



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

PRODUCTIVITY IMPROVEMENT ANALYSIS AT MUSHROOM INDUSTRY USING TIME STUDY METHOD

Report submitted in accordance with the partial requirement of the Universiti Teknikal
Malaysia Melaka for the Bachelor of Manufacturing Engineering
(Manufacturing Management)

By

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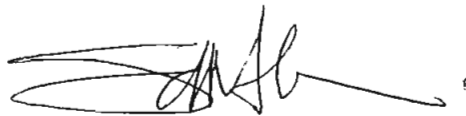
APPROVAL

This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfillment of the requirements for the Degree in Bachelor of Manufacturing Engineering (Manufacturing Management). The members of the supervisory committee are as follow:



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ABSTRAK

Value Stream Mapping dianggap sebagai alat penting dalam pelaksanaan pembuatan *lean*. Dengan ini, masalah (*waste*) dalam sistem dikenalpasti dan *lean* dapat diimplementasi dengan jayanya. *Value Stream Mapping (VSM)* merupakan suatu kaedah manual menggunakan kertas dan pensel di mana kaedah ini menggambarkan imej statik daripada proses yang membolehkan pengguna untuk mendapat gambaran *value added* dan juga *non-value added* di dalam *value stream*. Walaupun kaedah ini sangat berkesan, namun ianya rumit dan juga memakan masa. *Value Stream Mapping (VSM)* tradisional ini tidak memiliki kemampuan untuk menerap perubahan dengan cepat yang biasanya berlaku di bahagian pemprosesan semikonduktor di mana pada kebiasaannya merupakan suatu proses yang berterusan. Permodelan dan simulasi merupakan salah satu pendekatan yang baru dan boleh diamalkan dalam bidang Kejuruteraan Industri dan berupaya untuk menambah aspek dinamik dalam *Value Stream Mapping (VSM)*. Di samping itu, permodelan dan simulasi juga mampu meningkatkan masa analisis pada kajian *VSM*. Kajian ini memberi fokus kepada proses membina model simulasi *VSM* di bahagian proses semikonduktor yang telah dipilih. Kaedah yang dipilih untuk kajian ini adalah dengan menggunakan langkah-langkah permodelan simulasi yang lengkap untuk memberi panduan dalam pembinaan model simulasi *Value Stream Mapping (VSM)*. Model simulasi *Value Stream Mapping* untuk proses bagi produk SMA direka dan setelah model ini disahkan, ianya boleh digunakan untuk analisa yang lebih mendalam. Keputusan kajian ini merangkumi senario simulasi yang berbeza di mana penekanan kepada *waste elimination* di bahagian pemprosesan dan satu cadangan *Future Value Stream Mapping* juga disyorkan dalam kajian ini. Penelitian ini sangat berguna untuk Syarikat ABC kerana model simulasi *Value Stream Mapping* merupakan alat yang sangat berguna di mana ianya berupaya menunjukkan perubahan dalam sistem berdasarkan pada input untuk model dalam masa yang singkat.

ABSTRACT

Value Stream Mapping is regarded as an important tool in the implementation of lean manufacturing. It identifies the waste in the system, paving the way for a successful lean implementation. A value stream mapping (VSM) is a paper and pencil tool that depicts a static picture of a process that allows the user to see where value is added into the value stream. Although, this method is very effective but it can be very complicated, tedious and time consuming. The traditional value stream mapping (VSM) does not have the capability to response to rapid changes which occurs in the semiconductor assembly line where the work processes change continuously. Simulation modeling is one of new approaches that Industrial Engineering (IE) practitioners are using as a powerful tool which add the dynamic aspects to the value stream mapping (VSM) and able improve the analysis time of the VSM study. The study focuses on the development of a VSM simulation model of a selected semiconductor manufacturing assembly line. The methodology adapted for the study is using the simulation modeling systematic steps, which comprised of complete steps to guide the model building of simulation based value stream mapping. The simulation model for Current State Value Stream Mapping for product SMA is developed, the model is verified and validate before it can be used for further analysis. The result of this study includes simulation scenarios of waste elimination and proposed final Future State Value Stream Mapping. The study is indeed very useful to the company because the simulation model of Value Stream Mapping is very powerful tool, where it can demonstrate the changes in the behavior of the system adhering to the inputs for the model.

