

# India-Vietnam

Cultural Diplomacy and Act East Policy

*Editors*

Jayachandra Reddy G

Padmaja M



**UDAY PUBLISHING HOUSE**

**NEW DELHI**

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# **South China Sea**

## **A Flash Point Beyond ASEAN**

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# India-Vietnam

## *Enhancing Partnership*

*Editors*

Jayachandra Reddy G

Nguyen Xuan Trung



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# **India-Vietnam**

**Defence, Strategic and Economic Cooperation**

*Editors*

**Jayachandra Reddy G**

**Ramesh Babu V**



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## India and Vietnam: New Horizons

G. Jayachandra Reddy and Nguyen Xuan Trung

India-Vietnam relations have been exceptionally friendly and cordial since their foundations were laid by two friends - President Ho Chi Minh and Prime Minister Nehru. The traditionally close and cordial relations have their historical roots in the common struggle for liberation from foreign rule and the national struggle for independence. Pandit Jawaharlal Nehru was one of the first visitors to Vietnam after its victory against the French at Dien Bien Phu in 1954. President Ho Chi Minh visited India in February 1958.

Vietnam and India have a rich history of diplomatic relations. During the most testing times in its independence movement, India supported the North Vietnamese regime steadfastly. India was also one of the first countries to recognise the Vietnamese government once the consolidation of the country was achieved in the mid-1970s. Both Vietnam and India were also close allies of the Soviet Union during the Cold War.

Though both the countries believed in different political ideologies but the patriotic spirit and political goal was only achieving independence to their respective countries. Of course, Vietnamese have great admiration towards Gandhian philosophy of Peace and Non-violence at the same time Indians always respect the fighting spirit of the Vietnamese who won two great wars against French and the US. Though the political ideologies are different, India and Vietnam leaders have transformed their personal

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## Introduction

Jayachandra Reddy G and Padmaja M

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Over long years, the relationship between Vietnam and India has been guided by unshakable mutual good will. The relationship between two countries was further promoted to a new height describing it as "a cloudless sky". It is desirable here to look back the role which India has been playing in Southeast Asia together in compliance of the relations with Vietnam. It is noted that culture is playing a major role in building bondage between the two countries.

Before Indian independence some businessmen from Bombay had formed an association of merchants. These people also opened shops in Saigon, Vientiane and Phnom Penh. The Chettiars, one of the Indian business communities, were engaged in money lending, renting of buildings, vehicles, boats etc. Many of Indians married local Vietnamese women even though they had wives in India. They started going back to India since the early 1960s as the political situation in Vietnam became more unstable and the local violence increased. Another group of Indians who came from South India was that of Muslims. They built many mosques in the 1930s. Even today, a number of Indian Muslims live around these mosques in the centre of the city. There was another group of Indians, namely, the Sikhs who came mainly as security guards. They built *gurdwaras* (temple) in Saigon.

# **India-Vietnam in the Indo-Pacific: China Factor**

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# **India-Vietnam Cooperation in Emerging Indo-Pacific Order**

**Jayachandra Reddy G. and Prayaga M.**

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## **Introduction**

The time-tested traditional and historical relations of India and Vietnam got further strengthened during their national struggle for freedom in the last century. The visionary leaders, Jawaharlal Nehru and Ho Chi Minh admired each other's nationalistic sentiments, had laid strong base for the growth of contemporary relations between the two nations. On the foundations of their win-win cooperation, present-day relations of India and Vietnam pushed their contacts to several areas like economic, diplomatic, cultural, science and technology and people to people contacts. The sudden surge of geopolitics with end of the Cold War had ushered in immense changes in Asian economic, security and diplomatic spheres. As well, Asia is becoming the centre of world economy. The region could account for more than half of global GDP and about 40 percent of global consumption by 2040. Global cross-border flows are shifting towards Asia, and the "region's growth is becoming more broad-based and sustainable as its constituent economies increasingly integrate with each other."<sup>1</sup> This vividly reveals the growing verve of Asia and major powers appraisal in their economic, strategic and geopolitical calculations of the region.

Against the backdrop of defining shift of power from the West to the East, India's pivotal role in the emerging "Indo-Pacific" theater is steadily increasing.



The reactive extraction of levulinic acid (0.4686 – 0.781 mol/L) using tri-n-butyl phosphate (0.3652 – 1.461 mol/L) and tri-n-octylamine (0.2264 – 0.9059 mol/L) in 1-hexanol, 1-octanol and 1-decanol from their dilute aqueous solutions are carried out. The physical equilibrium, chemical equilibrium or reactive extraction, and effect of pH studies are investigated. Using the equilibrium experimental data, the distribution coefficient (KD), extraction efficiency (E%), loading ratio (Z), stoichiometric loading factor (ZS) and modified separation factor (Sf) are evaluated. The effects of the initial concentration of acid in the aqueous phase, initial extractant concentration in the organic phase, type of extractant, type of diluent and pH on the distribution coefficient and extraction efficiency are studied. The kinetic studies were carried out for the extraction of levulinic acid using 40% TOA in 1-hexanol at different speeds of agitation (50 rpm to 80 rpm) and the volume ratio of organic to aqueous phase (0.8 to 1.2).

