



KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA

MULTIPURPOSE LADDER

Thesis submitted in accordance with the requirements of the Kolej Universiti
Teknikal Kebangsaan Malaysia for the Degree of Bachelor of Engineering
(Honours) Manufacturing (Process)

By

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December 2005



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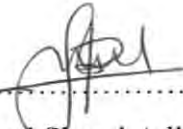
APPROVAL

This thesis submitted to the senate of KUTKM and has been accepted as fulfillment of the requirement for the degree of Bachelor of Engineering (Honours) Manufacturing (Process). The members of the supervisory committee are as follows:

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DECLARATION

I hereby, declare this thesis entitled “Multipurpose Ladder” is the results of my own research except as cited in the reference.

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ABSTRACT

Design is about developing and producing systems and products that suit the job they are intended for. Design can be seen as a series of steps from initially thinking of an idea for a product to eventually having a marketable product that will be cost effective to produce. A common assumption in design is that a system or product suitable for use by an average user is good design. In this study, the report is for providing a new product design for multipurpose ladder that follows the correct designing stages. The multipurpose ladder design must base on the principle that products should be usable by as wide a range of the population as possible. The design must meet the user's requirement because all the feedback is from them. The specification will be generate from the identified problem and furthermore will produce the conceptual design according to the specification. The final design has been draw into a detail drawing using the Solidwork software. After that, the suitable material been selected to suit to the multipurpose ladder requirement. Both the manufacturing process for the commercial and part of the ladder prototype fabrication will be propose and finally the costing of the fabricated part been prepared.

ABSTRAK

Merekabentuk adalah berkaitan dengan pembangunan dan penghasilan sesebuah system yang berkaitan. Rekabentuk juga merupakan satu cara untuk menghasilkan sesuatu produk yang berguna untuk dipasarkan. Sesebuah rekabentuk yang baik dan menarik adalah rekabentuk yang memenuhi spesifikasi pelbagai lapisan pengguna. Projek ini adalah sebuah projek untuk menghasilkan sebuah rekabentuk baru bagi tangga pelbagai guna mengikut kaedah-kaedah rekabentuk yang betul. Rekabentuk tangga pelbagai guna perlulah memenuhi permintaan pengguna. Rekabentuk juga harus mengikut tindak balas daripada pengguna untuk mengenalpasti masalah yang dihadapi oleh mereka. Daripada tindakbalas berkenaan, rekabentuk spesifikasi bagi tangga berkenaan akan diperolehi dan daripada spesifikasi itu rekabentuk dapat dijanakan.. Daripada rekabentuk akhir, sebuah lukisan lengkap dihasilkan.menggunakan perisian *Solidwork*. Seterusnya, pemilihan bahan yang bersesuaian dengan tangga pelbagaiguna akan dipilih. Kedua-dua proses pembuatan bagi kegunaan pengguna dan proses pembuatan bagi bahagian tangga yang telah dihasilkan untuk model akan disyorkan dan akhir sekali kos pembuatan bagi model bahagian tangga akan disediakan.

DEDICATION

Firstly thank to Allah S.W.T for the opportunity to finish this project. I owe this project and my true happiness I feel today to my beloved mother and family. Since the day I started going to this university until today, they are very caring and supporting for me.

ACKNOWLEDGEMENT

Many people greatly assisted me in completing my Final Year Project (PSM). I would like to express my sincere thanks to my supervisor Mr. Zolkarnain Marjom for his support and precious advice. During this research, Mr. Zolkarnain Marjom provides me with many valuable guidance and suggestion as well as spiritual support.

Special thanks are also given to my friends Siti Hajar Bt. Muhammad Shahlan, Helmy Rizal, Amir Syarifudin, Muazam Shah, Mohd Shariman, Jaafar Sidek Mohd Ani, Mohd Salleh Mat Yusop and Zulkiflie for their supporting when I faced a problem during completing my thesis.

Last but not least, I would like to express my appreciation to my family in Kuala Lumpur. This project cannot be success without their constant encouragement and support.

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LIST OF ABBREVIATIONS, SYMBOLS, SPECIALIZED NOMENCLATURE

ANSI	- American National Standard Institute
MM	- Millimeter
RM	- Malaysian Ringgit
T5	- Artificially aged only
T6	- Solution heat treated and artificially aged
T9	- Solution heat treated, artificially aged and cold worked.

LIST OF APPENDICES

APPENDICES

TITLE

A	GANTT CHART
B	QUESTIONNAIRE
C	WORKSYOP PERMISSION FORM
D	DETAIL DRAWING
E	MULTIPURPOSE LADDER FUNCTION FIGURES

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Ladder is a tool that helps people to make their work to be easier when dealing with height. However multipurpose ladder can make thing easier because it have more function compare to the normal ladder.

In this paper work, it is a study in how to design a better multipurpose ladder compare to the existing ladder in the market. The design process had to meet the right specification in designing stages. After proposing the design, a prototype of the multipurpose ladder must be produce.

