

PRODUCTIVITY IMPROVEMENT THROUGH WORK  
STANDARDISATION APPROACH

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## **PRODUCTIVITY IMPROVEMENT THROUGH WORK STANDARDISATION APPROACH**

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

by

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STANDARDISATION APPROACH**

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I hereby, declared this report entitled “Productivity Improvement through Work Standardisation Approach” is the result of my own research except as cited in references.

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Date : 26 JUNE 2019

## **APPROVAL**

This report is submitted to the Faculty of Manufacturing Engineering of Universiti Teknikal Malaysia Melaka as a partial fulfilment of the requirement for Degree of Manufacturing Engineering (Hons). The member of the supervisory committee is as follow:

.....  
**(ASSOCIATE PROFESSOR DR ZUHRIAH BINTI EBRAHIM)**

## ABSTRAK

Setiap syarikat perkilangan mencari penyelesaian untuk meningkatkan produktiviti mereka. Salah satu sebab yang menyumbang kepada produktiviti yang rendah dalam proses pembuatan adalah disebabkan oleh kerja semula (rework). Kajian ini dilakukan di Syarikat S Sdn. Bhd. yang menghasilkan kabel elektrik. Syarikat ini menghadapi produktiviti yang rendah kerana jumlah kerja semula (rework) yang lebih tinggi dalam proses Pembersihan dan Penggerudian. Oleh itu, kajian ini dilakukan bertujuan untuk mencadangkan penyelesaian untuk peningkatan produktiviti pada proses Pembersihan dan Penggerudian. Matlamat ini disokong oleh dua objektif: i) untuk menganalisis aliran proses semasa di Proses Pembersihan dan Penggerudian ii) untuk mengurangkan kerja semula sebanyak 50% melalui peningkatan aliran proses semasa. Masalah utama proses Pembersihan adalah gam terlebih pada terminal manakala bagi proses Penggerudian adalah lubang tidak selaras. Terdapat dua sebab utama yang dikenal pasti untuk proses Pembersihan dan Penggerudian iaitu: (i) tiada prosedur peyelarasan kerja dan (ii) kesilapan teknik Pembersihan dan Penggerudian. Kajian ini menggunakan konsep standardisasi kerja untuk meningkatkan produktiviti dalam proses Pembersihan dan Penggerudian. Cadangan penyelesaian masalah bagi projek ini ialah (i) prosedur penyelarasan kerja (ii) rekabentuk “jig” untuk mengawal aliran gam dan (iii) “on job training” untuk proses Pembersihan dan Penggerudian. Selain itu, beberapa alat dan teknik sokongan lain juga akan digunakan. Oleh itu, ia dijangka dapat mengurangkan 50% kerja semula dalam proses Pembersihan dan Penggerudian.

## **ABSTRACT**

Every manufacturing companies seeks for a solution to increase their productivity. One of the reason that contributes to low productivity in manufacturing process is due to the rework and scrap. This project was done at Company S Sdn. Bhd. that produces electrical cable which is flexible link. The company faces low productivity due to high number of rework and scrap at Cleaning and Drilling process respectively. Thus, this project aims to propose solutions for productivity improvement at Cleaning and Drilling process. The aim is supported by two objectives: i) to analyse the current process flow at Cleaning and Drilling process and ii) to reduce the rework by 50% through improvement of current process flow. The main problem of Cleaning process is residue glue on terminal meanwhile for Drilling process is misalignment hole. There are two main root causes identified in Cleaning and Drilling process: (i) no standard operating procedure and (ii) Cleaning and Drilling technique errors. The concept of work standardization has been applied in order to improve productivity at Cleaning and Drilling process. This project proposed (i) standard operating procedure (SOP) (ii) the design of jig to control the flow of glue and (iii) on job training (OJT) for Cleaning and Drilling process respectively. Besides, some other supportive tools and techniques will be applied as well. Thus, it is expected to reduce 50% of rework at Cleaning and Drilling process.

## **DEDICATION**

Only  
my beloved father, Malaya Bin Kasurah  
my appreciated mother, Salamiah Binti Idi  
my adored sisters and brother,  
for giving me moral support, money, cooperation, encouragement and also understandings  
Thank You So Much & Love You All Forever.



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## LIST OF ABBREVIATIONS

VSM	-	Value Stream Mapping
PSM	-	Projek Sarjana Muda
Sdn Bhd	-	Sendirian Berhad
SOP	-	Standard Operating Procedure
OJT	-	On Job Training

# **CHAPTER 1**

## **INTRODUCTION**

This chapter will brief about project background, problem statement, project objectives, and project scope, project significant and thesis outline.