Reactive Extraction of Levulinic Acid



N. Meenakshi  
Dr. B. Sarath Babu

Nampally Meenakshi is a PhD Research Scholar in the Department of Chemical Engineering at Sri Venkateswara University College of Engineering, Tirupati. She completed her undergraduate from JNTU, A. P and Post-graduate from Sri Venkateswara University College of Engineering. She is currently working on Reactive extraction of Levulinic acid.

## Reactive extraction of Levulinic acid

Reactive extraction of levulinic acid using tri-n-butyl phosphate and tri-n-octylamine in different diluents



Meenakshi, Sarath Babu

3.4.4

The reactive extraction of levulinic acid (0.4686 – 0.781 mol/L) using tri-n-butyl phosphate (0.3652 – 1.461 mol/L) and tri-n-octylamine (0.2264 – 0.9059 mol/L) in 1-hexanol, 1-octanol and 1-decanol from their dilute aqueous solutions are carried out. The physical equilibrium, chemical equilibrium or reactive extraction, and effect of pH studies are investigated. Using the equilibrium experimental data, the distribution coefficient (KD), extraction efficiency (E%), loading ratio (Z), stoichiometric loading factor (ZS) and modified separation factor (Sf) are evaluated. The effects of the initial concentration of acid in the aqueous phase, initial extractant concentration in the organic phase, type of extractant, type of diluent and pH on the distribution coefficient and extraction efficiency are studied. The kinetic studies were carried out for the extraction of levulinic acid using 40% TOA in 1-hexanol at different speeds of agitation (50 rpm to 80 rpm) and the volume ratio of organic to aqueous phase (0.8 to 1.2).

Reactive Extraction of Levulinic Acid



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## Reactive extraction of Levulinic acid

Reactive extraction of levulinic acid using tri-n- butyl phosphate and tri-n-octylamine in different diluents



Meenakshi, Sarath Babu

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## Chapter 8

# Design of Half-Ring MIMO Antenna to Reduce the Mutual Coupling



K. Vasu Babu and B. Anuradha

**Abstract** We propose a novel, dual-polarized MIMO radiator, which consists of half rings, and included in the ring a square shape at the top side and half circular shape at bottom side operating from 2 to 10 GHz with a microstrip feeding. The suppression of mutual coupling is obtained by maintaining the separation between the patches around  $0.25 \lambda_0$ . The half-ring MIMO antenna is resonating at dual band of frequencies at 7.24 and 8.16 GHz with impedance bandwidths of 430 and 230 MHz, has  $|S_{11}| < -10$  dB in the MIMO range from 2.0 to 10.0 GHz and has a mutual coupling with  $|S_{21}| < -20$  dB. The radiator has a low ECC (envelope correlation coefficient) with values equal to approximately less than 0.025, which will prove that the half-ring MIMO radiator shows better diversity performance. The half-ring MIMO radiator has improved the parameters of reflection coefficient, mutual coupling, realized gain, group delay and real/imaginary impedances.

**Keywords** Multiple input-multiple output · Realized gain · ECC · Group delay · Real/imaginary impedances

## Abbreviation

ECC	envelope correlation coefficient
GD	group delay
MIMO	multiple input-multiple output
NGD	negative group delay
UWB	ultra-wide band antenna

