ELIMINATION OF PRODUCT SHORTAGE AT DISPATCH LINE IN MANUFACTURING INDUSTRY BY USING LEAN TOOL

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

by

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DECLARATION

I hereby, declared this report entitled "Elimination of Product Shortage at Dispatch Line in Manufacturing Industry by using Lean Tool" is the result of my own research except as cited in references.

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Author's Name : NOR AZATUL FASYA BINTI AZMAN

Date : 20TH JUNE 2017

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 (Manufacturing Management) (Hons). The member of the supervisory committee are as follow:

…….....

(Dr. Effendi bin Mohamad)

ABSTRAK

Pelaksanaan pertama Kaizen telah dilakukan oleh Toyota dalam proses pengeluaran. Kaizen adalah satu amalan biasa di Jepun dan juga terpakai kepada proses-proses dalam industri pembuatan dengan matlamat mereka untuk penambahbaikan pengurangan produktiviti, keberkesanan, keselamatan dan sisa. Faedah-faedah menggunakan pendekatan Kaizen adalah lebih baik dalam masalah menyelesaikan, meningkatkan daya saing dan menambah baik kepuasan pelanggan dengan adanya produk yang berkualiti tinggi dan dengan sedikit kesilapan. Manakala kejayaan sebuah organisasi perkilangan bergantung pada bagaimana pelanggan berpuas hati dengan produknya dan matlamatnya untuk memenuhi keperluan pelanggan dengan memberikan produk yang tepat dari segi kualiti dan kuantiti. Tujuan kajian ini adalah untuk memperbaiki kekurangan produk di talian penghantaran pembuatan industri dengan menggunakan alatan pembuatan Lean. Kekurangan produk telah dikaji dengan menggunakan data suara pelanggan (VoC) dan beberapa alat analisis untuk mencari punca yang menyebabkan kepada masalah ini. Berdasarkan kajian ini, bacaan aduan tertinggi dari pelanggan telah dikenal pasti. Peningkatan hanya tertumpu kepada pelanggan tersebut dan Kaizen telah dilaksanakan untuk menghapuskan isu kekurangan produk. Kerja-kerja piawai dilaksanakan untuk mengatasi kekurangan prosedur di talian penghantaran dan menyeragamkan kaedah yang betul. Kerja-kerja piawai ini dirujuk kepada kerja arahan (WI) untuk proses palletizing. Penambahbaikan ini telah mengurangkan bilangan aduan pelanggan sebanyak 67% bagi tempoh tiga bulan. Keputusan ini menunjukkan bahawa pelaksanaan Kaizen dalam pembuatan industri adalah berkesan dalam mencapai kepuasan pelanggan dengan menghapuskan kekurangan produk.

ABSTRACT

The first implementation of Kaizen was done by Toyota in its production process. Kaizen is a common practice in Japan and also applies to processes in the manufacturing industry with their aims for improvements in productivity, effectiveness, safety and waste reduction. The benefits of applying the Kaizen approach are improved problem solving, improved competitiveness and improved customer satisfaction by coming from higher quality products with fewer faults. While the success of a manufacturing organization depends on how the customer is satisfied with the products and the goal is to satisfy the customer need with the exact product, quality and quantity. The purpose of this study is to improve product shortage at Dispatch Line of manufacturing industry by using Lean Manufacturing Tools. Product shortage was studied by using Voice of Customer (VoC) data and several analysis tools to find the root cause of this problem. Based on this study, customer with the highest complaint is identified. Improvements only focuses on this customer and Kaizen was implemented to eliminate the issue of product shortage. Standard work is implemented to overcome the lack of procedure at Dispatch Line and to standardize the proper method. This standard work is referred to Work Instruction (WI) for palletizing process. The improvements decrease the number of customer complaints by about 67% for a three months period. This result shows that Kaizen implementation in manufacturing industry is efficient in achieving customer satisfaction by eliminating product shortage.

DEDICATION

This project is dedicated to my beloved father, Azman bin Ahmad and my appreciated mother, Siliyani binti Kassim for motivated me during completing this project, who always stay beside me and who have never failed to give me moral support, financial and advised me to accomplish the task given by done one step at a time.

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In the name of ALLAH, the most gracious, the most merciful, with the highest praise to Allah that I manage to complete this final year project successfully without difficulty.

