UNIVERSITI TEKNOLOGI MARA

CAWANGAN TERENGGANU KAMPUS BUKIT BESI

MEC299

STUDY OF HARDNESS PROPERTIES OF BUTT WELDED JOINTS USING METAL INERT GAS (MIG) WELDING ON MILD STEEL PLATE

MUHAMMAD SYAHIR BIN AZMAN

2020882644

SUPERVISOR:

TS MOHD ARZAIMIRUDDIN BIN ARIFFIN

SEM MARCH - AUGUST 2022

ABSTRACT

Mild steel is one of the materials that is commonly utilised in many sectors due to its good mechanical qualities, but can this mild steel be used in welding with metal inert gas. An investigation was made on the welding procedure on mild steel plates employing metal inert gas. The butt kind of connection was employed for this investigation. After welding, mild steel plates undergo a hardness test using a Vickers hardness machine to determine their degree of hardness. On welded mild steel plates, dye penetration tests were also carried out. Any faults that could be present on the plate will be found using this test's outcome as its benchmark. The findings demonstrate that when mild steel plate is welded utilising metal inert gas welding, its hardness value improves.

Table of Contents

CHAPTER 1: INTRODUCTION

1.1 RESEARCH BACKGROUND

Welding is the process of joining two metals that are similar or different using heat and pressure, however, it may also be done without pressure in specific instances. It is frequently used for metals and thermoplastics, although it may also be applied to wood. A versatile technique, MIG welding may be applied to both thin sheets and large sections. When an arc forms between the end of a wire electrode and the workpiece, a weld pool is created. In the welding junction, the wire serves as a filler metal and a heat source. The copper contact tube through which the wire is passed transmits the welding current. The weld pool is shielded from the surroundings by a nozzle that surrounds the wire and disperses a shielding gas. Depending on the material being welded and the application, a certain shielding gas type will be appropriate.

In addition, gas metal arc welding (GMAW), sometimes referred to as metal inert gas (MIG) or metal active gas (MAG), is a welding process in which an electric arc forms between a disposable MIG wire electrode and the workpiece metal, heating and fusing them. In order to shield the operation from environmental contamination, a shielding gas is also supplied through the welding cannon with the wire electrode. Either a semi-automatic or fully automated process may be used. Although constant voltage, direct current power sources are the most popular for GMAW, alternating current and constant current systems can also be used.

There are four fundamental methods of metal transfer in GMAW: globular, short-circuiting, spray, and pulsed-spray. Each has its own characteristics, benefits, and drawbacks. The basic equipment required to perform gas metal arc welding includes a welding gun, a wire feed mechanism, a welding power source, a welding electrode wire, and a shielding gas supply.

Following that, metal inert gas welding (MIG) is a high-deposition-rate welding technique in which a metal wire is continually consumed as it travels toward the hot weld tip. A tiny electrode is used for MIG welding, and a trained operator supplies the electrode continuously during the welding process. In the metal inert gas welding procedure, a junction is created by heating, melting, and solidifying the parent metal and a filler material in a small area.