



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Productivity Improvement Using One Piece Flow Technique: A Study at an Electronic Company

Thesis submitted in accordance with the requirements of the
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Bachelor of Engineering (Honors) Manufacturing (Process)

By

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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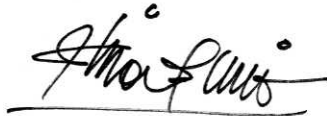
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I hereby, declare this thesis entitled “Productivity Improvement Using One Piece Flow Technique: A Study At An Electronic Company” is the results of my own research except as cited in the reference.

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DEDICATION

Specially dedicated to my beloved father, Yazid B. Ahmad and my mother, Salmah Bt. Abd. Majid and who are very concerns, understanding patient and supporting, thank you for everything to my supervisors, Miss. Zuhriah Bt. Ebrahim and Mr. Hasoloan Haery Ian Pieter , Mr. Teh Soon Cheng, my sisters, brother and all my friends. The work and success will never be achieved without all of you.

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ABSTRACT

This paper gives the study on productivity improvement using One Piece Flow technique. The study is done at Flextronics (M) Sdn. Bhd. This study are using Line A8 and Dory High product as a sample. The study consists of relayout Dory High line to identify the improvement happens after implementing One Piece Flow concept. The study also needs to analyze the quality improvement on this line. Several data were taken and prove the improvement by using One Piece Flow. The data covered cycle time, the output and quality data at VMI and ICT station. The One Piece Flow technique implemented at the backend area which consists ICT station, FCT station, Final Inspection station and Outgoing Quality Assurance (OQA) station. There is also one KAIZEN project implemented with One Piece Flow technique to reduce the reject rate. This project also been analyzed because it contribute to quality improvement. After the implementation of One Piece Flow activities, there are several problems detected. The problem is narrow path at backend area, operator behaviors and too many operators for VMI process although the VMI is Non-Value Added process. The suggestion is given to solve the problem.

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Flow at VMI station.

Graph of comparison before and after implementation of One Piece

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CHAPTER 1

INTRODUCTIONS

1.1 The Project

The project is a study on productivity improvements using one piece flow technique at Flextronics Sdn Bhd in Melaka. There are 30 types of assembly line in Flextronics. This project use line A8 as a pilot study starting at backend area which includes Manual Insert station, Touch Up station, VMI station, ICT station, Mock up station, FI station and OQA station. The product family and product model which are assembled in line A8 is Dory High. This project will base on Flextronics approaches on one piece flow implementation. The Lean Manufacturing concept has been implemented in Flextronics since last three years ago. However, there are still numbers of Lean Manufacturing projects will be carried out in order to recognise as a Lean Manufacturing company. The one piece flow projects as consists of activities such as relayout Dory High line, reduce manual insert conveyor, the number of required work station and installing cooling fan at the outfeed conveyor. The main objective of these three projects is to improve the Dory High Value Stream by using Lean Manufacturing tools and techniques to reduce the seven Mudass in production.

1.1.1 The Flextronics Company

Flextronics Malacca is the fifth plant of Flextronics in Malaysia. The others plant are two in Johor (Senai and Tampoi), Selangor (Shah Alam) and

Pulau Pinang. The newest plant is at Pelabuhan Tanjung Pelepas, Johor. The Malacca Plant was brought over by Flextronics from Dovatron (M) Sdn. Bhd. On the late of 1993, but only started its operation on January of 1994. However, they take almost 3 years to develop before granted with ISO 9002 on 1997. Flextronics (M) Sdn. Bhd. Now reaches 3600 workers today. It has 30 SMT lines and by end of June 2007, all production line at Malacca will transfer at the new factory at Pelabuhan Tanjung Pelepas, Johor. Figure 1.1 shows one of building at Flextronics Melaka while Figure 1.2 shows one of the work stations in Line A8 which is the manual insert Station.



Figure 1.1 Flextronics Malacca



Figure 1.2 Manual Insert Station

1.1.2 The Organisation Structure

Flextronics Technology (M) has a group line management that strong flexible and dedication until it reach a high achievement. This team management is divided into three groups which are Test development Engineering (T.D.E), Engineering Department and Production Department. In this three part which need to divide into two sections according types of customer which are Hewlett Packard, Non Hewlett Packard and carrier access

Before this the factory has divided their management into two sections which are two units BU1 and BU2 mean business unit, and then this system has change their name into HP and NON HP because of the model HP is produced into much quantity. That's why it needs more labor and concentration to make sure the product produced is in high quality. This system was changed again in year 2001 into three sections because of the carrier access production would give many problems. Figure 1.3 shows the organisation structure at Flextronics Melaka.

