DEVELOPING THE MATERIAL IN INDUSTRY USING 3D MODELING

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A report submitted in partial fulfillment of the requirement for t' neaward of the degree of Bachelor of Mechanical Engineerin
(Design and Innovation)

Faculty of Mechanical Engineering
Universiti Teknikal Malaysia Melaka

April 2007

I hereby declare that I have read this thesis and in my opinion this report is sufficient in terms of scope and quality for the award of the Bachelor of Mechanical Engineering (Design-Innovation)

Signature : Shamsul Anuar

Name of supervisor : **Mr. Shamsul Anuar**

Date : 10/5/2007.

I declare that this report entitled "DEVELOPING THE MATERIAL IN INDUSTRY USING 3D MODELING" is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : .....

Author : **Siti Farha Abdul Manan**

Date : **9th May 2007**

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Alhamdulillah with His Mercy and Blessings, this project was finally successful. I would like to express my deepest gratitude and appreciation to my supervisor, Mr. Shamsul Anuar bin Shamsudin Faculty of Mechanical Engineering, University Technical Malaysia Melaka (UTeM), for his tremendous help, advice, inspiration and unending guidance to me until completing this thesis.

Besides that, I would like to express my sincere thanks to Mr. Nazim, Mr. Ruzy and Mr. Ir Talib that mostly help and guide as a panel presentation. Then, I like to wish express our most gratitude to all technicians for daily guidance, supervising lab and giving a variety of practical training to enhance my theoretical learning.

Lastly, I would like to express my appreciation to my parents En. Salleh bin Mat Tan, En. Abdul Manan bin Abu Bakar, Pn. Sabidah Md. Yusop, Pn. Saleha Md Yusop, all my friends and all those who had given support and help in any way whether directly or indirectly manner.

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ABSTRACT

Developing the Material Handling in Industry by using 3D Modeling is mean to create one new system that can simplify the current system. Here the system is according to design process. Therefore, by developing this project, designer did not have to design every single new product whenever the customer request of their own requirement. There are a lot of advantages in the field such as the cost and time can be reducing on product designing. It also can easily meet the customer specification. In this project, the scope is to appear the desire product when the users key-in-all parameters of material handling. The product will be shown in 3D Modeling. So, the program that can be easily link to CATIA software must be develop. This is one important thing that is highlight in this thesis. The method use also been identified directly from one of CATIA V5 knowledge which is knowledgeware. The additional applications that have use are Macro and Visual basic Interference. These three applications work each other with function and finally make a simple implementation of 3D modeling simulation.

ABSTRAK

Pembangunan Sistem Penghantaran Bahan Dalam Industri dengan menggunakan aplikasi permodelan 3 dimensi bermaksud merekabentuk satu sistem yang baru yang mana ia boleh digunakan untuk mempermudahkan system yang sedia ada. System ini berkait rapat dengan proses merekabentuk mesindalam industri. Oleh yang demikian, pembangunan system yang baru ini, memberi banyak manfaat kepada seseorang pereka dimana mereka tidak lagi perlu melukis setiap komponen satu demi satu. Kelebihan lainnya ialah, ciri-ciri ini dapat disesuaikan dengan spesifikasi pelnggan selain dari menjimatkan wang dan masa. Skop projek ini mengkehendaki pembagun untuk membuat satu system dimana pengguna hanya perlu memasukkan data atau parameter komponen lalu penghasilan dalam bentuk 3 dimensi boleh dicapai. Kaedah yang digunapakai dalam kajian ilmiah ini akhirnya dapat dikenalpasti iaitu dengan menggunakan aplikasi 'knowledgeware' iaitu salah satu aplikasi pintar yang ada dalam perisian CATIA V5. Aplikasi tambahan yang turut terlibat ialah aplkasi macro dan visual basiv. Ketiga-tiga fungsi aplikasi ini akan bergabung untuk membina satu kaedah simulasi baru yang ringkas.

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

PROJECT INTRODUCTION

1.0 INTRODUCTION

Projek Sarjana Muda (PSM) is one of knowledge research that related to student's discipline. This particular final year project is vital and compulsory as to meet the Bachelor Degree's requirements. The task has to be accomplished completely and the objectives of this final year project must be successfully achieved. The main objectives are to train the student to be more skilful, competent and independent. The project has been divided into three categories, design project, technical/concept analysis and case study.

1. Design project should be base on certain design and finally could end with product or design.
2. Technical and concept analysis that relates to student's discipline their selves.
3. The case study project is more on study research on certain case or topic.

