UNIVERSITI TEKNIKAL MALAYSIA MELAKA

QUALITY IMPROVEMENT OF AUTOMATIC CUTTING AND SEWING MACHINE IN POLYPROPELENE MANUFACTURING INDUSTRY

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

by

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APROVAL

This project submitted to the senate of UTeM and ha s been accepted as fulfillment of the requirement for Degree of Bachelor of Manufacturing Engineering (Honors) (Management). The members of supervisory committee are as follows:

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Main supervisor

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DECLARATION

I hereby, declare this report entitled “Quality Improvement of Automatic Cutting and Sewing machine” is the result of my own project except as cited in the references.

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ABSTRACT

Nowadays, the worldwide polypropylene (PP) market carried a volume of $ 45 million tons and a value of approximately $ 65 billion. During the next few years, there will be a considerable increase in PP capacities and an improved supply of the preliminary product, propylene. Through this advantage, the project Quality Improvement Automatic Cutting and Sewing machine in Polypropylene Manufacturing Industry has been carried out. The aims of this project are to analyze the problem in cutting department, and to improve the productivity of Automatic Cutting and Sewing machine. In this project, the highest number of waste in the Cutting department of Assess Product Sdn.Bhd will be analyzing. A project is more on the Automatic Cutting and Sewing machine due to increase the productivity. This project focuses the output on 2008/2009 to improve the productivity of Automatic Cutting and Sewing machine. Furthermore, the factors of reject of Automatic Cutting and Sewing machine will be remark and several suggestions are giving due to improve the productivity of the company.

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ABSTRAK

Pada masa kini, industri polypropylene (PP) telah memberi nilai keuntugan sebanyak $ 45 million dan boleh menghampiri $ 65 billion kepada pendapatan negara. Berdasarkan kajian dan penyelididkna untuk beberapa tahun akan datang permintaan terhadap polypropylene (PP) akan bertambah dan Malaysia boleh menjdai salah satu pembekal utama polypropylene (PP) berdasarkan sumber yang ada. Rentetan daripada itu, Projek ini dilaksanakan untuk memenuhi keperluan semasa pasaran. Sehubungan dengan itu, Projek peningkatan kualiti " Cutting and Sewing machine" dalam industri Pembuatan polypropylene (PP) telah dilaksanakan. Objektive projek inin adalah untuk menganalisis masal yang berlaku di "Cutting Department" dan untuk meningkatkan productiviti "Automatic Cutting and Sewing machine". Dalam projek ini juga, telah dikenalpasti bahawa "Cutting department" mempunyai bilangan reject yag paling banyak di kilang Assess Product Sdn.Bhd telah akan di analisis. Projek ini lebih kepada mesin "Automatic Cutting and Sewing machine" dalam usaha untuk meningkatkan produktiviti. Projek ini focus kepada pergeluaran pada tahun 2008/2009 untuk meningkatkan produktiviti "Automatic Cutting and Sewing machine". Tambahan pula, factor- factor penyebab reject akan dikenalpasti dan cadangan pembaik pulih akan diberikan dalam usaha untuk meningkatkan produktiviti syarikat.

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DEDICATION

For my beloved mom and siblings

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LIST OF ABBREVIATIONS

ACAS	-	Automatic Cutting and Sewing machine
DOE	-	Design of Experiments
HDPE	-	high-density plastic films
ISO	-	International Standard Organization
OA	-	Orthogonal arrays
PCS	-	Pieces
PDSA	-	Plan, Do, Study and Act
PP	-	Polypropylene
PVC	-	Polyvinylchloride
QC	-	Quality Control
QFD	-	Quality Function Deployment
SPC	-	Statistical Process Control
UTeM	-	Universiti Teknikal Malaysia Melaka
%	-	Percentage
$	-	U.S Dollar

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CHAPTER 1
INTRODUCTION

This chapter provides the introduction of the project that includes problem statement, objectives, scope and the importance of the project.

1.1 Introduction

Today quality has become the most importance competitive strategic tools to develop products and services in maintaining success. Quality also should be designed and applied to give a clearly view on how it's work, the procedure, its method, advantages and disadvantages. The understanding of quality and involvement employee on quality totally can improve target. Quality has positive relationship with productivity, costs, cycle time and value.

As an organization, quality refers to the ability of a product or service to consistently exceed customer requirement. Directly, the improvement in quality result is an increase in productivity and also in term of cost such as the increasing in the quality conformance and decreasing in rework, scrap, customer complaints.

