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ORIGINAL PAPER

Pavement performance evaluation for different combinations of temperature conditions and bituminous mixes

M. S. Ranadive[1] · Anand Tapase[1]

Abstract The effectiveness of 2D axisymmetric finite element analysis in predicting the performance of flexible pavements at different temperatures is illustrated in the present study. The critical parameters are examined for variation in thicknesses and material properties of the bituminous layer, to select the right binder grade of bituminous mixes for the particular climatic condition or the selected temperature profile. To observe the effect of decrement in temperature profile of the under layer on the performance of the pavement, variation in modulus of dense bituminous macadam is analyzed for material properties reported as per IRC: 37-2012. For the modern trucks, which usually have more than 0.800 MPa tyre pressure, the right binder grade of bituminous layer comprising a wearing course and dense bituminous macadam is 1700 MPa for 250 mm-thick bituminous layer. When more stiffer binder is used, drastic change in the value of critical parameters is observed. A reduction of 18.98 and 5.25 % in horizontal tensile strain and vertical compressive strain, respectively, is observed at a 200 mm thickness of bituminous layer and around 21.12 and 6.72 % in horizontal tensile strain and vertical compressive strain, respectively, at 250 mm thickness of bituminous layer. As the values of the critical parameters are noticed well within the allowable limits at 200 mm, it is concluded that the use of a stiffer binder for DBM makes the pavement safe as far as fatigue of bituminous layer and rutting in subgrade is concerned with the reduction in thickness of the bituminous layer even at higher temperature. It is observed that the use of waste plastic/rubber is found in safe limits at 250 mm-thick bituminous layer for the selected condition. It is concluded that the use of too soft a bituminous mix results in lowering the structural capacity of the pavement at high temperatures and too hard bituminous mixes would become brittle at low temperatures.

Keywords Temperature · Modified bituminous mixes · Fatigue · Rutting · Flexible pavement

Introduction

The growing intensity of commercial vehicles, overloading of trucks beyond double its capacity and change in daily and cyclic temperature and environmental factors have been responsible for reducing the life of the pavement. A factor which causes further concern in India is low pavement temperatures in some parts of the country. Under these conditions, flexible pavements tend to become soft in summer and brittle in winter [1]. The complex characteristic of the present day systems like overloaded modern trucks therefore demands an application of analytical tool which can accommodate all the above said details of the complex system [2].

The abundantly available waste materials such as waste plastic, rubber, e-waste, etc., create problems of its disposal in an eco-friendly way. Investigations in India and abroad have revealed that such type of waste materials which are durable and recyclable can be effectively used in road construction [1, 3]. As per the Research Scheme R-55 of MORTH, use of rubber and polymer modified bitumen in bituminous road construction of Central Road Research

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Parameter sensitive analysis of flexible pavement

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Abstract

This paper describes the usefulness of FEM for exploring the parameter sensitive analysis. Using 2D axisymmetric analysis, the critical performance parameters are examined by varying the thickness and material properties of different layers of flexible pavement. Hypothetical pavement sections are also analyzed with a view to check the sensitivity of horizontal axisymmetric extent and refinement of mesh. The developed computer program after validation is used to calculate the horizontal tensile strain at the bottom of the bituminous layer (BL) and the vertical compressive strain at the top of the subgrade. These computed strains are incorporated in the fatigue and rutting criteria recommended in Indian Road Congress (IRC: 37-2012) to estimate the pavement life for various hypothetical conditions. Tensile strain at the bottom of BL and compressive strain on top of the subgrade decreases with an increase in the thickness of BL, which results in increase of fatigue and rutting lives. An increase in thickness of the base layer and the increase in its elastic modulus reduces the damage due to rutting, while it has less effect on damage due to fatigue. Such type of analysis proves beneficial for designing a pavement, keeping equilibrium between fatigue and rutting lives.
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Keywords: Flexible pavement; Parametric study; Finite element method

1. Introduction

The application of direct or indirect empirical approach in the current design procedures, results either in premature failure of the pavement or building up of uneconomical pavement sections. The relationship between design inputs and pavement failure is applied through experience, experimentation or a combination of both, which is limited to a certain set of environmental and material conditions [1,2]. A good pavement design is one that provides the expected performance with appropriate economic consideration, so, here the need arises to find an economical alternative in the form of analytical tool which can accommodate the details of the complex pavement system [3].

Application of such enhanced analytical tool can prove to be beneficial to predict the performance of pavement without actual construction or even by surpassing the expensive and time consuming laboratory or in situ tests, for various thicknesses and material properties of different component layers instead of relying on CBR values. In this connection, the application of the versatile finite element method (FEM) towards the design of flexible pavement holds a perfect assurance. As FEM is not constrained to two dimensional axisymmetric conditions, if required FEA can be easily used for two-dimensional plane stress/strain as well as more rigorous three dimensional finite element analysis for further extension of work [4]. Axisymmetric modeling predicts pavement behavior using a 2D mesh revolving around a symmetric axis by assuming identical stress states exist in every radial direction; therefore, loading is circular [5].

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UTILIZATION OF E-WASTE AND POLYMER MODIFIED BITUMEN IN FLEXIBLE PAVEMENT

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ABSTRACT

The escalation in various types of productions together with population growth has resulted in a massive increase in production of various types of waste material world over creating a problem of its disposal in eco-friendly way. To deal with the problem here an attempt is made to study the use of e-waste as an alternative to conventional material like aggregate in a DBM layer of flexible pavement along with partial replacement of bitumen with plastic by the wet mix process. Number of laboratory tests were conducted using marshall stability testing machine to check the suitability of e-waste and plastic as an alternative to conventional materials like aggregates and bitumen respectively. The results obtained in laboratory investigation indicate not only the increase in strength but also a considerable reduction in cost is seen. From the experimental work, it is clear that the properties of laboratories designed bituminous mix for DBM are much more superior to those of the control mixes entirely composed of mineral aggregates and can be effectively used in practical applications.

Key Words : Replacement, E-waste, Plastic waste, Flexible pavement, Eco-friendly disposal

INTRODUCTION

Plastic is a multipurpose material. Due to its large scale production plastic seemed to be a cheaper and valuable raw material for every fundamental sector of the economy starting from agriculture to packaging, building constru -ction, electronics, electrical, automobile and communication sectors. Every sector is almost revolutionized by the applications of plastic. Due to the change in scenario of life style the polymer demand is increasing everyday across the globe. Plastic is a non-biodegradable material and researchers have found that the material can remain for long duration on earth without degradation. Several studies have proven the health hazard caused by improper disposal of plastic waste. The health hazard includes reproductive problems in human and animal genital abnormalities etc. Looking forward the scenario of present life style a complete ban on the use of plastic cannot be put although the waste plastic taking the face of devil for the present and future generation. We cannot ban use of plastic but we can reuse the plastic waste.

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Several studies have verified that plastic (LDPE/HDPE) can be used in experimental works related to flexible pavements bitumen and bituminous mixes are modified in order to improve the performance of bituminous concrete mixtures. There are two different processes the wet method involves the use of ready mixed modified bitumen, while the dry process involves adding waste polymers/rubbers (in powder shredded or granular form) to the aggregate followed by bitumen during mixing process at the hot mix plant.[1] The effect of such modification varies with the percentage of the modifier used. In general consumption of such waste materials in the highway sector is a valuable dumping alternative, which reduces the disposal cost and save the environmental pollution.[2] consequently with improved durabi- lity and resistance against deformation to conventional bituminous mixes the durability of the roads is increased.[3] In this work, focus has been given on the strength of flexible pavement and disposal of plastic in eco-friendly way. To deal with the problem attempt is made on use of to plastic waste as partial replacement by wet mix process.

CONSUMPTION OF ELECTRONIC WASTE IN QUALITY ENHANCEMENT OF ROAD

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ABSTRACT

The work consists of an experimental approach towards waste management and finding an alternative to conventional materials in flexible pavements. Most of the electronic waste is recyclable or repairable, but number of worthless electronic pieces causes higher transportation cost for their processing which may be higher than its scrap value. So, such electronic waste is disposed very casually, which may cause serious health and pollution problems. Also the disposal of electronic waste is difficult because of non-degradable plastic contents and metals like lithium, copper and aluminum, which may lead to adverse effects on the environment. To deal with the problem, here an attempt is made to study the use of electronic waste as an alternative to conventional material like aggregate in a DBM layer of flexible pavement. Number of laboratory tests are carried out by replacing aggregates partially by shredded electronic waste. The outcomes from the laboratory investigation proves the suitability of electronic waste in road construction with substantial cost saving. So, disposal of hazardous electronic waste in the pavement can prove to be one of the alternatives to make the earth greener and pavements more durable.

Key Words : Waste management, Electronic waste, Pavement, Non-degradable plastic, Ecofriendly disposal

INTRODUCTION

Due to the modernization, falling prices and application of new and upgrading techniques, the electronic equipments are gathering much attention across the globe. As modern and most upgraded version is bought, the older one becomes scrap which results in a fast-growing surplus of electronic waste around the globe. Most of the electronic waste is recyclable or repairable, but number of worthless pieces causes higher transportation cost for their processing which may be higher than its scrap value. So, such electronic waste is disposed very casually, which may cause serious health and pollution problems.

All electronic scrap components, may contain contaminants such as lead, cadmium, beryllium, or brominated flame retardants. E-waste may involve significant risk as leaking of materials

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and unsafe exposure during recycling and disposal operations like landfills and incineration. Use of such materials as an alternative to conventional material in the construction industry may not only helps in reducing the manufacturing cost of a particular item, but also has numerous indirect benefits such as reduction in landfill cost, saving in energy and protecting the environment from possible pollution effects. Electronic waste, abbreviated as e-waste, consists of discarded old computers, televisions, refrigerators, radios basically any electrical or electronic appliance that has reached its end of life.

