age of 15 years and operated since 1993, Java Sea. This final project presents the results of the reassessment study of ETB jacket platform structure by doing the risk-based fatigue analysis using the full spectral analysis method of fatigue analysis for the operation life extension. Analysis calculated fatigue due to cyclic wave loads that occur during operation process. Based on the analysis of fatigue, then obtained lowest fatigue life of the connection structure (joint) of 301 and 403 in connection with the member '203-301' and '301-403' long each with 214.35 and 432.04 years. By doing reliability analysis using Monte Carlo simulation on the connection member that has the lowest fatigue life, obtained probability of failure per year / Annual Probability of Failure (PoF) for each connection 301 and 403 is $9.24 \times 10^{-4}$ yr$^{-1}$ and $3.14 \times 10^{-3}$ yr$^{-1}$ with respective reliability indices were 3.12 and 2.74. The risk level of of safety, containment, environment and production consequences at the joint are grouped as Low Risk Level. And for the cost consequences grouped as Medium Risk. At this final project, Risk Based Inspection are also applied so the interval of inspection time period could be obtained based on the risk. Finally ETB jacket structure are still feasible to operate 20 years forward after completing the 15 years of the operational life before.

Keyword(s) : Spectral Fatigue Analysis, ETB Jacket Platform, Reliability, Risk Based Inspection (RBI).