RE-EVALUATING STANDARD OPERATING PROCEDURES FOR HABERDASHERY PRODUCT USING ELEMENTAL BREAKDOWN ANALYSIS

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

by

RAVEEN KUMAR A/L MAGESVARAN

B051810176

971030-35-5219

FACULTY OF MANUFACTURING ENGINEERING

2022

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

Tajuk: **RE-EVALUATING STANDARD OPERATING PROCEDURES FOR HABERDASHERY PRODUCT USING ELEMENTAL BREAKDOWN ANALYSIS**

Sesi Pengajian: **2021/2022 Semester 2**

Saya **RAVEEN KUMAR A/L MAGESVARAN (971030-35-5219)**

mengaku membenarkan Laporan Projek Sarjana Muda (PSM) ini disimpan di Perpustakaan Universiti Teknikal Malaysia Melaka (UTeM) dengan syarat-syarat kegunaan seperti berikut:

1. Laporan PSM adalah hak milik Universiti Teknikal Malaysia Melaka dan penulis.
2. Perpustakaan Universiti Teknikal Malaysia Melaka dibenarkan membuat salinan untuk tujuan pengajian sahaja dengan izin penulis.
3. Perpustakaan dibenarkan membuat salinan laporan PSM ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. *Sila tandakan (√)

☐ SULIT (Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysiasebagaimana yang termaktub dalam AKTA RAHSIA RASMI 1972)

☐ TERHAD (Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/ badan di mana penyelidikan dijalankan)

☑ TIDAK TERHAD

Disahkan oleh:

Alamat Tetap:

No 41, Jalan Saderi 1, Taman Saderi, 09600 Lunas, Kedah
Tarikh: 28/6/2022

PROF. DR. MOHD RIZAL BIN SALLEH
Dean
Centre for Graduate Studies
Universiti Teknikal Malaysia Melaka
Cop Rasmi:
Tarikh: 21.7.2022

*Jika Laporan PSM ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa/organisasi berkenaan dengan menyatakan sekali sebab dan tempoh laporan PSM ini perlu dikelaskan sebagai SULIT atau TERHAD.

DECLARATION

I hereby, declared this report entitled "Re-Evaluating Standard Operating Procedures for Haberdashery Product Using Elemental Breakdown Analysis" is the result of my own research except as cited in references.

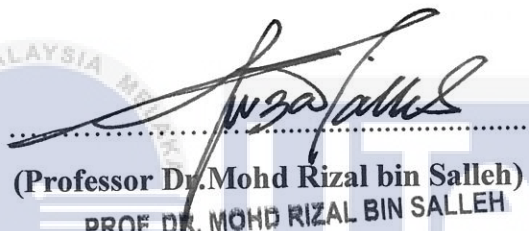
Signature : .....

Author's Name : RAVEEN KUMAR A/L MAGESVARAN

Date : 28/6/2022

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 Bachelor of Manufacturing Engineering (Hons). The member of the supervisory committee is as follow:



(Professor Dr. Mohd Rizal bin Salleh)
PROF. DR. MOHD RIZAL BIN SALLEH
Dean
Centre for Graduate Studies
Universiti Teknikal Malaysia Melaka

ABSTRAK

Keupayaan untuk mengoptimumkan kecekapan dan keberkesanan penggunaan sumber melalui penggunaan teknik kejuruteraan industri seperti keseimbangan proses pembungkusan dan kajian masa adalah penting untuk daya saing di dalam industri pembuatan 'haberdashery' kini. Oleh kerana kekurangan pemahaman tentang proses kejuruteraan perindustrian dan pelaksanaan praktikal, hanya beberapa sektor pakaian yang memahami tujuan ini. Ia ditemui selepas beberapa kajian bahawa jabatan pembungkusan berurusan dengan beberapa isu yang memberi kesan kepada prestasi dan kualiti output. Tujuan penyelidikan ini adalah untuk menggunakan analisis pecahan unsur untuk menilai semula SOP untuk produk 'haberdashery'. Beberapa objektif telah ditemui dan berdasarkan konteks dan kenyataan masalah yang disenaraikan. Objektif utama adalah untuk menganalisis prestasi pengimbangan proses produk 'haberdashery' semasa dan mencadangkan SOP baharu untuk memperbaikinya. Menganalisis prestasi mengimbangi proses pembungkusan dan mengesyorkan SOP baru untuk produk 'haberdashery' adalah matlamat utama. Metodologi yang digunakan melibatkan kaedah pengumpulan data dan prosedur untuk menjalankan kajian masa untuk mengoptimumkan kecekapan mengimbangi proses pembungkusan dan produktiviti keseluruhan. Hasilnya akan dipengaruhi dengan memperbaiki ketepatan masa piawai melalui kajian masa, menghapuskan aktiviti yang tidak bernilai daripada tugas, dan mengubah suai organisasi kerja di kalangan pekerja dan stesen kerja melalui pendekatan mengimbangi proses pembungkusan. Proses tersebut akan berfungsi dengan lebih efektif dan berkesan dengan cadangan SOP yang lebih baik. Hasil perbincangan akhirnya adalah, sembilan SOP telah dicadangkan.

