



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**PRODUCTIVITY IMPROVEMENT IN METAL INDUSTRY:
WORK STUDY IMPROVEMENT**

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

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 of Bachelor of Manufacturing Engineering (*Manufacturing Management*). The members of the supervisory committee are as follow:

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09/04/2010

ABSTRACT

Generally, standard work is one of the Lean Manufacturing tools and techniques. The development of good standard work is a key to lean success and most companies are aware of this and want to implement in their company. This project is carried out at Jati Beringin Sdn. Bhd (JBSB), which is located in Durian Tunggal, Melaka. The focuses of this study are at the production line. The objectives of the study are to perform work study at the JBSB production line, set the standard time using work study technique, establish the Standard Operating Procedure (SOP) for the company, and finally to identify and propose some recommendations for improvement. Work study which consists of method study and work measurement using standard time. Standardized work basically ensures that each job is organized and carried out in the most effective manner. As a result, standard time data will be develop in order to establish the Standard Operating Procedure (SOP) for the company. Lastly some recommendation is made to eliminate waste and improve the productivity.

ABSTRAK

Lazimnya, penyeragaman kerja adalah salah satu teknik di dalam Lean Manufacturing. Pelaksanaan penyeragaman kerja yang baik adalah kunci kejayaan untuk lean dan kebanyakan syarikat akan hal ini dan ingin mengaplikasikannya di syarikat mereka. Projek ini dijalankan di Jati Beringin Sdn. Bhd (JBSB) yang terletak di Durian Tunggal, Melaka. Fokus untuk projek ini adalah di bahagian pengeluaran. Objektif kajian ini dijalankan adalah untuk membuat kerja piawai di JBSB iaitu di bahagian pengeluaran, menetapkan masa piawai, membuat prosedur kerja yang piawai untuk syarikat dan mengenalpasti serta mencadangkan sesuatu untuk penambahbaikan. Ia telah dijalankan melalui kaedah pergerakan kerja dan pengukuran masa dengan menggunakan masa piawai. Penyeragaman kerja pada dasarnya menentukan setiap kerja diatur dan dijalankan dengan lebih berkesan. Hasilnya, data masa piawai telah ditentukan bagi membuat prosedur kerja yang piawai untuk syarikat. Akhirnya cadangan dibuat untuk menghapuskan pembaziran dan penambahbaikan.

DEDICATION

For my beloved mum and dad

Ab Ghani Bin Hj Mat Ali

Fauziah Bt Che Mud

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TABLE OF CONTENT

Abstract	i
Abstrak	ii
Dedication	iii
Acknowledgement	iv
Table of Content	v
List of Tables	ix
List of Figures	x
List of Equations	xi
List of Abbreviation	xii
1.0 INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Objectives	2
1.4 Scope of the Project	3
1.5 Review of Methodology	3
1.6 Structure of Report	4
2.0 LITERATURE REVIEW	5
2.1 Productivity	5
2.1.1 Productivity Improvement	7
2.1.2 Productivity Measurement Techniques	7
2.2 Six Sigma	9
2.3 Lean Manufacturing	11
2.3.1 Waste in Manufacturing	12
2.4 Lean Manufacturing Tools and Techniques	13
2.4.1 Kanban	13
2.4.2 5S	14

2.4.3	Total Productive Maintenance	15
2.4.4	Poka Yoke	16
2.4.5	Standard Work	17
2.5	Standard Operating Procedure (SOP)	19
2.6	Work Study	20
2.6.1	Method Study	22
2.6.2	Work Measurement	24
2.6.2.1	Time Study	25
2.6.2.2	Time Standard	26
2.6.2.3	Work Sampling	26
2.6.2.4	Predetermined Time Standard (PTS)	27
2.6.2.5	Stopwatch Time Study	29
2.6.2.6	Rating	30
2.6.2.7	Allowance	31
2.7	Example of Case Study that Implement Lean Manufacturing	33
2.7.1	7-Eleven Case Study (H.B Maynard and Company Inc)	33
2.7.2	Case Study: Thara Engineering, India	34
2.7.3	Case Study: Gold Seal Engineering Products Ltd, India	35
2.8	Summary	36
3.0	METHODOLOGY	37
3.1	Planning of the Study	37
3.1.1	Process Flow Diagram (PFD)	37
3.1.2	Gantt Chart	42
3.2	Data Collection	44
3.2.1	Primary Data	44
3.2.1.1	Site Visit	44
3.2.1.1.1	Direct Observation	44
3.2.1.1.2	Informal Interview	45
3.2.1.1.3	Time Study	45
3.2.2	Secondary Data	47