By the end of this project, student should come with solution of the problem.
This final year project title is "Developing the Material Handling in Industry using 3D Modeling". So, by the end of this project, the project should have come out with a design of a complete program simulation of material handling component which is work to assemble together in 3D modeling to be one material handling equipment as meet customer requirement.

1.1 OBJECTIVES

The objectives of this research are:

- To study the characteristics of the material handling equipment and component
- To do a briefly research of material handling systems and the process in industry.
- Know the main concept of material handling and its usage.
- To be common with the programming using 3D modeling software.
- To know the theory of the programming either using visual basic application (vba), or macros.
- To design one simple program using the application that being chosen
- To test, troubleshoot and improve the final program.

1.2 SCOPE OF PROJECT

Scope of research is an important stage as an elements to researcher know what actually needs in their project. In this case, material handling scope can be divide into five, which are material handling definition and concept, material handling principles, the equipment of material handling, the basic programming application and theory, the programming code and testing.

1.3 FLOW CHART OF PSM I

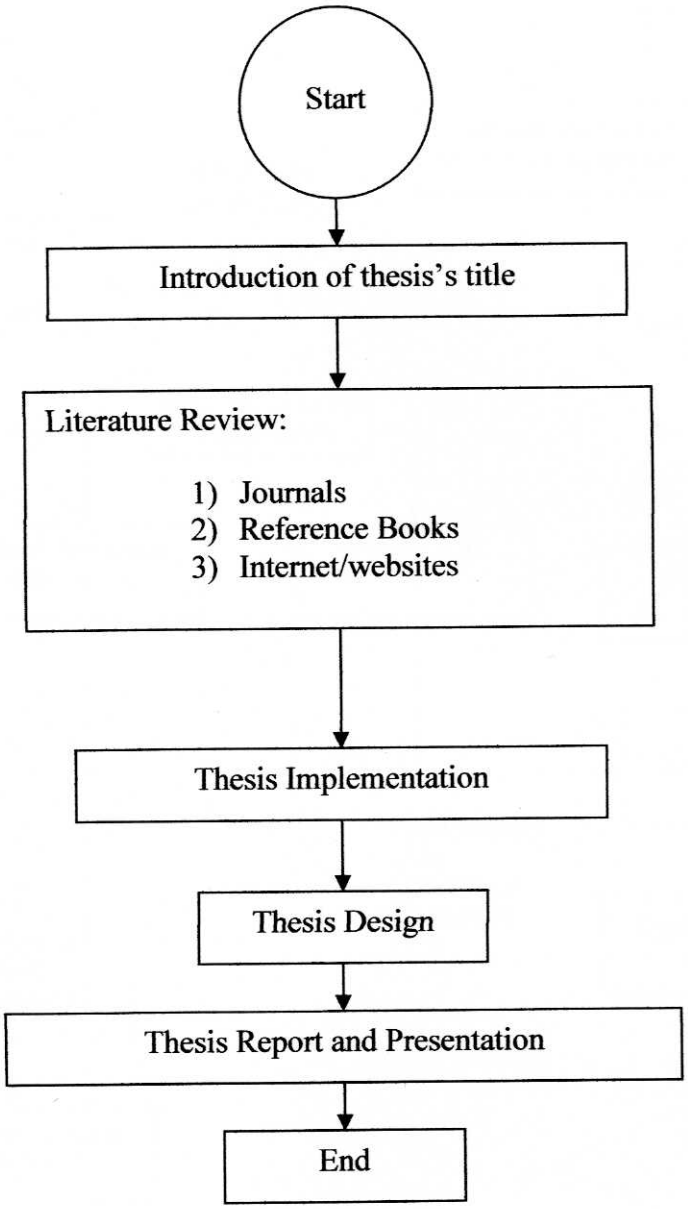

