
# UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## LEAN MANAGEMENT STUDY IN MANUFACTURING INDUSTRY

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

by

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I hereby, declared this report entitled "Lean Management Study In Manufacturing Industry" 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 members of the supervisory committee are as follow:

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(MR. NOR AKRAMIN BIN MOHAMMAD)

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(MADAM ROHANA BINTI ABDULLAH)

# ABSTRAK

Penyelidikan ini tentang kajian pengurusan pembaziran yang dihadapi oleh sektor industri perkilangan. Syarikat pembuatan yang dipilih untuk kajian ini adalah Syarikat Penyelidikan Komposit Teknologi Malaysia (CTRM) di Batu berendam, Melaka. Kajian ini difokuskan pada kawasan gudang kilang iatu tempat menyimpan barang seperti komponen dan bahan kimia yang diperlukan untuk proses pembuatan. Melalui kajian ini, ianya dapat membantu dalam mengenalpasti masalah pembaziran di kawasan yang dipilih. Tujuan kajian ini adalah untuk mengkategorikan jenis- jenis pembaziran yang terdapat di gudang termasuk mengenalpasti pembaziran utama di kawasan tersebut. Pengumpulan data untuk kajian ini boleh diperolehi daripada wawancara dan tinjauan yang dilakukan di kawasan tersebut dan juga daripada data- data sebelumnya. Untuk tujuan analisis dalam kajian ini, data yang diperolehi akan dianalisis menggunakan pareto rajah beserta sebab dan akibat rajah. Jenis pembaziran utama yang terdapat di kawasan gudang dapat ditentukan dan seterusnya cadangan untuk pembaikkan di kawassan tersebut akan dicadangkan untuk bertujuan meningkatkan kecekapan di kawasan tersebut.

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# ABSTRACT

This research is about the lean management study in manufacturing industry. The selected manufacturing company for this study is a Composites Technology Research Malaysia (CTRM) at Batu Berendam, Malacca. The study focused on the CTRM warehouse. Through this study, it can help to identify the waste problem at selected area. The objectives of the study are to categorize and identify the types and major waste at warehouse area. The data collection for the study can gained from the interview, survey and historical data. In order to analyze data collection some of statistical quality control tools were used such as pareto chart, cause and effect diagram and why-why analysis. The major waste at warehouse area is determined and suggests the improvement opportunities identified in order to improve the efficiency of warehouse.

# ACKNOWLEDGEMENTS

First of all, I would like to express my grateful to Allah S.W.T for His pleasure to let me accomplished my research and technical report successfully.

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# DEDICATION

**……This report is dedicated to my loves ones & everybody that has involved closely in the beginning …….**

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| | | |
|---|---|---|
| CTRM | - | Composite Technology Research Malaysia |
| ERP | - | Enterprise Resources Planning |
| JIT | - | Just In Time |
| MIS | - | Management Information System |
| MRP | - | Material Requirement Planning |
| NVA | - | Non Value Added |
| PSM 1 | - | Project Sarjana Muda 1 |
| PSM 2 | - | Project Sarjana Muda 2 |
| SEQ | - | Sequence |
| SME | - | Small Medium Enterprise |
| TPM | - | Total Productive Maintenance |
| VMI | - | Vendor Managed Inventory |

# CHAPTER 1

# INTRODUCTION

Chapter one, is briefly explain and discussed about the introduction of the project which is a lean management study in manufacturing industry. This project is about to identify and categorize the types of waste that found in industry by proposed the improvement identify. The contents of this chapter include the background of the project, problem statement, objective, scope, important of the research and structure of the report. Based on the sub topic for this chapter, the reader can easily understand and clearly define about the project in details.

## 1.1 Background of Project

This research is about the lean management study in manufacturing industry. After undergoing the practical training at composite manufacturing company, a problem in terms of implementation the lean concept in manufacturing sector was identified. This cause occurred due to lack knowledge about the lean concept.

