STRESS ANALYSIS ON FOUR BATTERED-LEGS OFFSHORE JACKET STRUCTURES

By

Amirul Asyraf Bin Amiruddin

Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Engineering (Hons)
(Mechanical Engineering)

JANUARY 2010

Universiti Technologi of PETRONAS
Bandar Seri Iskandar
31750 Tronoh
Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

Stress Analysis on Four Battered-Legs Offshore Jacket Structures

by

Amirul Asyraf Bin Amiruddin

A project dissertation submitted to the
Mechanical Engineering Programme
Universiti Teknologi PETRONAS
in partial fulfillment of the requirement for the
BACHELOR OF ENGINEERING (Hons)
(MECHANICAL ENGINEERING)

Approved by,

____

Dr. Setyamartana Perman
Main Supervisor

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

JANUARY 2010

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

____

AMIRUL ASYRAF BIN AMIRUDDIN

ABSTRACT

The level of static loadings within structural elements due to deck load that acted on the jacket structure may be estimated. This may routinely be performed at early design stages where all loading parameters and assumptions are predicted to act on the structure that results the response under normal operating condition. The paper addresses loading parameters, discuss analysis steps that have been applied to the structure and illustrate subsequent results of the static analysis within the structure due to the response to deck load acting on the structure.

Particular application includes the studies on typical shallows or medium water depth jacket structures under extreme deck loading. The significance of this research is important to apply deck load working on the jacket structure and the static analysis had been run on the drawing structure. This research starts by searching for any other relevant journal or article published by other researches and from there, the results would be review and useful information will be summarize and taken as an information to this research. CATIA V5 R18 was applied to model the drawings of the jacket structure and ANSYS 12.0 was used to analyze the static loads that act onto the jacket structure.

ACKNOWLEDGEMENTS

In the name of Allah, the Compassionate, and the Merciful. Alhamdulillah, with His will and guidance, this research project and thesis is finally completed.

I would like to express my deepest gratitude to Dr. Setyamartana Parman as my research supervisor for his interest, support, and patience in guiding me throughout the period of this research. I am very grateful that he had spared me his time to meet with me and discuss about my progress, shared his knowledge and experience, and giving me advices for improvement.

Next, goes to my research peers and friends who have helped disseminating information regarding the requirements of the thesis writing, submission and more. Together, we have worked our sweat and tears and have always been helpful among each other in terms of sharing of knowledge, demonstrating software application, patience, and tolerance.

Last but not least, to my parents has also partly been a good contribution in my research. Their prayers and motivational comfort has given me strength to resistance and stress control.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND NOMENCLATURES

2D	2-Dimensional
3D	3-Dimensional
CAE	Computer Aided Engineering
CFD	Computational Fluid Dynamics
DMX	Displacement Maximum
DOF	Degrees of Freedom
FYP1	Final Year Project 1
FYP2	Final Year Project 2
GN	Giga Newton
GPa	Giga Pascal
$kg.m/s^2$	Kilogram meter per second square
ksi	Kilo-pound-force per square inch
m	Meter
m/s^2	Meter per second square
mm	Milimeter
MN	Mega Newton
MPa	Mega Pascal
NC	Numerical Control
SEQV	Stress Equivalent
SINT	Stress Intensity
SMN	Stress Minimum
SMX	Stress Maximum