FIGURE 1: FLOW CHART PSM I

DETAIL FLOWCHART FOR PSM I & II

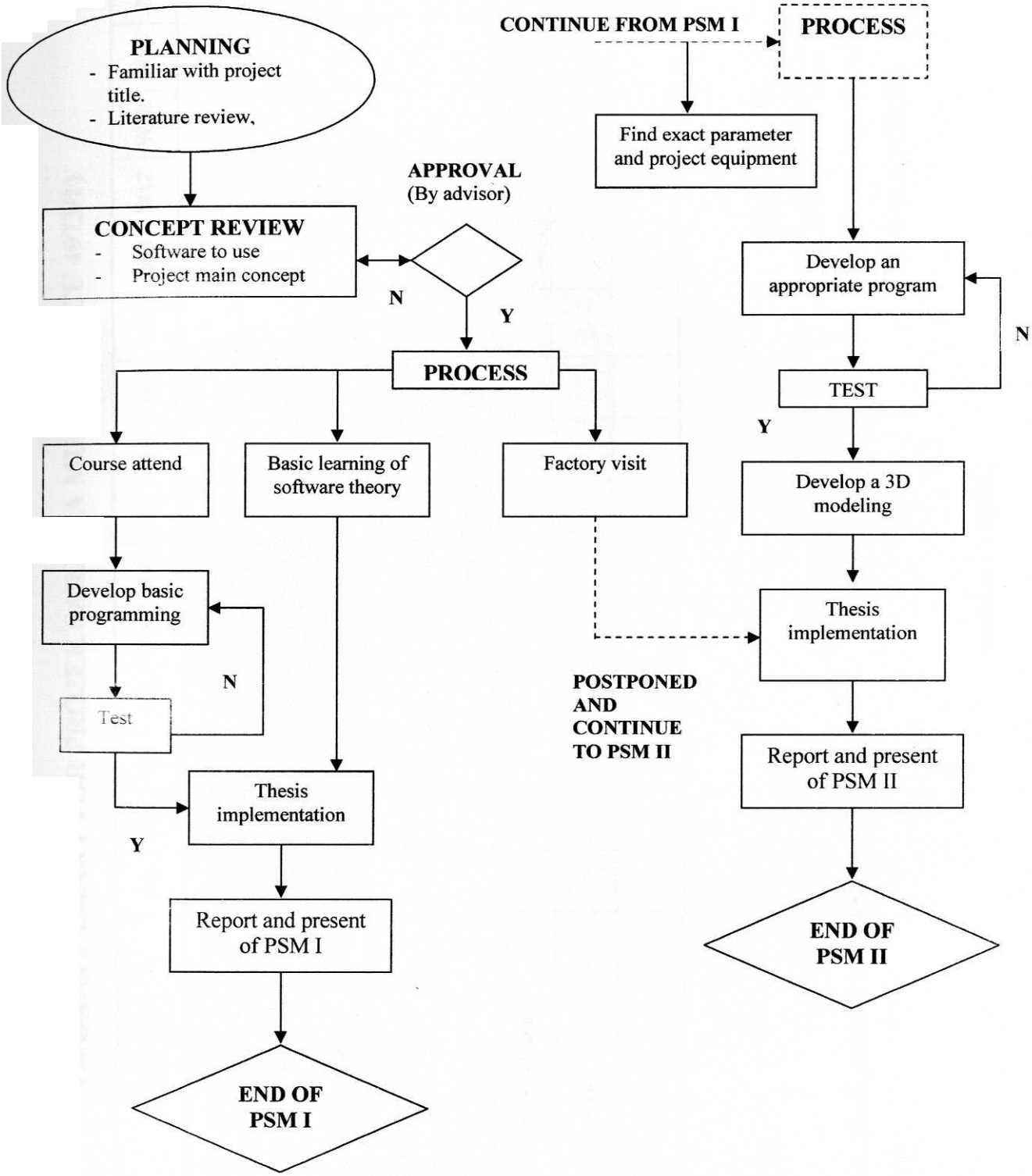

FIGURE 2: FLOW CHART PSM I & PSM II

1.4 GANTT CHART FOR PROJEK SARJANA MUDA I (BMCU 4973/1)

BIL	ACTIVITY	WI	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15
1	Literature review															
2	Research and methodology															
3	Theoretical framework															
4	Developing the concept															
5	Factory visit						POSTPONED TO PSM II									
6	Developing the simulation															
7	Complete report															
8	Presentation															

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TABLE 1 : PSM I

1.5 GANTT CHART FOR PROJEK SARJANA MUDA II (BMCU 4973/2)

BIL	ACTIVITY	WI	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15
1	Research															
2	Factory visit															
3	Drawing of part															
4	Developing the concept															
5	Developing the simulation															
6	Test															
7	Complete report															
8	Presentation															

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TABLE 2 : PSM II

RUMUSAN

BAB 1

Bab 1 menerangkan tentang tujuan utama Projek Sarjana Muda di jalankan. Bagaimana ianya secara ringkas melatih kemampuan pelajar untuk menjalankan projek dengan usaha sendiri. Di sini pelajar akan dapat memanfaatkan ilmu-ilmu berkaitan kejuruteraan yang pernah dipelajari sebelum ini sepanjang empat tahun mendalami ilmu kejuruteraan.

