



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**APPLICATION OF VALUE STREAM MAPPING (VSM) IN
MANUFACTURING INDUSTRY (CASE STUDY: JATI
BERINGIN SDN BHD).**

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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ABSTRACT

In manufacturing system, waste does not add value to the final product or company. Cost will be pay for this waste. Value Stream Mapping (VSM) will provide detailed understanding of all the processes involved in production and thus will improve it. A metal manufacturing industry will involve in this project, which is Jati Beringin Sdn. Bhd. the current problem that was being faced by JBSB is low production rate in ABC suspension hook product due to the high demand of the product. This project research is conducted to analyze the current flow of manufacturing/production system. The data had been collected to implement the tools for maximizing the productivity performance through time study and interview. From the data used in VSM, it shows the overall performance of the production line which is easy to see the overview of the production flow activities. Implementations of VSM tools are carrying out in waste analysis of manufacturing flow and improve the productivity by eliminate the waste. This project will focus on the ABC suspension hook product. The significant factor that influence the high lead time is the process flow facility and changeover time which reducing the productivity through the handling time and setup time. From the implementation of SMED and re layout the assemble process the time was being reduced.

ABSTRAK

Di dalam sistem pembuatan, pembaziran tidak menambah nilai kepada sesuatu produk atau syarikat. Value Stream Mapping akan memberikan pemahaman yang terperinci tentang semua proses yang terlibat didalam pengeluaran produk oleh itu, aktiviti yang tidak menambah nilai dapat dikenal pasti dan dihapuskan. Metal manufacturing industry telah terlibat didalam penghasilan projek ini iaitu Jati Beringin Sdn. Bhd. Masalah utama yang dihadapi oleh JBSB adalah pengeluaran produk 'Hook' yang kurang kerana permintaan yang tinggi daripada pembeli. Projek ini dilakukan untuk menganalisa pengaliran semasa untuk sistem pengeluaran/pebuatan. Temuramah dan analisis masa telan dibuat untuk mendapatkan data. Daripada data yang terdapat dalam VSM, keseluruhan proses dan prestasi dapat dilihat dengan mudah. Pelaksanaan VSM merangkumi analisis pembaziran aliran pembuatan dan mempertingkatkan penghasilan produk dengan menghapuskan atau mengurangkan pembaziran yang terjadi. Projek ini tertumpu pada produk yang dikenal pasti sebagai ABC suspension hook. Projek ini siap dengan mengkaji proses pembuatan semasa dan mencadangkan penambahbaikan di dalam VSM. Keputusan daripada projek ini akan ditunjukkan didalam VSM. Implementasi daripada alat VSM boleh mengenal pasti masalah dan boleh menaikkan produktiviti dengan menyingkirkan barang yang tidak diperlukan. Projek ini hanya fokus pada produk ABC suspension hook. factor yang mempengaruhi tinggi nya lead time adalah aliran process pada pemasangan process dan masa changeover. Daripada masalah itu, implikasi oleh SMED dan mengubah cara kerja pada proses pemasangan telah dilaksanakan untuk menyelesaikan masalah itu.

DEDICATION

To my dearest family and friend for their love, help and support

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TABLE OF CONTENT

Abstract	i
Abstrak	ii
Dedication	iii
Acknowledgement	iv
Table of content	v
List of tables	x
List of figure	xi
List of abbreviations	xii
1. INTRODUCTION	1
1.1 Background	1
1.2 Problem statement	3
1.3 Objective	4
1.4 Scope	4
1.5 Organization	4
2. LITERATURE REVIEW	6
2.1 Lean manufacturing	6
2.2 Waste in lean manufacturing	7
2.2.1 Non value added (NVA)	7

2.2.2	Necessary but non value added (NNVA)	8
2.2.3	Value adding (VA)	8
2.3	Seven waste in lean manufacturing	8
2.3.1	Overproductions	9
2.3.2	Waiting	9
2.3.3	Transport	9
2.3.4	Inappropriate processing	10
2.3.5	Unnecessary inventory	10
2.3.6	Unnecessary motion	11
2.3.7	Defects	11
2.4	Value Stream Mapping (VSM)	11
2.4.1	Definition of VSM	15
2.4.2	Step in VSM	16
	2.4.2.1 Current state mapping (CSM)	16
	2.4.2.2 Future state mapping (FSM)	17
2.5	Symbol in value stream mapping (VSM)	18
2.5.1	Process symbol in VSM	18
2.5.2	Material symbol in VSM	20
2.5.3	Information symbol in VSM	22
2.5.4	General symbol in VSM	24