On the other hand, with increased industrialization and growth of population there is an increase in demand for traditional road construction materials such as bitumen, cement, aggregate etc. the question is about sustainable development. For the same, the need arises to find an alternative to such type of conventional

PERFORMANCE EVALUATION OF POLYMER MODIFIED BITUMEN IN FLEXIBLE PAVEMENT

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ABSTRACT

The growth in various types of industries together with population growth has resulted in enormous increase in production of various types of waste materials world over creating a problem of its disposal in eco-friendly way. To deal with the problem, study on use of plastic waste as partial replacement to bitumen in flexible pavement is considered in the present work. The work consists of an experimental approach towards waste management and finding alternative to conventional materials in flexible pavements. To simulate with the field conditions Marshall stability method is considered to carryout experimental work. The objective of work is to investigate the effect of plastic waste in flexible pavement and to suggest the optimum percentage of bitumen that can be replaced by plastic waste for the improvement of roads. Number of laboratory tests has been carried out by replacing bitumen by plastic waste. The results obtained in laboratory investigation indicate major gain in strength with substantial saving in cost.

Key Words : Replacement, Plastic waste, Flexible pavement, Waste management, Ecofriendly waste disposal

INTRODUCTION

Plastic is a multipurpose material. Due to its large scale production plastic seemed to be a cheaper and valuable raw material for every fundamental sector of the economy starting from agriculture to packaging, building construction, electronics, electrical, automobile, communication sectors. Every sector is almost revolutionized by the applications of plastic. Due to the change in scenario of life style, the polymer demand is increasing everyday across the globe. Plastic is a non-biodegradable material and researchers have found that the material can remain for long duration on earth without degradation. Several studies have proven the health hazard caused by improper disposal of plastic waste. The health hazard includes reproductive problems in human and animal, genital abnormalities etc., Looking forward the scenario of present life style a complete ban on the use of plastic cannot be put, although the waste plastic taking the face of devil for the present and future generation. We cannot ban use of plastic but we can reuse the plastic waste. Several studies have verified that plastic

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Recent approach For Grape Leaf Disease Detection and Prediction

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Abstract—Cultivation of Grapes has social as well economic importance. Over the last few years, the quality of Grapes has degraded. The decrease in quality and quantity of agricultural productivity is mainly because of plant diseases. So that to diagnose the plant diseases timely is important. The traditional approach of finding the diseased plants by observation is very time consuming and needs a more human resource. In last few years various researchers have focused on providing an optimized technical solution for detecting Grapes diseases. Popular technologies like machine learning, image processing, artificial neural network etc. are used. This paper presents an overview of existing reported techniques used to detect the Grape diseases. Different methods based on the methodology and efficiency with future possible enhancements are included in this paper.

Keywords—Grape leaf disease, artificial neural network, image processing, feature extraction, downy mildew, powdery mildew.

I. INTRODUCTION

The grape is one of the finest fruits. It contains many of the most important elements necessary for life. In addition, it is known to have admirable medicinal qualities, and it has been used in natural therapy for centuries. Grape cultivation is one of the most profitable farming enterprises in India. Grapes are cultivated in 111.4 thousand hector area with 1,234.9 thousand tons of production in India [1]. About 53,910 tons of Grapes export from India valued at 48,505 (1000US$). It is nearly 1.54% of total export of grapes in the world. [2]. Grape is an significant fruit crop in India. Due to the disease on the grape plant, 10-30% of crops are lost. Therefore it is important to identify the diseases at the beginning and suggest solutions to the farmers so that maximum harms can be avoided so as to increase the yield. Use of naked eye observation to judge the diseases may be an inaccurate way. The grape suffers from massive loss due to the leaf diseases like Powdery mildew, Downy mildew and anthracnose etc. The disease on the plant is on their leaves, fruits and on the stem of the plant. An early detection of leaf diseases is a big challenge. Studies on plant pathology have been accompanied by various computer technologies related to data collection, data management, image processing, data analysis etc.

II. GRAPE DISEASES

Unfortunately, there are many kinds of Grape leaf diseases that thrive in all sorts of conditions.

A. Black Measles:

Due to Black Measles leaves get small chlorotic areas between veins, which enlarge and dry out. At any time between fruit set and ripening small, round, dark spots bordered by brownish-purple rings may appear on berries.

B. Anthracnose:

This disease attacks mainly the leaves and young shoots. It reduces the effective leaf area because of the short holes in the leaves. Affected blossoms fail to set fruits. Leaves become twisted and deformed. The disease causes circular brown sunken spots with dark brown margins on the berries. Rain and dew are highly favorable for the spread of the disease.

C. Leaf Blight and Bunch Necrosis (Alternaria alternata):

The disease attacks both leaves and fruits. Small yellowish spots appear along the leaf margins, which slowly enlarge and turn into brownish patches with concentric rings. Severe infection leads to drying and defoliation of leaves.

D. Downy Mildew (Plasmopara viticola):

The disease attacks the leaves, flowers, cluster and young fruits. Affected portions of the leaves turn brown Photosynthetic activity gets reduced. Once berries begin softening and change color, they cease to get infected.

E. Bacterial Leaf Spot (Xanthomonas campestris):

The disease infects leaves, shoots and berries. The symptoms appear as minute water-soaked spots on the lower surface of the leaves along the main and lateral veins. Later on, these spots coalesce and form larger patches. Brownish black lesions are formed on the berries, which later become small and shriveled.

Network Traffic Intrusion Detection System using Decision Tree & K-Means Clustering Algorithm

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Abstract- *In this world of computer networks and highly advanced emerging technologies, Network Security is a crucial topic, as network attacks have increased over past few years. So that Intrusion Detection System (IDS) has become important component to secure the network. As data mining techniques make it possible to search large amount of data for characteristics, rules and patterns, it can be applied to network monitoring data recorded on host or in a network for detecting intrusion and attacks. This paper gives introduction of different data mining techniques. Furthermore I present an intrusion detection scheme based on K-means clustering algorithm. I use the DARPA 98 Lincoln Laboratory evaluation dataset as training & testing data set. Training data containing unlabeled flow records are separated into clusters of normal & anomalous traffic. The corresponding cluster centroids are used for efficient distance based on detection of anomalies. I provide a detail description of the data mining and anomaly detection process and present the experimental result.*

Keywords: IDS, K-means, DARPA, Data Mining, KDD.

1. INTRODUCTION

Intrusion detection is the process of examining and evaluating the events occurring in a computer system in order to detect the signs of security problems. Data mining techniques are very striking because they can be applied to any kind of data in order to learn more about the hidden structures and correlations [1] The application of data mining methods to monitor data recorded from computer networks is a remarkable solution for intrusion detection. Intrusion detection system (IDS) using data mining can be termed as network data mining.

Section II gives the introduction of different data mining techniques used for intrusion detection. In section III I present the details of K-means clustering algorithm used for intrusion detection. I use the DARPA 98 Lincoln Laboratory Evaluation data set (DARPA set) as a training data as well as testing data. KDD 99 intrusion detection data set is also based on DARPA set. In section IV I have presented some initial experimental results of ongoing work and section V concludes the paper with a stance on future work.

2. DATA MINING TECHNIQUES

There are various data mining techniques used for Intrusion detection. In this section I have given the details

of decision tree and K-means clustering algorithm for intrusion detection.

A) IDS using Decision tree-

Decision tree is one of the powerful data mining methods. In decision tree leaf nodes represents class of data Decision tree helps us to categorize the data from largest dataset

a) DARPA'98 Dataset:

The DARPA set was defined by the information system technology Group of MIT Lincoln Laboratory. It provides the data set for the both training and testing. All attacks in DARPA sets can be categorized into four classes of attacks. They are Denial Of Service (Dos), Remote to Local (R2L), User to Root (U2R) and Scan.

b) Process to make decision tree using DARPA data set

1. Classification of DARPA set.

In training set 4 types of attacks are considered. We have to extract the TCP Dump data for each attack in whole DARPA training set. TCP dump list contains the information that identifies each flow and indicates whether the flow is an attack or not.

2. Preprocessing:

Preprocessing is done to summarize the information from the TCP dump files. Preprocessing manufactures the raw packet data to make the information meaningful

3. ID3 algorithm:

The data that we get after preprocessing is given as input to ID3 algorithm. ID3 adopts the greedy concept to locate the features in the decision tree, that is it chooses the features from the learning dataset according to the correlation between the features and the class [2].

4. Decision tree generation is done by using the features located by ID3 algorithm.

B) K-means clustering algorithm.

K-means clustering algorithm is another powerful data mining algorithm. In the next section, I have included the details of K-means algorithm, raw data and the extracted features of traffic. This raw data and features

Review: Apache Spark and Big Data Analytics for Solving Real World Problems

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ABSTRACT

Big Data analysis is having an impact on every industry today. Industry leaders are capitalizing on these new business insights to drive competitive advantage. Apache Hadoop is the most common Big Data Framework, but the technology in evolving rapidly and to cope with that the latest innovation is Apache Spark. This paper discusses the basics of Apache spark and some real world use cases and applications for Big Data analytics with Apache Spark.