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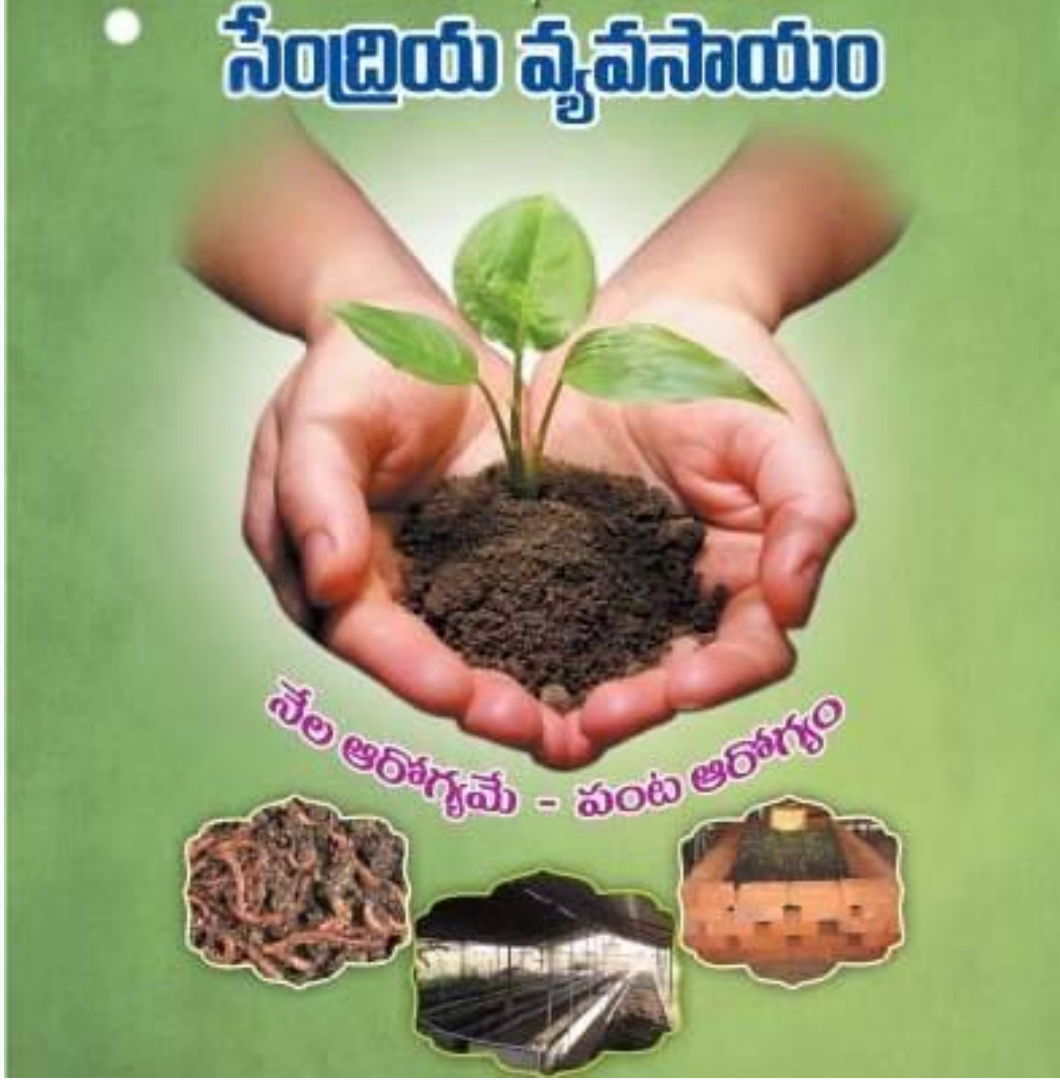
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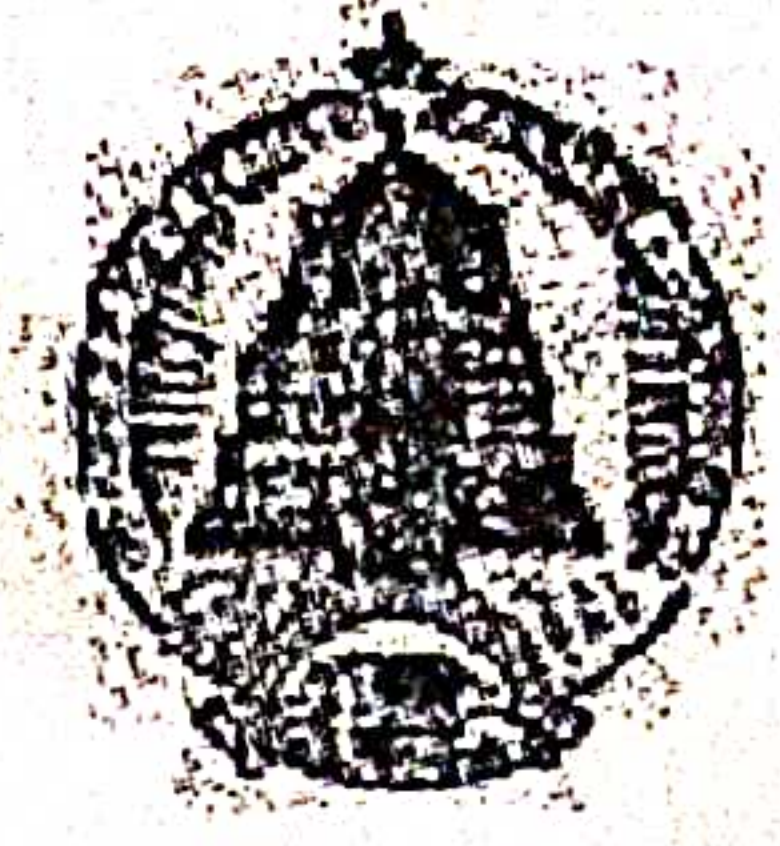
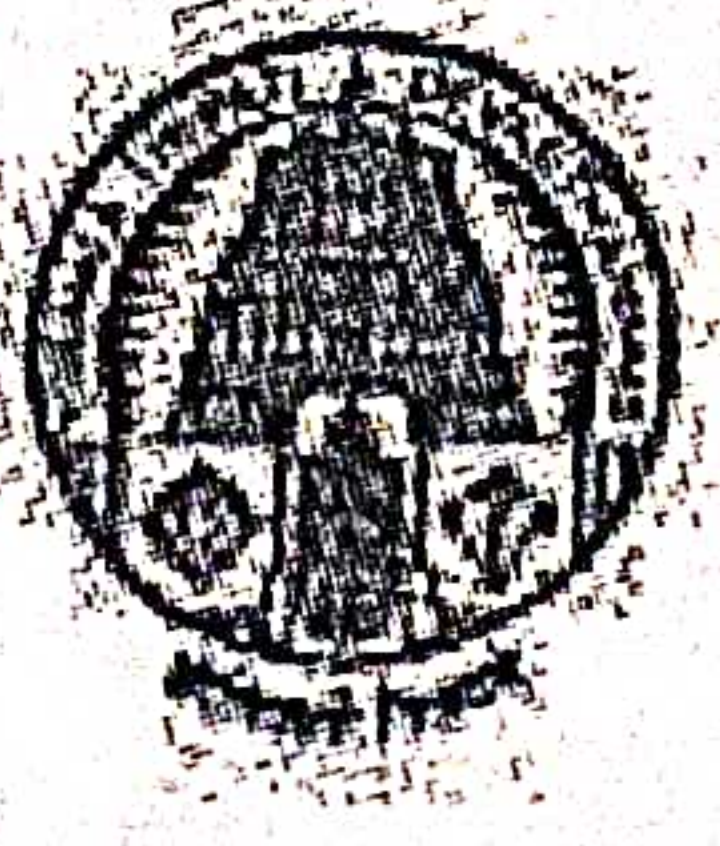


