



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**A STUDY ON BASIN FRAME PRODUCTION: A PROJECT  
MANAGEMENT APPROACH**

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Engineering (Manufacturing Management) with Honours.

by

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**FACULTY OF MANUFACTURING ENGINEERING**

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# UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## BORANG PENGESAHAN STATUS LAPORAN SARJANA MUDA

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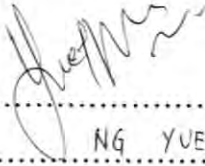
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I hereby, declared this report entitled “A Study on Basin Frame Production: A Project Management Approach” is the results of my own research except as cited in references.

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## APPROVAL

This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Manufacturing Management) with Honours. The member of the supervisory committee is as follow:



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## **ABSTRACT**

This report is part of PSM (Projek Sarjana Muda). This project is about basin frame of portable toilet produced by Uleetech Engineering Sdn. Bhd. Analysis is done in two areas that are the process flow and the scheduling of the project to identify the weaknesses of current plan. Then, weaknesses are improved, process flow is analyzed and process is scheduled to effective time horizon. The schedule is realistic with consideration of the capacity currently available in the company. Project schedule is compared to show the improvement in the schedule after applying project management technique. It is measured by using the percentage reduction in total project duration. Besides, plant layout analysis and rearrangement with respect to this project is conducted as a recommendation that is worth to put effort on. The steps are demonstrated in result & discussion chapter and improvement achieved is measured in terms of percentage reduction in total distance travelled.

## ABSTRAK

Laporan ini adalah sebahagian daripada PSM (Projek Sarjana Muda). Projek ini mengkaji tentang pembuatan rangka besin untuk tandas mudah alih yang dijalankan oleh Uleetech Engineering Sdn. Bhd. Analisis dilaksanakan untuk dua bahagian iaitu aliran proses dan proses ini juga dijadualkan demi mengkaji kekurangan pada rancangan sekarang. Kemudian, kelemahan yang diketahui akan diperbaiki, aliran proses dikaji dan proses ini juga dijadualkan supaya efektif dari segi masa. Aliran proses baru adalah realistik dengan pertimbangan bagi keupayaan yang didapati di syarikat kini. Jadual projek baru menunjukkan pembaikan yang dicapai selepas menggunakan teknik pengurusan projek. Pembaikan diukur dengan menggunakan kadar penurunan dalam jumlah masa untuk menyiapkan projek. Selain itu, analisis dan penyusunan semula pelan tapak pembuatan dengan menggunakan produk yang sama juga dilaksanakan sebagai satu cadangan kerja yang berbaloi untuk dikaji. Langkah-langkah untuk menjalani analisis tapak pembuatan ditunjukkan pada topik keputusan & perbincangan dan pembaikan yang dicapai adalah diukur berdasarkan kadar penurunan pada jumlah jarak yang dilalui.



## **DEDICATION**

*To my beloved family members and friends, for all your love and support.*

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I am very grateful that I have successfully completed this report to fulfill the requirement for a degree student to qualify for graduation. Taking this opportunity, I would like to thank everyone who has been kindly offered their help in assisting and guiding me through out the whole period of time when this project is conducted.

Very first of all, I would like to express my deepest appreciation to Uleetech Engineering Sdn. Bhd. for providing me an opportunity to conduct the case study in their manufacturing site. Sincerely, I would like to express my thanks to Mr. Raymond Ng and Mr. Elwin Lee. As engineers of Uleetech Engineering, both of them have always be there to update me with all information I needed for this case study and many extra knowledge on the industry.

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## LIST OF ABBREVIATIONS AND SYMBOLS

ANSI	-	American National Standards Institute
AOA	-	Activity-on-arrow
AON	-	Activity-on-node
BMW	-	Bavarian Motor Works
BOM	-	Bill of Materials
CAD	-	Computer Aided Design
CCPM	-	Critical Chain Project Management
CONWIP	-	Constant Work in Process
CPM	-	Critical Path Method
DUR	-	Duration
EF	-	Early Finish
ES	-	Early Start
ID	-	Identity
IEEE	-	Institute of Electrical and Electronics Engineers
JIT	-	Just In Time
KPI	-	Key Performance Indicators
LF	-	Late Finish
LS	-	Late Start
mm	-	Milimeter
NASA	-	National Aeronautics and Space Administration
No.	-	Number
OOSP	-	Object-Oriented Software Process
PERT	-	Program Evaluation & Review Technique
PLC	-	Programmable Logic Controller
PMBOK	-	Project Management Body of Knowledge
PMI	-	Project Management Institute
PMO	-	Project Management Office
pg.	-	Page
pp.	-	Pages
RES	-	Resource
Sdn. Bhd.	-	Sendirian Berhad (Private Limited)

