

## **OPTIMIZATION OF WIRE ELECTRICAL DISCHARGE MACHINING (WEDM) PROCESS PARAMETERS USING DESIRABILITY, FACTOR ANALYSIS AND GREY RELATION ANALYSIS**

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### **Abstract**

The objective of this study is to select the optimal combination of machining parameters in Wire Electrical Discharge Machining (WEDM) process using Taguchi technique. The basic concept behind this study is that in any manufacturing process, by changing the input parameters, output gets affected. In WEDM the most critical factors that affect the machining performances i.e. Metal Removal rate (MRR), Surface Finish (SF) and Kerf (Cutting width) are identified as Input peak voltage, Pulse-ON time, Pulse-OFF time, Dielectric fluid pressure, Wire feed, Wire speed and Servo voltage. For varying the input parameters, eighteen experimental trails based on  $L_{18} (2^1 \times 3^7)$  orthogonal array is selected and the corresponding responses are measured. For solving this multi-objective problem some of the classical methods like factor analysis, desirability index and grey relation analysis are used. Finally the results of three methods are compared and the best combination is chosen.

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**Keywords** : Metal removal rate; Surface finish; Kerf; Taguchi method; Factor analysis; Desirability; Grey relation analysis.