2.6	Advantages of value stream mapping (VSM)	25
2.7	Disadvantages of value stream mapping (VSM)	25
2.8	Implementation of value stream mapping (VSM)	26
2.9	Research on value stream mapping (VSM) technique	28
3.	METHODOLOGY	37
3.1	Planning of study	37
3.1.1	Planning for identification of the problem, objective and scope	40
3.1.2	Planning searching the literature review	40
3.1.3	Planning to determine the methodology	40
3.1.4	Planning for collecting data, data verification and data analysis	40
3.1.5	Planning the conclusion and recommendation for this project	42
3.2	Recourses	42
3.3	Development of VSM	42
3.3.1	Time study	43
3.3.2	Interview method	44
3.3.3	Develop VSM (current state mapping)	44
3.3.4	Analyze current state mapping condition	45
3.3.5	Develop VSM (future state mapping)	45
3.3.5.1	Takt time	46

4.	RESULT AND DISCUSSION	47
4.1	Data collection from JBSB	47
4.1.1	Work study	47
4.1.2	Time study	49
4.2	Capturing cycle time	51
4.2.1	Cycle time given	51
4.3	Inventory time	52
4.3.1	Rod part calculation	52
4.3.2	Washer part calculation	54
4.4	Value added time, non value added time and process lead time	56
4.5	Current state mapping	57
4.6	Value stream mapping flow	58
4.7	Value stream mapping section	62
4.8	Customer demand and takt time	64
4.9	Takt time graph	66
4.10	Single minute exchange die (SMED) method	67
4.10.1	Advantages of SMED	67
4.10.2	Problem was being facing	67
4.10.3	Propose of SMED	70
4.10.4	Method for sustain	72
4.10.5	Result after implementation	73

4.11	Propose of new process layout for assemble process	74
4.11.1	Problem at assemble line	74
4.11.2	Implementation of new process layout for assemble process	75
4.11.3	Result after implementation	76
4.12	Future state value stream mapping	77
4.13	Comparison between current and future state mapping	79
5.	CONCLUSION AND RECOMMENDATION	80
5.1	Overview of result finding	80
5.2	Limitation of project	81
5.3	Conclusion	81
5.4	Recommendation	82
	REFFERENCES	83
	APPENDICES	
A	Gantt chart PSM 1 & 2	
B	Purchase order of customer	

LIST OF TABLE

- 2.1 Example of Process Symbol
- 2.2 Example of Material Symbol
- 2.3 Example of Information Symbol
- 2.4 Example of General Symbol
- 2.5 Summarize of the research in the Value Stream Mapping (VSM) application

- 3.1 Form for record time study every process

- 4.1 Cutting process cycle time
- 4.2 Piercing process cycle time
- 4.3 Bending 1 process cycle time
- 4.4 Bending 2 process cycle time
- 4.5 Stamping process cycle time
- 4.6 Assemble process cycle time
- 4.7 Inspection process cycle time
- 4.8 Touch up process cycle time
- 4.9 Assemble process cycle time
- 4.10 Data comparison

LIST OF FIGURE

- 2.1 Current State Mapping (Womack, 2003)
- 2.2 Future State Mapping (Womack, 2003)

- 3.1 Flow chart of project's planning
- 3.2 Project framework

- 4.1 ABC suspension hook product process flow
- 4.2 Current state mapping
- 4.3 Supplier explanation
- 4.4 Flow of process explanation
- 4.5 Galvanize process explanation
- 4.6 After galvanize process explanation
- 4.7 Production Control
- 4.8 Supplier
- 4.9 Transportation
- 4.10 Process information
- 4.11 Total time
- 4.12 Takt time graph
- 4.13 Situation machine setup
- 4.14 Distance takes the tools
- 4.15 Different type of clamp
- 4.16 Different type of bolt
- 4.17 Tool was being label
- 4.18 Labelling toolbox A
- 4.19 Toolbox below the machine
- 4.20 Standardize of clamp and bolt length
- 4.21 Checklist for tools
- 4.22 Flow of assembly line process
- 4.23 Flow of new layout
- 4.24 Future State Mapping

LIST OF ABBREVIATIONS

VSM	-	Value Stream Mapping
NVA	-	Non Value Added
NNVA	-	Necessary But Non Value Added
VA	-	Value added
CSM	-	Current State Mapping
FSM	-	Future State Mapping
TPS	-	Toyota Production System
WIP	-	Work In Progress

CHAPTER 1

INTRODUCTION

Chapter one was give the brief overview about the whole project that was being doing starting with the background of the project title then the explanation of the metal manufacturing industry. Furthermore the problem statement that was determine at the metal manufacturing industry company and then the objective of the project. Afterward, the scope and the limitation of this project were being discussed.

