UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DESIGN ENHANCEMENT OF PADDLE FIN FOR FISHING KAYAK

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Engineering with Honours.

by

MUHAMMAD FIRDAUS BIN NORIZAN

B051710065

960424-14-6213

FACULTY OF MANUFACTURING ENGINEERING

2021

UNIVERSITI TEKNIKAL MALAYSIA

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

Tajuk: DESIGN ENHANCEMENT OF PADDLE FIN FOR FISHING KAYAK

Sesi Pengajian: 2021

Saya **MUHAMMAD FIRDAUS BIN NORIZAN** mengaku membenarkan Laporan PSM ini disimpan di Perpustakaan Universiti Teknikal Malaysia Melaka (UTeM) dengan syarat-syarat kegunaan seperti berikut:

1. Laporan PSM adalah hak milik Universiti Teknikal Malaysia Melaka dan penulis.
2. Perpustakaan Universiti Teknikal Malaysia Melaka dibenarkan membuat salinan untuk tujuan pengajian sahaja dengan izin penulis.
3. Perpustakaan dibenarkan membuat salinan laporan PSM ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. **Sila tandakan (X)

☐ SULIT*	Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia sebagaimana yang termaktub dalam AKTA RAHSIA RASMI 1972.
☐ TERHAD*	Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan.
☐ TIDAK TERHAD	

Yang benar,

.....*firdaus*.....

MUHAMMAD FIRDAUS BIN NORIZAN

Alamat Tetap: Lot 27965 Kampung Segambut Tengah, 51200 Kuala Lumpur

Tarikh: 2 September 2021

Disahkan oleh penyelia:

MAHASAN BIN MAT ALI
Lecturer
Faculty of Manufacturing Engineering
Universiti Teknikal Malaysia Melaka

Tarikh: 2 September 2021

*Jika Laporan PSM ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa/organisasi berkenaan dengan menyatakan sekali sebab dan tempoh laporan PSM ini

DECLARATION

I hereby, declared this report entitled DESIGN ENHANCEMENT OF PADDLE FIN FOR FISHING KAYAK is the results of my own research except as cited in references.

Signature: ……firdaus……

Author : MUHAMMAD FIRDAUS BIN NORIZAN

Date: 2 SEPTEMBER 2021

APPROVAL

This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor Degree of Manufacturing Engineering with Honours. The member of the supervisory is as follow:

Signature: ……

Supervisor: MAHASAN BIN MAT ALI
Lecturer
Faculty of Manufacturing Engineering
Universiti Teknikal Malaysia Melaka

ABSTRAK

Pengeluaran kayak telah mengubah kayak rekreasi mereka sekarang dalam beberapa tahun terakhir untuk memuaskan orang yang minat memancing dengan kayak rekreasi mereka. Kayak rekreasi sering dirancang untuk memberikan kecekapan maksimum. Jenis pergerakan yang dilakukan oleh pengguna biasanya dibatasi untuk mendayung. Oleh itu, objektif utamanya adalah untuk menyiasat jenis reka bentuk aerofoil lain yang dapat digunakan untuk memaksimumkan prestasinya. Beberapa jenis aerofoil yang ada dipelajari dengan beberapa kriteria aspek yang perlu dipertimbangkan untuk meningkatkan prestasi kayak memancing dengan perbezaan jenis aerofoil. Beberapa kaedah telah digunakan dalam projek ini untuk mencapai objektif projek. Kaedah pengumpulan data telah dilakukan untuk mencari beberapa jenis aerofoil yang sesuai untuk pemacu sirip dayung. Dari hasil pengumpulan data, langkah selanjutnya adalah mempelajari keperluan reka bentuk dan juga reka bentuk dengan menggunakan perisian reka bentuk dan analisis. Objektif ketiga yang telah dikenal pasti adalah untuk mengesahkan jenis aerofoil dengan tujahan ke depan yang optimum untuk memancing kayak. Setelah selesai menghasilkan reka bentuk sirip dengan pelbagai jenis udara dalam perisian Solidwork, reka bentuk sirip diimport ke perisian ANSYS untuk meneruskan analisis dalam projek ini. Berdasarkan hasilnya, reka bentuk pesawat udara yang mempunyai prestasi yang baik adalah NACA 2414 (separa simetri) berbanding dengan dua pesawat udara yang lain. Ini kerana NACA 2414 mempunyai prestasi yang baik dalam Coefficient of lift (CL), Coefficient of drag (CD) dan Lift force.

