CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter will discuss about background of the study, problem statement, objective of the project, and scope of the project.

1.2 BACKGROUND OF STUDY

Aluminium alloys widely used in the industry because of their attractive combination of properties such as high strength to weight ratio. (Sanjeev Kumar, 2010) During manufacturing of automotive and aerospace parts, welding of aluminium alloys 6xxx is frequently needed. Welding of aluminium is commonly performed by using metal inert gas welding or tungsten inert gas (TIG) welding. Gas metal arc welding offers the advantage of high deposition rate and high welding speed besides deeper penetration because of high heat input. However, excessive the heat input imposes to the problem such as melt through, distortion, especially when welding of thin aluminium sheets. Therefore, to produce high quality weldments, TIG welding is preferred than metal inert gas (MIG) welding. TIG welding process is one of the most well established processes which can not only weld all metals of industrial use but also produce the best quality welds among the arc welding process. (Rajesh Manti, 2008) It produces very attractive welds, good profile, edge wetting and bright appearance. (Sanjeev Kumar, 2010) The good welding skills make the welding penetrate well. The good well profile and free detects are responsible for the improvement of the tensile properties. Due to the low hardness of fusion zone, this region is the weakest area in the tensile test and much easier to fracture (Chen,
2009). For the hardness value, the hardness is lower in the weld metal zone region compared to HAZ and base metal region irrespective of welding technique (Lakshminarayanan, 2009).

1.3 PROBLEM STATEMENT

Aluminium alloys have been widely used in automotive, aerospace and manufacturing industry. Welding process is the major joining type in the industry. The poor strength of the joint caused the problem to the industry. The problem that occurs is an accident. The strength of the joint is the solution to solve the problem. The filler type and current is the method in the strength of welding joint.

1.4 OBJECTIVE

(i) To study the effect of current in TIG welding process to the mechanical properties of aluminium alloys.

(ii) To study the effect of different filler materials to the mechanical properties of aluminium alloys.

1.5 SCOPE OF THE PROJECT

(i) TIG welding process of AA6061 aluminium alloys sheet.

(ii) Current input 30, 40, 50, 60 and 70A in TIG welding process.

(iii) ER4043 and ER4047 are the filler type use with different composition of material.

(iv) Mechanical testing in this study are hardness test and tensile test.

(v) Microstructure analysis for weld zone, heat affected zone and base metal using optical microscope.