ABSTRACT

The capacity to optimise resource utilisation efficiency and effectiveness via the application of industrial engineering techniques such as line balance and time study is essential to haberdashery manufacturing industries' current competitiveness. Due to a lack of understanding of industrial engineering processes and their practical implementation, only a few garment sectors have grasped their purpose. It was discovered after some investigation that the packing department is dealing with several issues that have an impact on the output performance and quality. The purpose of this research is to use elemental breakdown analysis to re-evaluate a haberdashery product's standard operating procedure. Several objectives were developed and based on the context and problem statement listed. The primary objective is to analyze the haberdashery product's present line balancing performance and suggest a new SOP to improve it. Analyzing line balancing performance and recommending a new SOP for the haberdashery product are the main goals. The methodology employed involves data collection methods and procedures for conducting time studies to optimize line balancing efficiency and overall productivity. Based on my findings, the outcomes would be influenced by improving the precision of standard time through time study, eliminating non-value-added activities from tasks, and modifying the work organization among the employees and workstations through line balancing approaches. The packing lines will gradually function more efficiently and effectively with the proposed improved SOP. As a result of the final discussion, nine SOPs were proposed.

DEDICATION

Only

my beloved father, Magesvaran A/L Pawadeh

my appreciated mother, Shanthi A/P N.Periasamy

my adored sister, Logashini A/P Magesvaran

my project supervisor, Profesor Dr.Mohd Rizal bin Salleh

my panels of project and friends

for giving me moral support, money, cooperation, encouragement and also understandings

Thank You So Much & Love You All Forever

ACKNOWLEDGEMENT

With the greatest praise to GOD, the most generous, the most merciful, that I was able to accomplish my final year assignment effectively and without trouble.

I'd like to express my gratitude to Professor Dr. Mohd Rizal Bin Salleh, my project supervisor, for his advice and assistance during this research, as well as his trust in me.

I owe my parents a debt of gratitude for their continuous love and support throughout my life. Thank you for giving me the courage to reach for the stars and pursue my ambitions. Next, I would want to express my gratitude to my friends for their constructive criticism and suggestions throughout my research. I would never have finished this project if it hadn't been for all of your prayers and blessings, as well as your real love and assistance.

Finally, I would like to thank everyone who contributed to this FYP report, and I apologise for not being able to thank everyone of you individually. Thank you very much.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

UTeM	–	Universiti Teknikal Malaysia Melaka
GTP	–	Growth and Transformation
SOP	–	Standard Operating Procedure
LM	–	Lean Manufacturing
VSM	–	Value Stream Mapping
JIT	–	Just In Time
CT	–	Cycle Time
RPW	–	Ranked Positional Weight
LCR	–	Largest Candidate Rule
MODAPTS	–	Motion Arrangement of Predetermined Time Standards
PMTS	–	Predetermined Motion Time Study
SIMO	–	Simultaneous Motion
PSM	–	Projek Sarjana Muda
LLL	–	Life Long Learning

CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter provides background information on the haberdashery manufacturing firm and the issues that have been encountered in terms of production performance and quality. The problem statement, objectives, scope of the study, and importance of the study are all included in this chapter. This chapter gives readers an outline of the subjects that will be explored as the research develops.

