Article Abstract

Title:	Optimizing pulsed current micro plasma arc welding parameters to maximize ultimate tensile strength of Inconel625 Nickel alloy using response surface method
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Abstract:	This paper reveals the influences of pulsed current parameters namely peak current, back current, pulse and pulse width on the ultimate tensile strength of Micro Plasma Arc Welded Inconel 625 sheets. Mathematical model is developed to predict ultimate tensile strength of pulsed current micro plasma arc welded Inconel 625 sheets. Four factors, five level, central composite rotatable design matrix is used to optimize the number of experiments. The mathematical model has been developed by using Response Surface Method. The adequacy of the developed model is checked by using Analysis of Variance technique. By using the developed mathematical model, ultimate tensile strength of the weld joints are predicted with 99% confidence level. Validation experiments are conducted to validate the predicted values of the developed mathematical model. From the contour plots, it is understood that ultimate tensile strength is more sensitive to peak current and pulse. Also it is found that peak current is most dominant parameter out of all the selected parameters. The developed mathematical model has been optimized using Response Surface Method to maximize the ultimate tensile strength. The weld joints fabricated using peak current of 7 Amps, back current of 4 Amps , pulse of 40 pulses/sec and pulse with of 50% yielded superior ultimate tensile strength of 833 MPa compared to the other joints.
Keywords:	Pulsed current micro plasma arc welding, Inconel625, ultimate tensile strength, Design of Experiments, ANOVA, Response Surface Method