CHAPTER 1

INTRODUCTION

1.1 GENERAL INTRODUCTION

Manufacturing in general term is the use of machine, tools and labor to produce things for sale. It was a wide field that involves human activity from handicraft to high tech for process raw material into finished good and also process finished good into more complex product. Manufacturing usually occur in large scale that involve mass of production. In order to improve the traditional manufacturing, many technologies are developed and it’s cause many machine are created as well as tool itself.

There are many types of machine and tool that are use to process the material in manufacturing process. Some of them may involve high cost to operate the process such as cost of machine, cost of maintained, energy consumption, labor and so on. So in mass production, there is important to consider the economic aspect due to make the industry profitable and growth. Many method and machine are developed to make the manufacturing process more effective and decrease the cost of production.

One of the solutions is by reducing cost of maintained of the machine. It’s meant, create new machine that can stand longer than the old machine and not easily broken or fail. An ultimate machine required ultimate tool to operate at full of performance. We can use high quality of material to created better tool for example by using TiN-coated carbide cutting tool as it can stand at high temperature, high cutting-speed and it was prove that can improve the tool life. However, the performance of that cutting tool is depending on many variable of cutting condition.
In this project, I will investigate the performance of TiN-coated carbide cutting tool while machining aluminum and mild steel by using milling machine in variety value of cutting speed, feed rate and depth of cut.

1.2 PROBLEM STATEMENT

Performance of milling machine almost depending in how fast the machine can cut the work piece, its meant more faster the milling machine process material more finish product are produce in a period of time and the productivity of the machine are high. High productivity needed high rate of metal removal, so it will reduce manufacturing cost and operation time. Although the faster process is needed, it did not guarantee the quality of the produce good in term of surface roughness. Customer always prefer to a quality product and the quality of work piece machined surface and its integrity are most depend on tool wear and it directly depend on life of the tool. Moreover, despite having the target of achieving optimum superficial finishing with the shortest possible time one must take into account the consideration the quality of surface roughness, so that the complete finishing operation can be carried out with just one tool, avoiding the intermediate stops in order to change the tool due to its wear. Eventually, sudden failure of cutting tools lead to loss of productivity, rejection of parts and consequential economic losses. Selection of cutting tools and cutting conditions represents. Plus tool wear/tool life is an important aspect commonly considered in evaluating the performance of a machining process.

In this research, the main objective is to determine the optimum machining parameters in order to get the best quality of work piece surface roughness while using milling machine. Selection of cutting conditions represents an essential element in process planning for machining. This task is traditionally carried out on the basis of the experience of process planners with the help of data from machining handbooks and tool catalogs.
1.3 OBJECTIVE

(i) The main objective of this research is to determine actual parameter and condition while machining aluminum alloy and mild steel due to get the optimum performance of coated carbide cutting tool.

(ii) This project also to determine performance of coated carbide cutting tool by focusing on surface finish.

1.4 PROJECT SCOPE

(i) Use Response Surface Method to design the experiment and analyze the data from experiment. Run the experiment base on Response Surface Method (RSM).

(ii) Use CNC milling machine to operate the end milling on aluminium alloy and mild steel under wet condition.

(iii) Use Mpi Mhar Perthometer to analyze the surface roughness of work piece.

(iv) Use Minitab software to construct contour and surface graph and determine the relationship between cutting parameter and the surface roughness.

(v) Construct a graph of comparison between Aluminium Alloy and Mild Steel in term of the performance of cutting tool.