

INTISARI

ANALISA INTEGRITAS STRUKTUR ANJUNGAN LEPAS PANTAI (STUDI KASUS : SATELLITE WELLHEAD PLATFORM PECIKO 3 – TOTAL E&P INDONESIA)

Oleh Abraham Wijaya Sudirgo, NIM : 10/305180/TK/37396

Dosen Pembimbing Ir. Joko Waluyo M.T., Ph.D

Tugas akhir ini mengangkat materi analisa integritas struktur pada suatu anjungan lepas pantai yang nantinya untuk mengetahui kelayakan dan kekuatan anjungan lepas pantai dengan *4 legged jacket type* pada beberapa kasus pembebanan yang terjadi di lapangan, khususnya di site Peciko, Total E&P Indonesia. Dasar analisa integritas struktur berdasarkan *code* API RP 2A WSD dan API RP 2A 21ST / AISC 9th untuk kalkulasi *unity check ratio*. Analisa integritas struktur meliputi analisa beban statis, analisa beban dinamis, dan beban lingkungan. Kombinasi dari ketiga beban ini setelah dilakukan analisa akan digunakan untuk melihat kekuatan anjungan lepas pantai melalui nilai *unity check ratio* yang dihasilkan. Adapun perubahan – perubahan yang dilakukan untuk menambah kekuatan anjungan lepas pantai apabila *unity check ratio* berada di luar batas yang aman. Perubahan atau *redesign* pada tugas akhir ini meliputi penambahan beberapa *support beam* untuk menyangga beban pengangkatan *vent boom* serta beberapa *redesign* ukuran diameter dan ketebalan baja tubular.

Dari perhitungan diperoleh beberapa perubahan mayor dan perubahan minor untuk menjamin kestabilan struktur anjungan. Perubahan mayor berupa penambahan struktur *beam* W40X436 untuk menahan beban vertikal dari *vent boom* dan momen puntir dari *vent boom* akibat beban angin. Adapun dimensi panjang dari *beam* yang ditambahkan yaitu 36.805 meter. Perubahan minor berupa penambahan beberapa *beam* dengan dimensi panjang tidak lebih dari 5 meter serta beberapa perubahan ketebalan baja tubular struktur *trust* (pilar) dan perubahan ketebalan beberapa baja tubular *bracing*. Dari hasil analisa dan simulasi menghasilkan hasil yang aman dengan *unity check ratio* terbesar yaitu 0.998 pada salah satu *joint* dari struktur *jacket*.

Kata kunci : Anjungan lepas pantai, API RP 2A, Analisa integritas struktur, *Unity Check Ratio*.

ABSTRACT

STRUCTURAL INTEGRITY ANALYSIS OF OFFSHORE PLATFORM (CASE STUDY : SATTELITE WELLHEAD PLATFORM PECIKO 3 – TOTAL E&P INDONESIA)

By Abraham Wijaya Sudirgo, NIM : 10/305180/TK/37396

Lecturer: Ir. Joko Waluyo M.T., Ph.D

This final project is about structural integrity analysis of offshore platform to determine the feasibility and strength of an offshore platform with 4 legged jacket types in several loading cases that occur in the field, especially at the Peciko site, Total E&P Indonesia. The basis for structural integrity analysis is based on the code API RP 2A WSD and API RP 2A 21ST / AISC 9th for the calculation of the unity check ratio. Analysis of structural integrity includes analysis of static loads, dynamic load analysis, and environmental loads. The combination of these three loads after analysis will be used to see the strength of the offshore platform through the result of unity check ratio value. As for the changes made to increase the strength of offshore platforms if the unity check ratio is outside safe limits. Changes or redesigns in this final project include the addition of several support beams to support the lifting load of the vent boom as well as several redesigns of the diameter and thickness of tubular steel.

From the calculation obtained several major changes and minor changes to ensure the stability of the bridge structure. The major change is the addition of the W40X436 beam structure to withstand vertical loads from the vent boom and torsional moments from the boom vent due to wind loads. The length dimension of the beam added is 36,805 meters. Minor changes include the addition of several beams with dimensions of not more than 5 meters in length as well as changes in the thickness of the tubular steel for the trust structure (pillars) and changes in the thickness of several tubular bracing steels. From the analysis and simulation results produce safe results with the largest unity check ratio of 0.998 in one of the joints of the jacket structure.

Keywords: Offshore Platform, API RP 2A, Structure Integrity Analysis, *Unity Check Ratio*.