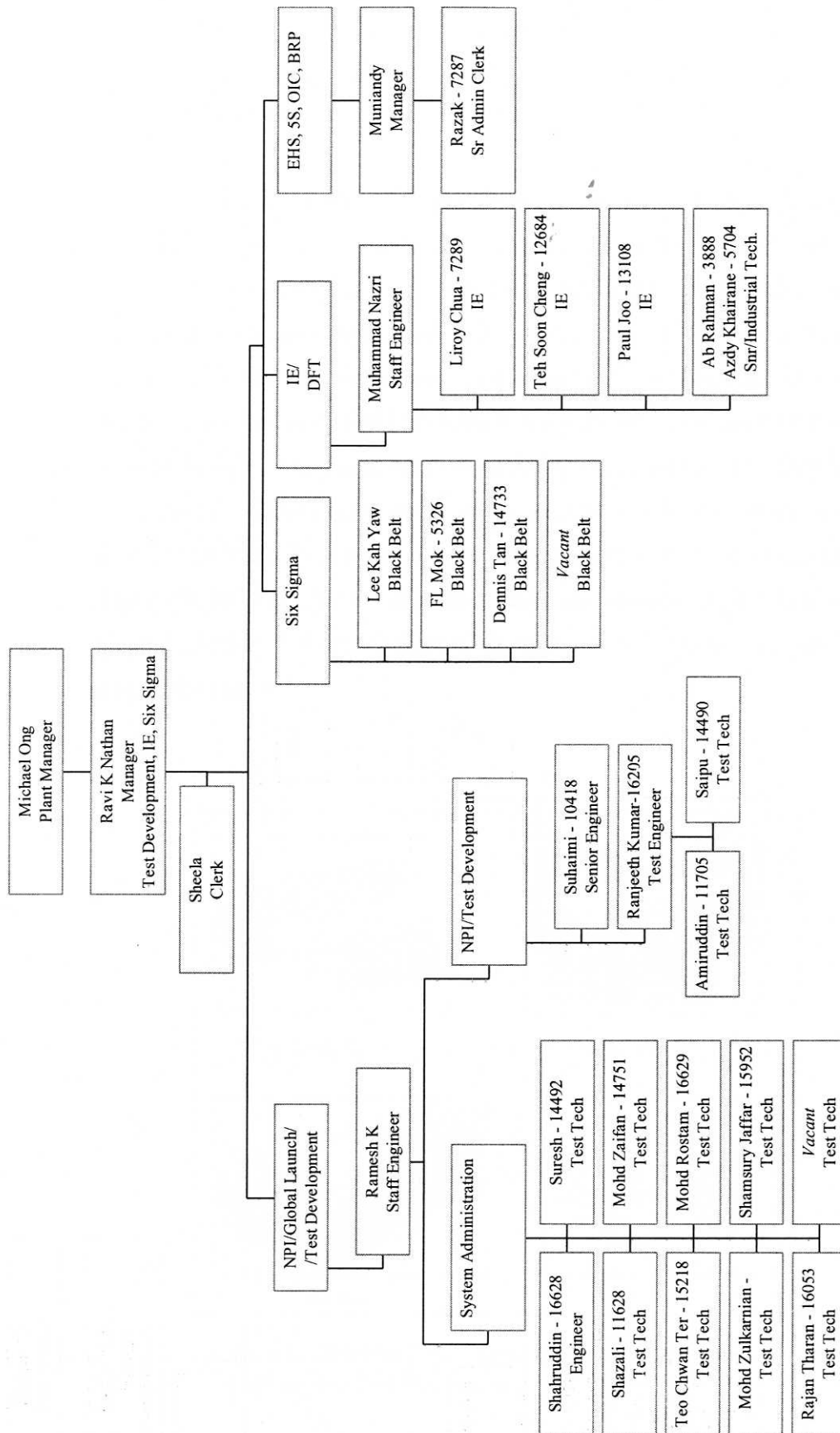


Figure 1.3 The Flextronics Organisation Structure

1.1.3 The Products

With the experience more than 25 years made this factory become flexible and strongest management to handle all the project that given by customer successfully and fulfil customer satisfaction. In 2002 the management factory was changed again into two sections because of model in focus give many problems. This model was transferred to the new branch factory at Senai, Johor Bahru. Recently, Malacca Branch has only produced model HP and Carrier Access Instead of focusing on manufacturing end products this plant is more on the creation of the main boards of the end products. The main customers of Flextronics Malacca are Hewlett Packard, Carrier Access, In Focus and Baxter. The main products for Flextronics Melaka are printers, digital cameras, Liquid Crystal Display Screen, Touch Screen and Video Projectors as can be seen at Figure 1.4 below;

