Optimization of Electro Discharge Machining Parameters for Drilling Titanium in Small Holes Using Taguchi Method

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Abstract

Electro discharge machining (EDM) is a process that use an electric sparks to generate the high temperature and melts the work piece. One of the processes using this method is drilling process. By using this concept, an electro thermal mechanism between electrode and work piece can creates the hole enlargement and the size of the hole its depend on the diameters of electrode are used. The present study performs Taguchi method to investigate the optimal process parameters for high speed super drill machine that was used to make a small hole from titanium alloy (Ti-6: ASTM B348 Grade 5) by using 2.0 mm diameter of copper electrodes. In this experiment, the process parameters namely, current pulse off; maximum current and standard voltage level were selected to optimize. An orthogonal array L_9 was employed to analyze the material removal rate (MRR) of the copper electrode of diameter 2.0 mm penetration. The optimum EDM hole process can be established through this method and the major parameters that effect the MRR can be also detected and verified the effectiveness through experimental results.

Keywords: ANOVA, High Speed Drilling, Hole Enlargement, Material Removal Rate (MRR), Optimization, S/N Ratio, Taguchi Method

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