



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

A STUDY OF VALUE STREAM MAPPING (VSM) IN HPF PLANT

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

by

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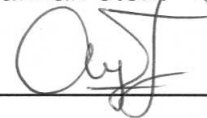
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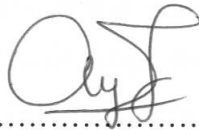
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APPROVAL

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ABSTRACT

Miyazu Malaysia Sdn Bhd (MMSB) is one of company that produces metal stamping product. Nowadays, in manufacturing industries field the competition are more intense. To increase productivity and have a good quality of product without producing any waste is impossible. The purpose of this study is to propose Value Stream Mapping (VSM) at manufacturing company to reduce waste at the HPF Plant production line. In order to draw VSM, Microsoft Visio is the best tool to be used. VSM will lead student to define the current state map then analyze the waste by create questions and the answer will help student to generate idea to seek opportunities for improvement, and finally develop the future state map to propose to the company for Rf Assy Center Pillar Outer Rh product family. All the improvement is using Lean Manufacturing tool and technique. It can be concluded from the current state map of Rf Assy Center Pillar Outer Rh the future state map suggest that 3.8% of lead time reduction could be achieved by eliminating most of the waste that has been identified.

ABSTRAK

Miyazu Malaysia Sdn Bhd (MMSB) adalah salah satu daripada syarikat yang menghasilkan produk dari Hot Press Stamping. Kini, dalam bidang industri pembuatan, persaingan adalah sengit. Untuk meningkatkan produktiviti dan menghasilkan produk yang berkualiti tanpa menghasilkan pembaziran adalah mustahil. Tujuan kajian ini adalah untuk mencadangkan penggunaan Value Stream Mapping (VSM) di syarikat pembuatan untuk mengurangkan pembaziran di HPF Plant. Untuk melukis VSM, Microsoft Visio akan digunakan. Pelan sebenar atau dikenali sebagai current state map akan membantu pelajar untuk melihat keadaan yang sebenar di bahagian proses pembuatan kemudian pelajar akan menganalisis pembaziran dengan mewujudkan soalan-soalan dan jawapan yang di jawab akan membantu bagi menjana idea dan mencari peluang bagi membuat penambahbaikan. Pelajar akan membuat pelan masa hadapan atau future state map dengan menggunakan kesemua penambahbaikan dari Lean Manufacturing teknik bagi produk Rf Assy Center Pillar Outer Rh. Pengurangan lead time sebanyak 3.8% boleh dicapai dengan menghapuskan sebahagian pembaziran yang telah berjaya dikenal pasti.

DEDICATION

To my beloved mother, father, family and friends thank you for the support and encouragement.

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First of all, I want to thank to ALLAH SWT for being my side throughout and finally, I was completed my Final Year Project (FYP), consisting of FYP1 and FYP2 accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM), as a partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Management). I would like to thank my project supervisor Dr. Seri Rahayu Binti Kamat for helping me throughout the development of the project. I wish to extent my sincere thanks to Encik Mursyidul as Production Manager at Miyazu (M) Sdn Bhd for always helping me and give me outstanding information that I need in order to develop this project. To my classmate Jazlan, thanks because always motivate and encourage me not to give up and need to work hard for this project. Not to forget the Faculty of Manufacturing Engineering, Universiti Teknikal Malaysia Melaka management because allowing me to gain new knowledge and gain new experiences thru this project. Lastly, a million thanks to my beloved family especially my parents, Mrs Maimun Hussin and Mr Samad Karto for their love, encouragement and support me throughout the development of this project.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

Avail	-	Available Time
Avg	-	Average
CSVSM	-	Current State Value Stream Mapping
CT	-	Cycle Time
C/O	-	Changeover time
FSVSM	-	Future State Value Stream Mapping
Fyp	-	Final Year Project
HPF	-	Hot Press Forming
min	-	Minutes
MMBS	-	Miyazu Malaysia Sdn Bhd
NVA	-	Non-Value Added
PSM	-	Projek Sarjana Muda
PQ	-	Product-quantity
PR	-	Product-routing
sec	-	Seconds
VA	-	Value Added
VSM	-	Value Stream Mapping

CHAPTER 1

INTRODUCTION

In this chapter, an introduction to the background of the project will be given.

