

## **OPTIMIZATION OF ELECTROCHEMICAL MACHINING OF STEEL AND ALUMINIUM WORK PIECE USING GREY RELATIONAL ANALYSIS OF TAGUCHI METHOD**

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### **Abstract**

The aim of this study is to investigate the effect and parametric optimization of process parameters for electrochemical machining. The optimization of ECM operating parameters for steel and aluminum work piece using the Grey relational analysis method. Nine experimental runs based on an orthogonal array of Taguchi method were performed. Four parameters namely, voltage, electrolyte flow rate, tool feed rate, and current are optimized. The surface properties of material removal rate (MRR) and surface roughness (SR) were selected as the quality targets. An optimal parameter combination of the ECM operation was obtained via Grey relational analysis. By analyzing the Grey relational grade, coefficient of grey relational, controllable process factor onto individual quality targets additionally, the analysis of variance (ANOVA) is also applied to identify the most significant factor. The experimental results for the optimal setting show that there is considerable improvement in the process. The application of this technique converts the multi response variable to a single response Grey relational grade and, therefore, simplifies the optimization procedure.

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**Keywords :** Electrochemical machining; Grey relation analysis; Material removal rate; Surface roughness.