

CHAPTER I

INTRODUCTION

1.1 Background

The title of this project paper is to study about the yield quantity discrepancy reduction in semiconductor back-end process. The focus of this project paper is to study the yield quantity discrepancy which currently affects the production overall output. Improvement should be made based on this study in order to get better production yield.

Production lines are an important class of manufacturing systems when large quantities of identical or similar product are to be made. They are suited to situations where the total work to be performed on the product or part consists of many separate steps. Example includes assemble product and mass-produced machined parts on which multiple machining operation are required. In a production line, the total work is divided into small tasks and workers or machined are assigned to perform this task with the great efficiency.

Production yield improvement has become one of the important issues to cope with the high demand of global market and survive in this competitive world. Otherwise, increasing in productivity generates a potential increase in production. If viewed in quantitative terms, productivity is the ratio of the output produced to the input use. At the national level, productivity is a major element of economic growth and progress.

Production yield improvement can be achieved by various techniques and methods, which consists of technology-based techniques, employee-based techniques, task-based techniques, product-based techniques, and material-based techniques. All of the techniques are useful especially in increasing productivity, machine utilization, material utilization and labor utilization in a manufacturing industry.

The study of improving the yield quantity discrepancy will be carried out in a semiconductor manufacturing plant. Semiconductor assembly process consist a combination of automatic system and manual system. The assembly process of semiconductor is very complicated and expensive, so that the study of the discrepancy is important to keep the production yield meet the achievement target and eliminate the loss cost.

1.2 Problem Identification

A Semiconductor back-end assembly process consists of various processes and work elements. Many factors cause the low productivity of the plant of production. From the observation and interview, some of the problems that occur in the production line, which cause low-productivity are:

- i) High defects - One of the factors which causing low productivity at the workstation is high rejects. Low productivity makes the company cannot achieve their vision and mission as a developing company. This situation will lead to loss cost and the customer will find another sub-contractor to fulfill their requirement.
- ii) Quantity discrepancy - Discrepancy or adjust quantity is another factor that contribute to low production yield. These factors usually were ignored compared to defects/rejects which are more significant but sometimes discrepancy will be one of the factors that will affect the product in stock/output.
- iii) Machine malfunction - The machine in the production line is running 24 hours a day and only shuts down during the holiday. Many problems will occur and therefore the machine needs to be repaired. The problems of the machine will affect the continuity of the production process and the flow of semiconductor process will disrupted.

- iv) Others - Other minority causes such as flow of material utilization in production line is slow, the workers not perform well, material handling is insufficient etc.

In order to achieve the productivity improvement, many ways and techniques can be use to solve the problems. In this study, the productivity improvement is more focus on the yield quantity discrepancy reduction which utilizes the method of:

- i) QC story
- ii) Kobetsu Kaizen (KK)

1.3 Objectives of the Study

The main objective of this study is to improve yield quantity discrepancy in semiconductor back-end process. The other objectives are:

- i) To identify the causes or sources of the products discrepancy by studying every process flows.
- ii) To improve the yield discrepancy of the product by using Kobetsu Kaizen techniques in order to achieve productivity improvement of a production line in a manufacturing.

1.4 Scope of the study

The scopes for this study are:

- i) The study will be carried out at one of the semiconductor manufacturing plant in Malaysia and it is only targeted on discrepancy of back-end assembly process.
- ii) To get the information/data that related with theory and assembly product of yield quantity discrepancy.
- iii) This project focuses on the reduction of yield quantity discrepancy in semiconductor back-end process. For this study the scope for the discrepancy is mainly focused on Transistor Diode package.
- iv) The data will be solved and analysed using Kobetsu Kaizen and Quality Control (QC) methodology.

1.5 Significant of Findings

In this study, it is important to identify the root cause of the discrepancy that lead to the yield loss of production. From the countermeasure using the Kobetsu Kaizen techniques, the discrepancy sources will be minimized and improve the yield quantity discrepancy which is the highest contributor to the production loss.

1.6 Report Structures

Chapter 1: Introduction

Include the introduction to the problem, objectives and scopes of the study, and also the findings.

Chapter 2: Literature Review

Literature review on Semiconductor Overview, Semiconductor Back-End Process, Productivity and Kobetsu Kaizen which is the tools that have been used to reduce the discrepancy.

Chapter 3: Methodology of Study

The methodology of the project, include the flow chart for the whole thing on how the study is done. Also, contains brief explanations about the process flows and step-by-step of Kobetsu Kaizen.

Chapter 4: Result, Analysis and Discussion

The sources and causes of the problem have been identified and the appropriate countermeasures have been taken in order to achieve the study's objectives.

Chapter 5: Conclusion and Recommendation

The value of the project itself and the recommendation for the same kind of project to be developed in the future are determined in this chapter. Finally, the conclusion about the whole field of study based from the objectives of the study.