3.2.2.1	Books	47
3.2.2.2	Journals	47
3.2.2.3	Internet Articles	47
3.3	Recommendation	47
3.4	Summary	47
4.0	RESULT AND DISCUSSION	48
4.1	Define Phase	48
4.1.1	Product	49
4.1.2	Product Categories	50
4.1.2.1	High Voltage Pole Accessories	51
4.1.2.2	Low Voltage Pole Accessories	52
4.1.2.3	Fixed Line Pole Accessories	52
4.1.3	Comparison of each category	53
4.2	Measure Phase	54
4.2.1	Average Time	54
4.2.2	Rating Factor	54
4.2.2.1	Normal Time	55
4.2.3	Allowance Factor	55
4.2.3.1	Standard Time	56
4.2.4	Explanation of the Stopwatch Time Study Sheet	58
4.3	Analyse Phase	59
4.3.1	ABC Suspension Hook	59
4.3.2	Clamp Pole Step Pole Iron	62
4.4	Improve Phase	65
4.4.1	ABC Suspension Hook	66
4.4.2	Clamp Pole Step Pole Iron	72
4.5	Control Phase	78
4.6	Summary	78

5.0	CONCLUSION AND RECOMMENDATION	79
5.1	Conclusion	79
5.2	Recommendation for Improvement	80
5.3	Future Work Recommendation	82
	REFERENCES	83
	APPENDICES	

LIST OF TABLES

2.1	Comparison of Lean and Six Sigma	9
2.2	The Method Study procedure	23
2.3	Performance Rating Table	30
3.1	Gantt Chart	43
3.2	Example form for record time study every process	46
4.1	High Voltage Pole Accessories Product	51
4.2	Low Voltage Pole Accessories Product	52
4.3	Fixed Line Pole Accessories Product	52
4.4	Stopwatch Time study sheet	57
4.5	Explanation of the template	58
4.6	Total time for every type of activity	59
4.7	Total time for every type of activity	62
4.8	Standard Operation Procedure for ABC Suspension Hook.	68
4.9	Standard Operation Procedure for Clamp Pole Step Pole Iron	74

LIST OF FIGURES

2.1	7 Waste (Melton, 2005)	13
2.2	The Affect of Standard Work (Steward, 2008)	18
2.3	Component of Work Study (Young, 1994)	20
2.4	Example of PTS time study. (Meyers, 2002)	28
2.5	Example of Stop watch time study. (Meyers, 2002)	29
2.6	ILO Recommended Allowance (Freivalds A et al,2009)	32
3.1	Process Flow Chart	39
3.1	DMAIC Methodology	40
4.1	Graph of Demand per Month of product	53
4.2	Graph of Activities	60
4.3	Graph of Percentage of Process Categories	61
4.4	Graph of Percentage of Activities	63
4.5	Graph of Percentage of Process Categories	64
6.1	Area should be focus to implement 5S	84

LIST OF EQUATIONS

2.1	Productivity	5
2.2	Work Sampling	27
2.3	Standard time	31
4.1	Normal Time	55
4.2	Allowance	55
4.3	Standard Time	56

LIST OF ABBREVIATIONS

JBSB	-	Jati Beringin Sdn Bhd
JIT	-	Just In Time
NT	-	Normal Time
NVA	-	Non-Value Added
PSM	-	Projek Sarjana Muda
PTS	-	Predetermine Time Standard
SOP	-	Standard Operation Procedure
ST	-	Standard Time
TPM	-	Total Productive Maintenance
VA	-	Value Added
VSM	-	Value Stream Mapping
WCM	-	World Class Manufacturing

CHAPTER 1

INTRODUCTION

In this chapter, an introduction to the background of study will be given. Following by that, the problem statement, objective, scope of the project and review of methodology will also be presented.

