CHAPTER 1

INTRODUCTION

This chapter will discuss briefly on the project background, problem statement, project objectives, project scopes, significant of study and flowchart.

1.1 Project Background

Among the various non-conventional processes, electro-discharge machining (EDM) is most widely and successfully applied for the machining of various workpiece materials. Although EDM machining technology is widely used in mechanical manufacturing, its low efficiency and poor surface quality have been the key problems restricting its development. Therefore it is of great importance to improve the machining efficiency and surface quality of EDM technology.

Like other machining methods, EDM machining is also divided into two phases: rough machining and finish machining. The finish machining phase requires high surface quality, while rough machining phase requires high machining efficiency with a certain quality. Numerous research results show that powder mixed EDM (PMEDM) machining can distinctly improve the surface roughness and surface quality in the finish machining phase and obtain nearly mirror surface effects, which have lead to the development and application of PMEDM in EDM finish machining.

Basically, there are two different types of EDM: die-sinking and wire-cut. Die-sinking EDM reproduces the shape of the tool used (electrode) in the part whereas in wire-cut EDM a metal wire (electrode) is used to cut a programmed outline into the piece. In this project, a study on the machining parameters

optimization of electrical discharge machining is to be carried out but only applied to the die-sinking type and 4 liters bottle neck had chosen as an electrode. A part from that, stavax will be choosing as a project specimen and copper as an electrode material.

1.2 Problem Statement

Based on the current situation, 4 litres bottle neck electrode had been designed, analysis and fabricate in UMP but it's not tested yet to fine a good surface finish. Beside, it is too difficult to distinguish the surface quality of 4 litres bottle neck only with visual contact. Other than that, it's not systematic and difficult to obtain the good surface quality of 4 liters bottle neck by assuming the machining parameters. So, this project is conduct to determine the optimum parameter of the Electro-discharge Machine (Die Sinker type) using 4 liters bottle neck as an electrode to find a good surface finish.

1.3 Project Objective

The main objective of this project is to investigate the optimum parameter of the Electro-discharge Machine (Die Sinker) on 4 litres bottle neck by using full factorial design method.

1.4 Project Scope

In order to achieve the objectives stated above, the following scopes are:

i. The workpiece is Stavax.
ii. The electrode is copper.
iii. Full factorial design method is applied during analysis and experiment.
iv. The works is focus on blow mold neck.
v. Investigate on the surface finish of the workpiece.
vi. Equipment is EDM-Die Sinked.
vii. The considered parameter is discharge current, gap voltage, pulse-on-time and off-time.

1.5 Expected Results

The outputs are:

i. Optimum parameter of EDM Die Sinked for electrode.
ii. Die Sinked bottle neck mould.

1.6 Significance of study

The significant of this study is aim to fined the suitable parameter of Electro-discharge Machine Die Sinker using copper electrode to get fine surface finishes.

1.7 Thesis Structures

Thesis structure is the brief explanation to every chapter in this thesis. The structures of thesis are brief as below:

1. **Chapter 1**

   This chapter discuss briefly on the project background, problem statement, project objectives, and project scopes. The main purpose of this chapter is to give an early understanding of the overall project.

2. **Chapter 2**

   This chapter includes all the information acquired regarding on the project which includes the quotes and summary from the journals, reference books and other types of article review. All the information including the principles, explanations and parameters related to this project were shown in this chapter for future reference.