Investigation on the microstructure and mechanical properties of 2205/X65 clad plate by explosive welding

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Abstract In this paper, 2205/X65 clad plate was joined by explosive welding. The clad plate would be used in the oil and gas transmission pipeline to replace the 2205 materials. After explosive welding, the microstructure and the composition of the clad were characterized using optical microscopy, scanning electron microscopy. Properties were inspected by using tensile test, shearing test, microhardness test and Intergranular corrosion test. The examination results showed the interface of the 2205/X65 alloy plate was typical wavy shape. And No pore, crack or melting zone was inspected in the interface. Tensile test results showed that the ultimate tensile strength, yield strength and elongation of the clad plate were 544MPa, 340MPa, 33%, respectively. The shearing strength average value was about 283 MPa. These mechanical properties results reach to the requirement of ASTM A264-2003 specification. And intergranular corrosion test showed that surface of the clad plate was smooth. It meets the requirement of the ASTM A262-2003 specification practice E. It indicated that the corrosion resistance of the clad plate was better than Mg alloy sheet. Above results indicate that 2205/X65 clad plate joined by explosive could be used in the oil and gas transmission field.

Keywords explosive welding, clad plate, microstructure, intergranular corrosion

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