

**DESIGN A NON-ELECTRICAL TABLE FAN**

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**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**DESIGN A NON-ELECTRICAL TABLE FAN**

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**A report submitted  
in fulfillment of the requirements for the degree of  
Bachelor of Mechanical Engineering**

**Faculty of Mechanical Engineering**

**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

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## DECLARATION

I declare that this report entitled “Design A Non-Electrical Table Fan” is the result of my own work except as cited in the references

Signature :.....

Name :.....

Date :.....

## APPROVAL

I hereby declare that I have read this project and in my opinion this report is sufficient in terms of scope and quality for award of the degree of Bachelor of Mechanical Engineering

Signature :.....  
Supervisor's Name :.....  
Date :.....

## **DEDICATION**

To my beloved father, Mohamad Norani bin Mansor  
and my mother, Normah binti Abu Bakar

## ABSTRACT

The title of this project is to design a non-electrical table fan. Through this research, the electricity consumption can be reduced. Thus, this product will be user-friendly. Indirectly, this is because it can be carried anywhere without the use of energy source to turn on the fan. Through this design, the consumption of energy sources can be reduced as well as high levels of Carbon Dioxide can also be controlled. After that, this report explain in detail about literature review that was studied by researcher in previous years. Apart from that this report comment on methods used in designing non-electrical table fan. The software used to design the product is CATIA P3 V5R20. On the other hand, 'Finite Element Analysis' (FEA) are used to analyse the critical part so that safety factor can be identified. In this report, product simulation was done by using DMU Kinematics. The purpose of this simulation is to give an overview operation to users before buying. In the end of study, the manufacture of non-electrical table fan will be considered in future.

## ABSTRAK

Tajuk projek ini adalah untuk mereka bentuk kipas meja bukan elektrik. Melalui penyelidikan ini, penggunaan elektrik boleh dikurangkan maka produk ini akan mesra pengguna. Secara tidak langsung, ini kerana ia dapat dipikul di mana saja tanpa penggunaan sumber tenaga memasang kipas. Melalui reka bentuk ini, penggunaan sumber-sumber tenaga boleh dikurangkan serta tahap Karbon Dioksida juga boleh dikawal. Selepas itu, laporan ini menerangkan tentang kajian ilmiah yang telah dikaji oleh pengkaji pada masa dahulu. Selain itu pula, di dalam laporan ini mengulas tentang kaedah-kaedah yang digunakan dalam mereka bentuk kipas meja bukan elektrik. Antaranya ialah dengan menggunakan CATIA P3 V5R20. Pada bahagian analisis pula, 'Finite Element Analysis' (FEA) digunakan pada bahagian kritikal untuk mengetahui faktor keselamatan telah dikenakan. Di dalam laporan ini, simulasi produk telah dilakukan dengan menggunakan 'DMU Kinematics'. Tujuan simulasi ini dijalankan agar dapat memberi gambaran kepada pengguna sebelum mereka membeli. Di akhir kajian ini, kipas meja bukan elektrik yang terbaik akan dipertimbangkan untuk dihasilkan pada masa akan datang.

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## LIST OF ABBREVIATIONS

PSM	Projek Sarjana Muda
CAD	Computer Aided Design
CATIA V5R20	CATIA Version 5 Revision 20
DC	Direct Current
USB	Universal Serial Bus
EMF	Electromagnetic Flux
LSF	Low-Speed Flywheels
HSF	High-Speed Flywheel
micro-HSF	Micro-High-Speed Flywheel
RPM	Revolution Per Minute
FEA	Finite Element Analysis
2D	Two Dimension
3D	Three Dimension
BOM	Bill Of Material
DMU	Digital Mock-Ups
UTeM	Universiti Teknikal Malaysia Melaka
PDS	Product Design Specification

**LIST OF SYMBOL**

$\omega$	Rotational speed of fan
$g$	The acceleration due to gravitational force
$l$	The length of the string
$r$	The radius at which string connect to the blade
$\theta$	The angle of the string with the vertical

## CHAPTER 1

### INTRODUCTION

#### 1.0 Introduction

The final year project as known as a Projek Sarjana Muda (PSM) is an individual project research related to mechanical engineering. The main purpose of this PSM is to apply the basic of science, mathematics and mechanical engineering. Additionally, this project provides exposure to product design and simulation to complement project objectives. This chapter explains the introduction of importance, objectives, scope, problem statement, and summary of project reports. All of these will be debated in the subtopic of this chapter.

The title of this project is to design a non-electrical table fan. Through this research, the electricity consumption can be reduced thus, this product will be user-friendly. Indirectly, this is because it can be carried anywhere without the use of energy source to turn on the fan. Through this design, the consumption of energy sources can be reduced as well as high levels of Carbon Dioxide can also be controlled.

#### 1.1 Project History

Malaysia located near the equator line, being hot and humid throughout the year. So in this condition, people usually feel uncomfortable in a hot environment. Hence, the use of table fan is recommended to become one of the cooling agent product. This is because fan used to create a flow of the air. One of the advantages using this table fan is, it can be carried anywhere but has a limitation on the usage of electrical power. Therefore, the fan industry needs a positive transformation that can facilitate user to use table fan in various places. Thus, the existing electrical mechanism in table fan motor needs to be modified so that it no longer use electricity. The mechanism that can be replaced with another mechanical mechanism. However to design a new mechanism needs more research in

order to have a good result. So, the focus study in this project is to design a non-electrical table fan mechanism to replace the electric motor in a table fan.

## **1.2 Problem Statement**

In a real world nowadays, most of the advanced technology industry requires a high electricity demand to run their production. It is good to produce goods, but the long-term impact of using high electricity can cause greenhouse effect leads to change of global climate. According to F. Anas Alam (2016), the haze that hit Malaysia in almost every year following El-Nino is the highlight of the global climate. Therefore in order to prevent this thing happen again, Malaysia is currently undertaking steps to reduce electrical energy consumption by replacing to renewable energy. The other way to use less energy is also by having a mechanical mechanism where it only has a mechanical part to move this product.

In addition, the problem of a traveler to use an electrical source during travel is limited. As Malaysia located near the equator line, being hot and humid throughout the year. The traveler who joint outdoor activities in Malaysia need to use portable table fan to comfort themselves. This is because portable table fan can be carried anywhere but there has limitation use on battery. The absence of electricity resource whenever going picnic or backpack in a long period becomes a problem to the users because of unable use table fan when sort of battery needed since it requires a power supply. Unfortunately, this table fan has a limitation on the usage of electrical power. This situation makes difficult to a user.

Therefore based on the problem above, one of the solutions had been made is to design a non-electrical table fan mechanism. This mechanism in table fan motor needs modified and replaced with other mechanical mechanisms so that it no longer use electricity.

## **1.3 Objectives**

The objectives of this project are to:

- 1) Design a non-electrical table fan mechanism
- 2) Produce product design capable of penetrating the current market.

## 1.4 Scope

The priority of this project is the design of a mechanism of production that does not require the power source to move the desk fan blade. This product design and analysis uses Computer Aided Design (CAD) software, CATIA V5R20. However, this study does not cover angina from outside sources.

- 1) Collect to all information related to the table fan.
- 2) Design mechanism that allows the fan blade to move without using electrical energy.
- 3) Design and analyze mechanisms using Computer Aided Design (CAD) software and analytics software.
- 4) Simulation movement of table fan mechanism.