



## **CONCEPTUAL DESIGN OF HUMAN POWERED HYDROFOIL**

**KHAIROL IZWAN BIN MOHAMAD**

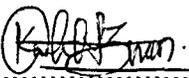
**2005606920**

A thesis submitted in partial of the requirement for the award of the Bachelor  
*Engineering (Hons) Mechanical*

Faculty of Mechanical Engineering  
University Teknologi MARA (UiTM)

November 2009

"I declared that this thesis is the result of my own work except the ideas and summaries which I clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in the candidature of any degree."

Signed :  .....  
Date : 24/11/09 .....

**KHAIROL IZWAN MOHAMAD**

UiTM No: 2005606920

## **ACKNOWLEDGEMENT**

All praises and thanks are to Him, the Almighty and the Lord of the universe, without whose Bounty and Mercy the author would not have complete this final year project report. Alhamdulillah, finally the author managed to complete this project and its report within the period of given time although many problems occur during the processes to complete the project.

The author would like to thank his advisor, En. Mohd Azahari Bin Johan for his guides, help and continuous encouragement in the duration of completion of this final year project. Without him, this project may not be done successfully and the report of this project cannot be documented with the required requirements. Thanks also to the other lecturers who were helped me in simulation.

Last, but certainly not least, this final year project report owes its success to the talented and tireless support of each and every member of the author family, friends and lecturers. Their contributions and personnel help are truly appreciated and will be remembered.

## ABSTRACT

A hydrofoil is a boat with wing-like foils mounted on struts below the hull. While, the human powered hydrofoil means the hydrofoil is moved by using human energy. The term "hydrofoil" is used to refer to the foil itself, especially when the airfoil profile has been specifically designed for use in water (such as for a propeller blade). Hydrofoils are now being applied in multiple marine applications. In this project, the student is design a human powered hydrofoil for the purpose of recreation activities. First, a research about the existing human powered hydrofoil was done. After that, a sketch of the hydrofoil was done by refer to the existing hydrofoil's design. Then, the most suitable material was selected and followed by strength analysis and lift analysis to find out the size of structure and foils. After the foil has been selected, it was simulated using CFD software. The simulation was done to prove the foil chosen is able to generate enough lift or not. The size of each structure of the human powered hydrofoil has been obtained for this project. NACA 2410 with 210 cm x 14 cm in dimension has been selected as wing design. A comparison between the theoretical and simulation result has been made to prove the analysis done is correct.

## TABLE OF CONTENTS

CONTENTS	PAGE
ACKNOWLEDGEMENT	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	vii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	xi

### CHAPTER I INTRODUCTION

1.0	Introduction	1
1.1	Project Background	2
1.2	Objective of Project	2
1.3	Scope of Project	2
1.4	Problem Statements	3
1.5	Methodology	4
1.6	Equipment required	5