1.1 Background of study

In terms of export-oriented industrialization, haberdashery manufacturing is one of the oldest, broadest, most labor-intensive, and most trustworthy industries for emerging countries (Abtew *et al.*, 2019). It is no longer enough to be the greatest in this new industrial revolution era and intense competition (Bongomin *et al.*, 2020). Still, it is also necessary to live long enough in the global market. To remain competitive in the worldwide market, haberdashery developers must respond quickly to changes in client demand by increasing productivity and efficiency. This is because productivity and efficiency are two of the most important factors determining a company's profit or success. As a result, assembly line design and continual improvement in manufacturing to achieve perfection are required to gain a competitive advantage.

Ethiopia's textile and garment industry is one of the fastest-growing industries. The second Growth and Transformation Plan (GTP) II is among the developmental sectors to which the government pays serious attention. The government is displaying willingness to invest in the sector by aiming to raise exports from the sector by one billion dollars by the conclusion of GTP II. Across many developing countries, the garment sector now contributes significantly to the national economy. Those countries are taking advantage of this business to generate significant foreign exchange by exporting garment products, which will help them build their economies.

The line balancing method entails a projected production rate for materials that must be created within a specific time frame. Furthermore, successful line balancing necessitates ensuring that each line segment's output limit can be fulfilled within the specified time frame while using the available production capacity. Before the item may be transferred to the next station on an assembly line, each station requires a specific amount of time to complete the essential procedures. If stations transmit products immediately after completing an operation, stockpiles and waiting time are created between stations if processing time varies. The line balancing method will help reduce production time, increase output, and decrease station imbalance to meet the desired run rate and maximum production flow. One of the outcomes of line balancing is that a single worker can handle two or more machines at once. Whereas improper line balancing could refer to the uneven distribution of tasks and the lack of equal workers along a production line.

In today's economy, productivity, efficiency, and effectiveness are all hot topics. To strive in a tough economy, the industry must develop itself by systematically identifying and eliminating waste, improving productivity, lowering costs, providing employee benefit incentives, and participating in social welfare activities. Companies use various tools and approaches to minimize waste, production time, and overall production costs to stay competitive in the global market (Mohibullah *et al* 2019). Organizations that want to boost productivity, enhance product quality, minimize inventory, shorten lead time, and eliminate manufacturing waste use lean production methods (Rebecca *et al*, 2015).

Besides that, Standard Operating Procedure (SOP) refers to a collection of guidelines that a company follows to formalize a routine or repeatable action. SOPs are an essential feature

of a successful quality management system because they provide employees with the knowledge, they require to complete their tasks effectively. Furthermore, a SOP elaborates all an organization's fundamental and technical operational processes. SOP is a document that contains all the general information or guidelines regarding a procedure to maintain its quality. Every station in a production plant should follow a uniform method to ensure that all products meet the same high standard [7]. A procedure for determining which policies or processes need to be reported should be in place inside the company. Next, people familiar with the job and the organization's internal system will prepare the SOPs. The authorized SOPs should follow the procedures outlined in the organization's Quality Management Plan or its SOP guidelines.

1.2 Problem Statement

This proposal was being carried out at Teaching Factory of UTeM, which is a sub-contractor of Prym Consumer Malaysia Sdn Bhd. The assembly line will be the core of the project. The assembling process for haberdashery products was carried out on the assembly line. After some observation, it was found that the department are dealing with some problems that affect production performance and quality.

Firstly, insufficient information to all workers. In general, manufacturers hold weekly meetings and production plan sessions. Even after receiving the meeting's information, the production department fail to provide the exact details to all employees. This will cause some issues for the employees since they don't have complete knowledge on handling the machines and line. As seen in the Figure 1.1, a lack of information can result in manufacturing rejects. In this case, the improper label causes the product to be sidetracked, often in distribution centres, until the mistake can be found and addressed. Customers will seek alternative sources of supply because of the label difficulties that result in delayed shipments, customer fines, or the delivery of the wrong product.

