

UNIVERSITI TEKNOLOGI MARA

**DESIGN AND FABRICATION OF AN
EFFICIENT TROLLEY WITH
PULLEY MECHANISM**

MUHAMAD HAZIQ BIN MOHD BAHARUDIN

Dissertation submitted in partial fulfillment
of the requirements for the degree of
Diploma
(Mechanical Engineering)

College of Engineering

FEB 2024

ABSTRACT

This project aims to address the limitations of traditional wheelbarrows by combining the functionality of a dump truck with the portability and ease of use of a wheelbarrow. The project proposes a pulling system mechanism that allows the user to pull the load behind them, utilizing gears and pulleys to transfer the pulling force to the wheels. Additionally, the vehicle will be equipped with a pulley system to facilitate easy unloading. The objective of this study is to develop a practical and innovative method for transporting light to medium amounts of loose material. By fusing the functions of a wheelbarrow and a dump truck, this project has potential applications in various industries. It aims to increase productivity, reduce physical strain on workers, and provide a cost-effective solution. The project will involve the design and analysis of the trolley using SolidWorks software, optimization for efficient unloading, and the use of steel bar and sheet metal for construction. The expected results include the creation of an efficient trolley that combines the benefits of a wheelbarrow and a dump truck, enhancing the ease and speed of transporting loads while remaining affordable and practical for a wide range of users.

ACKNOWLEDGEMENT

Firstly, I wish to thank God for giving me the opportunity to embark on my diploma and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor, Madam Syidatul Akma binti Sulaiman.

To the esteemed panel of evaluation, Sir Miqdad bin Khairulmaini and Sir TS Hazriel Faizal Pahraraji, I extend my deep gratitude for your time, expertise, and the valuable feedback that helped shape this dissertation. Your rigorous evaluation and constructive insights have contributed significantly to the quality of this work.

I also dedicate this achievement to my beloved parents. Their vision, sacrifices, and unending encouragement have been the driving force behind my educational journey. This victory is as much yours as it is mine.

Furthermore, I would like to express my thanks to my friends and all those who supported me throughout this journey together on helping me. Your belief in me and your encouragement were invaluable.

Finally, to everyone who played a role, whether big or small, in my diploma journey, I am sincerely grateful. Your support has made all the difference. This piece of victory is dedicated to all of you.

Thank You.

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-x
LIST OF ABBREVIATIONS	ii
CHAPTER ONE : INTRODUCTION	3-6
1.1 Background of Study	3
1.2 Problem Statement	4
1.3 Objectives	4
1.4 Scope of Study	5
1.5 Significance of Study	6
CHAPTER TWO : LITERATURE REVIEW	7-30
2.1 Benchmarking/Comparison with Available Products	7-16
2.2 Review of Related Manufacturing Process	17-18
2.3 Patent and Intellectual Properties	19-27
2.4 Summary of Literature	28-30
CHAPTER THREE : METHODOLOGY	31-66
3.1 Overall Process Flow	31-32
3.2 Detail Drawing	33-55
3.3 Engineering Calculation and Analysis	55-58
3.4 Bill of Materials and Costing	59-61
3.5 Fabrication Process	62-65

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Since ancient times, people have moved modest loads of materials with the use of the straightforward and practical wheelbarrow. But it is constrained by its moderate weight and restricted capabilities. Larger weight of material cannot be carried by the available wheelbarrow and unloading can be laborious and time-consuming.

The drawbacks of the traditional wheelbarrow are the amount of manual labour and physical effort needed to transport the weight from one location to another. For those who have physical restrictions, this can be challenging. It can also slow down the job process, which lowers productivity.

Dump trucks, which are larger vehicles capable of moving heavier loads of material more effectively, are the current solution to this issue. Dump trucks, however, are expensive, impractical for minor projects, and not portable or simple to manoeuvre in confined locations.

The solution proposed in this project is to combine the functionality of a dump truck with the portability and ease of use of a wheelbarrow. This would be achieved using a pulling system mechanism that would allow the user to pull the load behind them, using a system of gears and pulleys to transfer the pulling force to the wheels. The vehicle would also be equipped with a pulley system that would allow the bed to be raised and tilted for easy unloading.

The purpose of this study is to develop an original and useful method for moving light to medium amounts of loose material. This project aims to provide a novel solution with possible applications in a variety of industries, from building and landscaping to agriculture and trash management, by fusing the functions of a wheelbarrow and a dump truck. This initiative has the potential to increase productivity and lessen physical stress for workers across a variety of industries because to its emphasis on pragmatism, efficiency, and creativity.