Optimization of gas tungsten arc welding (GTAW) to develop the NiAl coating using neural networks and genetic algorithm

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(Received 25 June 2016 ; Accepted 9 October 2016)

Abstract
In this research, artificial neural network (ANN) and genetic algorithm (GA) were used in order to produce and develop the NiAl intermetallic coating with the best wear behavior and the most value of hardness. The
effect of variations of current, voltage and gas flow on the hardness and wear resistance were optimized by ANN and GA. In the following, the optimum values of current, voltage and gas flow were obtained 90(A), 10(v) and 9 (Lit/min), respectively. Then, the wear behavior in the environment temperature and high temperature for optimized NiAl compound was compared with two other experimental samples.

Keywords: Intermetallic NiAl compound; Cladding; Artificial neural networks; Genetic algorithm; High temperature wear.