PERFORMANCE OF ELECTRICAL DISCHARGE MACHINING (EDM) WITH NICKEL ADDED DIELECTRIC FLUID

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Abstract

In this study, the effect of nickel powder mixed dielectric fluid on Electrical Discharge Machining (EDM) performance of mild steel has been carried out. Peak current, tool/electrode diameter and concentration of powder are the process parameters. The process performance is measured in terms of material removal rate (MRR), tool wear rate (TWR), and surface roughness (SR). The experiment has been designed using a Full Factorial in Design of Experiment (DOE) software. The research outcome is to identify the important process parameters that maximize MRR and minimize TWR and SR. The experiment has been carried out using 2 levels of current (3.5 A and 6.5 A), tool diameters (14 mm and 20 mm) and Nickel powder concentrations (0 g/1 and 6 g/1). The weight of the mild steel work piece and copper electrode are measured before and after each run. Based on the results, current is the most significant parameter affecting MRR, TWR, and SR. It was also found that with added nickel powder in the dielectric fluid, the tool life is longer and surface roughness of the work piece is improved. Furthermore, it was shown that both MRR and TWR increased with the increase in tool diameter. However, SR was improved as tool diameter increased but its effect was not very significant.

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