CHAPTER 1

CHAPTER 1: INTRODUCTION

1.1 PROJECT BACKGROUND

The word “acoustic” is come from the Greek word “akoustikos”, which means has to do with “hearing” (Miller, 1987). The Latin synonym is “sonic”. After acousticians had extended their studies to frequencies above and below the audible range, it become conventional to identify these frequency ranges as “ultrasonic” and “infrasonic” respectively, while letting the word “ultrasonic” refers to the entire frequency range without limit. Acoustic emission testing (AET) becomes recognized as Nondestructive testing (NDT). Galvanized iron alloy commonly used in manufacturing of piping generally. As this can imply to its application, hence the results will show the characteristic of the effect before and after of Metal Inert Gas (MIG) welding on galvanized iron alloy. This research and experimental study of acoustic emission signal characteristics on the welding joint between two different types of galvanized iron alloys. Acoustic emission is defined as the transient elastic energy that is spontaneously released when material undergoes deformation, fracture, or both. It forms the basis of one of the new Non-destructive Testing (NDT) methods that provides means of evaluating structural integrity by the detection of active flaw that may ultimately cause failure of the material. Detection of AE represents actual detection of fracture or characteristics events as they occurred when material undergoes to crack (Sachse, et al, 1991).

This project involves research and studies of acoustic emission event in different characteristic before and during welding process of galvanized iron alloy. There will be two types of galvanized iron alloy to be performing as the material in
this project. As we know that acoustic emission can only quantitatively gauge how much damage or activity is contained in a structure. In order to obtain quantitative results about size, depth, and overall acceptability of a part, other NDT methods (often ultrasonic testing) are necessary. However in this project is concern about the activity of the welding process, hence the ultrasonic testing not required.

The welding join is used to test a material strength. It is to detect if there is any defects on the welding joint. The testing will be carried out during the welding process as to detect the signal characteristic before and after the joint is defected. This method will apply with acoustic emission equipment by follow the standard experimental procedure and set up of acoustic emission parameters. Then when the data collected, it will be analyzed by using Matlab software to interpret the data.

1.2 PROBLEM STATEMENT

During the welding process, there are two type of acoustic emission signal which is useful and disturbances signal. The useful signal occurs when essential changes in the melted region of the spot weld. Meanwhile for the disturbances signal, it is cause by the noise from surrounding. Noise from surrounding such as noise from the electrical component, noise of cooling liquid and also noise from electrodes knocks. In order to specify the types of signal characteristic of welding process, the acoustic emission device used with some analysis using Matlab software. The acoustic emission testing will be carried out after welding process. The signal that will catch by acoustic device will be interpret to find the variable signal character before and during welding process take place.