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Here, I would like to convey my sincere gratitude to my family for their support and encouragement. Their undivided love and support are the beacons that have continued to motivate me through the harshest of situations.

Furthermore, I sincerely grant my highest gratitude to my teammates for this handful one year we have been together through thick and thin. Not to forget my housemates for our random events and memories that always seem to put a hold in every pressure we had.

Lastly, I would like to thank those who did help me with helpful guidance and direction from beginning to the end of my project. All the nice and significant contribution to this project completion will be long remembered. Thank you so much.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CAED	-	Cause and Effect Diagram
CI	-	Continuous Improvement
CM		Cellular Manufacturing
CS	-	Customer Satisfaction
D		Detection
DMAIC	-	Define, Measure, Analyze, Improvement, Control
DZ	-	Dozen
FMEA		Failure Mode and Effect Analysis
IC	-	Inter-Company
JI	-	Job Instruction
JIT	-	Just-in-Time
LM	-	Lean Manufacturing
O		Occurrence
PDCA	-	Plan, Do, Check, Act
QFD	-	Quality Function Development
RFID		Radio Frequency Identification
RPN		Risk Priority Number
RTLS		Real Time Location System
S		Severity
SMED	-	Single Minute Exchange of Dies
SOP	-	Standard Operating Procedure
TPM	-	Total Productive Maintenance
USA		United States of America
VOC	-	Voice of Customer

VSM	-	Value Stream Mapping
WI		Work Instruction
WIP	-	Work in Process

CHAPTER 1
INTRODUCTION

1.1 Introduction

This chapter mainly discusses on the background of study, problem statement, objectives and scopes of this study.

1.2 Background

According to Eckert (2007), inventory management plays an important role in creating customer's satisfaction. In the past, stock administration has concentrated on not coming up short on wrapped up the merchandise. This made manufacturers stockpile a lot of crude materials, work in process and completed products. Manufacturers streamline their store network, minimize extensive inventories and cut holding cost on stock.

Cacioappo (2000) stated that steadfast clients are six times more possible to repurchase or prescribe the buy of the item or administration to another person. Researchers have demonstrated that by and large, four percent of the clients will be disappointed or complaint about the item. The disappointed client is probably going to tell nine other individuals while a fulfilled client will tell five individuals about the great treatment.

Edward Marien, executive of store network administration at the University of Wisconsin, characterizes 'perfect order' as when a client finds goal, condition, documentation and cost. To

work near 'perfect order' measurements, there must be powerful stock administration, rebuilding inventory network operations and redesigning principles of the ideal standard. At the point when overhauling the measurements, this would incorporate the cases transported versus the requests on-time conveyance, information synchronization, harms and usable items, days in supply, the requesting time cycle and retire level of administration (Red Prairie, 2005).

1.2 Problem Statement

The problem in achieving customer's satisfaction also occurs in ABC Company where this study is conducted. ABC Company is a metal manufacturing company based in Malacca Malaysia. This problem started at the dispatch department, which is the department that completes the customer order by doing the palletizing and shipment process. The problem of this issue due to the not providing a standard work for palletizing process that will effect to the training of manpower will be difficult, inconsistent and ineffective and also will make a work flows at dispatch line cannot be smooth but the most critical effect is have been complaining by customers about the shortage of product when the products were delivered to them.

The dispatch warehouse in ABC Company consists of three different racks labelled for three different customers, i.e. USA, PCE and 3rd Party as shown in Figure 1.1. The products will be stored according to the type of customer and part number.

Figure 1.1: Rack for Different Customers in Dispatch Warehouse

There are two types of shipment, by air and by sea. The shipment types will follow the customer's request through email. The differences between the two types of shipment are shown in Table 1.1.

Table 1.1: Types of Shipping Process

By air	By sea
• If the product requires urgently. • Used cargo • Height of pallet is 150cm	• If the product is not required urgently. • Used container • Height of pallet is 250cm.

Customers are anticipating that producers should deliver them with perfect order deliveries. The dispatch department will organize the distribution of good services to the customer in order to make sure that the product is delivered to customers on time and following the desired amount.

The problem of ABC Company is the delivery issue which is caused by shortage of product at dispatch warehouse. This is a critical issue at the company because of increasing complaints from customer especially USA customers. The issue will affect the customer satisfaction level. The information and data about the complaints have been recorded from February until November 2016 as shown in Figure 1.2. The data have been recorded based on the Voice of Customer (VoC).