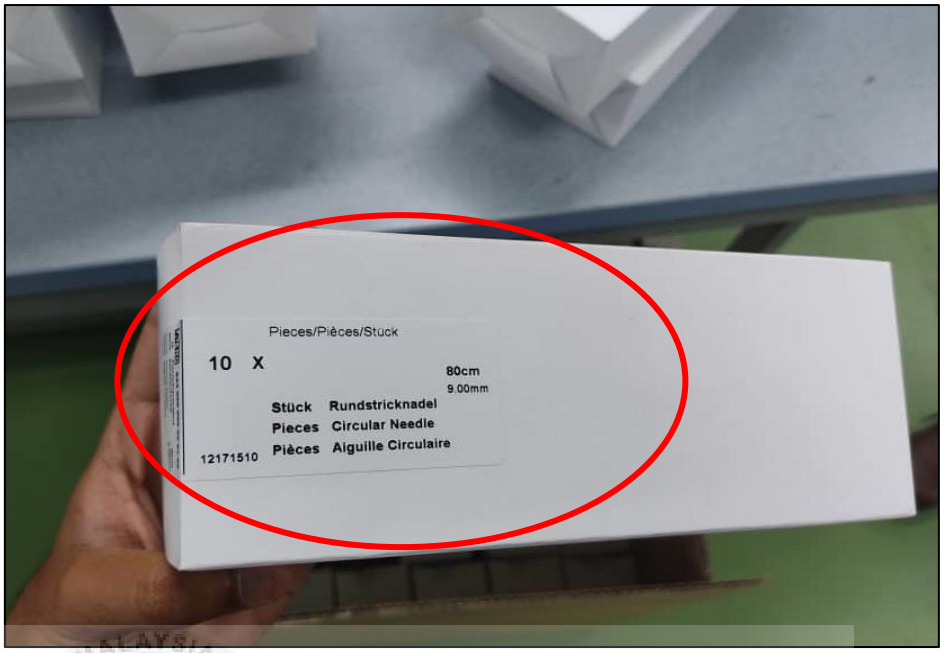


Figure 1.1:Incorrect labeling for materials

The next problem would be the inadequate performance from operators can affect the efficiency of packing lines. One of the issues that must be addressed is consumer complaints about missing parts. This issue arises because of the operators where they manually assembling the items using both hands. In general, only four people are permitted to work in a work cell, although some work cells include more than four people, which is not conventional. Figure 1.2 shows an incorrect packaging material technique that can affect production efficiency. According to my observations, the operators will take all the parts and mix them on the table during the assembly of the part. This is to make it even easier for them to pick up and assemble the parts simultaneously. This problem can be linked to human error in the assembly process.

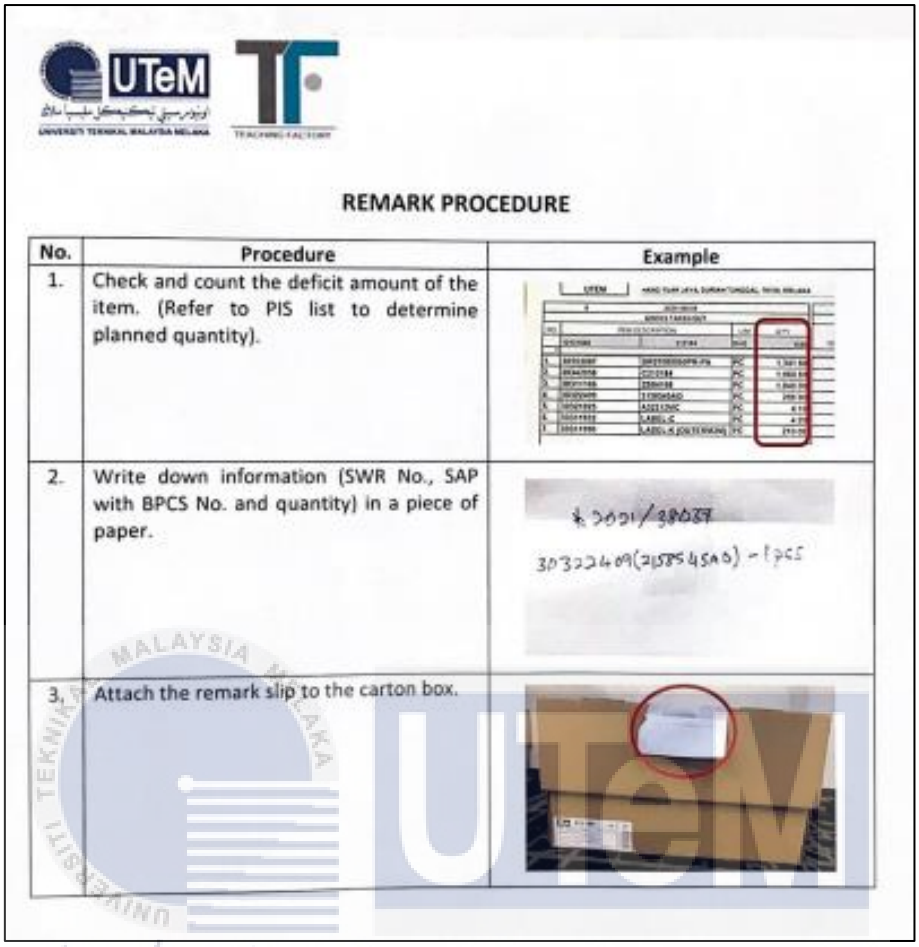
Figure 1.2:Improper procedures of packing products