Secara amnya, objektif Projek Sarjana Muda ini mengkehendaki pelajar untuk menjalankan kajian ilmiah, menjalankan analsis, membangunkan produk seterusnya mengenalpasti keputusan yang diperolehi.

Projek Sarjana Muda yang dipilih ini bertajuk Pembangunan Sistem Penghantaran Bahan Dalam Industri Dengan Menggunakan Permodelan 3 Dimensi. Pada akhir kajian pelajar seharusnya boleh mengeluarkan keputusan dimana system yang di kaji boleh mengeluarkan 'output' atau hasil dalam permodelan 3 dimensi.

Bab ini juga menunjukkan dengan teliti gambarajah proses atau carta alir proses sehingga tamat kajian. Jadual perancangan juga turut disertakan dengan terperinci. Keseluruhannya pelajar dapat mengagihkan masa dengan lebih baik untuk menjalankan kajian ini.

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

Material handling affects the productivity and profitability of a company more than almost any other major corporate decision. It is simply define as a moving material from one place to another. Improvements in material handling have positively affected workers more than any other area of work design and ergonomics. In this chapter we will learn briefly about material handling definition, their systems, equipments and program simulation to be use.

The idea to develop the material handling in using 3D modeling came when there was no one of material handling company using this method. The system that they are use is only in 2 dimensions. But this project is to design the fastest way to find an appropriate material handling machine or equipment as request by customer. The target is, by key in all the parameters in the program, the machine finally display in 3D modeling that is complete with all material handling specification such as motor location, suitable weight of load and many else. But that is the target will try to achieve in the end of the project. During this session, (Projek Sarjana Muda, PSM I), the task is to get familiar with the program that will use to develop the simulation. The software that chooses is CATIA V5, visual basic application (vba) and macro script.

So, in this thesis it will show many details on theory of programming using CATIA V5 software.

2.1 MATERIAL HANDLING REVIEW

2.1.1 Definition

Material handling is the function of moving the right material to the right place, at the right time, in the right amount, in sequence, and in the right position or condition to minimize the production cost. The principles of material handling and control systems must be understood. Material control systems are an integral part of modern material handling systems. Part numbering systems, location systems, inventory control systems and other systems required to keep the industrial moving

Material handling can be broadly defined as all movement of materials in a manufacturing environment. The American Society of Mechanical Engineers (ASME) defines material handling as the art and science involving the moving, packaging, and storing substance in any form. Material handling may be thought as five distinct dimensions: movement, quantity, time, space and control.

Movement involves the actual transportation or transfer of material from one point to the next. Efficiency of the move as well as the safety factor in this dimensions are of prime concerns. The quantity per moves dictates the type and nature of the material handling equipment and also the cost per unit for the conveyance of the good. The time dimension determines how quickly the material can move through the facility. The amount of the work in process, excessive inventories, repeated handling of material, and order delivery lead times are affected by this aspect of the material handling systems. The space aspect of the material handling is concerned with the required space for the storage of the material handling equipment and its movement, as well as the queuing or staging space for the material itself. The tracking of the material, positive identification, and inventory management are some aspects of the control dimension. Material handling is also integral part of plant layout. They cannot be separated. A change in material handling systems will change the plant layout.

Material can be move manually or automatic method, can be moved one at a time or by the thousand, can be place in fixed or at the random location. The variations are limitless and only by cost comparison of the many alternatives will the correct answer emerge.

The proper material handling equipment choice is the answer to the entire question in this section. A material handling equipment has reduced the drudgery of work. It has reduced the cost of the production and has improved the quality of work life for nearly every person in industry today.

But the handling of the material is attributed to more than one half of all industrial accident. Material handling equipment can eliminate manual lifting. But, like all equipment it also can causes an injury, so the factor of safety cannot being ignore.

2.1.2 Goals of material handling

The primary goal of material handling is being used is because to reduce the cost of production. All other goals are subordinate to this goal. But the following sub goals are also important.

a) maintain or improve product quality, reduce damage, and provide for protection of materials
b) promote safety and improve working condition
c) promote productivity through the following:
    - material should flow in a straight line
    - the distance of moving must be shorten
    - use gravity if the are any opportunity to use it
    - move more material at one time
    - mechanize material handling
    - automate material handling
    - maintain or improve material handling
    - Increase throughout by using automatic material handling equipment.