CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Grinding is a manufacturing process with unsteady process behaviour, whose complex characteristics determine the technological output and quality. In order to predict component behaviour during use or control the grinding process, it is necessary to quantify surface roughness, which is one of the most critical quality constraints for the selection of grinding factors in process planning. During the grinding process, the power transmits and generates friction. The excessive power and friction might cause the workpiece to accept the excessive temperature and lead the workpiece damage where it prevents the fine surface finish and desirable accuracy.

1.2 PROJECT BACKGROUND

In this project, Haynes 242 is need to grind with the center grinding machine, to find optimize surface roughness, temperature and tool wear when using water based coolant. The experiment will held using varied machining parameters which are depth of cut and constant table speed where 36 experiments are need to be run. Surface roughness is measured using Mahr S2 Perthometer. Alyuda NeuroIntelligence software is used to design experiments and find optimum parameters which are the depth of cut.

1.3 PROBLEM STATEMENT

Machining process that undergoes finishing process can achieve the high dimensional accuracy and good quality of the surface. Grinding is one of the processes
that used for fine surface finish. To avoid the effects on the quality of the surface, there are few things that need to consider. By controlling the parameter such as the depth of cut, feed rate, wheel speed, type of abrasive and others, will give good surface condition.

The common problem occur when grind the material is the excessive temperature that burning the workpiece. During machining operation, friction between workpiece and grinder wheel were interfaces resulting the high temperature on grinder wheel. The effect of this generated heat affects shorter tool life, higher surface roughness and lowers the dimensional sensitiveness of work material.

At the same time, doing some mistakes during the grinding process will be affect on the surface roughness of the material. The surface quality will not be in a good condition if letting the problem occur.

1.4 PROJECT OBJECTIVES

The objectives of this project as below which had been determined to start the project:

(i) To find optimum parameters of grinding process which the depth of cut.
(ii) To investigate the type of surface roughness, and wheel wear produced during experiment.
(iii) To develop prediction model for surface roughness by using neural network analysis.

1.5 PROJECT SCOPES

The scopes of this project as below are determined in order to achieve the objectives of the project:

(i) Design of the experiment
(ii) Perform the experiment on the grinding machine utilizing abrasive grinding wheel using water based coolant.
(iii) Surface roughness measurement by using Mahr perthometer S2.
(iv) Conduct experiment with 18 of experiment of single pass and 18 of experiments of multi-pass grinding process.

(v) Grinding process using two different wheel, SiC and Al₂O₃ wheels.

(vi) The constant table speed were used which 200rpm.

(vii) The material used was Haynes 242.

(viii) Wheel dressing operation by diamond wheel dresser.

(ix) Prediction model for surface roughness by using neural network analysis.

1.6 THEESIS OUTLINE

This thesis is included chapter 1 until chapter 5. In chapter 1, overall project background such as problem statement, objectives and scopes of the project have been discussed. All the information on this chapter is important to start the project. Chapter 2 is described about the literature review related to the project such as type of the grinding process that were used, mechanism of the grinding process and the properties of the Haynes 242. For chapter 3, the methodology of the project will be discussed. It is the most important things that need to be considered in order to ensure that the flow of the project is followed the schedule. All the details and related discussions on the process that involved will be described. Next chapter is chapter 4 that will be discussed and analyzed about the results from the experiment. All the data obtained are represented in terms of graph. The last chapter for this thesis is chapter 5 which include conclusion and recommendation. The conclusion will be made from the results obtained. Then, there are also some suggestions in order to make any improvement for this project.