CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

In joining process, they involve in various ways to combine between two metals with similar properties or with different properties. One of the processes is through welding process. Welding is most widely utilized as a joining method for steel structures. Weld joints often contains defects such as slag inclusions, incomplete fusion, gas pores, undercuts at weld toes, porosity and underfills. These defects act as stress raisers and cause premature failure of structures.

Welding is one of the types in permanent joining process. This method is widely use in many construction area for example in the port, harbor and automotive factory. Many type of welding was developed to improve weld quality and through that a new improvement product is produce from improved weld quality. In automotive part, almost all of the parts in a car use joining process whether it is welding process. This process is done to join between two metals. The improvement of welding quality is necessary to ensure that the product that was made using this process is safe and secure enough to be use by customer.
1.2 PROBLEM STATEMENT

In the recent development, machine is used to aid us in the welding fields. The major causes that make people or company used automated machine is the product that is going to be produce is a better product and can eliminate the common defects that always happened to human basis work. Overlaps, underfill, slag inclusions, gas pores, corrosion are common types of defects can be found after welding that was conducted by human. There are many type of crack can be determine through the experiment for example longitudinal crack, creep crack, toe crack and transverse crack. The focus of this study is how to improve weld quality before the crack propagate and reduce the percentage of crack from initiated by applying the normalizing at the heat affected zone (HAZ). Scanning electron microscope is going to be use to observed the microstructure and the crack.

1.3 OBJECTIVE OF RESEARCH

a) To improve the weld region by applying heat treatment that is normalizing.
b) To identify the effectiveness of the normalizing towards the crack.
c) To reduce the crack by applying heat treatment that is normalizing.

1.4 SCOPE OF RESEARCH

a) Improve weld quality by applying the heat treatment to the low carbon steel (AISI 1018) using normalizing.
b) Using Shield Metal Arc Welding (SMAW) arc welding to joint between 2 AISI 1018 steel.
c) Using Microscope to observed the crack and states the comparison of crack between before and after heat treatment.
CHAPTER 2

LITERATURE REVIEW

2.1 ARC WELDING

In the joining process, there are three major categories which are welding, adhesive bonding and mechanical fastening. Under the welding category, there are three more sub-categories which is fusion welding, solid-state welding and brazing and soldering. Arc welding fall into one of this type of welding that is fusion welding.
Fusion welding is defined as the process that melts materials and coalescing with each other (Serope Kalpakjian et al 2006). Filler material may or may not be used. Arc welding uses a welding power supply to create an electric arc between an electrode and the base material to melt the metals at the welding point.

Arc welding can be used either direct current (DC) or alternating current (AC), and consumable or non-consumable electrodes. Sometimes the welding region is protected by inert or semi-inert gas that is known as a shielding gas, and some of the process might use filler material or not (Serope Kalpakjian et al 2006). In the arc welding, there are some apparatus that must be prepared before welding is constructed. For example in the simple arc welding, the common apparatus that must be prepared are electrodes, power supply, welding helmet for protection from burr and ultraviolet protection.