

ABSTRACT

The aim of this investigation was to study the mechanical and microstructure properties of the AA6061 aluminium alloy that have been jointed using gas metal arc welding process. Single V butt joint configuration has been prepared for the plate's joining. Butt-joint welds were made on 6 mm thick plates using 21 – 22 V arc voltage. Two different filler ER4043 and ER5356 have been weld at the weld metal zone to weld Al alloy. Dynamic recrystallised microstructure in the weld metal zone was studied. It was shown that different grain sizes and shapes were found at the different zones. The tensile test, bending test and hardness test were used to investigate the mechanical properties of the sample. The mechanical properties of the sample were compared between weld metal and base metal. Result show that different filler may result in different mechanical properties. The results showed that the hardness was relatively higher in the base metal zone with value of 93HV compared to weld metal zone with value of 80.5HV and heat affected zone (HAZ) with value of 60.7HV. The coarse insoluble intermetallic compound were indentified based microstructure evolution study of AA6061 aluminium alloy. It was found that, the precipitates for weld metal filler ER5356 were Al-Mg-Fe (grey colour) and Al-Mg-Si (black colour), while the precipitates for weld metal filler ER4043 were Al-Si-Cr-Fe (grey coloured) and Al-Si (black colour).

Key words: Aluminium alloy AA6061, hardness properties, precipitates, microstructure, gas metal arc welding