1.1 Background

Manufacturing is one of the main businesses in this world. The aim of a company is to gain a maximum profit in their business. This will make them try to eliminate whatever waste that exists. In order to eliminate the waste, Lean Manufacturing is one of the initiatives that focused on cost reduction by reducing unnecessary activities in manufacturing. Lean Manufacturing first introduced in mid 1940s by a Japanese Eiji Toyoda and Taiichi Ohno at Toyota Motor Company which known as Toyota Production System. The objective is to make the company stay alive and become more competitive in the business through implementations various type of Lean techniques and tools. Taichi Ohno was determine that have seven waste or „Muda“ in the production to be eliminate which are:-

- 1) Unnecessary motion
 - No value movement of the operator or equipment.
- 2) Unnecessary inventory
 - Raw material or components more than production demand.
- 3) Overproduction
 - Finished products more than customer demand.
- 4) Waiting or Queues
 - Idle time or Machine downtime
- 5) Overprocessing
 - Process on the product that adds no value.
- 6) Transportation
 - Distance of the materials movement that has no value
- 7) Defect
 - Rework or scrap.

Lean Manufacturing has being set and focused on perfection. There are several techniques and tools can be use to eliminate the seven wastes such as Kanban System, Just-in-Time (JIT), 5S, Poke Yoke, Kaizen and Value Stream Mapping (VSM). VSM is a tool that provides detailed understanding of all the processes involved so that non-value added activities can be identified and eliminating. VSM is also an improvement tool for stream lining work and removing wasteful practices. VSM is based upon Lean principles and is a powerful tool used to identify opportunities for significant process improvement within an organization.

There are two type of maps that must to develop when want to create the VSM. First map is current map and second is future map. Current map is a graphic depiction of what is currently happening on the floor and it allow everyone to see and agree on what is occurring. Data from current map must be gathered from existing condition on the floor and not a data store. To gather this information, the team must walk the floor door to door following to the product as it is manufactured.

Analyzed data that was being collected in current map process to develop the future map. It is the best way to gain the correct focus on what the future state to look like. From this analyzed, it can show the problem within the current stream from a lean viewpoint. This is important to ensure that the correct direction for an operation future.

After the analyzed processes are complete, the future map will start develop. Future map processes are involved in reduce or eliminating waste at the production line due to the seven wastes that was determine by Taichi Ohno.

1.2 Problem Statement

Production line is an important thing in the industry which mainly can influence the profit that the company will gain. Improvement still must be doing to the production line even though it is under control or stable. Some of the wastage was being ignored by the production planner without realizing in the actual condition. Non-value added at the production line can be determined using the tools that have in the lean manufacturing such as Value Stream Mapping (VSM).

Jati Beringin Sdn. Bhd (JBSB) is one of the companies that produce the product to Tenaga National Berhad (TNB) and Telekom Malaysia (TM) in Malaysia. According to the high demand from the TNB to the product that called ABC suspension hook, JBSB want to determine and try to reduce or eliminate the waste that have occur in the process. They know that waste is a thing that influence to the producing time. They also don't have any reference that can be used as a monitor to review their production processes from the beginning to shipping process. Value Stream Mapping (VSM) was being introduced to the JBSB to solve the problem that was facing by them. Due to VSM, it will show the non-value added that have in the production line and from lean manufacturing tools and technique such as Kanban, 5s, Just In Time (JIT), Kaizen and other will eliminates or reduce the waste that was create.

1.3 Objective

Based on the titles “Application of Value Stream Mapping (VSM) in Manufacturing Industry” The objectives that achieved at the end of this project research are:

1. Create the value stream mapping (VSM) at the metal manufacturing industry.
2. Evaluate the production line and identify the wastage in the metal manufacturing industry using VSM.
3. Create the future state mapping (FSM) then compare to the current state mapping that was being done.