The project title is “A Study of VSM in HPF Plant”. It will be followed by problem statement, objective, and scope of the project.

1.1 Background of Study

Nowadays, in manufacturing industries field the competition are more intense. Manufacturing companies not only compete locally but also on a global basis. To increase productivity and have a good quality of product without producing any waste is impossible. Hot stamping industries are not exception from this globalization.

VSM is a tool that used to map a flow in the beginning of raw material until end of product. Value stream mapping is processes that arecreating a graphical that symbolize of process, information and material flows. The main goal of VSM is to determine and reduce waste within a process. Waste can be defined as an activity or process that not adds any value to a product. VSM can be a starting point to aid management, engineers, production, and customers to determine waste and also can help to identify its causes. The Value Stream Mapping (VSM) is a lean

manufacturing tools and technique that used to identify and be eyes of the flow for materials and information required to bring the product or service to the customers.

1.2 Problem Statement

Miyazu Malaysia Sdn Bhd (MMSB) is a company that specializing in automotive tooling engineering, design and manufacturing services, which are currently the leading, die provider for Proton cars. With more than ten years of experiences in the industry, MMSB now has tooling plants in Shah Alam and Tanjung Malim.

The automotive industry in Malaysia is an exciting business, with the constant needs for better innovation in tooling engineering and manufacturing field. By providing high quality products and services to its customers, Miyazu aims to further heighten the Malaysian reputation in the eyes of the world in its industry.

Miyazu Malaysia Sdn Bhd produces many type part of car that included several of brands such as PROTON, TOYOTA, PERODUA and HONDA. On preliminary discussion with company in this study to implement VSM in Hot Press Forming (HPF) line. At this moment, Miyazu Malaysia Sdn Bhd was produce body part for Proton PREVE. In this manufacturing sector, the organizations had tried their best to manage the company without any major or minor waste. By year of 2012, MMSB starting focusing to the concept of lean manufacturing that provided a solution to reduce waste at the production line. In lean manufacturing, Value Stream Mapping take a major role in visualize an entire production flow in order to manage production waste by use other tool and technique in lean manufacturing as a supporting tool.

For this PSM project, will be focusing on the purpose of future state mapping where the appropriate and suitable technique and tool of lean to be used by manufacturing company in Value Stream Mapping implementation. By selecting the suitable tools and technique of lean at the current state mapping, waste can be reducing especially at the production line.

1.3 Objective

The objective of this study is:

- a. To study and develop VSM in HPF Plant for monitor any non-value added activities.
- b. To analyse the non-value (waste) activities in the current value stream.
- c. To develop and purpose the future state value stream mapping by reduce the non-value added activities in the hot press forming by using lean manufacturing tool and technique.

1.4 Scope of study

The scopes in this final year project is to identify and reduce the wastes in the HPF Plant production line by define the current state and analyze the data. Then, suggest and purpose an appropriate solution at future state phase using lean tool and technique.

CHAPTER 2

LITERATURE REVIEW

Overall for this chapter is identified and understanding the concept of lean manufacturing including definition, principle, tool and technique, application of value stream mapping as the one of lean manufacturing tool and technique.

2.1 Lean Manufacturing

Lean manufacturing start at Toyota with a name such as just in time (JIT) or Toyota Production System. The lean manufacturing describes the profound revolution that was initiated by Toyota against a mass production system. Toyota revolutionized the automobile industry with their approach of “lean manufacturing” in the 1980’s. According to Womack and Jones, 2003, the original concept of “lean thinking” popularized during 1990’s.

Lean can be defining as a systematic approach that is reducing the waste and increase the value and by following the product at the pull of customer demand. Value, value stream, continuous flow and pull being the key concept align with lean goal, seek perfection. Lean can be defining as manufacturing without waste. Waste is anything other than the minimum amount of equipment, material, parts, and working time that are related to production (Shahram Taj, 2008).

