

UNIVERSITI TEKNOLOGI MARA

**DESIGN, ANALYSIS AND
FABRICATION OF STAIRCASE
CLIMBING TROLLEY**

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

College of Engineering

March 2022

ABSTRACT

Manual trolleys are commonly used in warehouses, building sites, malls and residential area. When this trolley is used on staircase, there will be some restrictions and limitations as it cannot travel and climb through stairs when carrying heavy loads. Therefore, people will carry the goods manually with hands which in a long period of time will give a serious health problem which are back pain and muscle injury. As a solution, this staircase climbing trolley project is being proposed to carry goods or loads up and down the staircase easily. This staircase climbing trolley aims to resist heavy weight or loads without having any problems and lift the heavy loads across a staircase with smooth and less effort as possible when there are no lifting facilities namely escalator and elevator. The SolidWorks software is used to make the design of the selected design concept to give more clearer vision about the dimension of the product. Moreover, some basic machining process will be used such as cutting, drilling and welding in order to fabricate the product. After all the fabrication process has been done, the result shows that the product could function really well and ready to be used to lift loads. In conclusion, this product could be beneficial to a lot of people as it can ease the burden of lifting loads on plane surface and across a staircase.

ACKNOWLEDGEMENT

First and foremost, all praises to Allah, the Almighty, for His showers of blessings throughout my final year project, I managed to complete the project successfully. Alhamdulillah!

I would like to express my deepest and sincere gratitude to my lovely supervisor and co-supervisor, Madam Nurrul Amilin and Madam Nadzrah for giving me the chance to choose my own title for my final year project. Their sincerity and patience of giving me guidance throughout the project have deeply inspired me. Without any of the guidance, I may not be able to complete my final year project.

I could not express enough thanks to my seniors and friends for their continue support and encouragement. They have been helping me since the first day I started my final year project by giving advices and teaching some of the things that I do not know during the journey of my final year project. My completion of this final year project could not have been accomplished without their support. I offer my sincere appreciation for the learning experience provided by my seniors and friends.

Finally, to my caring, loving and supportive parents, I would like to thank them for giving birth to me and always been supporting me spiritually through my ups and downs until today. I would never return the same favour as they did, but I will give all my best to success in life and make them proud. Insha Allah.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

There must be a situation in life where heavy loads such as a pile of books, boxes of A4 paper, and heavy travel suitcase will need to be transported from one place to another. These items can usually be handled by hand in most of the situations. But in long a long-term period of time, people can get back injuries as well as other health problems that is cause by lifting heavy objects.

Therefore, a normal hand trolley is one of the ways to carry and move heavy objects from one place to another without getting any harm if it is used correctly. It is actually a common device used by many industries in transferring heavy physical objects easily. A normal hand trolley consists of two wheels which located below a load-bearing platform as well as two handles on the support frame. Handles are used to pull, push and also manoeuvre the trolley. The handle of the device can be in a curved shape from the back. This normal hand trolley is usually stays upright making an L-shape and the loads will be placed on the top of the platform of the device. Hence, when the loads are in place, the trolley will be tilted backward in order to make the loads in a balance condition between the platform and the supporting frame of the device when manoeuvring [1].

Unfortunately, this normal trolley has its own limitation when it comes to stairs as they can only move on flat surfaces. To bring the loads across the stairs might be a hassle job especially when there are no modern facilities namely elevator, conveyor and escalator. Most of the buildings are quite congested and do not have any escalator and elevator to prevent from using more space [2]. Therefore, this proposed staircase climbing trolley is designed to resist heavy weights or loads without any problem. This Tri-wheel trolley which uses a set of three wheels on each end is designed to carry loads up and down a staircase as well as on flat surfaces easily when there are no lifting facilities such as elevator or escalator. The functionality of this trolley really can be an important role to many industries such as warehouses, malls, and construction sites as this trolley could save and lessen the burden of bringing loads across a staircase.