COMPUTER AIDED DESIGN AND ANALYSIS OF OCEAN CLEANING ROBOT

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FACULTY OF MARITIME STUDIES AND MARINE SCIENCE

UNIVERSITI MALAYSIA TERENGGANU

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COMPUTER AIDED DESIGN AND ANALYSIS OF OCEAN CLEANING ROBOT

BY

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A Thesis Submitted in Partial Fulfillment of the Requirements For The

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Department of Maritime Technology

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2013

DEPARTMENT OF MARITIME TECHNOLOGY

FACULTY OF MARITIME STUDIES AND MARINE SCIENCE

UNIVERSITI MALAYSIA TERENGGANU

DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled:

Computer Aided Design and Analysis of Ocean Cleaning Robot by **Norhayati Binti Abd Khalid, Matric No. UK 20216** have been examined and all errors identified have been corrected. This report is submitted to the Department of Maritime Technology as partial fulfillment towards obtaining the **Bachelor Degree of Applied Science (Maritime Technology),** Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

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DECLARATION

I hereby declare that this thesis entitled "Computed Aided Design and Analysis of Ocean Cleaning Robot" is my own research except as cited in the references.

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COMPUTER AIDED DESIGN AND ANALYSIS OF OCEAN CLEANING ROBOT

ABSTRACT

This project thesis presents the computer aided and analysis of ocean cleaning robot. There are several issues that have a significant impact on the world of which are present oil spill has the potential to harm the ocean, coastal fishing, mammals, reptiles, amphibians and birds. The purposed of this thesis was the development and virtual testing of five ocean cleaning robots that can operate to absorb oil spills on the ocean's surface involves five different types of tanks. It consisted of five simple concepts and easy to build. In general, these robots had included one or more aqua-robotic mechanisms where capable of collecting pollutants from water bodies while afloat in contaminated spill zones. In addition, this project also focuses on the analysis of data that was conducted virtual analysis using ANSYS of the candidate designs in view of stability, drag coefficient, powering and time to be taken to clean up a contaminated area. Therefore, it can be hypothesized that the robot is capable to perform highly repetitive task with availability of several or no human supervision. With the creation of this robot it is envisaged that the amount of human workers and time involved in the process of cleaning the ocean can be reduced, while at the same time improving the efficiency of the ocean cleanup activities. At the end of the project, each robot being tested to prove that which one had very high effective performance in the process of cleaning the ocean.

BANTUAN KOMPUTER DAN ANALISIS ROBOT PEMBERSIH LAUTAN

ABSTRAK

Projek tesis ini membentangkan bantuan komputer dan analisis robot pembersih laut. Terdapat beberapa isu yang memberi impak yang besar pada dunia di antaranya adalah tumpahan minyak yang hadir berpotensi untuk memudaratkan lautan dalam dan nelayan tepi pantai, mamalia, reptilia, amfibia dan burung yang hidup di dalam atau berhampiran laut. Tujuan tesis ini adalah untuk pembinaan dan ujian maya lima buah robot pembersihan laut yang boleh beroperasi untuk menyerap tumpahan minyak di permukaan laut melibatkan lima jenis tangki. Secara umumnya, robot ini telah dimasukkan satu atau lebih mekanisme robotik aqua di mana mampu untuk mengumpul bahan-bahan pencemar daripada permukaan laut semasa terapung di zon tumpahan minyak. Di samping itu, projek ini memberi tumpuan kepada analisis data yang menjalankan analisis maya terhadap setiap reka bentuk menggunakan ANSYS dari segi kestabilan, *drag coefficient*, kuasa dan masa yang perlu diambil untuk membersihkan satu kawasan yang tercemar. Oleh itu, ia boleh dihipotesiskan bahawa robot mampu untuk menjalankan tugas secara berulang-ulang dengan tiada ataupun adanya beberapa orang penyelia. Dengan penciptaan robot ini ia dijangka bahawa jumlah tenaga pekerja dan masa yang terlibat dalam proses pembersihan laut boleh dikurangkan, manakala pada masa yang sama meningkatkan kecekapan aktiviti pembersihan laut. Di akhir projek ini, setiap robot yang diuji untuk membuktikan mana satu yang mempunyai prestasi kecekapan yang sangat tinggi dalam proses pembersihan laut.