Optimization of Resistance Spot Welding Process using Response Surface Methodology and Simulated Annealing

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This study presents the Resistance Spot Welding (RSW) process of Deep Drawing Steel (DDS) optimization using Response Surface Methodology (RSM) and Simulated Annealing (SA). The RSW process was optimized to obtain the maximum shear force the DDS can withstand. The experiment was conducted under various DDS thickness, welding time and welding current. The experimental processes were conducted using L_{16} orthogonal array, which has nine rows. The processed DDS was tested using tensile testing machine which will generate the amount of shear force that it can withstand. RSM is first used to develop a suitable mathematical model. The model was tested using Analysis of Variance. From the test result, the model then was used as the objective function of SA. Based on the result, the maximum shear force can be well predicted, which leads to reduced cost and improved welding quality.

Keywords: Resistance Spot Welding, Deep Drawing Steel, Shear Force, Optimization, Response Surface Methodology, Simulated Annealing

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