

# OPTIMIZATION OF EDM PROCESS PARAMETERS USING TAGUCHI METHOD: A REVIEW

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## Abstract

Electrical discharge machining is assessed on the basis of Material Removal Rate (MRR), Tool Wear Rate (TWR), and Surface Roughness (SR). Process parameters that mostly affected the EDM Process are Pulse on Time, Pulse off Time, Discharge Current, Arc Gap and Duty Cycle. This paper reviews research for the optimization and improvement of various performance parameters measured in the experimentation on EDM by using Taguchi technique. In the study the main objectives of optimization is to minimize the tool wear rate (TWR) and surface roughness, and to maximize the material removal rate (MRR). Taguchi Method is widely used in the industry to optimize and improve various performance parameters associated with different machining processes. This paper also deals with the review of some of the work reported with the use of Taguchi method in last two decades.

**Keywords:** - EDM, Wire EDM, MRR, TWR, SR, Taguchi Technique.

## 1. INTRODUCTION

A properly planned and executed experiment is of the utmost importance for originating clear and accurate conclusions from the experimental observations. Design of experiment is considered to be a very useful strategy for accomplishing these tasks. The science of statistical experimental design originated with the work of Sir Ronald Fisher in England in 1920s. Fisher founded the basic principle of investigational design and the associated data-analysis technique called Analysis of Variance (ANOVA) during his efforts to improve the yield of agricultural crops. The theory and applications of experimental design and the related technique of response surface methodology have been advanced by many statistical researchers as Box and Hunter, Box and Draper, Hicks. Various types of matrices are used for planning experiments to study several decision variables. Among them, Taguchi's Method makes heavy use of orthogonal-arrays. Dr. Taguchi of Nippon Telephones and Telegraph Company, Japan industrialized a method based on "orthogonal-array" experimentations which gives much concentrated "variance" for the experiment with "optimum settings" of control parameters. Thus the manage of DCM with optimization of control parameters to obtain BEST results was achieved in the Taguchi Method. "Orthogonal Arrays" (OA) provide a set of well balanced (minimum) experiments and Dr. Taguchi's Signal-to-Noise ratios (S/N), which are log functions of desired output, serve as objective functions for optimization, help in data analysis and expectation of optimum results. Now a days Taguchi's methodology is widely used methods all over the globe for research resolutions, specifically to optimise the machining characteristics. In this paper an attempt has been made to put together some of the work done with Taguchi's Methodology. [1]



Fig. 1.1:- processes in Taguchi methodology

## 2. LITERATURE REVIEW

Y.S Liao in 1997 premeditated on the machining-parameters optimization of wire electrical discharge machining. An approach to determine the parameters were performed. The design was based upon the taguchi quality approach with analysis of the variances (ANOVA). In the research the significant factors affects the machining performance factors such as Material removal rate (MRR), gap width, surface roughness (SR), sparking frequency, average gap voltage

# Optimization Of Process Parameters By Taguchi Method

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## **Table of Contents Optimization Of Process Parameters By Taguchi Method**

1. Understanding the eBook Optimization Of Process Parameters By Taguchi Method
  - The Rise of Digital Reading Optimization Of Process Parameters By Taguchi Method
  - Advantages of eBooks Over Traditional Books
2. Identifying Optimization Of Process Parameters By Taguchi Method
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Optimization Of Process Parameters By Taguchi Method
  - User-Friendly Interface
4. Exploring eBook Recommendations from Optimization Of Process Parameters By Taguchi Method
  - Personalized Recommendations
  - Optimization Of Process Parameters By Taguchi Method User Reviews and Ratings
  - Optimization Of Process Parameters By Taguchi Method and Bestseller Lists
5. Accessing Optimization Of Process Parameters By Taguchi Method Free and Paid eBooks
  - Optimization Of Process Parameters By Taguchi Method Public Domain eBooks
  - Optimization Of Process Parameters By Taguchi Method eBook Subscription Services

- Optimization Of Process Parameters By Taguchi Method Budget-Friendly Options
- 6. Navigating Optimization Of Process Parameters By Taguchi Method eBook Formats
  - ePub, PDF, MOBI, and More
  - Optimization Of Process Parameters By Taguchi Method Compatibility with Devices
  - Optimization Of Process Parameters By Taguchi Method Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Optimization Of Process Parameters By Taguchi Method
  - Highlighting and Note-Taking Optimization Of Process Parameters By Taguchi Method
  - Interactive Elements Optimization Of Process Parameters By Taguchi Method
- 8. Staying Engaged with Optimization Of Process Parameters By Taguchi Method
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Optimization Of Process Parameters By Taguchi Method
- 9. Balancing eBooks and Physical Books Optimization Of Process Parameters By Taguchi Method
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Optimization Of Process Parameters By Taguchi Method
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Optimization Of Process Parameters By Taguchi Method
  - Setting Reading Goals Optimization Of Process Parameters By Taguchi Method
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Optimization Of Process Parameters By Taguchi Method
  - Fact-Checking eBook Content of Optimization Of Process Parameters By Taguchi Method
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
- 14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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