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कला, मानविकी एवं वाणिज्य की मानक शोध पत्रिका

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**Dr. G. Adinarayana**

M.A., L.L.M., Ph.D.



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## E-Resources in LIS Research

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### Abstract

This study explores the various types of e-resources, aimed to provide fundamental information about specific types of services that can be used for study in the Library and Information Science (LIS). Based on the study conducted on literature review analysis on e-resources, the authors tried their level best to find more about the reasons for not utilizing all electronic resources and simultaneously underutilization of e-resources. The authors also stressed the importance of plagiarism checking in the theses.

**Keywords:** E-resources, LIS research. E-books, Subject Gateways, E-journals, E-databases,

### Introduction

The emerging status of information technology would lead to significant improvements in the way information is exchanged. Advances in the field of ICT have provided new possibilities for the dissemination of electronic resources. Electronic resources are material that is transmitted through a CD-ROM, a floppy disc, or a magnetic tape, or over an internet network, such as e-journals, E-Books, and ETDs.

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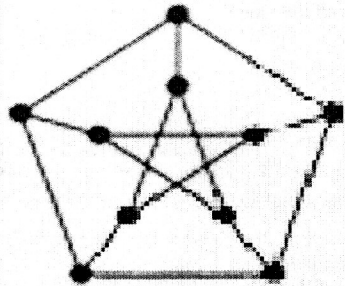
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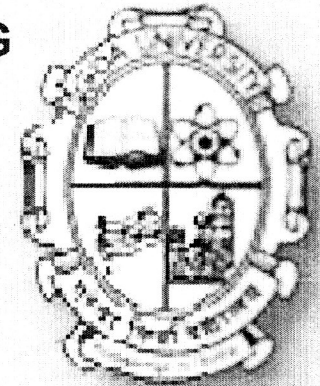




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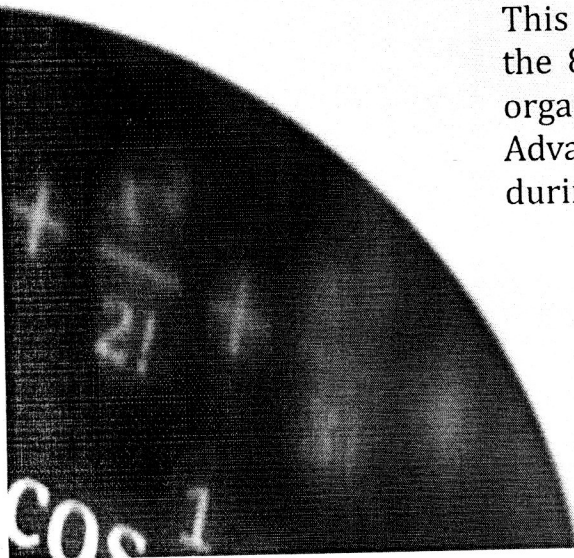
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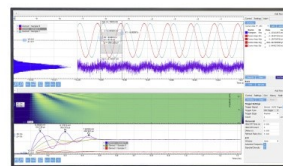
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## Process parameter optimization of wire EDM on weldment of Monel 400 and AISI 316 grade steel

