Performance Parameters Optimization of Power Mixed Electric Discharge Machining (PMEDM) by Taguchi Method

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Abstract

Electrical discharge machining (EDM) is widely used in the production of dies. This paper describes an investigation into the optimization of the EDM process when silicon powder is suspended into the dielectric fluid of EDM. Taguchi's parameter design approach was adopted to obtain an optimal setting of powder mixed EDM (PMEDM) process parameters (peak current, pulse duration, duty cycle, concentration of silicon powder added into the dielectric fluid) that may yield optimal process performance (material removal rate and surface roughness). A modified powder mixed dielectric circulation system was developed in the laboratory. Experiments have been performed on this newly designed experimental setup. The experimental results indicate significantly improved performance of PMEDM over EDM. The results were verified by conducting confirmation experiments with optimal process conditions.

Keywords: Powder mixed EDM; Material removal rate; Surface roughness; Process optimization