### **1.1 Project Background**

In this era globalization, electrical cable company has changed from living a small company to a very large company. Generally, the electrical cable company focus on supplying cables for particular applications referring to the industry needs. The electrical cable company has a lot of quality and technical particulars although it is a volume-driven product. However, electrical cable company mostly will bring a challenge to the field of manufacturing, marketing, human resource, supply chain and procurement. Besides that, all companies around the earth are attempting repeatedly to maximize their system regular and reduce the quality cost since the level of the competition in the worldwide become increases. Thus, it will gives impacts to the productivity (Aaditi, 2012). There are many tools and strategies that can be carried out by the managements in order to achieve the aims.

Syverson (2011) stated that productivity is the ratio of output over input. The term productivity can be used to examine efficiency and effectiveness in production. As such, it is typically described as how much output is obtained from a given set of inputs. According to Rogers (1998), increasing productivity indicate either higher output is formed with the same quantity of inputs, or that lower inputs are needed to produce the same quantity of output. The concept of productivity is related firmly with the concern of efficiency. Therefore, the higher the efficiency, the higher the productivity.



## 1.2 Problem statement

Nowadays, the common problem facing by manufacturing companies is how to increase the productivity in order to stay competitive in the market and satisfies customer. It is very important to provide consistency in their action to increase its efficiency and for companies to stay competitive and survive in the market. However, it is quite difficult to retain the required consistency and might be affect in the variety of customized products or services. This is due to the different ways of carrying out the identical process by different operators which have different educations, experiences or skill levels. Basically, it will helps in getting little of variations and ensure better quality in the production if all workers followed the standard method of implementing the task that was documented and captured. Thus, the organizations will more concerned in standardizing their processes (Ungan, 2006).

This project was taking based on Company S Sdn. Bhd in Melaka. Company S is a medium manufacturing company that produced customized product which is electrical cable named flexible link. The flexible link is widely used in electrical industry. In Company S, one of the reasons that contributes to low productivity in manufacturing process is due to the rework. Hence, the company seeks for solution to increase their production productivity.

Figure 1.1 shows the total number of rework from January 2018 until September 2018 (131 units). The details data were collected from Company S. As can be seen, the highest total number of rework is on August 2018. Along the period, the total output that were produced are 7,019 units. In total, the number of rework contribute 1.9% of the total output along year 2018 (up to September). Therefore, there were rework occur along the period.

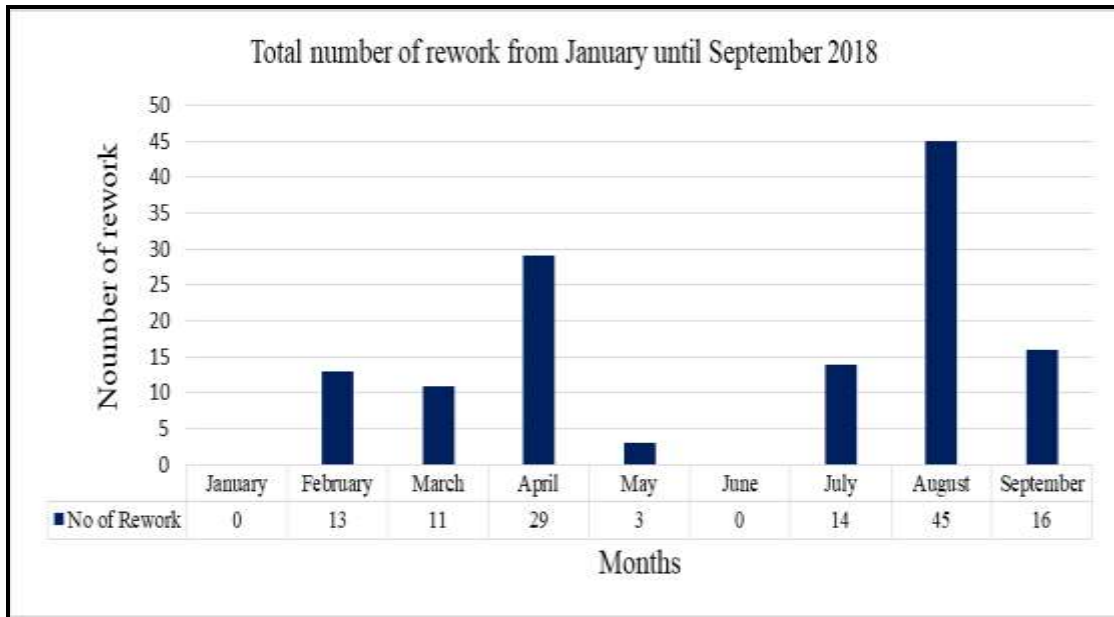


Figure 1.1: Total number of rework from January until September 2018 (Company S record, 2018)

Figure 1.2 shows the total number of reworks (131 units) in each process from January 2018 until September 2018. The highest number of the rework (119 units) was identified at Cleaning process. In this case, Cleaning process contribute 90% of the total number of rework among other process. However, the company was proposed to focus also in Drilling process as Drilling process contributes the highest rework during the production. There were no data that shows there were rework occurs in Drilling process since the company didn't record the data. Therefore, in this project, there were two process that will be focused on which are Cleaning and Drilling process in order to improve the productivity.

