RELIABILITY ANALYSIS OF STRUKTUR TOPSIDE MODULE FPSO DURING OPERATION

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ABSTRACT

FPSO (Floating Production Storage and Offloading) in operations have a significant influence from environmental and operational expenses. It also affects the components of existing structures on it, including topside structure that serves as a processing module of oil and gas. Construction FPSO topside modules must be strong with loads that occur when operating conditions. In this study, the power structure of topside modules have been studied with deterministic and Probabilistic method or reliability. In the assessment with deterministic methods are used SACS software while the reliability assessments using Monte Carlo simulation. Modelling dynamic loads due to wave FPSO completed with MOSES software. Modelling FPSO topside modules and the structure is modeled with a variety of draft. To determine motion of structure, do analysis for RAO motion of structure. The dominant movement occurred in the 45° and 135°. As for the maximum in each movement are: RAO surge 0.957 (heading 0), RAO sway 1.307 (heading 90), RAO heave 0.953 (heading 90), RAO roll 2.972 (heading 90), RAO pitch 0.739 (heading 135) and RAO yaw 0.346 (headings 45). From the analysis results obtained structural strength unity check (UC) maximum on various drafts that is, the draft 18.0m structural strength FPSO topside modules are safe with (UC) maximum is 0.923. Then the strength of the structure at draft 16.2m FPSO topside modules are not safe with (UC) maximum is 1.251, then the strength of the structure at draft 14.6m FPSO topside modules are not safe with (UC) maximum is 1.311, as well as up to the lowest draft 13.9m structural strength FPSO topside modules are safe with (UC) maximum is 1.348. Reliability structure of FPSO topside modules based on results of calculations using Monte Carlo simulation obtained reliability on the variation of draft as, at draft 18.0m reliability is 0.903, then at draft 16.2m reliability drops to 0.687, then at draft 14.6m reliability drops to 0.617 as well as to 13.9m lowest draft declining reliability of 0.560. From the structural strength and reliability in draft variation shows that the structure of FPSO topside modules is safe and high reliability in draft 18.0m, while the lower draft the FPSO structural strength and reliability of the structure of FPSO topside modules will decrease.

Keyword : reliability, structure of topside module, FPSO, draft, RAO.