1.1 Background of Study

Nowadays, there are many companies that apply lean manufacturing in order to increase their productivity with their own tools and techniques. Generally, the study is about improving the productivity in metal industry which will be conducted in Jati Beringin Sdn Bhd (JBSB)

Productivity is a measure relating a quantity or quality of output to the inputs required to produce it. By this definition there are two primary ways of increasing productivity which is increase the value created and decrease time required to create that value. Productivity is a measure of how efficiently an economy transforms its labor, capital, and raw materials into goods and services. In other words, productivity is a broad, shorthand measure that economists and government statisticians use to describe the output that an hour of labor produces. If output per hour worked increase, productivity is said to increase.

Productivity also referred as efficiency, it is the ratio or proportional relationship between the generate, create or yield compared to actual personal capacity to produce.

Many people do have the ability to perform better, become more productive and effective either at the workplace and at home or in whatever they are doing.

So, in JBSB existing process and proposed better ways of doing work for the purpose of establishing standard time. Then, the SOP for the company will be established. An SOP is a set of instructions or steps someone follows to complete a job safely, with no adverse impact on the environment and which meets regulatory compliance standards. It is a way that maximizes operational and production requirements. An SOP is a set of written instructions that document a routine or repetitive activity. Thus, more effective method of doing work which can be developed and unnecessary operation, delay and waste can be eliminated.

1.2 Problem Statement

The study is to observe and find the standard time of every process in selected metal industry, Jati Beringin Sdn Bhd (JBSB). The work study method is use which is focused on work flow in processing the product in JBSB. Work Study deals with the technique of method study and work measurement. The focus of this study is concerned with the reduction of the work content of a job or operation, while work measurement is typically concerned with any ineffective time associated with the method and subsequent establishment of time standards for the operation in order to increase productivity.

1.3 Objectives

The objectives of the study are:

1. To perform work study at the JBSB production line.
2. To set the standard time using work study technique.
3. Establish the Standard Operating Procedure (SOP) for the company.
4. Identify and propose some recommendations for improvement.

1.4 Scope of the Project

Basically, this study is focused on work study in order to improve the company productivity at all process to produce products. Work Study is the systematic study of an operation or process to ensure the best possible use of the human and material resources available. The documented SOP will be establish for the company in order to standardized work and have a consistent procedure in the workplace. Therefore work procedures will be standardized to ensure that the tasks are organized in the best sequence and products will be made the best way every time. The duration of the project will be start from July 2009 until April 2010.

1.5 Review of Methodology

Firstly, this study is start with conformation of the title of the project and identifies a suitable company to conduct this study. This study is conducted at a metal industry which is the Jati Beringin Sdn Bhd. To guide of this study, the main objective and scope of the project is defined which is then followed by writing the literature review. The source of literature review is mostly from the journals, articles and reports. There are also the sources from the books that are related to this study. In addition, case studies that are related to this study will be included in the literature review. When the problem is being clarified based on an observation, the work method study will be carry out and all of this will be cover in PSM II. The process of making products will be study and all the data and information about the process will be recorded. Then, the standard time will be identified. From that the waste during the processing time will be determined. Finally the result will be presented with the recommendation technique to improve the productivity in the company.

1.6 Structure of Report

Generally, this report is divided into two parts which are Projek Sarjana Muda (PSM) I and PSM II. In total, this report contains of five main chapters. These chapters are separated into two parts which the first part contains three chapters; introduction, literature review and methodology. Whereas, the second part contains two more chapters, results and discussion. Finally, conclusion and recommendation of this study will be discussed in PSM II.

In the first chapter, Introduction, briefly explain the background of the study which is about the important of the productivity in manufacturing. It is also contains the problem statement, objectives, scope, research methodology and also structure of the report. All theories were obtained and referred from the articles, journals, and some books related to the study are explain in detail in Chapter 2, Literature Review.

In chapter 3, Methodology, all methods that have been use are explained specifically in term to achieve the objectives and obtain the result of the study. On the other hand, in Chapter 4, for the results and discussion, this report are focus primarily on the data that been collected and identify the influence factor that achieve the result.

In the last chapter, Conclusion and Recommendation which conclude this study and also included some suggestion in order to improve this study for future. Finally, all the chapters are compiled separately in sequences in order to give a clear view to the readers.

CHAPTER 2

LITERATURE REVIEW

Basically, this chapter discuss about literature review that relates to the scope of the study. The sources of information are obtained from articles, journals, case studies and some books, electronic media related to the study. Indeed, it covers elements that are important in this study such as productivity and work study that can considerably increase the productivity. At the end of this chapter, the entire element will be narrowed down to the scope of the study.