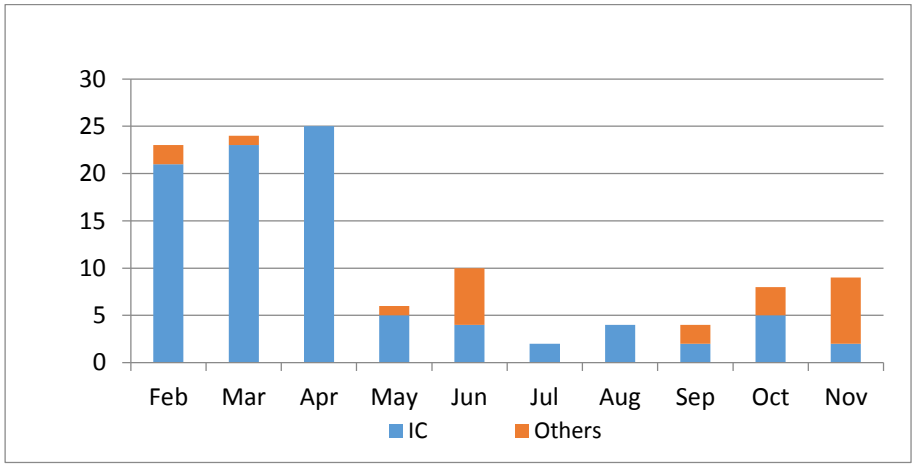
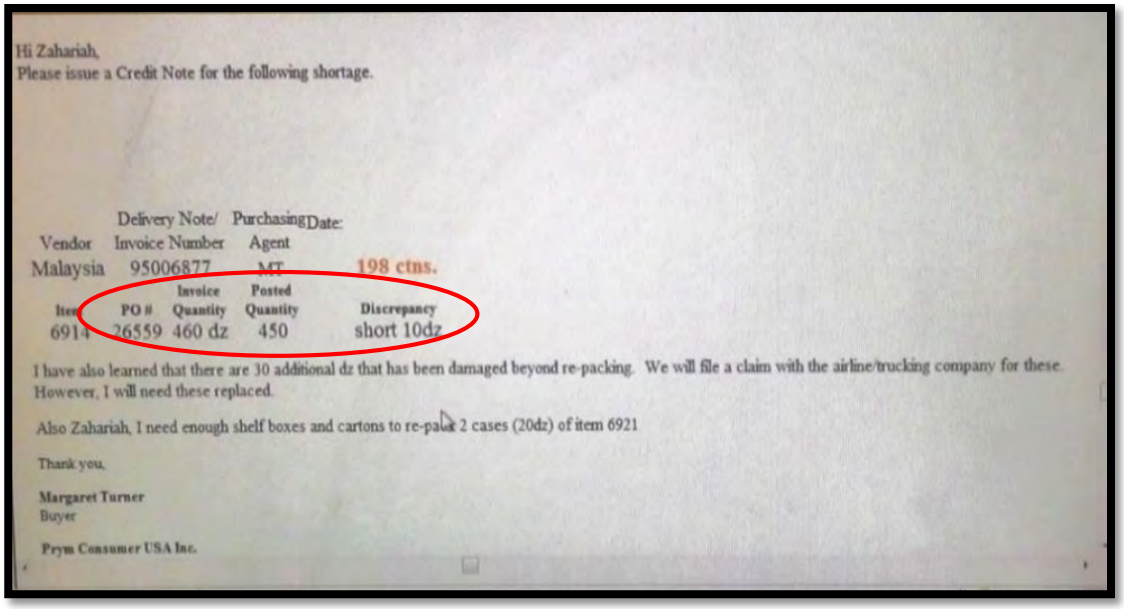


Figure 1.2: Number of Cases Recorded for IC and others
*IC = Inter-company (example: USA, PCE)

The example of USA customer complaint about the shortage of product by 10dz. DZ refers to the unit of product which is dozen. Figure 1.3 shows the example of customer complaints. Therefore, the objective of this study is to analyze the shortage of product at the dispatch warehouse of ABC Company and its effect on customer's satisfaction.



Hi Zahariah,
Please issue a Credit Note for the following shortage.

Vendor	Delivery Note/ Invoice Number	Purchasing Agent	Date:
Malaysia	95006877	MT	198 ctns.

