

Title:

Effect of FSW on the Mechanical properties and Microstructure of 6082-T6 AA

Abstract :

This paper reports the effect of Friction Stir Welding on the mechanical properties and microstructure of 6082-T6 Aluminium alloy. The welds were produced using three different transverse speeds of 90, 120 and 150m/min to vary the heat input to the welds. The rotational speed of 750rpm is constant for the three welds samples, plunge depth of 0.31mm and tool tilt angle of 3 degrees was employed. The mechanical properties were characterised by the tensile analysis, the microhardness and joint efficiency of the welded interface. The microstructures, macrostructures, fracture surface and grain sizes were characterised. The result revealed that tensile strength at the joint interfaces of the three samples was enhanced as the transverse speed increases from 90m/min to 150m/min. The joint efficiency of the joint interfaces of the three welded samples increases. The Vickers hardness values at the joint interfaces were enhanced for the three samples when compared with the base material. This is attributed to the strain hardening phenomenon. The resulting microstructural characterization shows that good metallurgical bonding was achieved at the joint interfaces of the welds produced, this is evident with the presence of the transition region separating the advancing side from the retreating side of the joint interfaces.