SL	-	Slack Time
Std	-	Standard
TQM	-	Total Quality Management
U.S.	-	United State
UTeM	-	Universiti Teknikal Malaysia Melaka
Vol.	-	Volume
WBS	-	Work Breakdown Structure
WIP	-	Work In Process
$t_e$	-	Expected duration of activity
$t_o$	-	Shortest time of activity
$t_m$	-	Most likely length of time of activity
$t_p$	-	Longest time of activity
$\sigma^2$	-	Variance
$\sigma$	-	Standard deviation
$\sum_{i=1}^n$	-	Summation of 1 <sup>st</sup> element to n element
z	-	Sample data's distance from population mean

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

Ancient wonders of world, great temple of Incas, pyramid, and Great Wall of China are all projects managed by skilled and competent project managers. They plan, organize, schedule, and control the projects. Originate in construction, defense, and aerospace, project management is one of the fastest growing professions. Project management focuses on an undertaking that has a finite life span, differs from functional management that the department exists indefinitely. It also needs resources on a temporary basis while permanent organization utilizes resources full-time.

The development of project management practices can be traced from the year of 1950s. During this period, US Navy employed modern project management methodologies in Polaris project. In 1960s and 1970s, Department of Defense, NASA, and large engineering and construction company used project management principles and tools to manage large-budget, schedule-driven project. Later in 1980s, manufacturing and software development sectors started to adopt and implement sophisticated project management practices. By the 1990s, project management theories, tools, and techniques are widely expanded and received by different industries and organizations.

Historical accounts abound on how industrial revolution had a profound effect on world development. Sustainable industrial development can positively impact the political, economic, cultural, and social balance in a community. Project management is now practiced across a broad and comprehensive range of industries

and professions. It brings together and optimized resources (skill, talent, cooperative effort, facilities, tools, equipments, information, system, techniques, and money) to successfully complete the project. In spite of project management's long standing benefits, only in the past few years project management has emerged as the formal discipline and is now globally recognized.

Today's fast-changing and highly competitive global market, every industry and enterprise is constantly striving to get ahead of others. Integrating project management into organization culture offers one avenue to achieve that goal. The evident that proved the project management fast development is the rapid growth in project management professional membership around the world. Many companies or corporations have joined all sorts of project management organizations to benefit most from the progress of project management philosophy. There is no single country that can claim not to be touched daily by the impact of project management processes.

One of the most significant developments in recent years has been the formalization of the implementation of the project management office (PMO) and its increased importance to the organization. Because of the beneficial effect of implementing a PMO, increasingly more organization opts to establish a PMO to support and manage the project management effort. PMO is now becoming an essential component for the future success of the organization. In the rush to implement project management, some organizations are now implementing large-scale training programs, hiring project management consultants, and setting up project offices which are the heart of project management community.



## 1.2 Company Background

Uleetech Engineering Sdn. Bhd. registered and started its business on 4<sup>th</sup> December, 1995. Its nature of business includes engineering works, material handling system, contract manufacturing, steel structure works, machine design and fabrication, hydraulic control system, pneumatic control system, automation and programmable logic controller (PLC) control, and engineering parts supply.

Uleetech Engineering has its factory located at Rawang, Selangor while its office at Ampang, Selangor. As an one-stop automated materials handling system solutions provider and engineering works, they experienced in consultancy, design, manufacture, installation, commission, and maintenance of integrated solutions for automated materials handling systems and bulk materials handling solution stretching back more than 12 years.

Uleetech Engineering produces variety of products range from unit materials handling systems, bulk materials handling solutions, logistic, sortation, and warehousing systems and also specialist in contract equipment manufacturing. They have a comprehensive range of products from standard design to custom design materials handling system and also total control system, tailored to different budget and specific requirements of their clients.

While fully equipped the factory site for various kinds of works, Uleetech Engineering believed that the provision of automation system to their clients is the beginning of their working relationship. It is the after-sales service, training and maintenance that will be needed most when production gets underway. They have formed a comprehensive after-sales service programs and networks to provide various supports to all the clients. These supports include training to end users, repair and maintenance services in factory or at client's premises, routine checking on machinery, equipment upgrading, provide consultancy, and other related services to ensure that their clients enjoy maximum benefits and satisfaction.

### 1.3 Problem Statement

Uleetech Engineering Sdn. Bhd. is a company operated based on short term demands by customer who sent their orders not in a regular basis or when needed. Since there are one time jobs and having a starting time and ending time, these jobs are characterized as projects. Continuously, the company received projects of various types and of different specifications. Each project has its unique requirements and thus calls for distinct configuration through out the process of accomplishment.