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# Process parameter optimization of wire EDM on weldment of Monel 400 and AISI 316 grade steel

P Hema<sup>1</sup> and K Aparna<sup>2</sup>

<sup>1</sup>Department of Mechanical Engineering, Sri Venkateswara University College of Engineering, Tirupati-517502, AP, India

<sup>2</sup>Department of Production Engineering, Sri Venkateswara University College of Engineering, Tirupati-517502, AP, India.

**Abstract:** The purpose of this paper is to explore the optimal set of input parameters such as pulse on time, pulse off time and wire tension in Wire Electrical Discharge Machining (WEDM) on weldment of dissimilar metals of Monel 400 and AISI 316 grade steel using brass wire. This experiment describes the difference in values in material removal rate (MRR), surface roughness and kerf width with change in three process parameters. A rectangle shaped cut is made using ZNC WEDM. Each combination of parameters is considered according to the L9 Orthogonal array. Taguchi method based grey relational analysis is used and analyzed results indicated that pulse on time has a significant effect on three output parameters. 9<sup>th</sup> experiment, i.e., pulse on time at 150 $\mu$ s, pulse off time at 40 $\mu$ s, wire tension of 14 kg-f are found to be optimal process parameters.

**Keywords:** Wire electrical discharge machining (WEDM), Taguchi technique, material removal rate (MRR).

## 1. Introduction

A non-conventional method of machining that uses thermal electrical energy for machining is Wire Electrical Discharge Machining (WEDM) as it machines with good dimensional accuracy and surface finish, it is used in machining complex shapes. It is often used in the machining of hard materials that, due to vibration issues, or otherwise difficult to machine using traditional machining processes. In Wire EDM, the effect of process parameters on material removal rate (MRR), surface roughness, kerf width are to be investigated experimentally. In order to evaluate the parameters using different approaches, different methods are used. Here, as a standard for the design of experiments, Taguchi orthogonal array was used and Grey relational analysis was carried out. In this study, the cutting factors considered are pulse on time, pulse off time and wire tension. Using Pulsed Current Gas Tungsten Arc welding using three different filler metals such as ER309L, ERNiCu-7 and ERNiCrFe-3, K.Devendranath Ramkumar, N.Arivazhagan (2014) investigated the pulsed current for joining two different Monel 400 and AISI 304 metals using Pulsed Current Gas Tungsten Arc welding and obtained that parent metal Monel 400 had better tensile properties compared to other areas. Angolkar Pooja, J Saikrishna (2017) have investigated the weldability of steel grade Monel 400 and AISI 316 and mechanical properties such as tensile strength, hardness are measured. Residual stresses are measured and maximum stress tensors at the welded joint are defined. J. Jeeamalar, Dr. S. Ramabalan (2017) found that both optimization and prediction can be used by taguchi experimental design tool. Rajyalakshmi.G (2013) analyzed the optimization of process parameters of Wire Electrical Discharge



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# PROCESS PARAMETERS OPTIMIZATION OF LBM FOR MICROSLOT ON COPPER USING GREY RELATIONAL ANALYSIS AND ANOVA

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**Abstract:** Laser-beam machining is a non conventional machining process. Laser-beam machining is a thermal material-removal process that utilizes a high-energy, coherent light beam to melt and vaporize particles on the surface of metallic and non-metallic workpieces. LBM is newer thermal technique also widely accepted in industry today. Laser beam machining is based on the conversion of electrical energy into light energy and then to thermal energy. The objective of this paper is to investigate the effects of parameters associated with CO<sub>2</sub> laser cutting of micro slot contains width 0.3mm and length 20mm on copper plate of 4 mm thickness. Micro-slots or micro-channels are one such type of feature which has more applications in the fabrication of miniature devices, micro-fluidic devices or heat exchangers. The experiment was designed and carried out on the basis of standard L27 Taguchi's orthogonal array in which the three laser cutting parameters viz. laser power, cutting speed, assist gas pressure, and were arranged at three levels. The result showed that the parameter like power has greater influence on MRR and cutting Speed has greater influence on Kerf Width and gas pressure has less significance compare to both.