ABSTRACT

Kayak manufacturers have changed their current recreational kayaks in recent years to satisfy people who are interested in fishing with their recreational kayaks. Recreational kayaks are often designed to provide maximum efficiency, for example speed and directional stability, for good stability or balance between the two. The type of movement carried out by the user is normally restricted to paddling in a recreational kayak. Hence, the main objectives are to investigate other type of aerofoil design that can be used to maximize its performance. The literature review it was conducted to investigate the several type of aerofoil for paddle fin fishing kayak. A some existed type of aerofoil it was studied with several criteria an aspect was taken to considerate to improve the performance fishing kayak with differences type of aerofoil. Some method has been used in this project to achieve the objectives of project. A collecting data method has been conducted to find several types of aerofoils that suitable for paddle fin drive. From the result collecting data, the next step is to study the design requirements as well as the design by using design and analysis software. The third objective that has been identified is to validate the type of aerofoil with an optimum forward thrust for fishing kayak. After finish generate the fin design with different type of airfoil in Solidwork software, the design of fin was imported to ANSYS software to continue the analysis in this project. According to the result, the airfoil design that have good performance is the NACA 2414 (semi symmetrical) compared with other two airfoil. It is because the NACA 2414 have good performance in Coefficient of lift (CL), Coefficient of drag (CD) and Lift force.

ACKNOWLEDGEMENTS

The name of Allah, Alhamdulillah, I'm grateful because able to finish the project as one the requirements that want to be complete in the time given.

I want to give my appreciation and gratitude to all those who gave the corporation for finish the report. A special thanks to my supervisor, En Mahasan Bin Mat Ali, whose helped me to coordinate my project.

Next, thank you to my parents for encouraging and supporting me to finish this project. This project it was prepared with the support and cooperation from many people. Then, not to forget beloved friends for give many supports and suggestions to me for finish the project.

Last, I want to thanks those that contributed and involve directly or indirectly for complete this project.

DEDICATION

Alhamdulillah,

Praise to Allah S.W.T

Special appreciation this study to my family,

My supervisor, En Mahasan bin Mat Ali,

My lecturer and my superb friends

that always believe in me and giving me cooperation, support and encouragement also understandings to complete this report.

Thank you so much.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF SYMBOLS

%	-	Percentage
Kg	-	Kilogram
Mm	-	Millimetre
Cm	-	Centimetre
rij	-	Concept j raw rating for the criterion
wi	-	Criterion weighting
n	-	Criteria number
sj	-	Concept j total score
°	-	Degree

LIST OF ABBREVIATIONS

UTeM	-	Universiti Teknikal Malaysia Melaka
PSM	-	Projek Sarjana Muda
NACA	-	National Advisory Committee for Aeronautics
CAD	-	Computer Aided Design
CAE	-	Computer Aided Engineering
FEA	-	Finite Engineering Analysis
SUP	-	Stand Up Paddle
FCS	-	Fin Control System
Fx	-	Force x
Fy	-	Force y
CF	-	Coefficient Force
CD	-	Coefficient of Drag
CL	-	Coefficient of Lift
LF	-	Lift Force

CHAPTER 1

INTRODUCTION

A brief introduction to the project is given in this chapter. The introduction begins with a research history which describes briefly current knowledge or previous relevant studies on the topic discussed. The problem statement subsequently provides a summary of the current problem in relation to these issues. The aim is to show the objectives that want to achieve. The scope that determines the project border or limitations is then defined. The significance of this analysis is seen at the end of this chapter in terms of project importance.

1.1 Project Background

Kayak manufacturers have changed their current recreational kayaks in recent years to satisfy people who are interested in fishing with their recreational kayaks. like in Figure 1.1.1. There is always a trade-off between efficiency and stability when making recreational kayaking. Recreational kayaks are often designed to provide maximum efficiency, for example speed and directional stability, for good stability or balance between the two. The type of movement carried out by the user is normally restricted to