Furthermore, ineffective SOP of identification and tracking mechanism are causing some negative impacts. There have been some customers complaints about the incorrect quantity of items were received. A poor SOP format or template will make it tough to implement or even tedious. Many executives and third-party consultants make the error of directing the development of SOPs. According to the figures below, there is no adequate SOP documentation for packing nickel steel plated pins, despite the existence of other documents such as the return and remark method.

RETURN PROCEDURE

No.	Procedure	Example
1.	Check the quantity and record all the information in return slip (1 item 1 return slip).	
2.	Gather all items (same SWR No.) and placed in one plastic bag.	
3.	Locate the PIS list (front page only) with return card into the plastic bag.	
4.	Seal the plastic bag neatly.	
5.	Place the sealed bag inside the container.	

Figure 1.3:Example of SOP for return the items



REMARK PROCEDURE

No.	Procedure	Example
1.	Check and count the deficit amount of the item. (Refer to PIS list to determine planned quantity).	
2.	Write down information (SWR No., SAP with BPCS No. and quantity) in a piece of paper.	
3.	Attach the remark slip to the carton box.	

Figure 1.4:Example of SOP for remark items

1.3 Objectives

Based on the background and problem statement listed, the objectives of this research study are as follows:

i. To investigate the current line balancing performance based on provided SOP of nickel steel plated pins.
ii. To propose a new SOP for enhancing the productivity in line assembly.
iii. To validate the procedures that has been proposed in enhancing the line assembly.

1.4 Scope

The scope of the research study are as follows:

i. The line balancing strategy to improve the productivity of the line assembly.
ii. The Standard Operating Procedures of handling haberdashery products in line assembly.
iii. The lean management tools are used to analyze waste throughout the line assembly process.

1.5 Importance of study

The importance of the research is to increase productivity by using line balancing techniques, enhancing line efficiency, and providing standard time for each workstation using a time study to meet the company's target plan. From the lean management tools, it leads to the implementation line balancing method which it enhances the line assembly to the optimal efficiency of the output. Besides that, to review and revise the Standard Operating Procedures of handling haberdashery products. As a result, can improve labor productivity increased quickly and at a low cost.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

The second chapter has been organized into sections to make it easier for readers to understand. This section contains summaries of papers written by various authors on related topics, and this will help to make the knowledge gained from this research more useful. In addition, this section will go into lean management and tools, line balancing, time and motion study in detail.

2.1 Lean Management

Lean management began in the 1950s on a Japanese production shop floor to systematically identify and eliminate wastes to improve operations and business performance (Zhu & Lin, 2018). To define Toyota's production system, John Krafcik invented the term Lean Manufacturing (LM) in 1988. Lean principles intend to maximize production rate and value for both companies and customers by lowering waste, expenses, and time to complete a task. There are extensive lists of LM tools that are extensively used in a corporate world and industrial production system (Adefemi Aka *et al*., 2019). Value stream mapping (VSM), 5S, Jidoka, Kanban system, line balancing, Just-In-Time (JIT), production smoothing, and continuous improvement are the most often employed LM tools in a company, according to the research study.