**Keywords:** Copper material, Microslot, Design of experiments, Grey Relational Analysis, ANOVA.

## 1. INTRODUCTION

Micro manufacturing techniques have become so important due to increasing demand for micro parts and structure of various industries. Micro structures, including micro holes, micro slots, micro shafts, and micro gears are widely used micro products required in industries. Micro-slots or micro-channels are one such type of feature which has immense applications in the fabrication of miniature devices, micro-fluidic devices, micro-heat-sinks, or heat exchangers etc. Most laser cutting carried out using CO<sub>2</sub> lasers. CO<sub>2</sub> lasers dominate in the market. Laser cutting of mild steel and stainless steel has a long history and has been one of the primary applications for CO<sub>2</sub> lasers. The laser beam is typically 0.3 mm in diameter with a power of 3-6 KW. Laser is an acronym for Light Amplification by Stimulated Emission of Radiation. The world's first laser was demonstrated by Maiman using a ruby crystal (Maiman 1960). Laser cutting is a thermal based non-contact process capable of cutting complex contour on materials with high degree of precision and accuracy. It involves process of heating, melting and evaporation of material in a small well defined area and capable of cutting almost all materials. Laser has a wide range of applications, ranging from military weapons to medical instruments. In industries laser is used as an unconventional method for cutting and welding. The main advantage of laser cutting is that, it is a non-contact operative method from which a good precise cutting of complicated shapes can be achieved. Also laser can be used to cut variety of materials like wood, ceramic, rubber, plastic and certain metals. Copper has high reflectivity. Their low absorption of infrared laser light makes these metals challenging to cut. Copper and

brass are good reflectors of the infrared laser light, especially in their solid state. Pure copper reflects > 95% of near-IR radiation in its solid state. The reflectivity of copper and other reflective metals decrease when the metal warms up, and drops sharply once the material melts. These metals absorb significantly more laser energy in molten state. When choosing optimized laser, optics, and cutting process, a laser beam quickly melts the surface of reflective materials to then interact with the more absorptive molten metal and initiate an efficient, stable cutting process. Wrong choice of laser/optical setup, or using non-optimal process parameters can result in excessive dwelling of the laser with the solid metal, and therefore excessive amount of back-reflected light. Too much reflection in turn results in the inefficiency of cutting process and potential damage to optics. The critical stage in cutting reflective metal is the beginning of the process, especially the piercing stage when the laser interacts with solid metal. After the cut is established, laser beam mostly interacts with the molten material.

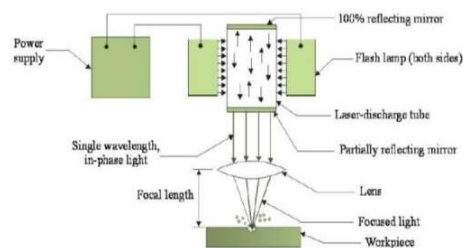


Figure 1: Schematic Diagram Of Laser Beam Machining

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# Effect of Process Parameters on 6065 – T6 Aluminum Alloy Using CNC End Milling – A Fuzzy Approach

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**Abstract** – The present work deals with the investigation of performance parameters of surface roughness and material removal rate of the machined parts during milling of Aluminum alloy 6065-T6 using CNC vertical milling machine with High speed steel milling, Carbide tool cutter by optimizing the process parameters such as speed, feed, cutting environment, depth of cut and cutting tool. The experiments are conducted based on Taguchi design of experiments with an orthogonal array (L16) the optimization of process parameters based on performance measures are done by using Fuzzy Logic. Also the most influential process parameters are found out by using ANOVA technique. Ideal execution parameters are found for smaller surface roughness and larger MRR utilizing the MINITAB and MATLAB software's.

**Keywords** – CNC Vertical Milling Machine, 6065-T6 Aluminum Alloy, Fuzzy Logic, ANOVA, Surface Roughness and Material Removal Rate.

## I. INTRODUCTION

The important goal in the modern industries is to manufacture low cost, high-quality products in a short time. Milling is the most common method employed for metal removal and especially for the finishing of machined parts. It is widely employed in a variety of manufacturing units such as aerospace and automotive sectors. Surface Roughness is a widely used index of product quality and essential for mechanical components. Achieving the desired surface quality is of great importance for the parts. Surface roughness is a measure of the quality of a product and a factor that greatly influences manufacturing cost. It can be generally stated that the lower the desired surface roughness the more the manufacturing cost and vice versa.

An end mill is a type of milling cutter, a cutting tool used in industrial milling applications. It is distinguished from the drill bit in its application, geometry, and manufacture. While a drill bit can only cut in the axial direction, most milling bits can cut in the radial direction. Not all mills can cut axially; those designed to cut axially are known as end mills. End mills are used in milling applications such as profile milling, tracer milling, face milling, and plunging. For the present research work, High Speed Steel (HSS) milling, Carbide tool cutter is used for machining operations and they are shown in Fig. 1(a) and 1(b).