Keywords:- Big Data Analytics, Apache Spark, In Memory Computation

I. INTRODUCTION

In today's world of computers human life is very much dependent upon the technology. Our personal, professional and social life is fully surrounded by technology. By some or the other means we are dealing with some kind of data. This data is originated through mobile phones, computers, laptops, cameras and many other electronic gadgets. Due to immense growth of data the challenges of data management arise. Data Management deals with not only storing the data but it also involves the accessing, analyzing and securing it. Big Data analysis is involves the collection of the data from different sources, organizing it so that the accession and the analysis will become easier. This analysis helps us to dig out the hidden facts and information from the huge data collection. Analysis is found useful for categorizing and ranking the data as per its importance with respect to the application.

This paper focuses on open source tool Apache Spark. It is the best alternative for faster big data analysis. Spark supports in-memory computing, which is faster than disk based engine like Hadoop. This paper is organized as follows: section II explains concept of big data analytics and focuses on the key barriers to the Big Data Analytics. Section III explores the basics of Apache Spark, section IV will discuss some case studies of Big Data analytics using Apache Spark and finally the conclusion is stated.

II. BIG DATA ANALYTICS

Data is our most valuable resource. Organizations use this data for enhancing situational awareness among people forecasting market dynamics in financial services, for early detection analysis in health care. There is some desired value is obtained from the vast amount of data called as Big Data by the government organizations and private firms[1].

Some Big Data Facts-

1. 2.5 Quintillion bytes data is created every day.
2. 90% of the world data is created in last two years
3. 80% of the world's data is unstructured.
4. Facebook processes 500 TB per day.
5. 72 hours of videos are uploaded to youtube every minute.

This data must be analyzed to gain the insights and to act on complex issues this is what big data analytics is Big Data analytics is the process of collecting, organizing and analyzing the large sets of data i.e Big Data to discover the patterns and other useful information.

The big data analytics can be categorized into following categories:

1) Descriptive analytics: what happened?
2) Diagnostics analytics: What did it happen?
3) Predictive analytics: What is likely to happen?
4) Prescriptive analytics: What should I do with it?

What makes the Big Data analytics critical?

1) Data volume is very large and it is steadily growing.
2) Data volume has variety of data ie structured, unstructured etc.
3) Volume and speed of the data creates challenge for architectural management and analytics services.

Organizations are using new big data technologies and solutions such as Hadoop, MapReduce, Hadoop Hive, Spark, Presto, Yarn Pig NoSQL databases and more to support their big data requirements.

A Static Object Detection in Image Sequences by Self Organizing Background Subtraction

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Abstract - *In several video surveillance applications, such as the detection of abandoned/stolen objects or parked vehicles, the detection of stationary foreground objects is a critical task. In this paper the model based framework is suggested for detecting static objects. Firstly, a background subtraction based method that relies on modeling not only the background, but also the stopped foreground is implemented. Secondly, self-organizing model for image sequences which automatically adapts to scene changes is performed. Finally, we evaluate the proposed algorithm and compare results with the background segmentation algorithm using video surveillance sequences from visor datasets. Experimental results show that the proposed approach has better detection accuracy of stationary foreground regions as compared to the segmentation approach.*

Key Words: *SFS - Stopped foreground subtraction algorithm, SOBS - Self organizing background subtraction, MOG - Mixture of Gaussians*

1. INTRODUCTION

Detecting stationary foreground regions in video has recently become an active area of research in many video surveillance areas such as the detection of abandoned objects and illegally parked vehicles [15]. Video surveillance systems aim to provide automatic analysis tools that may help the supervisor personnel in order to focus his/her attention when a dangerous or strange event takes place.

There are many algorithms have been proposed that deals with the detection of stationary foreground objects, the majority of them based on background subtraction techniques. Background subtraction techniques are the most popular choice to detect stationary foreground objects [1][2][4], because they work reasonably well when the camera is stationary and the change in ambient lighting is gradual, and they represent the most popular choice to separate foreground objects from the current frame.

Many approaches have been proposed for stationary region detection in video. They can be classified based on tracking [11] or background subtraction. As

tracking accuracy is significantly degraded in complex sequences, such as crowded videos, this section focuses on the second category that does not use tracking and can be applied to a wide variety of video-surveillance scenarios.

As suggested in [13], Adaptive background subtraction (ABS) has been proposed to handle photometric errors by continuously updating the background model. Combinations of fast and slow adaptation rates can be used for stationary detection [6]. However, such adaptation might decrease detection performance as static objects can be incorporated into the background before they become static [12]. Thus, slow rates are preferred that reduce the robustness to photometric errors. Moreover, background initialization is complex in crowded sequences that, if incorrect, may lead to many false positives (of foreground), which decrease stationary detection performance.

This paper combines SFS algorithm [2] along with neural network. The basic idea consists of maintaining an up-to-date model of the stopped foreground and discriminating moving objects as those that deviate from this model [1]. Neural network-based solutions are already been considered due to the fact that these methods are usually more effective and efficient than the traditional ones [3][5].

A 3-D neural model for image sequences that automatically adapts to scene changes in a self-organizing manner was targeted for modeling the background and the foreground, finalized at the detection of stopped objects. Coupled with the proposed model-based framework for stopped object detection, it enables the segmentation of stopped foreground objects against moving foreground objects [2].

The remainder of this paper is structured as follows: section 2 describes the different background subtraction based approaches, proposed system is presented in section 3, section 4 shows experimental results and section 5 closes the paper with some conclusions.

2. RELATED WORK

Two major error sources affect the performance of detection approaches based on background subtraction. The first corresponds to photometric factors (illumination

A Secure Role Based Access Policy for PHR Patient-Centric Model of Health Information Exchange Using Homomorphic Encryption

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Abstract: *Cloud computing has being defined as a pool of virtualized computing resources. Due to this virtualization, there is an immense growth in applications of cloud computing. One of the important fields is Personal Health Records. In recent years, personal health records (PHR) has transpired as a patient-centric model for exchanging health information. The health information is outsourced to a third party like cloud service providers. But what if the service providers are compromised, this may create a huge threat to the patient's information. Personal Health Records enables patients to manage their own medical records in a centralized way. But by storing PHRs in the cloud, the patients lose physical control to their personal health data, which makes it necessary for each patient to encrypt their PHR data before uploading to the cloud servers. In our proposed framework we securely share PHR files with fine-grained access. The framework efficiently handles the prime challenge of key management brought by introduction of multiple PHR users and owners. The framework addresses the unique challenges brought by multiple PHR owners and users, in that it will also reduce the key management complexity while enhance the privacy guarantees compared with previous works. The solution for securely storing PHR on cloud can be proved as both scalable and efficient though implementation and simulation.*

Keywords: PHR, cloud computing, fine-grained access control, attribute-based encryption

1. Introduction

In recent years, personal health record (PHR) has emerged as a patient-centric model of health information exchange. A PHR service allows a patient to create, manage, and control her personal health data in a centralized place through the web, from anywhere and at any time (as long as they have a web browser and Internet connection), which has made the storage, retrieval, and sharing of the medical information more efficient. Especially, each patient has the full control of her medical records and can effectively share her health data with a wide range of users, including staffs from healthcare providers, and their family members or friends. In this way, the accuracy and quality of care are improved, while the healthcare cost is lowered.

The PHR providers are more and more willing to shift their PHR storage and application services into the cloud instead of building specialized data centers, in order to lower their operational cost. For example, two major cloud platform providers, Google and Microsoft are both providing their PHR services, Google Health1 and Microsoft HealthVault2.

While it is exciting to have PHR services in the cloud for everyone, there are many security and privacy risks which could impede its wide adoption. The main concern is about the privacy of patients' personal health data and who could gain access to the PHRs when they are stored in a cloud server. Since patients lose physical control to their own personal health data, directly placing those sensitive data under the control of the servers cannot provide strong privacy assurance at all.

The PHR data could be leaked if an insider in the cloud provider's organization misbehaves, due to the high value of the sensitive personal health information (PHI). Since cloud computing is an open platform, the servers are subjected to malicious outside attacks. To deal with the potential risks of privacy exposure, the proposed methodology is developed to secure the personal health record.

2. System Architecture

As shown in figure 1, any user can create personal health record and store it on cloud server. Such user is known as PHR owner. Patient having PHR for storing health related information on cloud has all access control of creating, managing and controlling his/her record. Records are fully controlled by the patient for maintaining security of data sharing and access control of the records. Homomorphic Encryption is used for ensuring the high degree of patient privacy PHR is stored in an encrypted format. Only authorized users have rights to access the PHR.

To maintain the security of data storage and reducing the key management for the owners and users, users are categorized into multiple security domains. Personalized fine-grained role based access policies are specified for file encryption in the proposed mechanism for key distribution and encryption of records. In case of emergency of any type emergency department i.e. ED has a control on the PHR of the patient. In the case of any emergency, emergency staff communicates with the ED. ED provides access to the PHR record by verifying the emergency situation and its identity and also provides the temporary read key for accessing the record [1]. Homomorphic encryption technique is used for maintain the security and scalability of personal health records and also provides role based access policies to the user. With this

Study of Evasion Attack using Feature Selection in Adversarial Environment

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Abstract: *Not only Pattern recognition but also machine learning techniques have been increased in adversarial settings such as intrusion, spam, and malware detection, although its security against well-crafted attacks that aims to evade detection. Spam filtering is one of the most common application examples considered in adversarial machine learning. In this task, the goal is often to design feature selection against attacks. Here we use Random Forest Classifier to find evasion attacks. The ability of rapidly evolve to changing and complex situations has helped it become a fundamental tool for computer security. Evasion attacks assumes that the attacker can arbitrarily change every feature, but they constrain the degree of manipulation, e.g., limiting the number of medications, or their total cost. Adversarial Feature Selection design phase are given in this paper.*

Keywords: Adversarial learning, classifier security, evasion attacks, feature selection, spam filtering.