In alternative short definition of quality is "customer satisfaction and loyalty". Quality has eight different dimensions like performance, features, conformance, reliability, durability, service, perception and aesthetics. Quality activities also effect the value or price of the products and the ease words quality product gain high profit.

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Nowadays, many manufacture industries build up even the economic not stable due to the increase of labor cost, employee satisfaction, political issues and unstable petrol price. Through this external factors each manufacture hard to think the best method to increase the quality of their product with limited cost spends. As what happened to the Polypropylene industry that still the minor industry even the profit given are more than 16 billion to Malaysia.

Since Malaysia now as a steady supply of feedstock of material for plastic industry like Polypropylene (PP), Polyvinylchloride (PVC), high-density (HDPE) plastic films and others. This factor help led the plastic products industry to become on of the most strategic industries in Malaysia manufacturing sector. Therefore, overall performance of the plastics industry need to be improve, especially in quality of product due to help Malaysia economic.

1.2 Problem Statement

There are four main department in Assess Products Sdn Bhd such as Extrusion, Weaving, Printing and Cutting department. The main waste came from Cutting department with more than 20% waste compared to others, where the Automatic Cutting and Sewing machine (ACAS) in this department as the main problem. The main problem have analyze the total waste from January to July 2008 and found that 20% waste comes from ACAS machine. This involved cutting and sewing process of the woven bag. Due to the impact of this problem, the company faces the productivity has not been optimal yet. And therefore the using seven quality tools can improve the productivity of the Automatic Cutting and Sewing machine.

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1.3 Objective of this Project

The objectives of this project of Quality Improvement of Automatic Cutting and Sewing machine in Polypropylene Manufacturing Industry are:

a. To analyze the problem in Cutting department.
b. To improve the productivity of Automatic Cutting and Sewing machine.

1.4 Scope of this Project

In this project, the highest number of waste in the Cutting department of Assess Products Sdn Bhd will be analyzing. A projects more on the Automatic Cutting and Sewing machine due to increase the productivity. This project focuses the output on 2008/2009 to find remark factors with highest reject of Automatic Cutting and Sewing machine.

1.5 Project Outline

Based on the project for Projek Sarjana Muda (PSM I and PSM II), the project has been constructed for the process flow of completion in order to fulfill course of Degree in UTeM. Below shows the format of the project:

Chapter 1, formally present the chapter of the introduction of the project, objective of the project, problem statement, scope of project and the project outline for the project.

Chapter 2 begins with the definition of quality and the introduction of Quality Gurus, then measurement of Quality with eight dimensions. Then, summarized all the journals, books and internet webpage findings that related to the project based on Quality Improvement by analyze the setting parameter of Cutting And Sewing Machine. Last, different types of tools are used in order to overcome the current problem that occurs in the journals findings.

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Chapter 3 actually, this chapter represents the flow chart related to the whole process of the methodology.

Chapter 4 for the results, the collected data from Case Study Company was analyzed especially at Automatic Cutting and Sewing machine performance of output. Present the data collected will be analysis using the quality tools, based on the Design of Experiments (DOE) planned.

Chapter 5, this chapter discusses the data analysis based on the data that analyzed in chapter 4. The Pareto diagram and cause-and-effect diagram is used to determine the major causes for the defected.

Chapter 6, present the conclusions of the whole project and give suggestions for the future work.

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CHAPTER 2

LITERATURES REVIEW

This chapter is briefly explained about what is Quality Improvement of Automatic Cutting and Sewing machine in Polypropylene manufacturing industry.

2.1 Introduction of Quality

One of the most important issues that Manufacturing has focused on in the last 20-30 is quality. As markets become more competitive so quality has become widely regarded as a key ingredient for success in business. “Quality refers to the ability of a product or service to consistency meet or exceeds customer requirement or expectations. Besides, different customer will have the different requirement, so a working definition of quality is customer-dependent” (Stevenson, 2007, p.397). In other words, Quality can be interpreted as "Customer's expressed and implied requirements are met fully". Furthermore, Crosby claims that “perfect quality is both technically possible and economically desirable has rekindled many of the old arguments about how much quality is enough” (A. Garvin, 1988, p 18).

For customer’s definition, quality means how well the products or service can perform well to meet their expectations. In other situation the quality can be defined as five points of view:

a. Product Based - Quantity of a particular attribute with precise and measurable measurement of the product. The products have been checked through quality control (acceptance sampling).