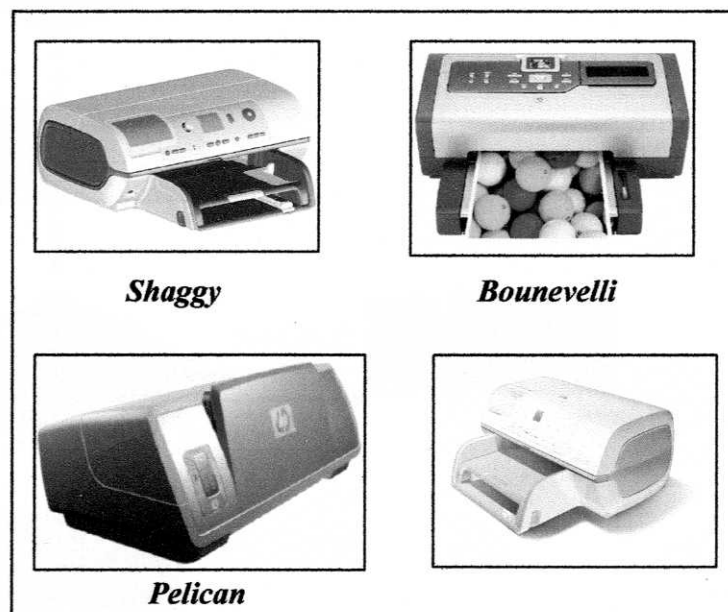
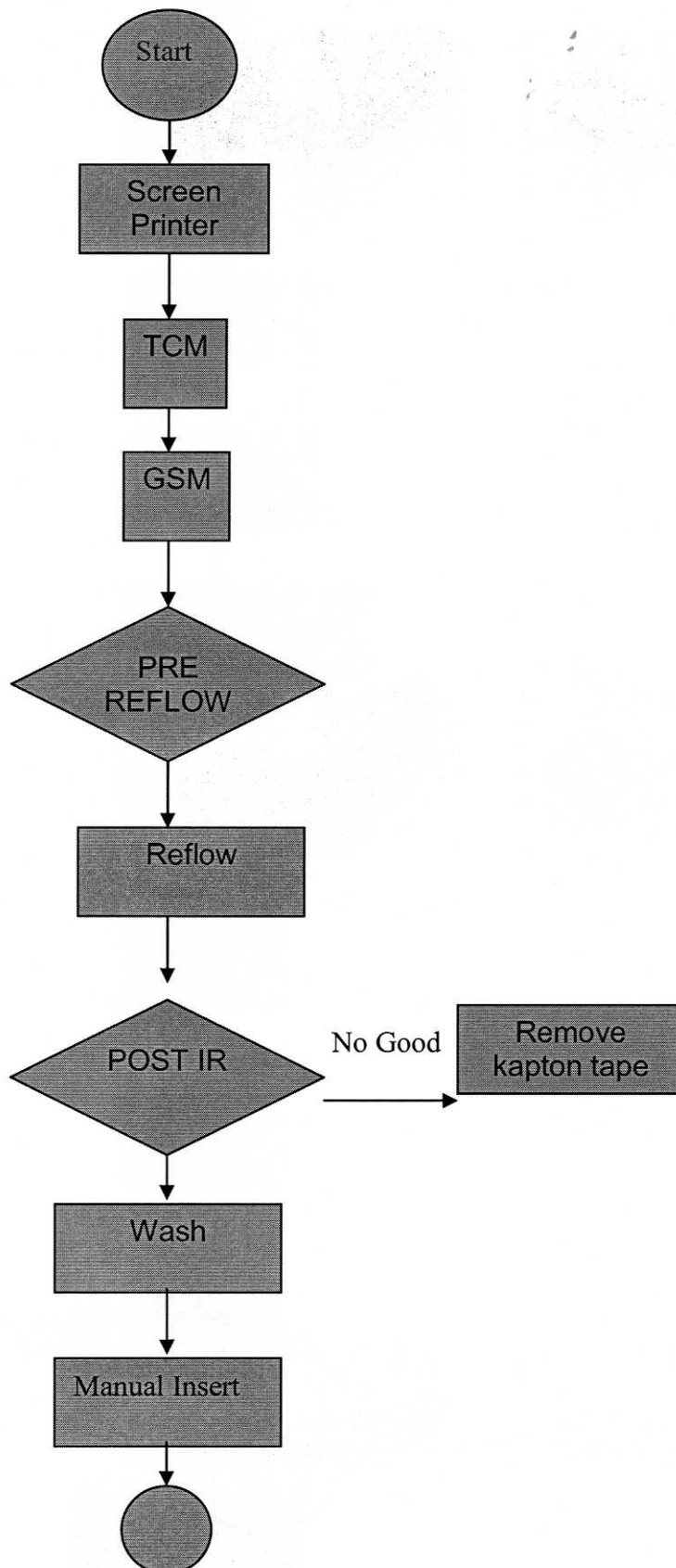


Figure 1.4 Several end product of the company based on the name of PCBA given.