1. Introduction

Machine-learning and pattern-recognition techniques are increasingly being adopted in security applications like spam filtering, network intrusion detection, and malware detection due to their ability to generalize, and to potentially detect novel attacks or variants of known ones. The main aim of feature selection (FS) is to discover a minimal feature subset from a problem domain while retaining a suitably high accuracy in representing the original data [8]. Many spam detection techniques based on machine learning techniques have been proposed. As the amount of spam has been increased tremendously using bulk mailing tools, spam detection techniques should counteract with it.

If we hope to use machine learning as a general tool for computer applications, it is incumbent on us to investigate how well machine learning performs under adversarial conditions. An interesting, preliminary result is that classifier security to evasion may be even worsened by the application of feature selection.

It requires:
1) Finding potential vulnerabilities of learning before they are exploited by the adversary;
2) Investigating the impact of the corresponding attacks (i.e., evaluating classier security); and
3) Devising appropriate countermeasures if an attack is found to significantly degrade the classer's performance.

Figure 1: Structure of Adversarial Feature Selection

It shows the structure of Adversarial Feature Selection. It is now acknowledged that, since pattern classification systems based on classical theory and design methods[2] do not take into account adversarial settings, they exhibit vulnerabilities to several potential attacks, allowing adversaries to undermine their effectiveness [1], [3],[4], [5], [6], [7].

Below section 2 will give information about existing system, section 3 will give system architecture. Furthermore conclusion and reference.

2. Existing System

- An implicit assumption behind traditional machine learning and pattern recognition algorithms is that training and test data are drawn from the same, possibly unknown, distribution. This assumption is, however, likely to be violated in adversarial settings, since attackers may carefully manipulate the input data to downgrade the system's performance. It categorizes attacks according to three axes: the attack influence, the kind of security violation, and the attack specificity. The attack influence can be either causative or exploratory. Depending on the kind of security violation, an attack may compromise a system's availability, integrity, or privacy: availability attacks aim to downgrade the overall system's accuracy, causing a denial of service; integrity attacks, instead, only aim to have malicious samples misclassified as legitimate; and privacy attacks aim to retrieve some protected or sensitive information from the system.

- Bursteinas and Long 00; Thota et al. 09; Zhao and Zhu 06; Zhu 08] performed feature selection but they did not mention how they decided the number of important features, and they did not provide variable importance of each feature as a numerical value.

- Spam filtering assume that a classifier has to discriminate between legitimate and spam emails on the basis of their textual content, and that the bag-of-words feature representation has been chosen, with binary features

Open Source Implementation of Protocol Carrying an Authentication for Secure Network Access Based on IETF Standards

: Link Layer Protocol

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Abstract— As we know that network authentication to access the network securely is one of the most important procedure for network operator to restrict and control the user access to the network service. Based on this platform many researchers had already done a lot of work but still there is a space for research, also the IETF proposed a PANA protocol to carry out network access authentication regardless the underlying access technology for giving the user a secure network access. This protocol has gaining more interest as a potential candidate for network authentication of both the category (access and service authentication) in both existing and emerging network environments. But due to lack of open source implementation of the protocol standards does not provide the fruitful results during the deployment and testing on different network environments which is the major hurdle in broader expansion and acceptance of this standards. So In this article, we provide the design and open source implementation of protocol based on PANA standard. We also provide the analysis of the performance result of the protocol with the other active open source implementation of PANA (OpenPANA and CPANA) which will definitely help the others developers to create their own implementation by extending this protocol implementation

I. INTRODUCTION

In network security area this work will be majorly accepted to solve the network security issues by implementing an Protocol based on IETF standards, using the User Datagram Protocol (UDP) Protocol as transport & it act as application protocol to carry the Extensible Authentication Protocol (EAP) in order to support different authentication mechanisms for network access, irrespective of the network access technology. This work provides flexible authentication framework using EAP flexible authentication framework for network access & allow multiple clients to authenticate using Multithreading concept. Using advanced secure key algorithm for the key in implementation of PANA provides more secure solution.

There has been consideration of other alternative solutions to PANA such as AAA protocols, DHCP, and IKEv2 are responsible for EAP transport. After analysis following point is notify that among these protocol some of are having header fields are very large , some are very short & some are not present at all, and so on. But PANA, accepted this all limitation as a challenge & designed its own message format, from start to end and which aims is to matches & satisfy the EAP transport requirements. But when we integrate EAP with DHCP2 then analysis notify that the EAP has creating complexity problems which eliminated it as a candidate for the EAP standard. So this work is considered the EAP with AAA Protocol for the implementation of PANA. Recommendation systems uses the piggybacking of messages which allows either PaC or PAA to send a single PANA message that represents both an answer and a request. This work successfully implemented PANA and recommended that on following area the applicability of PANA is successfully considered.

- Currently used Network (IPV4)
- Forthcoming Generation Network (IPV6)
- Wireless Network

This work create great impact on network security at link layer by combining Protocol based on IETF standards with EAP & completely satisfies the requirements of EAP lower-layer protocol on ordered message delivery and the reliability requirement for messages exchanged after the authentication and authorization phase (e.g., PANA-Notification-Request and PANA-Termination-Request messages require a response from the communicating peer to complete the notification and session termination operations, respectively) using UDP Protocol. It fully satisfies the EAP lower-layer protocol requirement on ordered message delivery and the reliability requirement for messages exchanged after the authentication and authorization phase using UDP Protocol.

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Parallel Genetic Algorithm on GPGPU

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Abstract— Parallel Genetic Algorithms (PGAs) are effective and robust methods for solving many optimization problems. But PGAs gives lot of iteration and time to finding optimal solution. This paper provides the information about how various authors. researchers. scientists have applied GA PGA on GPGPU [General purpose Graphics Processing Units] with parallelelism. Many problems have been solved on GPGPU using GAs PGAs. The parallel natures of GA's are well utilized on GPGPU.. Paper gives review of various applications solved and future probable area of works possible to solve with GAs PGAs on GPU.

Key words: Parallel Genetic Algorithm. GPGPU. CUDA

I. INTRODUCTION

Although GAs are very effective in solving many practical problems. their execution time can become a limiting factor for some large scale problems. because a thousands of candidate solutions must be evaluated. Fortunately, the most time-consuming fitness evaluations can be performed independently for each individual in the population using various types of parallelization like master slave model. fine grained model. island model etc. Performance of PGA with respect to other heuristic techniques calculated with the parameters such as number of iterations. population size. computational time, effectiveness. quality of roster, efficiency. completeness. CPU utilization. memory utilization and convergence rate etc.

Selection-crossover-mutation cycle present in PGAs like our simple Genetic algorithm. But in PGA we meet to new term is migration. Migration is nothing but exchanging rate of individuals between the demes. Basically migration can be done by two types. one is synchronous and another is asynchronous. Migration has a huge impact on speed reaching the solution. It is a new process which describes how many migrants will be exchanged between the demes. when there is the right time for migration and which type of the migration schemes is useful. In parallel computation, topology is an important characteristic and like in the PGA. There are many types of topologies between nodes demes. Static and dynamic topologies could be used. It is worth to note that the topology brings a new dimension to GAs, because we have got several demes instead of one. Demes exchange individuals among themselves and are not anymore controlled "globally".

GA is one of best algorithm for optimization problems of engineering area. GA is basically based on natural selection and population. Most of the optimization problem needs day or week for computation on our serial machine. We can reduce computational time with the help of parallelism. Sequential GA faces the some problems when optimization problem is large scale. Convergence, diversity. population size problem comes after implementation of Sequential GA for the large scale

problem [21]. We can resolve this type of problem with the help of GPGPU.

II. PARALLEL GENETIC ALGORITHM

Theoretically speaking. a serial or a conventionally written parallel algorithm can run on a GPU without any modifications for smaller problems. However, there is a dire need for algorithms exclusively designed for the modern GPUs because GPUs are very different from the conventional parallel computing. To be more specific. for an efficient implementation, all the genetic operators, fitness function (if required) and local search algorithms need to be redesigned with considerable care. Various models are available for paralyse GA.

A. Master-Salve Model

When we analyse genetic algorithm, we find that genetic algorithms outer structure is serial. There are a lot of parallel parts in the internal of genetic algorithm. For example, we can implement fitness function in parallel on processor network, and implement selection operator. crossover operator and mutation operator in serial on master processor. Master/Slave implementations are more efficient as the evaluations become more expensive and contribute a bigger portion in algorithm's total runtime. This method is effective. when the fitness function is complex. Otherwise, the communication time will be longer than before [19].

B. Coarse-grained model

In this genetic algorithm model, there are some subgroups. Every subgroup runs on an individual processor. They evolve independently. Every processor just implements fitness function, selection operator. crossover operator and mutation operator. Those subgroups translate their excellent individuals to other subgroups every some time. Some time we call this model island model and call this type of genetic algorithm distributed genetic algorithm. The genetic algorithm uses a little time to communicating between subgroups [19].

C. Fine-grained model

In this model, every individual own a processor. Every processor just operators one individual in the same time. So we can calculate individual's fitness value quickly. The operators of selection, crossover and mutation are individuals which are adjacent. This model has a great parallelism. It is suitable for SIMD system [19].

