CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In this thesis some aspects of process capability analysis are considered. Process capability analysis deals with how to assess the capability of manufacturing processes. Based on the process capability analysis one can determine how the process performs relative to its product requirements or specifications. An important part within process capability analysis is the use of process capability indices.

This thesis focuses on process capability indices in producing titanium dioxide (\( \text{TiO}_2 \)) at Tioxide (M) Sdn. Bhd, located at Teluk kalung, Kemaman.

1.2 PROJECT OBJECTIVES

The objectives that wanted to achieve in this thesis are to assess the current process capability and predict the future capability of the process to produce product within specification in the company. Another objective is to identify process improvement opportunities that can be applied in the industry.

1.3 PROJECT SCOPES

The purpose of the research is to study the process capability analysis in Tioxide (M) Sdn Bhd which is manufacturing titanium dioxide (\( \text{TiO}_2 \)). As a big
manufacturer in chemical industry, Tioxide (M) has moving forward with a mission to improve the whiteness of the pigment and to makes particles of uniform size to improve reflectivity and opacity. In order to hold this target, four parameters have been chosen to be controlled. These four parameters are involving in three stages of process.

1.3.1 Process Stages

There were three stages of process manufacturing titanium dioxide that had been chosen. They are:

A) Precipitation tank
B) Calciner
C) Sand Milling Unit (MSU)

1.3.2 Parameters Control:

In the three stages above, four parameters had decided to choose in order to predict the process capability analysis.

i) Grey Stage Time
ii) Precipitation Recovery
iii) Crystal size & Crystal size distribution
iv) Particle size & Particle size distribution

1.4 BACKGROUND OF TITLE

Process capability is the performance of a process under normal and in control conditions. Its indices are to measure the inherent variability of a process and thus to reflect its performance. To calculate the Cp or Cpk indices for key characteristics, most industries normally assume their process output is normal. The
Cp should be at least 1.33 in order for the process to be considered capable. If the process is not capable, the improvement steps must be taken by the company.

1.5 PROBLEM STATEMENT

This research focuses on the process capability analysis in Tioxide (Malaysia) Sdn Bhd. This factory is the largest manufacturer of titanium dioxide pigments in Malaysia. The titanium dioxide pigments usually use in paints. To accomplish this research, the current process capability was accessed by using data collection and data evaluation. An analyzing had been conducted to predict the future capability by using statistical process control and Minitab had been chosen as software. All the critical parameters stated had been analyzed to make sure the process is in control or out of control.

1.6 METHOD AND PROCEDURES

The methods and the procedures can be seen in section 3.7, while the Gantt Chart of this project schedule is shown in appendix.

1.7 ORGANIZATION OF THESIS

Chapter 1 is about the introduction of the whole thesis. It consists of general introduction that is necessary to understand the process capability analysis concept.

Chapter 2 is the sequences for the chapter 1. It is based on the literature review related to process capability analysis and the titanium dioxide which is the product of the Tioxide (M) Sdn Bhd.

Chapter 3 is about the methodology for this project. This methodology describes the methods and tool used to complete this thesis. It is including how the information gathers, data collection steps, data evaluation process and the software to perform the analysis.