

## GREY RELATIONAL APPROACH FOR MULTIPLE RESPONSE OPTIMIZATION OF PROCESS PARAMETERS IN WIRE-EDM OF IS 5986 FE 410

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## ABSTRACT

Non-traditional machining methods are popular in the recent era for machining of various profiles in different engineering materials. In this work, the effect of critical process parameters namely current, pulse-on time, pulse-off time, wire-speed and voltage on material removal rate and surface roughness is investigated while machining of IS 5986 FE 410 steel by wire-electrical discharge machine. The nature of two response parameters considered in the study for optimization is contradicting i.e., one response is of output maximization type and other of minimization type. The experiments were designed using Taguchi  $L_{16}$  arrays and results are analyzed using statistical methods after converting all output responses into grey grades. The results showed that the process parameters such as current, pulse-on time and pulse-off time significantly affected the response. The effect of wire speed and voltage was found to be comparatively less effective on the material removal rate and surface roughness.

KEYWORDS: Wire-Electrical Discharge Machine, Material Removal Rate, Pulse-off Time, Current, IS 5986 FE 410 Steel, Wire Speed, Pulse-on Time & Voltage