D. Hybrid -grained model

Mixed model is also called multi-layered parallel model. This model, which has developed fast in recent years, mixes the former three kinds of fundamental models and develops into a hierarchical structure. This model not only makes chromosome compete for optimal solutions, but introduces competition to structural genetic algorithm and provides a

STUDY OF PROTOCOL FOR CARRYING AUTHENTICATION FOR NETWORK ACCESS (PANA) AND ITS FUNCTIONALITY

(FOR ACHIEVING NETWORK SECURITY IN THE NETWORK LAYER)

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ABSTRACT : Nowadays networking world requires IP-device to alternative themselves before getting permission to access a network means to get authorization to use it. To achieve this authentication a protocol is needed , which provides several authentication methods and special features that link layer is not able to satisfy. Because of the absence of such mechanism like a protocol for authorization in link layer ,non standard and proprietary methods where used to get the needed functionality. Both application layer and additional layers between link-layer and network-layer where used, in addition to overloading existing network layer's protocol to achieve the functionality of missing authentication protocol . Instead of those non standard inventions a network layer protocol for authentication would be a better solution. An authentication protocol for a higher layer than link layer is necessary . When functionality of link layer authentication is not satisfying and does not meet the expected authentication and security requirements. Access control with authentication and authorization of the clients and the access networks is needed to provide secure network access. Therefore a protocol is required which work as a transport for the authentication parametes between the client and the access network.

PANA working groups goal was to define or identify a carrier respectively a transport for a certain payload. This payload should ideally be an existing authentication protocol which meets the current requirements of network access authentication . The working group took care of described problem and defined a protocol for clients using IP protocols to authenticate themselves to an access network in order to be granted network access, called PANA. Now a client can get access to a networks backend Authentication ,Authorization and accounting (AAA) infrastructure without knowing the details about the used protocols and without having link layer specific mechanism . PANA also supports both multi-access and point to point links, as much as methods for authentication ,dynamic service provides selection and roaming clients PANA provides a protocol that allows a host and a network to authenticate each other for network access.

So it is not intention of PANA to develop a new security protocol and technologies belonging to such a protocol like authentication and authorization mechanism. Existing methods should be reused, such as the Extensible Authentication Protocol (EAP) and its features like key distribution and derivation Methods. The EAP may need to be extended to fulfill the need or requirements for PANA. But this extension is outside the scope of PANA. The protocol to be invented, PANA can be considered as a front end of AAA protocol or any other protocol the network uses for authentication of its clients. To understand PANA, we will first discuss about the requirements of PANA and before that we will study the description of PANA usage model, Components of PANA etc.

PROTOCOL OVERVIEW

Network access authentication is a key procedure for network operator to control user access to the network service. The IETF recently finished its major work in this area by standardizing an IP based protocol named Protocol for Carrying Authentication for Network Access (PANA).We provide a fruitful analysis of PANA Architecture based on develop IETF Standard deployed on IPv4 and next generation network environments.

1. PANA [2] is an application protocol using the User Datagram Protocol (UDP) as transport, which has been specially conceived by the IETF to carry the Extensible Authentication Protocol (EAP) in order to support different authentication mechanisms for network access, regardless of the underlying network access technology.

2. EAP [4] was standardized by the IETF to provide a flexible authentication framework for network access.

3. Various solutions can be considered as an alternative to PANA, AAA protocols, DHCP, TCP and IKEv2 are considered here as potential alternatives to PANA for EAP transport. AAA protocols such as RADIUS or

A Survey of Black hole Attack in Mobile Ad-hoc Network

Er. Dangat Ganesh D., Prof. Jayanti E

Abstract— Mobile Ad hoc Networks (MANET) has become an exciting and important technology in recent years because of the rapid proliferation of wireless devices. A mobile Ad hoc network consists of mobile nodes that can move freely in an open environment. Communicating nodes in a Mobile Ad hoc Network usually seek the help of other intermediate nodes to establish communication channels. In such an environment, malicious intermediate nodes can be a threat to the security of conversation between mobile nodes. The security experience from the Wired Network world is of little use in Wireless Mobile Ad hoc networks, due to some basic differences between the two Networks. Therefore, some novel solutions are required to make Mobile Ad hoc Network secure.

Wireless networks are gaining popularity to its peak today, as the users want wireless connectivity irrespective of their geographic position. There is an increasing threat of attacks on the Mobile Ad-hoc Networks (MANET).In this paper, we are discuss the Black Hole attacks to the best of our knowledge.

Index Terms— Black hole attacks, MANET, Survey, Security.

Fig 1 shows the Architecture of MANET

Fig.1 Mobile Ad hoc Network

I. INTRODUCTION

Ad-hoc Networks; They have no any infrastructure ,where any node can be join into the network or it will be left from the network any time.it is really a free network having any kind of infrastructure or less infrastructure. In such type of network there is no central administrator to manage the network. They have capability to create the network & destroy it Ad hoc network Categories into following types [3].

1.Static Ad hoc Network.
2.Mobile Ad hoc Network.

1. Static Ad hoc Network:-

In the static ad hoc network workstation & the geographic Location are not moving from one place to another they are fixed. That's why they are known as static Ad hoc Network.

2. Mobile Ad hoc network:-

It is a collection of mobile device which will be continuously moving from one location to the other location. Whenever any mobile will enter into the network then it will form the network without any central administrator. Following are the some characteristic of MANET [5].

1. Self-Organizing
2. Self-Configuring Multi hop wireless network
3. No geographical restriction
4. One of the limitations of MANET is limited energy resource of the node.
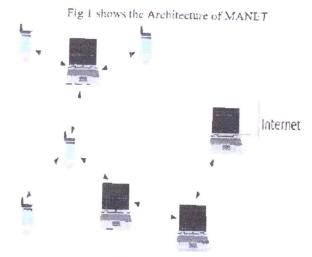
II. SECURITY REQUIREMENT FOR MANET
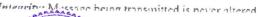
There are five major security goals that need to be addressed in order to maintain a reliable and secure ad-hoc network environment [7]. They are mainly: Same thing will be require for MANET as compare to the fixed station like:

1. Confidentiality
2. Availability
3. Authentication
4. Integrity
5. Non Repudiation

Confidentiality: Protection of any information from being exposed to unintended entities. In ad hoc networks this is more difficult to achieve because intermediates nodes receive the packets for other recipients, so they can easily eavesdrop the information being routed.

Availability: Services should be available whenever required. There should be an assurance of survivability despite a Denial of Service (DOS) attack. On physical and media access control layer attacker can use jamming techniques to interfere with communication on physical channel. On network layer the attacker can disrupt the routing protocol. On higher layers, the attacker could bring down high level services.

Authentication: Assurance that an entity of concern or the origin of a communication is what it claims to be or from. Without which an attacker would impersonate a node, thus gaining unauthorized access to resource and sensitive information and interfering with operation of other nodes.

Integrity: Message being transmitted is never altered

Study of PANA Architecture and its Applicability on Emerging Network Environments for Secure Network Access

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I. INTRODUCTION

Network access authentication is a key procedure for network operator to control user access to the network service. The IETF recently finished its major work in this area by standardizing an IP based protocol named Protocol for Carrying Authentication for Network Access (PANA).

We provide a fruitful analysis of PANA Architecture based on develop IETF Standard deployed on IPv4 and next generation network environments.

II. LITERATURE SURVEY

Up to the early 2000s there was no standard protocol to transport network access authentication information.. For example

1. Using Point-to-Point Protocol over Ethernet (PPPoE) to implement an authentication protocol, but it complicates the implementation of multicast-based services over PPPoE.

2. In Mobile Internet Protocol version 4 (MIPv4) has an extension to support network access authentication that requires a *foreign agent* in the visited network.

3. In Wi-Fi networks *captive portal*, has been implemented on top of Hypertext Transfer Protocol (HTTP).This variety of choices greatly complicates the management of authentication and network access control

To solve this problem, the Internet Engineering Task Force (IETF), through the PANA Working Group (WG), has developed the Protocol for Carrying Authentication for Network Access (PANA)[2] and an associated architecture [3] to carry network access authentication regardless of the access technology.

III. OBJECTIVES AND SCOPE LIMITATIONS OF THE PRESENT INVESTIGATIONS/STUDY

1. PANA [2] is an application protocol using the User Datagram Protocol (UDP) as transport, which has been specially conceived by the IETF to carry the Extensible Authentication Protocol (EAP) in order to support different authentication mechanisms for network access, regardless of the underlying network access technology.