Lean in manufacturing is defined as the philosophy of the systematic approach to identify and eliminate the waste and enabling to make a continuous improvement from Liker's (1996). Generally, there are seven types of waste, which are overproduction, waiting, inventory, inappropriate processing, transportation, unnecessary motion and

defect (Womack and Jones, 2003). Besides that, nowadays industries also focus on reducing the waste in terms of energy, labour, time, and complexity. This lean concept was driven by "The Toyota Production System" that is has been developed by some Japanese leader such as Eiji Toyoda, Taiichi Ohno, and Shingeo Shingo. The main objective of the system was to minimize the consumption of resources that added no value to the product and customer in order to produce a high quality product in the market. Normally, the good product has a high demand from the customer, which is looking for the low price, but still has a good performance and quality.

Lean management, discussed the most efficient and effectiveness organization possible using the lean principle and technique with the least cost and zero waste. The five lean principles used as to be guide and reference. The five lean principles are value, value stream, flow, pull, and perfection.

In lean approach, there has a tool and technique that can be used such as kaizen, kanban, poka- yoke (mistake proofing), 5S, and visual management, cellular manufacturing and single minute exchange of dies (SMED). This all tools can help the organization to minimize waste at all level, improve the quality, and reduce cost and time. Furthermore, to implement the lean concept in industry, it also needs the support from the top management for the lean success by changing the corporate culture, suggest by Hines and Taylor (2000).

## 1.2 Problem Statements

After undergoing the practical industrial training at Composite Technology Research Malaysia (CTRM), a lot of waste can be found in the warehouse area. According to the company, there has come out with eleven types of waste, which are overproduction, time, inventory, transportation, defect, labour, material, space, complexity, energy, and safety. This wastage can influence the process of the product in terms of lead time,

delivery time, quality, performance and efficiency of the system and cost of the production.

In order to overcome this problem, further study needs to improve the efficiency of the warehouse. Therefore, it is requires to do a survey in order to identified the types of waste found at the area of the study. Then, from that, the several opportunities for improvements will be suggest in order to fix the problem; hence, the cost can be reduced.

## 1.3 Objective

The aims of this study are:

i. To perform survey at CTRM warehouse.
ii. To categorize and identify the types and major waste found by using the pareto.
iii. To proposed improvement opportunity identified.

## 1.4 Scope

This research of the project will focus primarily to categorize and identify the types of waste at CTRM warehouse. Besides, the survey method will be used for the data gathering activities. From the data gathering and analysis, the opportunity for the improvement will be suggesting in order to improve the efficiency at the warehouse.

## 1.5 Importance of the Research

Through this research, it is expected that the company can save the cost and time by identify and eliminate the waste and also enabling to do a continuous improvement. By doing this, the organization can has a smooth and efficient system and at the same time produce high quality product.

## 1.6 Structure of the Report

a) Chapter 1

Chapter one is a introduction of the project, that consists the background of the study, problem statement, objective project, scope of study, potential benefits of study and structure of the report.

b) Chapter 2

This chapter consists of the literature review about the lean system in manufacturing industry in order to eliminate the non value added.

c) Chapter 3

This chapter described details of the case studies and focused about description of the methodology that being used to collect the relevant data and to support the analysis of the study to achieve the objective. It also present the Gantt chart which describing the progress of entire research.

d) Chapter 4

Present the results of the data gathered based on the interview, and survey of the research. In this chapter, also describe the details about discussion and analysis of the study by using the data gathered.

e) Chapter 5

The final chapters in this report consists the conclusion and recommendation for the study.