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b. Process Based – Quality depends on the conformance to process methods and it relies on stabile. Measurable using Statistical Process Control (SPC) help to improve the quality on Process based and most of Process based on outcome oriented.

c. User Based – Quality definition in User based is “Fitness for Use/ suitable to the customer”. Quality is in the eyes of the beholder with highly subjective and should be satisfaction for the user in high Quality.

d. Value Based - “Affordable Excellence” and it also defined in terms of cost and benefit.

e. Transcendent- “Know It When You See It” and other definition of quality with transcendent is synonymous with Innate Excellence. Timeless also give the definition of quality.

2.2 History of Quality Gurus

A guru, by definition, is a good person, a wise person and a teacher. A quality guru should have a concept and approach to quality within business that has made a major and lasting impact.

2.2.1 Walter A. Shewhart

Walter A. Shewhart is all known as the true "Father of Modern Quality with approach on quality control". Dr.Shewhart believed that lack of information will reduce the effort of control and management processes in a production environment. In order to avoid and solve this problem, Dr.Shewhart develops Statistical Process Control methods. Besides, Dr.Shewhart also developed Shewhart Cycle Learning and Improvement cycle, combining both creative management thinking with statistical analysis. This cycle contains four continuous steps: Plan, Do, Study and Act. These steps (commonly referred

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to as the PDSA cycle). Furthermore, Dr.Shewhart developed control chart theory with limit, assignable and chance causes of variation, and rational subgroups.

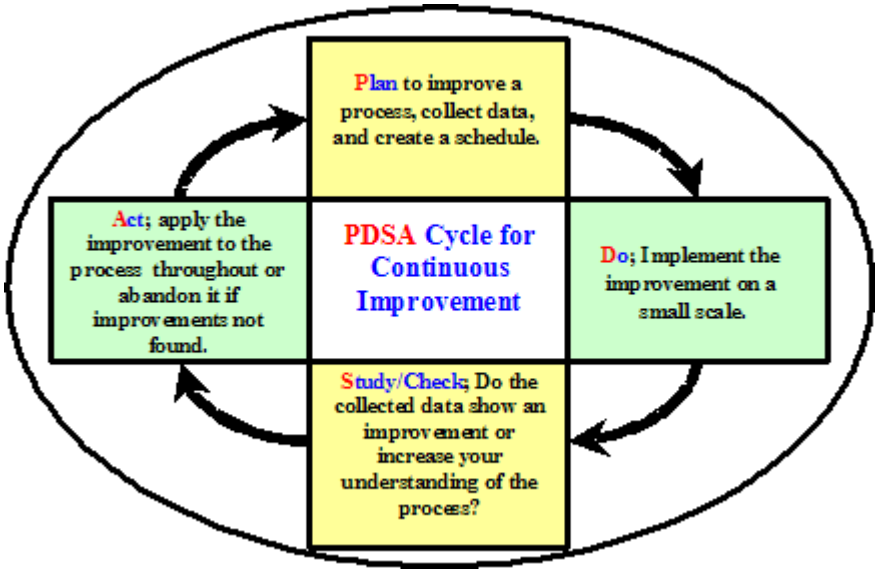

Figure 2.1: PDSA cycle

2.2.2 Dr. W. Edwards Deming

Dr. W. Edwards Deming is known as the father of the Japanese post-war industrial revival and was regarded by many as the leading quality guru in the United States. Dr. W. Edwards Deming placed great importance and responsibility on management, at the individual and company level, believing management to be responsible for 94% of quality problems. His fourteen point plan is a complete philosophy of management that can be applied to small or large organizations in the public, private or service sectors:

a. Create constancy of purpose towards improvement of product and service
b. Adopt the new philosophy. We can no longer live with commonly accepted levels of delay, mistakes and defective workmanship
c. Cease dependence on mass inspection. Instead, require statistical evidence that quality is built in.
d. End lowest tender contracts or in other word end the practice of awarding business on the basis of price.

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e. Find problems. It is management's job to work continually on the system
f. Institute modern methods of training on the job
g. Institute modern methods of supervision of production workers, The responsibility of foremen must be changed from numbers to quality
h. Drive out fear, so that everyone may work effectively for the company
i. Break down barriers between departments
j. Eliminate numerical goals, posters and slogans for the workforce asking for new levels of productivity without providing methods
k. Eliminate work standards that prescribe numerical quotas
l. Remove barriers that stand between the hourly worker and their right to pride of workmanship
m. Institute a vigorous programmed of education and retraining
n. Create a structure in top management that will push on the above points every day.

Furthermore, the key elements of Deming's 14 points are constancy of purpose, continual improvement and profound knowledge. Profound knowledge involves an appreciation of a system, a theory of a variation, a theory of knowledge and psychology. Deming's concept of profound knowledge incorporates the beliefs and value about learning that guided Japan's rise to a world economic power. Besides, Dr. W. Edwards Deming believed that management's greatest challenge in achieving quality was in motivating workers to contribute their efforts to achieve the goals.