2. EAP [4] was standardized by the IETF to provide a flexible authentication framework for network access.

3. Various solutions can be considered as an alternative to PANA. AAA protocols, DHCP, TCP and IKEv2 are considered here as potential alternatives to PANA for EAP transport. AAA protocols such as RADIUS or Diameter (or a subset of them) do not have message formats that satisfactorily meet the requirements (see RFC 4058) for an EAP lower-layer protocol. Some header fields are too large, some too short, some are not present at all, and so on. PANA, designed from scratch with its own message format, matches the EAP transport requirements. EAP over DHCP2 has complexity problems that eliminated it as a candidate for the IETF EAP standard. These include:

4. Difference in messaging direction between EAP and DHCP (e.g., EAP requests and DHCP requests are sent in opposite ways)

5. Difficulty with integrating (stateful) EAP authenticator and stateless DHCP relay agent

IV. SCOPE

Applicability of PANA
1) On emerging network (IPV4)
2) Next Generation Network
3) Wireless multihop and smart grid
4) Mobile network

V. LIMITATION

The TCP option for EAP transport adds burdensome redundancy. Its strong reliability functionality is not required. In contrast, by using timers and sequence numbers, PANA fully satisfies the EAP lower-layer protocol requirement on ordered message delivery and the reliability requirement for messages exchanged after the authentication and authorization phase (e.g. *PANA-Notification-Request* and *PANA-Termination-Request* messages require a response from the communicating peer to complete the notification and session termination operations, respectively). Hence, the lighter weight UDP based PANA transport is also less complex and more efficient. The final alternative here is IKEv2 [9], which is also defined on top of UDP and supports EAP authentication to interwork with AAA. However, IKEv2 mandates a Diffie-Hellman key exchange, which is considered more expensive than other cryptographic operations like the simple hash-based message

Recognition of ASL using Hand Gestures

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Abstract: *Gesture recognition is an area of active current research in computer vision. It brings visions of more accessible computer system. Gesture is often used to mean an initiation or conclusion of some human interaction. Hand gestures can be classified in two categories: static and dynamic. A static gesture is a particular hand configuration and pose, represented by a single image. A dynamic gesture is a moving gesture, represented by a sequence of images. In this paper single-handed gestures, are considered which are of distinct hand shapes and hand region. The intention is to achieve correct perception of the hand gesture performed by the user in front of a camera with a uniform non-skin color background (darker than the skin color and not in the shades of red color). A hand gesture recognition system is introduced to recognize static hand gestures which are the subset of ASL (American Sign Language). The system is designed to recognize the alphabets from A to Z in terms of sign language i.e. hand gestures which will be taken from a video scene captured by camera. The system is designed for 26 gestures of alphabets which are used in American Sign Language.*

Keywords: ASL, Hand Gestures, Neural network, Gesture Recognition.

1. INTRODUCTION

It is observed that using hand for performing gesture requires the user to wear unnatural device that cannot easily be ignored and which often requires significant effort to put on and calibrate. Even optical systems with markers applied to the body suffer from these shortcomings. Also there are some problems related to hand tracking in successive frames. Some trackers have been developed which use methods such as tracking contours with snakes ,using Eigenspace matching techniques, maintaining large sets of statistical hypotheses, or convolving images with feature detectors but all these are computationally too expensive. Color-based tracking are simpler algorithms but slower at any given CPU speed due to their use of color correlation, blob and region growing and contour considerations. We want a tracker that will track a hand in successive frames of a video sequence with minimal computational cost and with reduced complexity in design.

The system consists of three modules:

1. Skin color detection: For detecting the skin colored pixels in the image the technique of Explicitly defined skin region is used. This technique provides effective results in extracting skin colored objects from the image with dark non-skin colored background.

2. Hand Tracking: After skin colored object extraction separation of region of interest i.e hand region in the images is separated by performing morphological operations on the images. In each frame the location of hand is found out. Then CAMSHIFT algorithm is implemented so as to track the region of interest i.e. hands in the successive frames of the captured video scene. In CAMSHIFT algorithm tracking is done by placing a bounding box or search window around the hand region in the successive images.

3. Hand gesture Recognition: In this module implementation of a neural network for hand gesture recognition is done. A single frame is selected with the completely tracked gesture and send as a input to the neural network. A standard Perceptron neural network is constructed . The network has an input layer and a Perceptron layer .The inputs are connected to all nodes in the Perceptron layer. Hexagonal arrangement of neurons is followed in the network. Gesture is then classified on the basis of comparision of feature vectors. The feature vector chosen for the comparision of the images is orientation histogram which makes the system robust against the different illumination values of the image.

2. ASL (AMERICAN SIGN LANGUAGE)

ASL is a complete, complex language that employs signs made with the hands and other movements, including facial expressions and postures of the body. It is the first language of many deaf North Americans, and one of several communication options available to deaf people. ASL is said to be the fourth most commonly used language. American Sign Language is a unique system of communication because it is both a visual language and manual language. Instead of expressing himself through sound, a speaker using ASL employs a combination of facial expressions, body language, gestures, palm orientations, and hand shapes. Learning the subtleties of communicating in this manner can often take years of intensive study. In American Sign Language, signs can be classified as transparent, translucent, or opaque. Signs that are transparent have meanings that are easily understood even by people who have not mastered the basics of the language. Translucent signs are understood by non-proficient speakers once the meaning has been explained. In comparison, a sign that is classified as opaque has a meaning that is not often guessed by someone who is not fluent in American Sign Language. Most of the signs needed to communicate clearly using American Sign Language are classified as opaque. In spoken language, the different sounds created by words and tones of voice (intonation) are the most important devices used to communicate. Sign language is based on the idea that sight is the most useful tool a deaf person has to communicate and receive information. Thus, ASL uses hand shape, position, and movement; body

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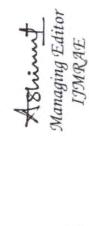
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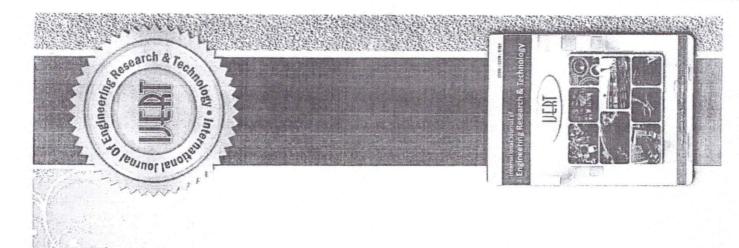
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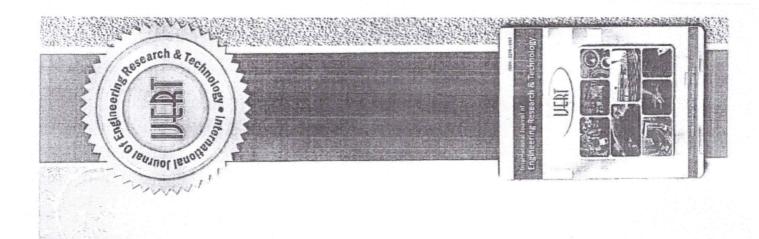
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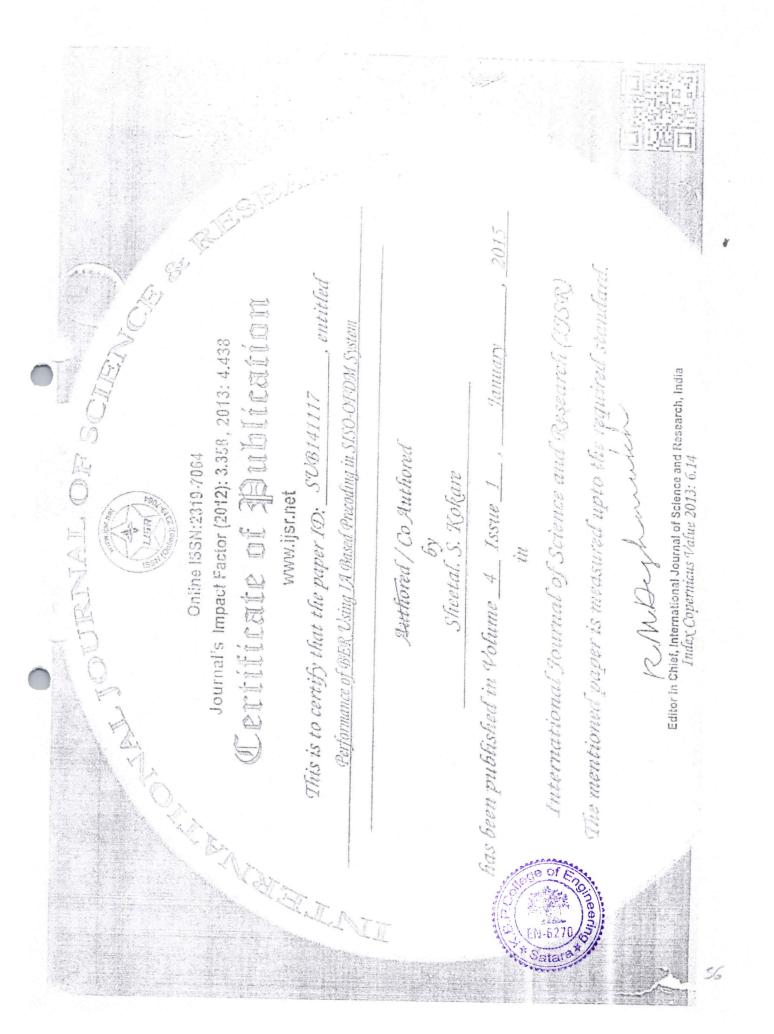
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Improvement of Machinability Using Eco-Friendly Cutting Oil in Turning Duplex Stainless Steel

Dayanand Ananda Ghatge[a], Ramanujam. R[a,*], Sudhakar Reddy. B[a], Vignesh M[a]

[a]School of Mechanical Engineering, VIT University, Vellore, Tamilnadu – 632014, India.

Abstract

In this work, currently used non-biodegradable mineral oil as a cutting fluid during machining is replaced with vegetable oil. In this work, duplex stainless steel is machined (turned) with the vegetable oils like coconut oil and neem oil. As a first step, vegetable oil based oil-in-water nano-emulsions were formulated using non-ionic surfactant (Tween-80) by ultrasonic emulsification method. In the second step, spindle speed, feed rate, depth of cut and type of cutting fluid are varied at three levels and Taguchi L27 machining experiments were performed. Measurement of surface roughness, tool wear and tool temperature were done as an output performance measure. From the results, it is evident that the order of influence for the improvement of tool wear and surface roughness are cutting fluid, feed rate and depth of cut respectively.

