

PRODUCTIVITY IMPROVEMENTS USING LEAN PRACTICES AT JAPANESE  
ELECTRICAL AND ELECTRONICS MANUFACTURING

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**DEDICATION**

*Alhamdulillah, praise to Allah S.W.T for blessing me and giving me the strength to complete this project in time without facing any difficulty.*

To my beloved parents, Hj. Parnon bin Saikon and Hjh. Rubiah binti Wakiman,  
family and friends.

For their endless love, encouragement, sacrifices and support.

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## **ABSTRACT**

Nowadays, many companies around the world are struggling to deal with market and demand uncertainty. Unstable demand, poor economic scenario and high operational cost may worsen the company performance and insisting company to slow down its new model development and funding other Research and Development (R&D) activities. In order to remain alive and thrive in such a competitive global market, companies are now shifting to lean production in order to increase daily productivity output, reduce lead time, reduce operational cost either direct and indirect cost and improve quality thus providing the up most value to customer. In this study, investigation towards lean implementation at Japanese electrical and electronics manufacturing plant in Senai, Johor. The main problem statement in this project is to identify and eliminate non-value-added activities that may lead to high production lead time and low production efficiency thus unfulfilled production daily output demand. Lean assessment is used to measure leanness level at respective production. Then Visual Stream Mapping both current state and future is developed to identify, analyze and eliminated Non Value Added waste using appropriate lean tools. Finally, several process improvement solution is proposed and implement at respective production line.

## ABSTRAK

Pada masa kini, banyak syarikat di seluruh dunia sedang bergelut untuk berurusan dengan pasaran dan permintaan yang tidak menentu. Permintaan yang tidak stabil, senario ekonomi yang lemah dan kos operasi yang tinggi boleh memburukkan lagi prestasi syarikat, melambatkan pembangunan model baru dan pembiayaan aktiviti-aktiviti penyelidikan dan pembangunan (R&D). Dalam usaha untuk kekal berkembang maju dalam pasaran global yang kompetitif, syarikat kini sedang beralih ke *lean manufacturing* bagi meningkatkan produktiviti pengeluaran harian, mengurangkan masa pengeluaran, mengurangkan kos operasi, meningkatkan kualiti dan meningkatkan nilai kepada pelanggan. Dalam kajian ini, penyiasatan ke arah pelaksanaan *lean* dilakukan di syarikat pengeluaran elektrik dan elektronik Jepun di Senai, Johor. Pernyataan masalah utama dalam projek ini adalah untuk mengenal pasti dan menghapuskan aktiviti yang tidak mempunyai nilai-tambah yang boleh membawa kepada masa pengeluaran yang lama, dan kecekapan pengeluaran yang rendah. Ini menyebabkan permintaan pengeluaran harian tidak dapat dipenuhi. Penilaian *Lean* digunakan untuk mengukur tahap *leanness* di rantai pengeluaran. Kemudian *Visual Stream Mapping* bagi keadaan semasa dan masa depan dibangunkan untuk mengenal pasti, menganalisis dan menghapuskan aktiviti bukan nilai tambah menggunakan alat-alat *lean* yang sesuai. Akhir sekali, beberapa penambahbaikan proses penyelesaian akan dicadangkan dan dilaksanakan di rantai pengeluaran yang berkenaan.

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Background of Study**

Nowadays, many companies around the world are struggling to deal with market and demand uncertainty. Unstable demand, poor economic scenario and high operational cost may worsen the company profit-loss performance and insisting company to slow down its new model development and funding other R&D activities <sup>[1]</sup>. In order to remain alive and thrive in such a competitive global market, companies regardless Multi National Company (MNC) or Small Medium Enterprises (SMEs) are now shifting from mass-production to lean production in order to increase daily productivity output, reduce lead time, reduce operational cost either direct and indirect cost and improve quality thus providing the up most value to customer. The fundamental of Lean Manufacturing or better known as Toyota Production System (TPS) is to eliminate wastes and produce only products needed at the required time and in the required quantities <sup>[2]</sup>. The systematic approach, tools and technique that been introduced in Lean Manufacturing (e.g. Just-in-time (JIT), cellular manufacturing, total productive maintenance, single-minute exchange dies, production smoothing) may assist enterprise to identify and eliminate waste activities through continuous improvement <sup>[3]</sup>. All these effort are objectively to ensure company run daily operation at minimum operation cost and stay ahead in the race.