2.2.3 Kaoru Ishikawa

Systemic or holistic approach advocated by 'Company-Wide Quality' - everyone involved in or affected by the company and its operations should be involved in the quality programme. Participation, active and creative co-operation between those affected. Then, it is an atmosphere where employees are continuously looking to resolve problems, greater commercial awareness, a change of shop floor attitude in aiming for

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ever increasing goals and cultural requirements. Kaoru Ishikawa is emphasis on communication through simplicity of analysis, method and commonality of language.

Kaoru Ishikawa introduce the Seven tools of quality control its taken together they are a set of pictures of quality, representing in diagrammatic, or chart form, the quality status of the operation or process being reviewed.

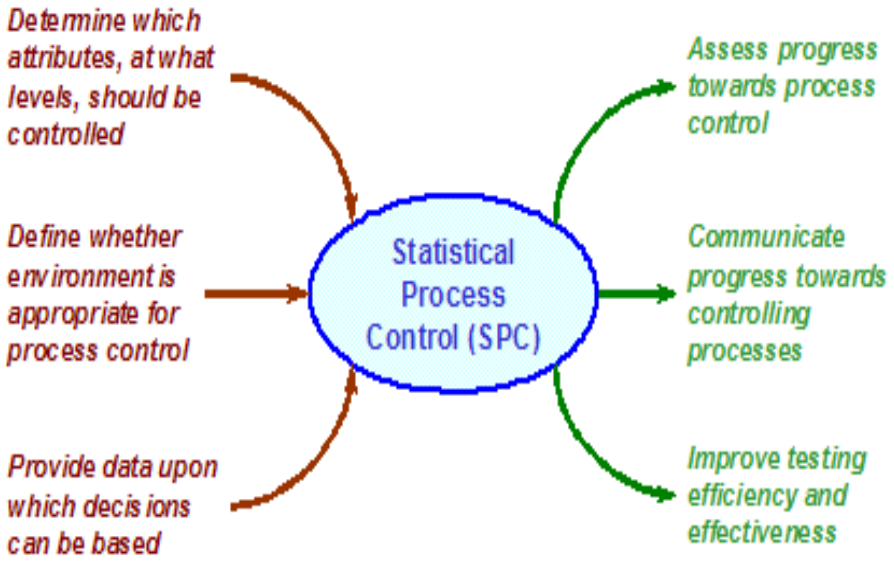

Figure2.2: "Statistical Process Control" Gold Practice

Figure 2.3: Cause and effect diagrams

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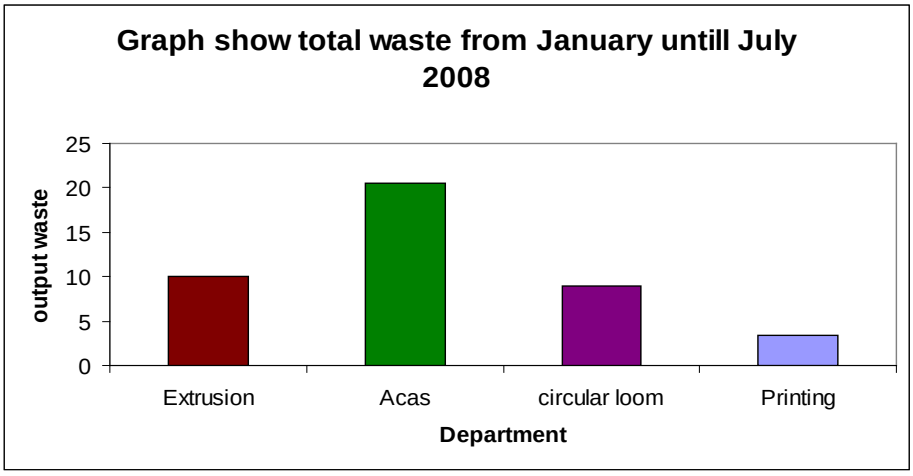

Figure 2.4: Histogram diagram

Table 2.1: The Seven Tools of Quality

Tool	Example of Use
Check Sheet	To count occurrences of problems.
Histogram	To identify central tendencies and any skewing to one side or the other.
Pareto Chart	To identify the 20% of the modules which yield 80% of the issues.
Cause and Effect Diagram	For identifying assignable causes.
Scatter Diagram	For identifying correlation and suggesting causation.
Control Chart	For identifying processes that are out of control.
Graph	For visually displaying data, e.g., in a pie chart.

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