

PARAMETRIC OPTIMIZATION OF POWDER EDM PROCESS USING GREY RELATIONAL ANALYSIS AND TOPSIS

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ABSTRACT

There are strong needs for productive/quality machining strategies of notoriously “difficult-to-machine” aerospace materials, automobile parts, surgical instruments and super alloys. The newest EDM technology may be able to machine intricate and complex 3D structures and also circumvent the problems encountered in mechanical machining methods. This study is based on parametric optimization of powder-mixed EDM machining of EN-31 tool steel. Copper is used as micro-tool. GRA and TOPSIS are used for optimization of parameters. The optimum parametric conditions were found to be $150\mu\text{s}/0.7\text{DC}/12\text{A}/2\text{g/l}$. Peak current (I_p) was found to be the most influencing factor followed by conc (D) then time-on-pulse (T_{on}) and finally duty cycle DC. It is also observed that with powder-mixed dielectrics. MRR was found to be high and R_a to be low. Moreover, the machined surface develops high resistance to corrosion and abrasion.

KEYWORDS: Grey Relational Analysis, Electro Discharge Machining