DEDICATION

This study is dedicated to my beloved Mother and Father who have supported me all the way since the beginning of my studies;

Kasee a/l P.Chattapan

Mallika a/p Marimuthu

Also, this study is dedicated to my brothers who have been a great source of motivation and inspiration.

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Sundramoorth a/l Kasee

All of the family members and relatives

&

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Project Supervisor

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Thank you for the encouragement, support and motivation given in completion of
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LIST OF ABBREVIATIONS

IKS	-	Industri Kecil Sederhana
PTS	-	Predetermined Time Standard
TMU	-	Time Measure Unit
PSM	-	Project Sarjana Muda
FYP	-	Final Year Project
LED	-	Light Emitting Diode

CHAPTER 1

INTRODUCTION

1.0 Introduction

1.1 Background

At present, each industry will do their best to achieve a remarkable level in their respective sectors and it become a new competitive era. Caused of that desired, there a lot of method been provided which related to the associate with their field and requirement. It is very clear to see that every industries all over the world, it's all about quality, productivity and profit. According to the Benjamin W. Niebel (1993), about a decade ago, only a few industries get involved in the competition particularly like electronics and automotive industries. But now, this competition was spread to the world wide. In order to increase these matters, they must have a very good method to be applied on their sectors to fulfill the requirement.

One of the best methods to help any industries to increase their productivity is motion and time study method, especially stopwatch time study. Time study method is founded by Frederick Winslow Taylor in 1881 while associated with Midvale Steel Company in U.S.A that time. The method have been developed and expended by Frank and Lilian Gilbreth and they are also considered as founders of modern motion and time study techniques.

Time study method not only limited to the huge and established industries such as manufacturing, production, fabricating, supplying and others huge application. This method also can be applied to the average and small industries (Industri Kecil Sederhana – IKS) such as agriculture, farming, packaging, food and many more. In order to improve the productivity of IKS, they also can implement the time study method as well.

Regarding to the agriculture and packaging industries, times become one of the important matter to be concern to ensure that the product they produce can hit the target in terms quantity and quality. Because of this sector can be categorized as small industries, these factors become priority to be considered. Time study method can be conducted into this industry either to help the industries to achieve the target or to improve their productivity.

Time study also involve of the criteria of designing and creating. Continuity from the time study that been applied, we also can create a guideline like scheduling to achieve the objective of time study. Due to the designing, may we can comes with a new design of tools or machine that van be used in time applied the time study method together with the guideline.

1.2 Problem Statement

One of the key aspects in winning the hearts of customers is packaging technique. As we know, appearance is the most first thing that customers and users will considered compared to price and quality. That is why good packaging techniques of any product to sell must get a good feedback and thus get a better return.

For the agriculture sector like mushroom industry also involve packaging process in their business flow. During the mushroom's packaging process, there is an issue about less of satisfactions due to the mix size of the mushroom in one package. This happened because diversity of needs and interest of those customers about mushroom size. This matter will affect the packaging quality and also the level of customer's satisfactions and it definitely will give bad effect to the business.

Due to the mentioned problem as above, it might caused by another problem such as the tools that the workers use during the packaging is not effective to fulfill the customers need and requirement. The workers do the packaging process by manually, so the process of selected the mushroom is been done by randomly pick based on their visual inspection and experience in packaging. Every package will consist of different quantity and size of mushroom. Such differences contribute to customer's dissatisfaction.

1.3 Objectives of Project

The project is intended to be carried out because of:

- i. To analyze the mushroom's production process flow using Time Study method.
- ii. To propose solution for problems identified.
- iii. To improve the process of packaging products.

1.4 Project Scope

To ensure that all project objectives are achieved, the following are several important elements that must be followed during the project:

- i. The study of this project will be conducted at mushroom industry.
- ii. The study was undertaken using the Time Study Method which is used stopwatch time study technique.