1.2 OBJECTIVE

The objectives of the project combining with both of the semester are:

- i. Designing the design step for multipurpose ladder
- ii. Study the design methodology and implement it to design a new multipurpose ladder.
- iii. Study the existing multipurpose ladder that is in the market.
- iv. Design a better multipurpose ladder according the design methodology.
- v. Do modification on the existing multipurpose ladder to produce a better multipurpose ladder.
- vi. Fabricate a prototype part of the design result.
- vii. Propose a current technology of manufacturing in producing the final design.

1.3 SCOPE

The scope is to study the capabilities of the existing product, product history and literature survey, market survey, material selection, design comparison and proposed a futuristic or a comeback design of a multipurpose ladder. After that, the fabrication of the prototype according to the detail design will be produce.

1.4 STEP OF PROJECT

Step of project had been built in order to give more general information about the project flow. This project starts from literature review to get more information about the existing multipurpose ladder. After defining the design methodology, the problem of the existing product has to be identified. Two different approaches had been used that are public users questionnaire and analysis of the existing product. All the feedback will be gather in the Product Specification Design (PDS). The conceptual design will be produce according to the Product Specification Design (PDS) and the problem identification. The concept design will be compared between each other to expand the design idea and finally will be evaluated to get the final design.

1.4.1 STEP OF PROJECT DIAGRAM

The step of project diagram is a diagram that shows the flow of the project. This project starts with the study about the literature review. The literature review is a study about the existing multipurpose ladder that is in market. After that, the methodology will be used and the problem will be identified using two different approaches that are public users questionnaire and analysis of the existing product. A Product Specification Design (PDS) will be done to generate the conceptual design. An expending idea will be form and lastly a final idea will be come out. Below are the project methodology diagram:-

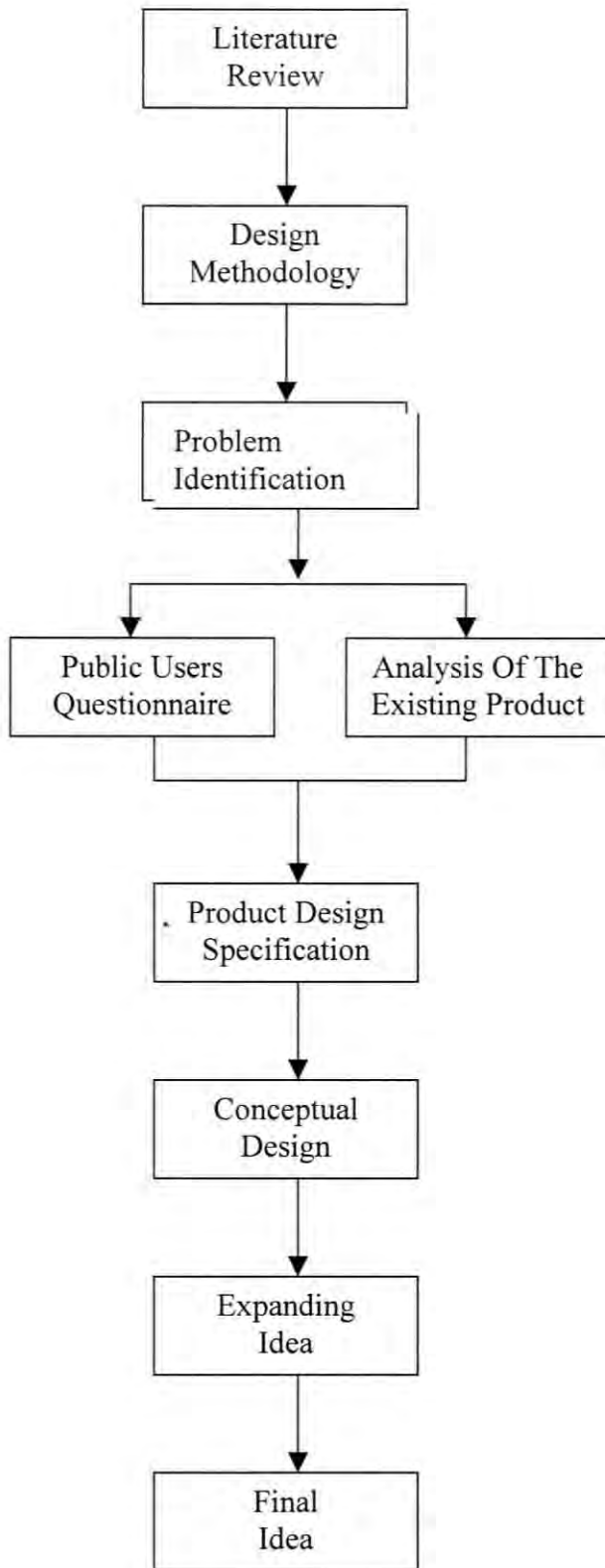


Figure 1.1: Step of Project Diagram