1.1.4 The Process Flow

Figure 1.5 below shows the Flextronics process flow for Dory High product.



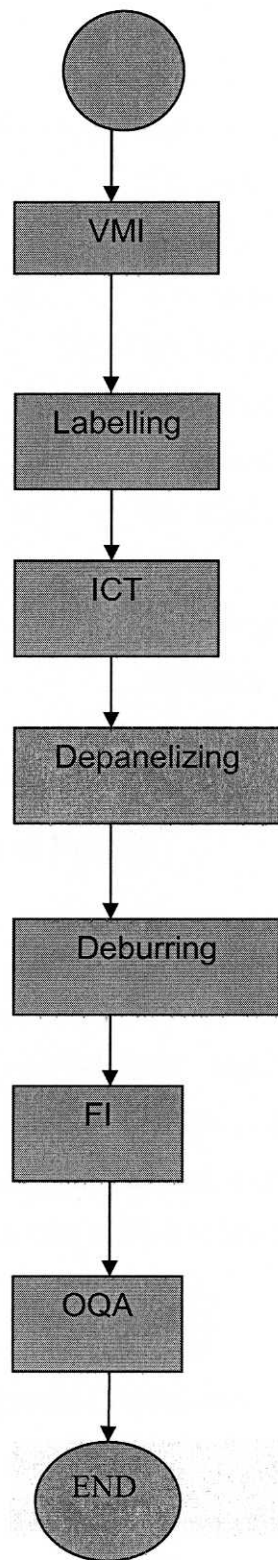


Figure 1.5: TheProcess Flow for Dory High

1.2 Objectives of Project

Since the project is based on Flextronics progress on their one piece flow techniques implementations, the objectives of this project is;

- i) To study the achievement of productivity improvement through Flextronics approaches.
- ii) To reduce unbalance workload by eliminating the bottleneck within the processes in line A8.
- iii) To reduce the cycle time by eliminating the idle time within the processes in line A8.
- iv) To identify the implementation problems of One Piece Flow.
- v) To provide suggestion for overcoming the implementation problems in future.

1.3 Scope of Project

The result of productivity improvement using one piece flow techniques is referred to line A8 performance as the pilot line which located in Flextronics Sdn Bhd., Melaka. Since Flextronics already had the project plan for the One Piece Flow activities, so that the methodology of this project is based on the planned activities or tasks for this Line A8. However, all relevant data will be collected according to the project requirements.

1.4 Background Problems

There are numbers of problem on the model Dory High Line at line A8 such as work flow, unbalance work load and quality problem. The first problem is the current flow in the line is not smooth due to the used style of spaghetti flow. To solve this, Flextronics has proposed to implement U-cell

layout to replace the spaghetti flow. It involves relayout activities in order to reduce the total distance traveled from 466ft to 339ft.

The second problem is the number of operator at Manual Insert Station. By using the TAKT time approach, it can determine an appropriate number of work stations. In addition the bottleneck will be identified and the work flow can be improved as well. Finally, installing the cooling fan at outfeed conveyor, enable to reduce the false reject rate at ICT station.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

This chapter consists of two main topics; first theoretical concept of One- Piece-Flow and second, the Flextronics planned activities in implement One-Piece-Flow techniques. The One-Piece-Flow concept is part of concept that has been used to achieve Lean Manufacturing successful implementation.

2.2 The Lean Manufacturing Principles.

2.2.1 Definition of Lean Manufacturing

Lean Manufacturing can be defined as a systematic approach to identifying and eliminating waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection. (Womack, J.P., Jones, D.T. and Roos, D., 1990).

Lean Manufacturing is the practise of eliminating waste in every area of production including customer relations (sales, delivery, billing, service and product satisfaction), product design, supplier networks, production flow, maintenance, engineering, quality assurance and factory management. (Ricky Smith and Bruce Hawkins, 2001). Its goal is to utilize less human effort, less inventory, less time to respond to customer demand, less time to develop products and less space to produce top quality products in the most efficient and economical manner possible.