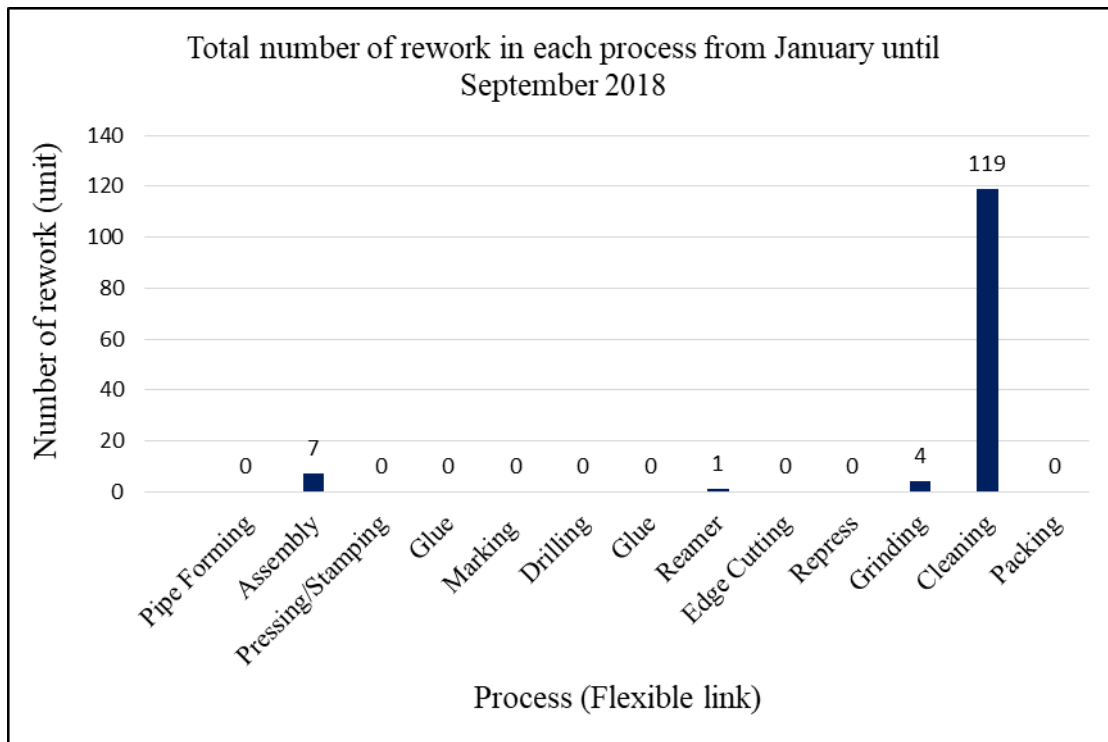


Figure 1.2: Total number of rework in each process from February 2018 until September 2018 (Company S record, 2018)

Based on the details data that were collected from the company, the rework process at Cleaning process can be up to one day to complete a product. However, not all rework in each process took one day to complete. The rework time spend depends on condition of the defects.

Hence, the implications of the problems are the cycle time of the process will increase since the operator need to spend much time for the rework and at the same time will increase the quality costs in the production. The company experiences the large number of products rework thus, the company need to be more effective to survive and in order to do this, the management team need to seek for process improvement methods.

### **1.3 Project Objectives**

The objectives of this project are:

- i. To analyse the current process flow at Cleaning and Drilling process.
- ii. To reduce the rework by 50% through improvement of the current process flow.

### **1.4 Project Scope**

The scope is based on Company S Sdn. Bhd. that manufacture customized product which is electrical cable. The project focuses on the general demand of product and providing solutions for rework at Cleaning and Drilling process respectively based on the analysis factors which are Man, Method, Machine and Material. In addition, work standardization approach and other tools will be applied in order to reduce rework.

### **1.5 Project Contribution**

The significant of this project is productivity improvement through implementation of work standardization and other tools that could reduce the number of rework by 50%.

### **1.6 Thesis Outline**

Chapter 1 consist of defining the problem occurs in Company S. Based on the data collected, the problem statement was identified. Objectives, scope of the project, significant projects are also stated to make sure the project is always in the right track. The manufacturing process flow of the company also shown to give clear understanding on where the project is carried out.