Lean manufacturing is an operational strategy oriented towards achieving the shortest possible cycle time by eliminating waste. The term “lean manufacturing” is to represent half human effort in the company, half the manufacturing space, half the investment in tools, and half the engineering hours to develop a new product in half the time (Puvanasvaran A. Perumal, 2012).

Lean manufacturing can be defined as a systematic approach to identifying and eliminate waste (non-value added activities) through continuous improvement by following the product at the pull of the customer in pursuit of perfection. In lean production, the value of a product is defined by the customer. The product must meet customer need at both a specific time and price. (Henderson and Evans, 2000).

Lean manufacturing is a comprehensive term referring to manufacturing methodologies based on maximizing value and minimizing waste in the manufacturing process (Borbye, Stocum et. al. 2009). The term lean manufacturing is synonymous with different names, such as agile manufacturing, just-in-time manufacturing, synchronous manufacturing, world class manufacturing, and continuous flow (Tinoco, 2004). The benefits of lean manufacturing generally are lower costs, higher quality, and shorter lead times (Liker, 2004). The term lean manufacturing is created to represent less human effort in the company, less manufacturing space, less investment in tools, less inventory in progress, and less engineering hours to develop a new product in less time (Tinoco, 2004).

According to Dennis P Hobbs, 2004, lean manufacturing has the capability to produce product using the least amount of non-value adding activities that add time and subsequently cost to the manufacturing process.

2.1.1 Lean Principle

According to Puvanasvaran A. Perumal, 2012, lean operating principles began in manufacturing environment and are known by a variety of synonyms such as lean manufacturing, lean production and Toyota production system and other. Everyone at industry has been studies lean principle for many years and has enjoyed tremendous bottom line improvement by adhering to them.

Lean manufacture requires a step to thinking that focuses on making the product flow through value adding process without interruption, a pill system that cascades back from customer demand by replenishing only what the next operation take away at short intervals and a culture which everyone is striving continuously to improve (James Womack, Daniel Jones, 1996). There are five key principles that guide lean thinking, refer figure 2.1. The five key principles are:

- a. Identify value
- b. Map the value stream
- c. Create flow
- d. Establish pull
- e. Seek perfection



Figure 2.1: The Key Lean Principles

(Source: <http://www.operational-excellence-consulting.com>, 11.10.2012)

a. Identify value

It defined as entirely by customer. Product must meet customer requirement in area of time and price. The customer willing to pay for that adds value of any process to the product.

b. Map the value stream

It determined as a sequence of process from raw material until to customer. It can help to identify step required to make product.

c. Create flow

It beginning from production process; raw material then assembly process until last process (packaging). Flow characterized by time, cost and value.

d. Establish pull

Pull can be determined as to build something when it is actually needed by a customer.

e. Seek perfection

The systematic elimination of waste will reducing cost and help to fulfill customer desired for maximum value at the lowest price.

2.2 Value Stream Mapping

In lean manufacturing, there are many tool and technique that can be used to make a production and process more efficient and smooth without any problem such as process time studies, work standardization, 5S, Kanban, Andon, Jidoka, Poka Yoke, single minutes exchange die (SMED), VSM and Kaizen. VSM or Value Stream Mapping is a lean manufacturing tool that been chosen to use for solving bottleneck problem.

Jones and Womack, 2000, define value stream mapping as “the simple process of directly observing the flow of information and material as they now occur summarizing them visually and then envisioning a future state with much better

performance”. The ultimate goal of VSM is to identify all types of waste in the value stream and take steps to try and eliminates these (Rother and Shook, 1999).

A value stream is defined all of the action; value added and non-value added required to complete a product or service from beginning to end. It is vital to have all the operators, users, and customers of the value stream involved in the improvement activity (James P. Womack, Daniel T. Jones, 2003)

VSM is a method of visually mapping a product production path. It can serve as a starting point to help engineer, management, production associates, schedulers, suppliers and customer recognize waste and identify its cause (Daniel T. Jones, James P. Womack, 2002).

