

## Documents

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**Taguchi Optimization of Wear Properties of Duplex Stainless Steel Reinforced Surface with Silicon Carbide Using TIG Torch Melting**

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### Abstract

This work presents experimental and numerical results of deposition of SiC coating using TIG torch method. The Taguchi approach was used to optimize the TIG torch melting process of duplex stainless steel for increasing the wear properties. The process variables used are current, voltage, transverse speed and gas flow rate. The parameter combinations were carefully chosen with the purpose of producing a hard surface layer with the enhancement of wear properties. Three levels of parameters were used in the experimental design in accordance with L9 orthogonal array. The signal-to-noise (SN) ratio was employed to analyze the experimental data. The results show that the current provides the most influencing parameter while the transverse speed provides the least contribution on the improvement of wear properties. The optimize parameter on the hardness and wear rate is 80 A of current, 20 V of voltage, 1.0 mm/sec of transverse speed and 25 L/min of argon flow rate. The main worn surface mechanism for SiC-DSS reinforced surface exhibited mild striation for the best sample of hardness and wear resistance. © 2024, Universiti Malaysia Perlis. All rights reserved.

### Author Keywords

Duplex stainless steel; Optimization; Silicon carbide; Taguchi; Wear

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