Selection and/or Peer-review under responsibility of International Conference on Materials Manufacturing and Modelling (ICMMM - 2017).
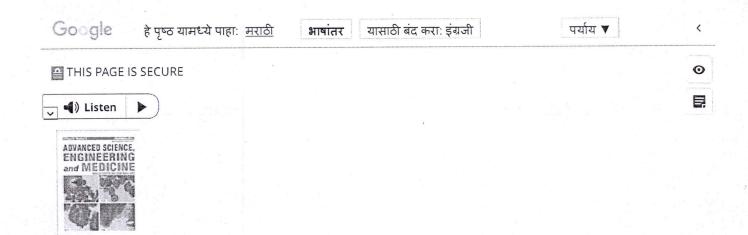
Keywords: vegetable oils; nano emulsions; machining experiments; surface roughness.

1. Introduction

Machining is one of the most essential and eldest process for shaping components of required shape and dimension with good surface quality and surface finish. During machining, these performances are influenced by one such factor called the cutting fluid [1]. These cutting fluids has the tendency of eliminating the heat during machining process, removal of and lubricates the chip-tool interface [2]. Though this cutting fluid has lot of advantages, it was tested for adverse effects like worker health (skin and respiratory issues) and environmental effect (damage of soil and water resources). Use of environment friendly cutting fluids helps in reducing or eliminating these adverse effects. But usage of these eco-friendly oils at certain levels called minimal quantity lubrication

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Study of Homogenous Two Phase Flow Through Helically Coiled Capillary Tube

Authors: Jadhav, Pravin; Agrawal, Neeraj

···
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This paper presents a numerical study of the flow characteristics of R22 refrigerant flowing through adiabatic helically coiled capillary tube. The theoretical model is based on conservation of mass, energy and momentum of the fluids in the capillary tube. The model is validated with the experimental data of Kim et al., Zhou and Zhang. The results obtained from the present model show reasonable agreement with the experimental data. Various friction factor correlations are compared for helical capillary tube. It is observed that the most suitable equations for calculating the numerical friction factors are Mori and Nakayama, and Schmidt correlation. The developed model can be considered as an effective tool for designing and optimizing numerical model.

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Original Articles

A comparative study in the straight and a spiral adiabatic capillary tube

Pravin Jadhav & Neeraj Agrawal ✉

ABSTRACT

Numerical studies on straight and spiral capillary tubes are addressed for the CO_2 and R22 refrigerant. A homogenous, one-dimensional steady-state adiabatic flow model is developed using fundamental principles of fluid dynamics and thermodynamics. Churchill and Ju et al. friction factor correlations are employed. Numerical results are validated with the experimental results of Agrawal and Battacharya, Jabaraj et al. and Mittal et al.

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Numerical Study on Choked Flow of CO_2 Refrigerant in Helical Capillary Tube

Pravin Jadhav and Neeraj Agrawal

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Abstract

Metrics

This paper presents a numerical study on an adiabatic helical capillary tube employing homogenous and choked flow conditions of a CO_2 transcritical system. The theoretical model is based on the fundamental principle of fluid dynamics and thermodynamics. The result of the present model validates with the previously

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Studies on Process Parameter of Laser Beam Welding by Taguchi Method

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[1,2] Department of Mechanical Engineering, Karmaveer Bhaurao Patil College of Engineering, Satara, India

chavanvrc@gmail.com[1], dayanand.ghatge@kbpcoes.edu.in[2]

Abstract - In the present study, laser welding of two dissimilar metals of copper and stainless steel (304 Grade) were joined by lap joint welding. The relationship produced to calculate weld quality of the laser beam welding of two different metals by welding parameters like laser power, thickness of material and beam diameter. The analysis of laser welding operation was done for the various combination of welding process parameters. The Taguchi's L9 orthogonal array was utilized to perform the experiments for measuring the effect of welding process parameters on determining responses. From the experimental results, it is noticed that as laser power goes on increasing weld strength increases and similarly from thickness size 0.4 to 0.6 mm weld strength goes on increasing. The maximum weld strength of 311 N was obtained at power 70% and thickness 0.6 mm which are highest values of process parameters.

Keywords: Laser Welding, Laser Power, Beam Diameter, Thickness of Material, Weld Strength

1. INTRODUCTION

Laser Beam welding is fusion welding process, where lasers generates intense beam of coherent light that can directed precisely to heat, melt or vaporize the selected area of any type of material. Laser beam having small heat affected zones as well as Weld lines may be as narrow. Tensile strength of the weld joint is always more than base metal. Laser welding produces a very narrow heat affected zone with low stress and small welding in perfection in the base metal. Laser beam welding does not allow any air gaps especially between small parts. The maximum air gap should be less than ten percent of the thinnest component [4]. Shield gas is required for laser welding to protect from the outer atmospheric gas contacts which affects the weld bead [7]. Laser beam welding is one of the special welding techniques to join metals through the heating effect of a concentrated beam of coherent monochromatic light known as LASER.

An inert gas, such as helium or argon is used to protect the weld bead from contamination and oxidation [1]. Laser Beam Welding is a flexible process, which is capable of welding dissimilar materials like Ferrous and Nonferrous [8]. In laser beam welding the speed of welding is proportional to supply of power as well as type and thickness of the work-pieces. [2]. In Laser Beam Welding the size of the weld is larger and the depth of penetration is thinner. In Laser Beam Welding keyhole is form due to narrow, deeply penetrating vapour cavity or local vaporization. The keyhole is enclosed by a thin layer of melted material. The thin layer of melted material is maintained by balance between vapour pressure and hydrostatic pressure [3].

It is very difficult to join dissimilar material combination due to physical and chemical properties of metals. The high power density and low energy input of laser provides solution to a sum of problems commonly met with conventional joining methods. Expensive materials with specific properties can be used in acute positions, with less expensive alloys being in supporting roles [6]. Joints between austenitic stainless steel and carbon or low-alloy ferritic steel are required in many sectors of industry, to satisfy performance and economic criteria.

In the co-generation industry, the use of low-alloy carbon steels for high pressure piping becomes unusable in locations where the temperature exceeds 6000 C, due to insufficient strength and oxidation resistance. The use of stainless steel in the entire construction is often uneconomical. Copper and aluminium joints are between solar collector radiators. Copper and steel is most used in power and co-generation plant due to their high thermal conductivity and stiffness (SS for corrosion resistance). Copper and stainless steel are used in manufacturing of solar panels [5].

2. EXPERIMENTATION

2.1 Workpiece Material

The stainless steel and Copper are used for the experimentation. The chemical analysis was carried out and the composition obtained is shown in Table 1 and Table 2 for the 304 stainless steel & copper material.

Table 1 Chemical Composition of 304 Stainless Steel

%C	%Mn	%Si	% P	% S
0.19	0.04	0.26	0.06	0.05

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EVALUATING THE PERFORMANCE OF PROCESS PARAMETERS IN ROLLER BURNISHING OF EN9 MATERIAL

Dayanand A. Ghatge* & Priyanka S. Yadav**
Mechanical Engineering Department, Karmaveer Bhaurao Patil College of Engineering, Satara, Maharashtra

Abstract:
Burnishing is a surface finishing process which improves surface finish without removal of material. The burnishing process mainly includes the suppression of surface irregularities and thus smoothening of the work piece surface and giving it a shiny look. Roller burnishing is a cold rolling process which has a great effect on the surface finish of a work piece. In this paper, the effect of parameters on surface roughness in roller burnishing of EN9 material is determined. It is observed that the highest contributor in improvement of surface finish is depth of penetration followed by feed rate, burnishing speed and then number of passes. The design of experiment is done by Taguchi parametric design strategy for process parameters and then the optimization of results is carried out.

Key Words: Roller Burnishing, Taguchi, ANOVA, Surface Roughness & EN9 Material

Introduction:
Burnishing is a surface finishing process which improves surface finish without removal of material. This process used to polish and harden the metal work surface. Roller burnishing process also used to smoothen and harden the surface. During burnishing, considerable residual compressive stresses are induced on the surface of the work piece and thus the fatigue strength and wear resistance of the surface layer is improved. Thus, in conjunction with giving finer surface finish it additionally enhances surface properties like hardness, wear resistance, fatigue life, corrosion resistance, etc. It involves rolling a hard, smooth object over the minute surface irregularities that are produced during machining or shearing. The hardened roller of burnishing tool suppresses the surface irregularities to a more flat surface. The improvement in surface finish takes place due to the application of dynamic loading on work-piece. [1]

Experimental Procedure:

Material and Method:
Commercially available EN9 steel bars (dia., 32 mm) were machined on a CNC lathe machine to the required sizes. Work piece was cut to 60 mm length on a hacksaw machine using water emulsion as lubrication. Then facing operation was done and work piece was turned to 30 mm outer diameter on CNC lathe machine. Then the burnishing process was carried out using single roller burnishing tool made of D3 tool steel.

Machines and Equipment:
The proposed worked of roller burnishing was carried out on CNC lathe machine.