Puvasvaran A. Perumal, 2012, found the value stream mapping is a lean manufacturing technique that used to analyze the flow of the raw material and information currently required to bring a product or service to a consumer. It is also a sequence of process to the customer. VSM are currently used for identify the target product, product family or service. VSM is hard work because it required looking at a process if every step is non-value added and is costing the organization time and resources.

VSM is based upon lean principle and is a powerful tool to use for identified opportunities for significant process improvement. It helps to uncover bottleneck in a process that prevent it from flowing at its optimum. It enables organization to understand any workflow, taking an end to end view of their process capability (Shahid Mujtaba, Robert Feldt, Kai Petersen, 2010).

2.2.1 Step in Value Stream Mapping

According to Guo-qiang, Ding-zhong and Maei-xian, 2010, there are four (4) steps to develop the Value Stream Mapping (VSM) that is:

- Determine the value stream (product family) - choose a particular product or product family as the target for future improvement. Not all the product can be selected to map the flow that passes through the factory. The mapping effort starts with determining the value stream to be improved.
- Create the current state value stream mapping (CSVSM) - show how things really work. It show flow from first until end of process. Figure 2.2 show an example of current state of VSM.

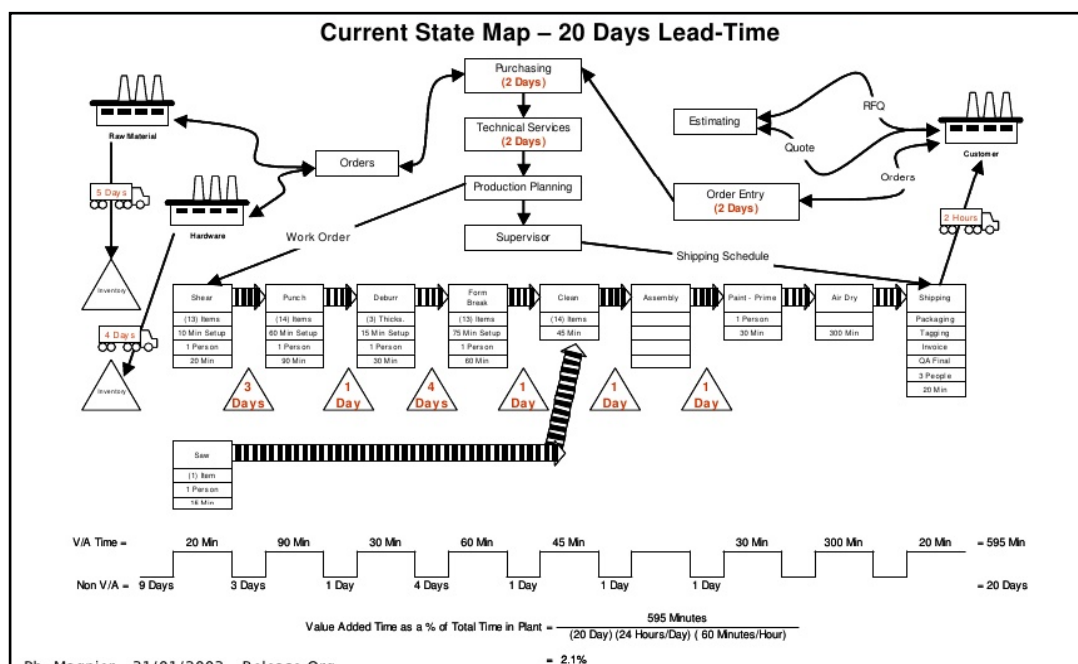


Figure 2.2: Current State of VSM

(Source: www.slideshare.net/truongtrung/4-steps-to-vsm, 11.10.2012)

- Create the future state value stream mapping (FSVSM) - the future state value stream map improves the flow and reduces non value added activities. Future state must meet customer requirements and improve necessary process to achieve value stream vision. Figure 2.3 show an example of future state of VSM.