

## Multi-Response Optimization of EDM for Ti-6Al-4V Using Taguchi-Grey Relational Analysis

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**Abstract :** Ti-6Al-4V is a titanium alloy having high strength, low weight and corrosion resistant which is a required characteristic for a material to be used in aerospace industry. Titanium, being a hard alloy is difficult to the machine via conventional methods, so it is a call to use non-conventional processes. In present work, the effects on Ti-6Al-4V by drilling a hole of  $\varnothing$  6 mm using copper (99%) electrode in Electric Discharge Machining (EDM) process is analyzed. Effect of various input parameters like peak current, pulse-on time and pulse-off time on output parameters viz material removal rate (MRR) and electrode wear rate (EWR) is studied. Multi-objective optimization technique Grey relational analysis is used for process optimization. Experiments are designed using an L9 orthogonal array. ANOVA is used for finding most contributing parameter followed by confirmation tests for validating the results. Improvement of 7.45% in gray relational grade is observed.

**Keywords :** ANOVA, electric discharge machining, grey relational analysis, Ti-6Al-4V

**Conference Title :** ICPIE 2017 : International Conference on Production and Industrial Engineering

**Conference Location :** Singapore, Singapore

**Conference Dates :** March 29-30, 2017