Optimization of Waterjet Paint Removal Operation Using Artificial Neural Network

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Abstract Paint removal of automotive parts without environmental effects has become a critical issue around the world. The high pressure waterjet technology has received a wider acceptance for various applications involving machining, cleaning, surface treatment and material cutting. It offers an advantage to remove the automotive paint due to its superior environmental benefits over mechanical cleaning methods. Therefore, it is important to predict the waterjet cleaning process for a successful application for the paint removal in the automotive industry. In the present work, ANN model was used to predict the surface roughnes after the paint removel process of automotive component using the waterjet cleaning operation. A response surface methodology approach was employed to develop the experimental design involving the first order model and the second order model of central composite design. Into training and testing, a back-propagation algorithm used in the ANN model has successfully predicted the surface roughness with an average of 80% accuracy and 3.02 mean square error. This summarizes that ANN model can sufficiently estimate surface roughness in waterjet paint removal process with a reasonable error range.

Keywords Waterjet cleaning · Paint removal · Multiple jet passes · Surface roughness · Artificial neural network

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