Fig. 1(a) Carbide Tool Milling Cutter



Fig. 1(b) Carbide Tool Milling Cutter

A large number of researchers conducted research on CNC Vertical Milling Machine with different types of alloys as well as end mill cutters and find out the performance parameters related to optimized process parameters. Some of the research findings are summarized below:

**Dr. Mike S. Lou et al.** [1] developed a multi-regression model that can predict the surface roughness on the surface of the specimen (Al-6061) on which end milling operation has been carried out using a CNC machine. **Ghani, et al.**, [2] presented a study on hardened steel AISI H13 to optimize cutting parameters in End Milling machine with TiN coated P10 carbide insert tool under semi-finishing and finishing conditions of high cutting speed by using Taguchi optimization methodology. **Julie Z. Zhang, et al.**, [3] is presented a study on surface roughness optimization of CNC face milling operation using Taguchi Design methodology for machining on aluminum blocks. **Bharat Chandra Routara, et al.**, [4] studied a multi-objective optimization problem by applying utility concept coupled with Taguchi method through a case study in CNC end milling of UNS C34000 medium leaded brass. **Seref Ayku et al.**, [5] developed an ANN model to predict the surface roughness of Castamide material after machining process. **Surasit Rawangwong, et al.**, [6] investigated the effects of cutting parameters on the surface roughness in semi-solid AA 7075 face milling. **Avinash A. Thakre** [7] presented a work on 1040 MS material on CNC vertical milling machine using carbide inserts to optimize the milling machining parameter to minimize surface roughness by using Taguchi method. **B. Vijaya Krishna Teja et al.** [8] conducted an experimental study on performance characteristics of AISI 304 stainless steel during CNC milling process. **J. S. Pang, et al.**, [9] is introduced the application of Taguchi methodology for optimization of CNC end milling cutting parameters for machining on the hybrid composite material halloysite nanotube with



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# Optimization of Process Parameters for Machining of a Pair of Holes by Twin Tool in Die – Sinking EDM Using Genetic Algorithm

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**Abstract** – This paper proposed a novel approach for machining of pair of holes in a single stream using twin tool in Die – Sinking Electric Discharge Machine (DSEDM) with two identical stainless steel electrodes. An L9 orthogonal array is chosen based on taguchi design of experiments and is used to determine the impact of process parameters like voltage, duty cycle and frequency on the performance parameters such as Material Removal Rate (MRR) and Tool Wear Rate (TWR). Mathematical models have been developed for relating the performance parameters to process parameters. The developed models predict the machining conditions within the experimental domain. These developed equations are used as a fitness function in Genetic Algorithm (GA) tool and optimize the EDM process parameters with multiple objectives.

**Keywords** – Die – Sinking EDM, Twin tool, Orthogonal Array, Material Removal Rate, Tool Wear Rate, Genetic Algorithm (GA)

## I. INTRODUCTION

Electrical Discharge Machining (EDM), is also known as spark machining whereby a desired shape is obtained by using electrical discharges (sparks) i.e., material is removed from the workpiece by a series of rapidly recurring current discharges between two electrodes, separated by a dielectric medium and subject to an electric voltage. One of the electrode is called the tool while the other is called the workpiece. It is also called as non-contact thermal process. The basic working principle of Die – Sinking EDM process is shown in Fig. 1.

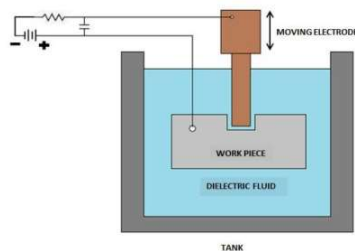


Fig. 1 Die – Sinking EDM Process

New developments in the field of Material Science have led to new engineering metallic materials, composite materials and high – tech ceramics, having good mechanical properties and thermal characteristics as well as sufficient electrical conductivity so that they can readily be machined by spark erosion. At the present time, DSEDM is a widespread technique used in industry for high precision machining of all types of conductive

materials such as metals, metallic alloys, graphite and some ceramic materials of whatsoever hardness.