Item	PO #	Invoice Quantity	Posted Quantity	Discrepancy
6914	26559	460 dz	450	short 10dz

I have also learned that there are 30 additional dz that has been damaged beyond re-packing. We will file a claim with the airline/trucking company for these. However, I will need these replaced.

Also Zahariah, I need enough shelf boxes and cartons to re-pack 2 cases (20dz) of item 6921

Thank you,

Margaret Turner
Buyer

Prym Consumer USA Inc.

Figure 1.3: Customer Complaint about the Shortage Issue

1.3 Objectives

The objectives of this study are:

1. To study the current issue of product shortage at dispatch line based on Voice of Customer (VoC).
2. To analyze the root causes of product shortage using brainstorming and cause and effect diagram.
3. To implement the new standard works and propose the solutions using Kaizen technique in order to improve the product shortage.

1.4 Scopes

This study mainly focuses on:

- Dispatch area – a respective department to complete the customer order.
- All types of product at the dispatch warehouse
- USA customer - due to the highest complaints.

1.5 Structure of Report

This report comprises five main section that is the introduction, literature review, methodology, result and discussion and conclusion. Chapter ONE covers the background study, problem statement, objectives, research scope and structure of report. Continue with Chapter TWO, this section is generally reviewed the past study about customer satisfaction, lean manufacturing, concept of Kaizen, qualitative and quantitative method, spaghetti diagram and standard work. In Chapter THREE, the methodology of the research is illustrated using flow chart and relationship between objectives and methodology. The methodology involves the overall method used for each objectives. All the data collected from all objectives will be included in the Chapter FOUR for further discussion. Lastly, overall findings from this research will be concluded in Chapter FIVE.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

In this chapter mainly discussed about the customer satisfaction, lean manufacturing (LM) and Kaizen philosophy.

2.2 Customer Satisfaction

Customer satisfaction is how much clients see that they got items and administrations that are worth more than the value they paid (Tracey, 1996). Then, there are an arrangement of factors that impact consumer loyalty including quality, conveyance speed, conveyance constancy, cost, adaptability and development (White's, 1996; Zhang et al., 2003). Customer satisfaction means the customer feedback to the complaint of satisfaction and customer judgement of the fulfilled state (Oliver, 1997). There are many benefits for a company when have a high customer satisfactions level. It elevates client reliability and anticipates client need, brings down clients' cost affectability, lessens working expenses because of client number increments, improves the capability of promoting and upgrades business reputation (Fornell, 1992). The principle consider of determining customer satisfaction which is the customers' view about the quality of management (Kim et al., 2004).

In overall, customer satisfaction is viewed as the essential for customer dependability. Besides, the meaning of customer satisfaction was gotten from clients' general assessment of the stock involvement in the marketing setting (Macintosh and Lockshin, 1997) furthermore, the execution of a contribution to date in the administration setting (Gustafsson et al., 2005). In

the online business perspective, satisfaction is characterized as the happiness of the purchaser with regard to his/her past buy encounters with a web based business firm (Chen, 2012). Customer satisfaction is viewed as a feeling based reaction which is dictated by whether the desires of customers for the item/benefit before buy are steady with the genuine item/benefit got taking after buy (Oliver, 1981). Meanwhile, Churchill and Surprenant (1982) stated that customer satisfaction is gotten from the consequences of customers acquiring and utilizing items. Fornell (1992) also proposed that fulfillment is a general feeling that can be specifically assessed, customers contrast an item or benefit and their optimal models. Low et al. (2013) proposed that there are two types of satisfaction which are:

i. Economic satisfaction – gotten from unmistakable items.
ii. Social satisfaction – given by administration experiences.

According to the Innis and La Londe (1994), customer satisfaction is some of the main objectives of marketing actions and might lead to improved procurements by customers and increased profits for the firm. The simple knowledge is the possibility of satisfied customer to repurchase, important to improve the sales and market share of the company. Anderson (2014) has identified the correlation between market share and customer satisfaction in the company. The correlation of these two is shows in Table 2.1.

Table 2.1: Correlation between Market Share and Customer Satisfaction

	Market Share	**Customer Satisfaction**
Ordinarily utilized in	Small development or immersed markets	Small development or immersed markets
Procedure sort	Offense	Defense
Point of convergence	Competition	Customers
Measure of achievement	Share of market with respect to customers	Client standard for dependability.
Behavioral goal	The purchaser is exchanged	Purchaser faithfulness