Chapter 2 is conducted to gain literature review about the project. Past research are referring to illustrate how the subject has been studied previously. Terms of productivity, impacts of reworks and Work Standardization approach were identified.

Chapter 3 explains about the method used to achieve objective especially for data collection and data analysis. The work standardization approach is used to achieve the objectives.

Chapter 4 explain the details about the obtained results and discussion that close related to the achievement of three objectives which are:

- i. To analyse the current process flow at Cleaning process
- ii. To reduce the rework by 50% through improvement of the current process flow

Chapter 5 conclude all the findings results based on the objectives. It will review whether the objectives were achieved or not. Recommendation is also stated in this chapter.

## **CHAPTER 2**

### **LITERATURE REVIEW**

The purpose on this literature review is to obtain understanding into Work Standardization Approach and how it can be implemented in manufacturing company in order to improve the productivity of process. In this chapter, there are discussed about common issue in productivity, rework, tools and technique and overview of Work Standardization Approach.

#### **2.1 Productivity**

Productivity is the ratio of efficiency between the input and output in the production line. It is a significant relationship between the outcome and the income. Productivity shows the decline in resources' wastage like material, machine, men, area, modal etc. It can be described as human efforts to produce more and less inputs of resources. Hence, there will be high distribution of profit among maximum number of people.

Productivity build a relationship between one or all required inputs and output. According to Mapfaira *et al.* (2015), productivity is a very important part in the operation of manufacturing because it contributes vision into the efficiency and effectiveness of operations. Productivity is the efficiency and effectiveness in which an organization converts inputs into output. That was a part of the efficiency and effectiveness of an organization in generating output with the assets available. For productivity improvement in the production line, the company will obtain many advantages, which basically results in maximized profitability of the organization.

Productivity improvement is a centre planning against manufacturing accomplishment and also a fundamental to accomplish excellent operational performance and financial. It improves customer fulfilment, shorten time and reduce cost to establish, manufacture and distribute products and service. Besides that, productivity has a good and powerful connection to fulfilment quantification for utilization operation, output operation, cost of product and work-in-process inventory levels and on-time delivery. Development can be in the shape of removal, adjustment of ineffective step, clarifying the operation, monitoring the service, minimizing variation, increasing throughput, minimizing cost, maximizing responsiveness or quality and shorten time taken (Naveen and Babu, 2011).

In order to succeed and be competitive, the organization must be customer oriented and flexibly respond to all the requirements and needs as well as rapidly and unexpectedly. Essentially, the organization must give high quality product to the customers. Hence, quality has turn into the main average of competitive attempt (Míkva *et al.*, 2016).

### **2.1.1 Rework**

Rework is described as parts of production rejects that were transformed into re-usable products with the same or lower quality. Rework can be very beneficial, especially when the disposal cost are huge and the materials are limited in time. Non-defective, rework able defective or non-rework able defective may be occur to the produced lots. Rework able defective lots degrade over time that will give effects to the time and cost (Huang and Liang, 2010). Sivashankari and Panayappan (2014) stated that the defective parts are produced with the finished goods in an incomplete manufacturing process. Thus, the rework process is needed to transform those defective parts into finished goods.

### 2.1.2 Effect of reworks on productivity

Reworks are one of the common problems occur in manufacturing process. Rework is a transformation of rejects product into re-usable products of the same quality. Rework is a performance operation that are required to repair in the previous action that were performed poorly, correct or compensate for an unpredictable quality specification, side effect of outcome due to shortage, design change, customer demand and replace a defective component.

The operation of production start with the in-control state. However, the operation might be change to the out-of-control state thus the non-conforming parts will produced. When this matter happened, the production process is disrupted, the process can be defined as an imperfect process (Chen *et al.*, 2010). Chiu *et al.* (2016) claimed that reworking the non-conforming parts can decrease the product quality and at the same time increase the quality costs in production. Therefore, this matter will give problems to the company which is the overall production and inventory cost will become increase. Rework has been rejected by some companies in the manufacturing sector. This is because rework minimizes the product quality and increase costs.

Apart from that, there are some effect occurs during the rework process. The impact of the rework will affects the performance of a process with 100% inspection followed by rework on the entire production. According to Agnihotri and Kenett (1995), there is no perfect process in manufacturing industry. Since some of the process is not perfect, the defects will generates and thus it will became waste due to inspection, rework, scrap, yield loss, additional material handling costs and excessive production delays.

Some products at the same stage might be reworked. The quality of products degrade during the rework process. Thus, the products may be rejected to be reworked or else the products cannot be reworked as well. In a result, there were maximum in time and cost for operating rework process (Inderfurth *et al.*, 2006).

During the production, rework might be produced. This are due to the imperfect quality of the components, subassemblies that are brought from the suppliers and