

ABSTRACT

Continuous drive friction welding (CDFW) is a solid state joining process. CDFW heat generated by friction on the object the joining. Heat generated from the friction is fed as welding energy. In the method CDFW used several parameters that effect the welding results, such as : friction pressure, friction time, upset pressure, upset time and rotation speed machine. This research was conducted to analyze effect of upset pressure variation on tensile strength, microstructure and hardness of connection with continuous drive friction welding method.

In this research the material used is a solid cylindrical metal AISI 304. Welding process using variation parameter of upset pressure 70 MPa, 80 MPa, 90 MPa, 100 MPa, 110 MPa, 120 MPa, 130 MPa, 140 MPa, 150 MPa and 160 MPa. While the other parameters are determined constant, 70 MPa friction pressure, 5 seconds friction time, 5 seconds upset time and rotation speed machine 1000 Rpm. To analyze effect of upset pressure variation on connection result of AISI 304 was observation tensile strength test, microstructure and hardness micro Vickers test.

The results of the microstructure test of this research on a variation of upset pressure 160 MPa described in connection AISI 304 visible area around joining there are large granules that not uniform. On a variation 70 MPa of welded joint area changes that presence of small grains that can increase the hardness. The high hardness rate of upset pressure variation 160 MPa is there in the base metal of 243,8 VHN at distance of 15 mm, at the connection result area in a hardness value of 215,3 VHN. While the upset pressure variation 70 MPa the high hardness value at a distance 9,5 mm at 243,8 VHN, in the joining area produced a hardness value of 231,8 VHN. In tensile test obtained the high tensile strength of 563,4285 MPa with variation of upset pressure 160 MPa and the tensile strength results low obtained at a variation of upset pressure 70 MPa with a value of 478,0039 MPa. It can be concluded that the large of the upset pressure used, the high value tensile strength to be obtained from the connection result.

Keywords : continuous drive friction welding, upset pressure, AISI 304, microstructure, tensile strength test