HEAVY DUTY HAND TRUCK

NO.	NAME	MATRIX NO.
1.	ABDUL HADI BIN ROSLI	2018203394
2.	MUHAMMAD ASYRAF BIN ISHAK	2018270322
3.	MUHAMMAD AFIF SYAFIEQ BIN MUHAMAD YA RAFI	2018807238
4.	SHAMIEM FARHAN BIN MOHD SHUPIAN	2018662782
5.	AHMAD ASYRAF BIN AHMAD HAKHIM	2018295876

DIPLOMA MECHANICAL ENGINEERING

UNIVERISITI TEKNOLOGI MARA (UiTM)

2021

Dedicated to our lovely family

ACKNOWLEDGMENT

Firstly, we would like to thanks Almighty Allah (S.W.T), whom His willingly, provided us with good strength and health and guided us to successfully complete this final year project.

We are grateful and would like to express our sincere gratitude to our supervisor Mr Mohd Arzaimiruddin Bin Ariffin for his invaluable guidance, continuous encouragement and constant support in making this research possible. We really appreciate his guidance from the initial to the final level that enabled us to develop an understanding of this research thoroughly. Without his advice and assistance, it would be a lot tougher to completion. We also sincerely thank for the time spent proofreading and correcting our mistakes. We would like to express our gratitude and sincere thanks to our team group members who always provided support to complete this task and help each other.

We acknowledge our sincere indebtedness and gratitude to our parents for their love, dream and sacrifice throughout our life. We are really thankful for their sacrifice, patience, and understanding that were inevitable to make this work possible. Their sacrifice had inspired each of us from the day we learned how to read and write until what we have become now. We cannot find the appropriate words that could properly describe our appreciation for their devotion, support and faith in our ability to achieve our dreams.

Lastly we would like to thanks any person which contributes to our final year project directly or indirectly. We would like to acknowledge their comments and suggestions, which was crucial for the successful completion of this study.

ABSTRACT

The hand trolley is a very useful tool for moving loads from one position to another. However, its utility decreases when it needs to conquer such obstacles such as stairs or when it is used to transport small and circular shaped items, research is carried out in literature review to overcome these consequences based on types and mechanisms of stair climbing trolleys along with the optimum pulling force required to safely pull trolley, then three concepts of design were then generated on the basis of these results, from which Tri-Star wheel stair climbing trolley was selected as the most feasible concept. To stop small and circular form objects falling down during transportation due to their asymmetric shape, a bracket was added to the trolley. The design then runs through is CAE using Solidworks to produce simulations of trolleys when a load of 250 kg is added to it. Next, the hand trolley can also save space as it is designed to be folded on its body. with the advantage of being able to fold in the middle of the trolley body, this will also be used by users to lift the trolley and does not require a lot of manpower moreover it can also save time. The design was discussed and inferred on the basis of the results of the simulations. The design was discussed and inferred on the basis of the results of the simulations. In conclusion, hand trolley Tri-Star wheel stairclimbing will operate in satisfactory condition as it achieves the goals.

Table of Contents

PAGE TITTLE i

PROJECT APPROVAL ii

DECLARATION iii

ACKNOWLEDGMENT iv

ABSTRACT v

TABLE OF CONTENTS vi

LIST OF TABLES ix

LIST OF FIGURES x

CHAPTER 01 - INTRODUCTION 1

1.1 Overview Of Project 2

1.2 Objectives Of Project 3

1.3 Scope Of Project 4

1.4 Significance of Project 5

1.5 Project Planning 6

CHAPTER 02 – PROBLEM DEFINITION 9

2.1 Need Identification 10

2.2 Customer Requirement 11

2.3 Product Design Specification (PDS) 12

CHAPTER 03 – LITERATURE REVIEW 15

3.1 Type Of Hand Trolley……16

3.1.1 Dolly 16

3.1.2 Two Wheel Trolley..... 16

3.1.3 Multi Wheel Trolley 17

3.1.4 Special Trolley..... 17

3.2 Tri-Star Hand Truck Trolley 17

3.3 Patent, Code, Standard 20

CHAPTER 04 - CONCEPT DESIGN AND EVALUATION..... 21

4.1 Concept Generation……22

4.1.1 Morphological Chart.....22

4.2 Concept Design 24

4.2.1 Concept Design (Standard)..... 24

4.2.2 Concept 2..... 25

4.2.3 Concept 3..... 26

4.2.4 Concept 4..... 27

4.2.5 Concept 5..... 28

4.3 Concept Selection..... 29

4.4 Concept Evaluation 30

4.4.1 Pugh Chart..... 30

CHAPTER 05 – EMBODIMENT OF DESIGN……..32

5.1 Design Layout……..33