2.1 Productivity

Productivity generally expresses the relationship between the quantity of goods and services produced (output) and the quantity of labor, capital, land, energy, and other resources to produce it (input). When measured, productivity is often viewed as a relationship between output and a single measure of input, such as labor or capital. The simplest definition of productivity is an output or input. (Kenneth, 2004)

From that, productivity can be defined as the application of the various resources (inputs) of an organization, industry or country, in order to achieve certain planned and desired results (outputs).

$$\text{Productivity} = \text{Output} / \text{Input} \tag{2.1}$$

Another opinion of productivity is a process of continuous improvement in the production/supply of quality output/service through efficient, effective use of inputs, with emphasis on teamwork for the betterment of all. Productivity is a concept that is understood differently by different people. Generally, a productivity ratio is output to input. (NPCC, 2009)

There are many different examples of productivity measurements used in companies and organizations. These measurements are both used for monitoring and development of the daily operation as well as for long term strategic considerations of the business. The productivity measures can be divided into three types (Hannula, 1999):

1. Total productivity
2. Total factor productivity
3. Partial productivity measures

According to Al-Dharab (2000), productivity is in its pure sense the ratio of outputs to inputs and has been classically computed at two levels. Productivity, defined as labor productivity, is very specific to the type of service provided and does not allow for easy comparison across different services. An example of this would be to try and compare the number of visits per hour for primary care physicians to the number of procedures performed by a surgeon. The multi-factor productivity is a more generic form that transforms all outputs and inputs into a common unit of measure, making comparisons across services effective. Historically, productivity has been measured accurately in manufacturing environments and, in general, poorly in service related fields due to the difficulties in measuring outputs and inputs whose work content vary widely

An interesting point here was that labour productivity is a good proxy for total productivity. The most interesting point made was that most of the things that determine productivity come down to managerial choice.

2.1.1 Productivity Improvement

The result of productivity analysis should be a clear picture of improvement opportunities. The level of management attention to productivity will dictate the type of improvement program required. If little attention has been given to productivity, then management must evaluate the business planning process and be certain that productivity improvement is clearly reflected in the mission and vision of the organization. In a more productivity conscious organization, the structure will be in place to continuously improve. Productivity improvement should be viewed as an ongoing continuous process. (Kenneth, 2004)

Lean thinkers are aiming for perfection and in doing so the improvement cycle is never ending. For many in the process industries this culture change is the hardest change of all. However, for assured sustainability the organizations who are truly lean will invest the time and effort to support a change in culture (Melton, 2005)

Productivity helps companies to continuously improve productivity by creating a culture of continuous improvement using various techniques including, Work Study tools which include Method Study and Work Measurement. This method also will be used in this study.

2.1.2 Productivity Measurement Techniques

Performance measures are often to be used to increase the competitiveness and profitability of manufacturing companies through the support and encouragement of productivity improvements. (Tangen, 2003)

Any manufacturing companies are still primarily relying on traditional cost related performance measures, such as return on investment, profit margin and cash flow. (Ghalayini *et al*, 1997)

There are many different types of performance measures (Tangen, 2003):

i. Financial measures

Financial measures are clearly concerned with cost elements and try to quantify performance solely in financial terms, but many improvements are difficult to quantify directly in monetary value, such as lead time reduction. (Ghalayini *et al*, 1997)

ii. Traditional productivity measures

Usually two traditional types of index productivity measures are distinguish (Tangen, 2003):

1. Partial productivity measures: ratios of output to one source of input such as labour, capital, material or energy.
2. Total productivity measures: ratios of total output to the sum of all input factors.

iii. Time-based productivity measures

Another approach is the unit time can be used in the case of several products being produced, where a variety of products are made, it may be that common unit does not exist. In this case the unit common to all products is time. The work content of a product is expressed as the time required making the product using a given method of manufacture. Using time study techniques, the standard time for a job can be determined.

iv. Non-cost performance measures

A new classification of performance measures involving three intrinsic dimensions is therefore introduced by (Flapper *et al*, 1996):

1. Decision type: Tactical/operational, this dimension focuses on the kind of decision the measure is meant to support.