# CHAPTER 2
# LITERATURE REVIEW

## 2.1 Introduction

This chapter will be review and explore the dominant themes includes study and research of published materials like journals, thesis, case study, technical document, and conference. Generally, the purpose of a review is to analyze critical segment of a published body of knowledge through summary, classification, and comparison of prior research studies, reviews of literature, and theoretical articles. Inside this chapter will briefly goes through and discusses about the lean system in manufacturing industry. Besides that, it is also discuss and describe the lean tools and techniques which are apply in industry. Nowadays, the lean approach has a worldwide application and became very useful tools according to their purpose and implementation. Furthermore, by using the lean concept, the organization can enabling to make a continuous improvement, which are can improve the quality of the product and at the same time can reduce the cost and time for non – value added activity.

## 2.2. Lean

There has a lot of definition for lean. In simple word, lean defined as a systematic system or approach to identify and eliminate the waste and enabling continuous improvement. Generally, lean viewed as a long-term journey and survival, which is there has no ending and limitation for the continuous improvement. Lean usually take a time

to implement because the barrier of the culture and lack information of lean. Furthermore, lean give many benefits to the organization because it can increase the productivity of the company, which is manufacture a good product with great performance and quality. Below are shown the definition of lean based on various perspectives.

According to Jeffery Liker's (1996) lean view as a philosophy that when implemented reduces the time from customer order to delivery by eliminating sources of waste in the production flow.

Hines and Taylor (2000) define lean as reducing waste at all levels and also concerned about changing corporate culture.

Womack and Jones (1996) describe that lean is a way of thinking and the whole system approach that creates a culture in which everyone in the organization continuously improve operations.

## 2.3 The Origins of Lean

Lean Manufacturing is the latest buzzword in manufacturing circles. It is not especially new. It derives from the Toyota Production System or Just In Time Production, Henry Ford and other predecessors.

In early development of lean manufacturing, there have many famous predecessors like Eli Whitney, Frederick W. Taylor, Frank Gilbreth, and Lillian Gilbreth. They create method for time study, standardized work, motion study and process charting. These were the people who originated the idea of "eliminating waste", a key tenet of just in time and lean manufacturing.

According to R. C. Thomas, October 2005, starting about 1910, Ford and his right-hand-man, Charles E. Sorensen, fashioned the first comprehensive Manufacturing Strategy. They took all the element of a manufacturing system such as people, machine tools, processes, and products were assembled into an efficient manufacturing system to produce the Model T. Ford that was considered to be the first one to use just-in-time and lean manufacturing as means to improve production.

Towards that, at Toyota Motor Company, Taichii Ohno and Shigeo Shingo, began to incorporate Ford production and other techniques into an approach called Toyota Production System or just in time . They recognized the central role of inventory and successfully implementing the lean manufacturing concept in Toyota.

In world class manufacturing today, the thought process of lean was thoroughly described in the book, "The Machine That Changed the World" (1990) by James P. Womack, Daniel Roos, and Daniel T. Jones. In a subsequent volume, Lean Thinking (1996), James P. Womack and Daniel T. Jones has mentioned about lean principles and lean tools and techniques. Besides, Lean Manufacturing caught the imagination of manufacturing people in many countries and lean implementations are now commonplace. The knowledge and experience base is expanding rapidly. As lean thinking continues to spread to every country in the world, leaders are also adapting the tools and principles beyond manufacturing, to logistics and distribution, services, retail, healthcare, construction, maintenance, and even government. Indeed, lean consciousness and methods are only beginning to take root among senior managers and leaders in all sectors today.

