Evaluation of metallurgical and mechanical properties of dissimilar metals welds between duplex stainless steel and HSLA steel

Brahim BELKESSA, Djamel Miroud, Naima Ouali, Mustapha DJAMA

Abstract: The welding of a duplex stainless steel 2205 DSS (UNS 31803) and high strength low alloy steel (HSLA) API X52 by shielded metal arc welding process was conducted using two different filler metals, the duplex E2209 and austenitic E309 grade. Mechanical properties and microstructure of the dissimilar metals joint have been investigated. The microstructure investigation was conducted with optical microscope, scanning electron microscope, EDS and X-ray diffraction. A high hardness value was recorded at the interface between the weld metal and API X52 steel, between the fusion boundary and the type II boundary. Tensile strength and toughness values of the weld metal produced by E309 electrode are slightly higher than of the weld metal produced by E2209 electrode.

Keywords: Dissimilar welding, Heat affected zone, filler metals, mechanical characterisation