A large number of researchers conducted research on EDM with different conductive and semi – conductive materials and find out the performance parameters related to optimized process parameters. Some of the research findings are explained below:

**K. Aruna et al. (2018)** have fabricated the DSEDM for machining of holes on copper plate and investigate the optimal combination of influential parameters by using grey taguchi analysis [1]. **K. Aruna et al. (2017)** have fabricated the Micro-Electrical Discharge Machining ( $\mu$ -EDM) for machining of blind holes on silica wafers and investigated optimum performance parameters such as Material Removal Rate (MRR) and Tool Wear Rate (TWR) [2]. **Grzegorz Skrabalaka et al. (2016)** compared the various unconventional processes of machining such as electrochemical, electro-discharge and electrochemical discharge machines for holes production and surface roughness measurement using batch electrodes [3]. **Chetan M Rathod et al. (2015)** investigated the size of the hole, circularity and delamination of the hole during the drilling operation of carbon fiber reinforced polymer using ANOVA and found that the most influential parameters for drilling holes on carbon fiber reinforced polymer are voltage, pulse on time and pulse off time [4]. **Bharat Raj Bundel (2014)** used Die – sinking EDM to study the electrode wear of the cylindrical copper electrode [5]. **F. L. Amorim et al. (2014)** investigated the performance parameters of high strength copper based alloys such as copper and tungsten copper for injection molds using DSEDM on rough and fine machining conditions [6]. **J Jeevamalar et al. (2015)** have studied the basic ideas and process parameters of DSEDM at various machining conditions [7]. **M. M. Pawade et al. (2013)** analyzed the different methods of machining using EDM process and undertook specialist reviews to improve process parameters and integrate the machining conditions with Computer Integrated Manufacturing for multi – start control, powder blended EDM process, servo control framework [8]. **Jun Li, Shanhyao Shi et al. (2013)** analyzed DSEDM process for micro holes machining using central composite design based response surface methodology [9]. **E. Uhlmann et al. (2013)** have optimized the Die – sinking EDM technology for machining of Nickle based alloy (MAR – M247) for Turbine Components [10]. **K. S. Banker et al. (2013)**

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# MODELING AND ANALYSIS OF LOW NOISE MULTI STAGE RATING GLOBE VALVE IN BOILERS

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**ABSTRACT:** Globe valves are one of the oldest valve types used for throttling application for all sizes due to better controllability and range. There are different types of globe valve available, but for control valve condition cage and plug designs are widely employed. Cage and design consist of body, valve cage, plug and an actuation mechanism. At present the globe valves designed for various purposes are of these 150/300/600/1500/2500/4500 classes. Now the requirements of globe valves are to control high pressure and high temperature, which doesn't come under these classes. In this work to design and analysis of low noise multi stage 3000 rating globe valve and design a globe valve, which can control high pressure required in the boiler which used in thermal power plants and in petroleum refineries, which is not come under the above given classes. The 3000 pressure rating globe valve is designed and analysis for the very first in Asia, and in India .Two dimensional and the three dimensional design software's are used to design the particular globe valve .The flow path analysis and stress analysis using cosmos works.

**Keywords:** GlobeValve3000, Cosmos, Cage and Control.

**1. INTRODUCTION:** Valves are widely used in irrigation, energy, water distribution networks and process industries and in many other areas. Among the different types of valves used in the process industry, control valve plays a vital role in the functioning and profitability of a plant. Trouble-free operation of control valve in the piping network is essential to avoid a situation leading to the total closure of the concerned industrial activity. Further, their efficient working leads to an effective use of the available resources. The abundant improvement in the design and performance of control valve are still insufficient to claim perfection in the agreement of theory and practice. Control valves are valves used to control conditions such as flow, pressure, temperature, and liquid level by

fully or partially opening or closing in response to signals received from controllers that compare a "set point" to a "process variable" whose value is provided by sensors that monitor changes in such conditions. The opening and closing of control valves is done by means of electrical, hydraulic or pneumatic systems.

Positioners are used to control the opening or closing of the actuator based on Electric, or Pneumatic Signals. The most common and versatile types of control valves are sliding-stem globe and angle valves. Their popularity derives from rugged construction and the many options available that make them suitable for a variety of process applications, including severe service. Globe valve are widely used for throttling applications in the process industry for both liquid and gaseous applications. The main advantages are relatively low cost, linear characteristics and good controllability and range. To obtain the required flow and pressure drop characteristics for the valves, different types of internals were evolved for globe type valves. Cage and plug internal is one among them. At present the available classes of control valves are 150/300/600/900/1500/2500/4500. There is no control present in the rating of 3000, which is highly required in the field of oil refineries and boilers. The basic requirement a raised for the 3000 rating valve is because to control high pressure and high volume of flow.

**2. OBJECTIVE OF THE DESIGN: THE** available classes of control valves are 150/300/600/900/1500/2500. There is no control present in the rating of 3000, which is highly required in the field of oil refineries and boilers. The basic requirement a raised for the 3000 rating valve is because to control high pressure and high volume of flow.

- Designing of a Low Noise Multistage 3000 Rating Globe Valve.

  
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## **CERTIFICATE**

*This is to certify that* **Dr.S.Venkatramana Reddy**  
*of the College / University / Institute* **Department of Physics, Sri Venkateswara University,**  
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