

Parametric Influence and Optimization of Wire-EDM on Oil Hardened Non-Shrinking Steel

Authors : Nixon Kuruvila, H. V. Ravindra

Abstract : Wire-cut Electro Discharge Machining (WEDM) is a special form of conventional EDM process in which electrode is a continuously moving conductive wire. The present study aims at determining parametric influence and optimum process parameters of Wire-EDM using Taguchi's Technique and Genetic algorithm. The variation of the performance parameters with machining parameters was mathematically modeled by Regression analysis method. The objective functions are Dimensional Accuracy (DA) and Material Removal Rate (MRR). Experiments were designed as per Taguchi's L16 Orthogonal Array (OA) where in Pulse-on duration, Pulse-off duration, Current, Bed-speed and Flushing rate have been considered as the important input parameters. The matrix experiments were conducted for the material Oil Hardened Non Shrinking Steel (OHNS) having the thickness of 40 mm. The results of the study reveals that among the machining parameters it is preferable to go in for lower pulse-off duration for achieving over all good performance. Regarding MRR, OHNS is to be eroded with medium pulse-off duration and higher flush rate. Finally, the validation exercise performed with the optimum levels of the process parameters. The results confirm the efficiency of the approach employed for optimization of process parameters in this study.

Keywords : dimensional accuracy (DA), regression analysis (RA), Taguchi method (TM), volumetric material removal rate (VMRR)

Conference Title : ICAMAME 2015 : International Conference on Aerospace, Mechanical, Automotive and Materials Engineering

Conference Location : Berlin, Germany

Conference Dates : May 21-22, 2015