



**UNIVERSITI TEKNOLOGI MARA
CAWANGAN PASIR GUDANG**

**DESIGN AND FABRICATION OF PORTABLE
HACKSAW MACHINE**

DANISH HAIKAL BIN MOHAMAD HAMZANI

2019272796

DIPLOMA

(Mechanical Engineering)

FEBRUARY 2022

ABSTRACT

Since the beginning of time, people have relied on cutting instruments in their daily lives and there have been numerous advancements in this cutting instrument up till now. Industrial workers frequently employ cutting tools to perform a variety of manual operations on a single piece of raw material. Similarly, students in the field of education use a variety of cutting tools when working in the workshop and there are also several of cutting machines. However, this machine is not generally available in the workshop because of its high costs and difficult to operate. To aid in the expansion of the number of cutting machines in educational institutions, the portable hacksaw machine is designed to be more portable and make cutting tasks easier by using a hacksaw as a cutting mechanism and utilizing less expensive materials to create this machine. As a result, this machine can be controlled easily and does not require much procedure while operating it. In conclusion, it is predicted that this project will meet all its objectives and provide valuable functionality.

ACKNOWLEDGEMENT

Firstly, I'd like to express my gratitude for being given the time and chance to embark on such an incredible journey to achieve my diploma while also completing this lengthy and difficult assignment. I'd like to express my gratitude to my supervisor, Miqdad Bin Khairulmaini, and my Co. Supervisor, Ts Zahari Bin Abu Bakar for their assistance with my project from the beginning of MEC299 to MEC300.

Secondly, I'd want to express my gratitude to my friends and classmates for their direct and indirect support, as well as for providing me with the opportunity to accomplish this Final Year Project (FYP). I owe them a respect and gratitude for their encouraging inspirations, supportive direction, and gracious oversight in bringing this project to a successful conclusion.

Finally, I'd want to dedicate this effort to my parents, because I would not be where I am now without their unwavering support and prayers. This achievement is dedicated to both my parents and my supervisor.

TABLE OF CONTENTS

	Page
CONFIRMATION BY SUPERVISOR	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	xi
CHAPTER ONE: INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Objectives	3
1.4 Scope of Work	3
1.5 Significant of study	4
CHAPTER TWO: LITERATURE REVIEW	5
2.1 Information on Existing Product, Patens, and standards	5
2.2 Component of Hacksaw Machine	6
2.2.1 Hacksaw	6
2.2.2 DC Motor	7
2.2.3 Pulley Wheel	8
2.2.4 Bench Vice	9
2.3 Jigsaw Cutting Machine	11
2.4 Chainsaw Machine	11
2.5 Product Design Specification Based on Literature Review	12

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Cutting has been utilized by people to maintain civilization throughout the years. Cutting using stone tools was employed by the homo habilis to cut foods and produce more advanced tools as far back as 2.6 million years ago [1]. Since then, cutting has been founded on the principle of separating items with highly directed force. To conduct this process efficiently, the cutting tool must be tougher and more resistant to deformation than the material itself [1]. During the cutting process, stress builds up at the tool-material contact point, causing the material to deform at some point. When a force is applied that exceeds a material's elastic limit, irreversible deformation occurs.

Hand tools are commonly used by industrial worker to execute a variety of manual tasks on a specific piece of raw material. The objective of hand tools is to increase the range, strength, and efficacy of hand movements so that the user can operate the tool with ease and comfort. An ergonomically designed hacksaw handle is presented based on an ergonomics review of existing non-powered hacksaws with original/horizontal and conventional/market handles. The hand sizes are divided into three groups: small, medium, and large, to accommodate the complete male and female populations [2].

Nowadays, there are multiple developments and technologies in the generation of engineering. However, there are concerns in some of workshop activities which is cutting process. One of the tools that we can use such as hacksaw is a fine-toothed saw that is commonly used to cut metal. Hacksaws can also be used to cut a variety of other materials, such as plastic (PVC pipes and pipe fixtures) and wooden items [2]. Almost all hacksaws are hand saws with a C-shaped frame that uses a retention screw to holds the blade. Part of hacksaws include a handle with pins for connecting a narrow disposable hacksaw blade, which is commonly made of a wooden grip. A saw's cutting edge is either a serrated blade or teeth. In addition, the frames can be adjusted to accommodate blades of various lengths [2].