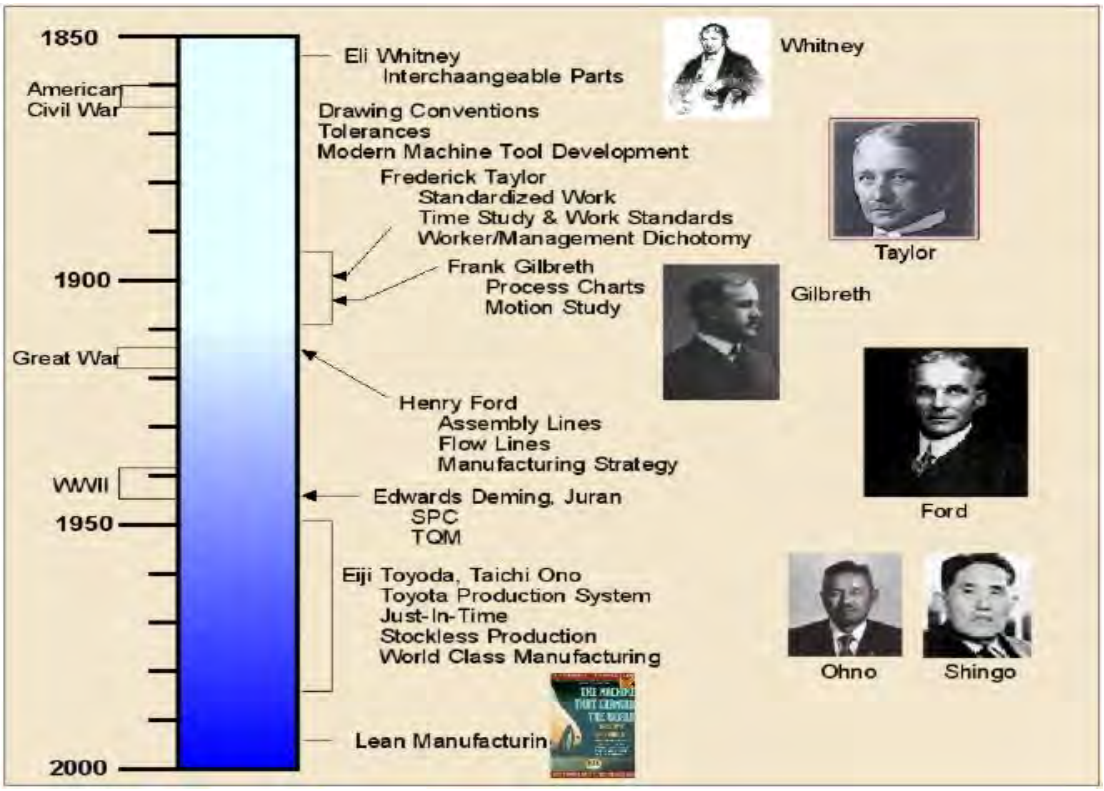


**Figure 2.1:** History Timeline for Lean Manufacturing (Anonymous, 2000)

## 2.4 Lean Principle

A principle of lean is a fundamental to understand in details about the lean system. Generally, lean have five principles that must be followed by the organization. This is involved in the processes to improve and change it with continuous improvement done and with waste eliminated along the flow process perfection is the ultimate sweet reward that companies can achieve (James Womack and Daniel Jones from Five Elements of Enabling a Lean Approach). The five lean principles are:

### 1. Specify Value

In lean production, the value of a product is defined entirely by the customer. The product must meet the customer's needs at both a specific time and price. Identifying the value in lean production means to understand all the activities

required to produce a specific product, and then to optimize the whole process from the view of the customer.

**2. Identify the Value stream**

The value stream is the sequence of processes from raw material to the customer that create value. It is also a technique or tool with a pencil and paper that helps people to see and understand the flow of material and information as a product makes its way through the value stream mapping (VSM).

**3. Flow**

Flow means sequence of the process. It is begin from first process, which is start from raw material until the finish good delivery to the customer without delay or interruption.

**4. Pull**

Pull means response to the customer's rate of demand, which is only build something when it is actually needed by a customer. Customer needs to pull a product from the manufacturer to avoid the waste in terms of inventory

**5. Perfection**

The concept of perfection in lean production means that there are endless opportunities for improving the utilization of all types of assets. The systematic elimination of waste will reduce the costs of operating the extended enterprise and fulfills customer's desire for maximum value at the lowest price. Perfection is an aspiration goal. Constantly striving for perfection by a process of continuous improvement is the only way to keep perfection.