In this study, investigation toward Lean Implementation at Japanese electric and electronics manufacturing plant in Senai, Johor will be carried out. Next, the methodology employed for investigating Lean implementation is presented. The individual practices associated with lean manufacturing tool and techniques will be applied, then by measuring production performance and monitoring Incoming Process Quality before and after lean manufacturing is performed, a comprehensive understanding of Lean manufacturing implementations is achieved. The relationship between Lean Manufacturing, production efficiency and quality improvement are analyzed and the results of the study are discussed. At the end of this project, findings of study are summarized and the study's contribution to understanding Lean Manufacturing implementations in manufacturing plant at Senai, Johor is discussed.

## **1.2 Problem Statement**

This project study will deals with the end to end perspective of reducing waste at a telephone domestic production assembly line. After intense brain storming and a thorough study of production assembly line, it was observed that the assembly activities contain various forms of non-value-adding (NVA) activities that may lead to potential quality issue, high production lead time, below target production efficiency, unfulfilled production daily output demand and slow down finish product introduction at end user. Process with longer cycle time may result bottleneck and production cannot meet takt time as well.

In the existing conditions, Japan telephone assessment index is rated 3.3. Weakness area are material management and low cost sector in assessment criteria. All the average production lead time is found to be around 13 minute far behind

from established standard time which is 9.45 minute and line balancing efficiency 51.8%. Furthermore, 4M (Man, Material, Man and Machine) issues such as poor workstation and bin arrangement, under maintenance jig, checker capacity limitation and poor work standardization need to tackle down as soon as possible to avoid any delay in lean implementation at respective assembly line. We strongly believe, by focusing and strengthen Lean Manufacturing implementation at this assembly line, production efficiency can increased up to 50% and assessment index is improved around 4.0.

### **1.3 Objective and Scope of Study**

The objectives of this project are:

- a. To measure leanness and manufacturing healthiness level at Japan Telephone production.
- b. To identify, analyze and eliminated Non Value Added waste at Japan telephone production using appropriate lean tools.
- c. To propose process improvement solution at Japan telephones production.
- d. To increase 50% line balancing line efficiency from current state.

The scope of this project is,

- a. Case study, data collection and improvement will be carry out at Panasonic System Networks Malaysia (PSNM).
- b. Project will only concentrate on Japan telephone assembly line.
- c. Not all lean tools will be demonstrated in this project. Depends on suitability and necessary.
- d. Proposed method and solution are not necessary to be implemented.

#### **1.4 Significant of the Study**

Lean Assessment tool can be used as monitoring tool in monitoring progress of lean implementation in factory. It also can use in benchmarking performance with other sister company or other competitor with same business core structure. From the assessment result, factory healthiness and leanness level can be identified and it is easier to find which weakness area that need to tackle down.

From this study also, able to demonstrate various lean tools correctly in dealing with daily production problem. The lean tools mostly used to identify and remove Non Value Added Activity at assembly process. Once wastes are eliminated, production able to run smoothly and it will provide customer with better product quality and upmost value.

The outcome of this study is to increase assembly line efficiency more than 95% and aim to minimize time difference between standard time and actual operation time. Furthermore, the study helps company in reducing unnecessary secondary process such as rework and jams set, reduce overtime and rework cost and reduce warranty claim too. Through line balancing and man power rationalization, company will save average RM140, 000 yearly per assembly line.

## **1.5 Research Contribution**

At end of this project, do hopes that lean practitioners are realize the importance of Lean Assessment tool as part of waste elimination activity. The assessment criteria that been used in this assessment probably practical to other industry with same business structure. Criteria with insufficient information or weak control item can be improved and propose to assessment secretariat at this company. In conjunction with waste elimination activities, it is expected to assist respective assembly line to meet daily production target and at the same time reduce overall operation cost that may benefit to company.

## **1.6 Organization of Report**

This project report is organized in seven chapters and some of the highlights are summarized as below:

Chapter 1: Introduction to the project, problem statement, objective, scope of study and significance of the project.

Chapter 2: Literature review on Lean Manufacturing, Productivity and techniques or tools that been used to carry out the project will be discussed extensively in this chapter. Collection of information and data such are gathered from scientific journals, lean manufacturing projects and technical conference articles are summarized in table.

Chapter 3: Research Methodology describes how and in what way data been collected, methods, techniques, equipment and material used (if necessary).

Chapter 4: Problem identification and initial data discussion. In this chapter we will go in depth on data collection conducted in this research. Discussion on lean assessment method and prior finding in Company A will be the main focus of this chapter. Included are company background, its

organizational structures, layout and process flow and detrimental information that would contribute to this research.

Chapter 5: Countermeasure development by proposing and implement improvement idea.

Chapter 6: Discussion on result of data collected and analyzed using related tools. Further discussion on corrective action and prevention program initiated based on the results of the assessment. We will also discuss some of the effort that was put in place to sustain the preventive measure that was derived from research.

Chapter 7: Conclusion and future works of the research discussed.

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