CHAPTER 2

LITERATURE REVIEW

2.0 Literature Review

2.1 Introduction

One of the oldest and evergreen fundamental methods ever used to get result of increased in productivity and quality as well was time study method. This method focuses on whole aspect of one complete working process due to time study and motion that involve during the process. Since the method almost cover all important aspects, the history of time study so into the most useful tools in manufacturing industries.

Since this project using the method of time study, it will be based on the actual research and approach. Most of the source used in this project came from reliable and trustworthy sources which is including of journals, books and articles. Regarding to the time study method, there are a lot of techniques consist but the project research only focus on one method. The method is stopwatch time study and it been chosen for this project because of it compliance with the selected industry. Effective approach by this method would provide a success to improve working flow process, quality of packaging and productivity of chosen industry, mushroom industry.

2.2 Philosophy of Time Study

According to the Benjamin W. Niebel (1993), time study is often referred to as work measurement. It involves the technique of an allowed time standard to perform a given task, based on the measurement of the work content of the prescribed method, with due allowance for fatigue and for personal and unavoidable delays. Time study analysts use several techniques to establish a standard: a stopwatch time study, computerized data collection, standard data, fundamental motion data, work sampling and estimates based on historical data. Each of these techniques has application under certain conditions. Time study analysts must know when it is best to use a certain technique and then use that technique wisely and correctly.

Referring to Meyers (2002), time standard can be defined as “the time required to produce a product at a work station with the following three conditions: a qualified, well-trained operator, working at a normal pace and doing a specific task”. The three conditions are explained as below:

i. A Qualified, Well-trained Operators

Experience is usually what makes a qualified, well-trained operator and time on job is the indication of experience. The time required to become qualified varies with the job and person. The greatest mistake ever made by new time study personnel is time studying someone too soon. A good rule of thumb is to start with a qualified, fully trained person and to give that person a fortnight on the job prior to the time study. One new job or task, predetermined time study systems are used. These standards seem hard to achieve at first because the time are set for qualified, well-trained operator.

ii. Working at a Normal Pace

Only one time standards can be used for each job, even though personal differences of operators caused different results. A normal pace is usually comfortable for most people.

iii. Doing a Specific Task

It is a detail description of what must be accomplished. The description should include the prescribed work method, material specification, the tools and equipment being used, the position of incoming and outgoing material and additional requirement like safety, quality, housekeeping and maintenance task.

Time study always played a role of work measurement and involving a technique of establishing an allowed time standard to perform a given task, based on the measurement of the work content of the prescribed method and with due allowance for fatigue, personal and unavoidable delays. Basically, time study is used to determine the time required by a qualified well-trained operators working at a normal pace and do the specific task. The result of study time is the time that a person suited to do the job and fully trained on specific method. The job needs to be performed if he/she works at a normal or standard tempo. This kind of time called the standard time of operation. Time study is consisting of four parts:

- i. Developing a preferred method.
- ii. Standardizing the operation.
- iii. Determining the time standard.
- iv. Training the operator.

2.3 Objectives of Time Study

According to the Benjamin W. Niebel (1992), the principles objective of time study are to increase productivity and product reliability and lower unit cost, thus allowing more quality goods and/or services to be produced for more people. The ability to produce more or less will result in more jobs for more people for a greater number of hours per year.

Only through the intelligent application of the principles of method and time study can producer of goods and services increase while, at the same time, the purchasing potential of all consumers grows. Through these principles unemployment and relief rolls can be minimized, thus reducing the spiraling cost of economic support to non producers. Corollaries that apply to the principal objectives are to:

- i. Minimize the time required to perform task.
- ii. Continually improve the quality and the reliability of the products and services.
- iii. Conserve resources and minimize cost by specifying the most appropriate direct and indirect materials for the production of goods and services.
- iv. Produce with a concern for the availability of power.
- v. Maximize the safety, health and well being of all employees.
- vi. Produce with and increasing concern to protect our environment.
- vii. Follow a human program of management that results in job interest and satisfaction for each employee.