The company utilized the same plant layout for all projects. Management team set up projects' deadline according to experiences and imagination without a detail schedule for each process. Processes are started on batch basis, estimated to be 50 units per batch. While attempting to survive in the industry that has more and more competitors; increasing cost of business due to high priced raw material and labour cost forced Uleetech Engineering Sdn. Bhd. to change its way of work.

Since it is a project based company, project management is thus chosen to be the most appropriate practice to be implemented in the company working environment. The basin frame project is the focus of study. Current approach used in the company needs to be changed. Project management could help the company to establish a detail schedule for the project so that the company could keep all the processes on track to assure on time delivery to customer. Besides, project management implementation could help relocate resources of the company for maximum gain from them.



## 1.4 Objectives

Upon accomplishment of this project, the following outcomes are expected to be achieved.

1. To identify weaknesses of current practices of Uleetech Engineering Sdn. Bhd. in carrying out their projects or orders.
2. To analyze the project by using process operation map.
3. To propose project management approach in improving performance of the company.

## 1.5 Scope

Since the company produces many kinds of product ordered by customer, this report would only select one of the project which has a potential influence to the company performance. The scope of this project can be described as follow:

▪ **Analyzing processes of a project and generating the best possible sequence of process.**

The study would discuss the process of the order into process operation map. The draft of current planned process is analyzed and a systematic process flow is reorganized. Thus, improvements may be made on either the sequence of process to suit current needs.

▪ **Developing an effective schedule for the project that delivered time-saving accomplishment.**

A smooth sequence of process does not guarantee on time completion of the project. To ensure that the project could be delivered to customer as promised, each small process needed to be scheduled to find out when each of the process should be started and when would be the latest time to finish it so that the whole process won't delay. This schedule also provides a clear indication for effective arrangement of processes to cut time.

## 1.6 Potential Benefit of Study

After the project has been carried out, an established format of planning and monitoring is ready exist. Using the format, coming projects could be handled more consistently and organized. With the scheduling done in project management, company could provide customer with a more accurate delivery time of product which in turns increasing the company's reputation within the industry. Besides, the more effective model of working on projects could probably bring more profit to the company.

## 1.7 Structure of Report

This report consists of six chapters organized accordingly with the name introduction, literature review, methodology, result, discussion, and conclusion which come along with suggestion for future study. The summary of each chapter's content is described as follows.

### ▪ CHAPTER 1 : Introduction

This chapter briefly explained about the background of the subject in study, background information of the company in concern, problem statement of the case study, objectives of the project, scopes that would be covered in the report, report arrangement structure, and potential benefits of the study.

### ▪ CHAPTER 2 : Literature Review

In this section, the subject in study that is the project management would be evaluated in more detail and informative. The general application of the principle and its current development are included too.

### ▪ CHAPTER 3 : Methodology

This is a chapter that listed what are the methods and techniques that have been utilized thorough out the process of conducting the case study. How these methods and techniques are used is explained too. The advantages and shortcomings of using these techniques and methods are discussed too.

#### ▪ **CHAPTER 4 : Results & Discussion**

All the quantitative and qualitative findings of the case study are recorded in this section. This section gave the proof to support the points of argument. Analyzing the data from results part, findings or opinions obtained from the results are discussed more evaluated in this part. Besides, the effectiveness estimated for the improved approach is discussed too.

#### ▪ **CHAPTER 5 : Conclusion & Recommendations**

This section is the ending part of the report. It summarizes important findings of the case study. Recommendation that may be conducted to develop more on this subject is suggested too.



## **CHAPTER 2**

### **LITERATURE REVIEW**

A project is a problem scheduled for solution. It should have definite starting and ending points (time), a budget (cost), a clearly defined scope of work to be done, and specific performance requirements that must be met. Projects are officially defined by Cleland and Gareis (1994), as the process that changes an unsatisfactory state of affairs into better state within certain time and resources limit. Badiru (2007) stated that project management is a process of managing, allocating, and timing resources to achieve a given goal in an efficient and expeditious manner. Project management is accomplished through the application and integration of the project management processes of initiating, planning, executing, monitoring and controlling, and closing.

#### **2.1 What is Project Management?**

Project is work too. People sometimes could not distinguish project from normal works. There are many definitions that describe what is a project. However there is still confusion laid in between project and normal work. It is better to look at characteristics that made project different from other works.

To be categorized as a project, the work shall fulfill the following attributes:

- The work is an instrument of making a change to current state.
- It is a non-routine work that is this work is not done regularly. It happened one-time off.
- The work is unique. There is no other work with all its aspects same with this work.