1.4 Scope

This research is developing a Value Stream Mapping (VSM) for the product called ABC suspension hook that was producing by the JBSB. This research was determine the non value added while produce ABC suspension hook product using the VSM according to the seven waste that was being determine by Taichi Ohno .

1.5 Organization

Based on the thesis for Poject Sarjana Muda 1 (PSM1), an organization has been constructed for the process flow of completion in order to fulfil course of degree in UTeM. Below shows the format of the organization:

Chapter 1, the introduction of this report and describe general background of the project research. The problem statement and objective is stated. The scope of the project and the organization of the report are also presented in this chapter.

Chapter 2 is the literature review of this report which explains the theories and tools used in the project research. The lean manufacturing concept and value stream mapping tools are presented in detail in this chapter.

Chapter 3 is the methodology of this report which comprises the information of procedure on the project conducted. A flow chart explains the overall flow of the project. The project planning and progress of the project is presented in a Gantt chart in this chapter.

Chapter 4 is result and discussion of this report which all the data that was got from the method which had been brief in chapter three. Then the analysis and discussion will be doing in this chapter.

Chapter 5 is conclusion and recommendation of this report. In this chapter it was conclude whole of the report that was being done. Other than that, the recommendation for the future also was being done at this chapter.

CHAPTER 2

LITERATURE REVIEW

Literature review was giving the explanation about the value stream mapping and the tools that was use in the value stream mapping. The explanation of this literature review was come from many sources such as journal, access from the internet, book and etc. This chapter was explaining about the meaning of value stream mapping then the tools that was use in the value stream mapping.

2.1 Lean manufacturing

In this globalization era, lean manufacturing tool and technique was being obligation to the company that want to make the improvement. (Womack et al., 1990) is the first person that introduces the term “lean manufacturing” or “lean production in their book *The Machine that Changed the World*. Lean manufacturing can be defined as a system where wastes are defined, identified and removed from the system continuously. Lean manufacturing is the systematic approach to identifying and eliminating waste (non-value added activities) through continuous improvement by allowing the product to flow in respond at the pull of the customer in pursuit of perfection (NIST-MEP Lean, 2000).

2.2. Waste in lean manufacturing

Waste can be determined as an activity (Ohno, 1988) or behavior (Emiliani, 1998) that adds cost but does not add value. All the waste that have in the company need to be removed or reduced to ensure that the productivity can be improved. There are seven wastes that have in the Toyota Production System (TPS). The purpose of waste removal is to drive competitive advantages inside organizations and it was pioneered by Toyota chief engineer, Taiichi Ohno, and sensei Shingo in the 1980s and is oriented fundamentally to productivity rather than to quality. The purpose for this reason is thought to be that improved productivity leads to leaner operations which help to expose further waste and quality problems in the system. Thus the systematic attack on waste is also a systematic assault on the factor underlying poor quality and fundamental management problems. There are three types of operations that are undertaken in an internal manufacturing due to (Monden, 1993). It can be categorized into:-

1. Non value added (NVA)
2. Necessary but non value added (NNVA)
3. Value adding (VA)

2.2.1 Non Value Added (NVA)

The first of these are the pure waste that must be completely removed from the company. The examples of this waste are double producing, waiting time and stacking intermediate completely.

2.2.2 Necessary but Non Value Added (NNVA)

Necessary but non value added may be wasteful but it is under the current operating procedures. As example, the walking period that was take to pick or take the item that place at far place, unpacking delivery and transferring the tools from one hand to the another hand. In order to solve this problem is the company must create the new layout that suitable to the company process and deal with the supplier for arranges to deliver unpacked goods.

2.2.3 Value Adding (VA)

Value adding operations involve the conversion or processing the raw materials or semi finished product through the manual labour. This process would involve activities like sub assembly of the parts, forging the raw materials and painting the body work.

2.3 Seven Waste In Lean Manufacturing

Value Stream Mapping involves in the identification of value adding and wasteful activities based around Ohno's seven wastes as shown below (Monden, 1993).

1. Overproductions (faster than necessary pace)
2. Waiting
3. Transport (conveyance)
4. Inappropriate processing
5. Unnecessary inventory (excess stock)
6. Unnecessary motion
7. Defects (correction of mistakes)