Figure 1: CNC Lathe Machine
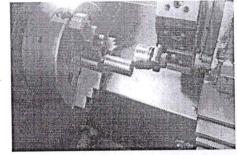
Figure 2: Setup for burnishing process

The measurement of the output parameter, that is, surface roughness was done with the help of surface roughness tester Mitutoyo SJ-210

Fig. 3: Mitutoyo surf test SJ-210

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Flow characteristics of helical capillary tube for transcritical CO₂ refrigerant flow

Pravin Jadhav , Neeraj Agrawal [*], Omprakash Patil

Department of Mechanical Engineering, Dr. B. A. Technological University Lonere, Raigad Maharashtra, India

Abstract

Helically coiled capillary tubes flow is characterized for transcritical CO₂ refrigerant numerically, developing theoretical model established on fundamental equations of mass, energy and momentum considering homogeneous two phase flow. Various friction factors models are compared, present in the open literature. The results obtained from the present model are fairly matches with the simulation results Mori & Nakayama and Schmidt friction factors agree reasonable well with mean average error of 2.2% and 5.7% for R744, respectively. The present model may be used to design helical capillary tubes working with CO₂ refrigerant.

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Peer-review under responsibility of the organizing committee of RAAR 2016.

Keywords: Transcritical, Helical, Capillary tube, Adiabatic, friction factor

1. Introduction

In the research of the alternative refrigerants, it is narrowed down to natural refrigerants being the ecological safe. CO₂ is the strong contender of natural refrigerants which have a perceived a revival [1]. Serving with advantages such as low cost, low starting torque and simple, capillary tubes are considered to most suitable for small-capacity refrigerating and air-conditioning units typically lower than 10 kW as expansion devices. Flow in a capillary tube is a complex phenomenon where internal surface friction and flow momentum both contribute to expansion of refrigerant. However, in the two-phase region existence vapour dominates momentum pressure drop over friction pressure drop. As a result enthalpy reduces in the two phase region of the capillary tube as part of the total energy is transformed to kinetic energy.

[*] Corresponding author. Tel.: 91 2140275142; fax: 91 2140275140.
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Topic : Process Optimization for Turning Operation - a Review

Authors:P.S.Kulkarni || S. S. Patil
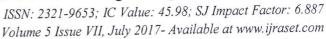
Abstract:This dissertation work shall focus on the unique response -Residual Stress - found upon turning the workpiece using CNC turning center. The material chosen is EN353, which is used in Automobile applications like shafts & gears, where the case of the part is expected to be hard while the core should stay soft to offer toughness during shock loading. The research shall be performed upon identifying fundamental machining parameters that influences this response. Statistical techniques shall be used to determine the optimal settings for the given parameters. The experiment shall be performed at a suitable facility and the optimal results shall be validated through experimentation. The residual stresses are being considered to be measured using 'Hole Drilling Method' or a suitable technique at the test lab. The objective of the work shall be to optimize the parameters in order to realize reduced level of residual stress while maintaining the rate of production for the given component.

Keywords: CNC turning, Speed, Feed, Depth of cut, Residual Stress, Optimization, Process parameters, Statistica treatment1

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Review Paper on Laser Welding Machine

Mr.Vivek. R. Chavan[1], Mr. D. A. Ghatage[2], Mr. Bhosale K. K[3]

[1,2] K.B.P.College of Engg. Satara ,

[3] Dr.Daulatrao Aher college of Engg. Karad

Abstract: This paper gives literature review of laser welding machine and parameter optimization of laser welding machine. In this paper literature, introduction , methodology and objectives of laser welding machine are described. It is very difficult to join dissimilar material combination to large difference in their physical and chemical properties of metals.

Keywords: Optimization, Laser welding Machine, Taguchi method, Literature, Analysis.

I. INTRODUCTION

Majority of recent developments in welding have been driven by the requirement of higher productivity and lower cost. It is very difficult to join dissimilar material combination to large difference in their physical and chemical properties of metals. The high power density and low energy input of laser provides solution to a number of problem commonly encountered with conventional joining techniques. Joints between dissimilar metal are particularly common in components used in solar panel, power generation and chemical, petrochemical, nuclear and electronics industries . The use of different metals and alloys in product provides the designer and production engineer with greater flexibility and often results in technical and economic advantages over components manufactured from a single material. Expensive material with specific properties can be used in critical locations, with less expensive alloys being in supporting .

Continuous welding is the simplest form of the laser welding. There are two types of continuous welding modes: conduction and penetration. The conduction welding mode is employed for micro-joining purposes. Penetration welding permits aspects ratios (ratio of depth to width) much higher than unity. In continuous welding the effect of process parameters such as the welding speed, the focal length of the beam, type focusing lens, the work piece position relative to the beam focal point and the shielding gas type and flow characteristic on weld strength [11]. Experimentation will be based on the shear test (weld strength). Shear test will be performing on sample of dissimilar metals on tensometer, to observe the strength of continuous weld.

There are following objectives, which needs satisfied in laser continuous-welding.

A. Highly accurate positioning of the components to be weld.

B. Creation of a protective atmosphere.

C. Accurate positioning of the components in the focus of the laser to prevent variations in the irradiance.

II. LITERATURE

A. Tzeng [27] focused on the process parameters affecting pulsed Nd:YAG laser welding. Pulsed laser seam welding is characterized by having a large number of process parameters that have influence to various extents on the welding performance. The parameters can be grouped into a diagram, depicted in figure 2 [27], which demonstrates the various factors affecting the quality pulsed laser welding. It indicates both the flexibility and complexity in the selection of pulsed laser parameters. The question that thus arises is how to select a satisfactory combination of the associated parameters to enable efficient effective pulsed laser welding application.

B. Sun Z.et.al. described the principles underlying laser welding of dissimilar metal combination and highlight the above benefits in a number of practical applications. It is concluded that there is potential for its application in many industrial sectors.

C. Abdel-Monem El-Batahgy et.al. was discussed about the bead on plate and autogenous butt weld joints were made using CO2 laser with maximum output power of 5 KW, And found that penetration depth increases with increasing power. Mechanical properties were not significantly affected by heat input.

D. Zhao H. et.al. was discussed about the problems that automotive industry facing now a day. Laser welding plays important role in joining the aluminum alloys that seems to be probable answer for the weight reduction.

STUDY OF CAPILLARY TUBE FOR TRANSCRITICAL CO₂ SYSTEM

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ABSTRACT : *A review of the literature on the flow of Carbon dioxide refrigerants through the straight capillary tubes of different flow configurations especially adiabatic and non adiabatic, has been discussed in this paper. The paper presents the experimental and numerical analysis of different categories. The paper provides information about the range of input parameters especially tube diameter, tube length, surface roughness.Other information includes type of refrigerants used, correlations proposed and methodology adopted in the analysis of flow through the capillary tubes of different geometries operating under adiabatic and non adiabatic flow conditions.*

Keywords: CO₂, Transcritical cycle, Capillary tube, Adiabatic, Non adiabatic (diabatic)

1. INTRODUCTION

In recent years, the pursuit for environmentally friendly refrigerants has caused CFCs (chlorofluorocarbons) and HCFCs (hydro chlorofluorocarbons) refrigerants to gradually fade from use in the refrigeration industry. Research interests in this field turn to fluids with a low GWP (Global Warming Potential) and low Ozone Depleting potential(ODP), the global warming potential (GWP) is an index that relates the potency of a greenhouse gas to the CO_2 emission over a 100-year period. The Ozone Deflecting Potential (ODP) is an Deflecting Potency of substance compared to that of R-11 or R-12

Instead of continuing the search for new chemicals, there is an increasing interest in technology based on ecologically safe 'natural' refrigerants, i.e. fluids like water, air, noble gases, hydrocarbons, ammonia and carbon dioxide. Among these, carbon dioxide (CO_2, R-744) is the only non-flammable and non-toxic fluid that can also operate in a vapor compression cycle below 0 ^0C. In addition to its environmental advantages, the CO_2 has attractive thermal characteristics that make it a viable alternative refrigerant.

The commonly reported disadvantages of CO_2 were loss of capacity and low COP at high heat rejection temperature, and high expansion losses compared to other common refrigerants, CO_2 refrigerant has high operating pressure. Compared to conventional refrigerants, the most remarkable property of CO_2 is the low critical temperature of 31.1 ^0C. Vapor compression systems with CO_2 operating at normal refrigeration, heat pump and air-conditioning temperatures will therefore work close to and even partly above the critical pressure of 7.38 MPa. Heat rejection will in most cases take place at supercritical pressure, causing the pressure levels in the system to be high, and the cycle to be 'transcritical',[1,2] i.e. with subcritical low-side and supercritical high-side pressure as shown in figure 1.

Figure 1 .Transcritical cycle in the CO₂ pressure–enthalpy diagram [1, 2]

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Flow characteristics of helical capillary tube for transcritical CO_2 refrigerant flow

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Abstract

Helically coiled capillary tubes flow is characterized for transcritical CO_2 refrigerant numerically, developing theoretical model established on fundamental equations of mass, energy and momentum considering homogeneous two phase flow. Various friction factors models are compared, present in the open literature. The results obtained from the present model are fairly matches with the simulation results Mori & Nakayama and Schmidt friction factors agree reasonable well with mean average error of 2.2% and 5.7% for R744, respectively. The present model may be used to design helical capillary tubes working with CO_2 refrigerant.

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Peer-review under responsibility of the organizing committee of RAAR 2016.
Keywords: Transcritical, Helical, Capillary tube, Adiabatic, friction factor

1. Introduction

In the research of the alternative refrigerants, it is narrowed down to natural refrigerants being the ecological safe. CO_2 is the strong contender of natural refrigerants which have a perceived a revival [1]. Serving with advantages such as low cost, low starting torque and simple, capillary tubes are considered to most suitable for small-capacity refrigerating and air-conditioning units typically lower than 10 kW as expansion devices. Flow in a capillary tube is a complex phenomenon where internal surface friction and flow momentum both contribute to expansion of refrigerant. However, in the two-phase region existence vapour dominates momentum pressure drop over friction pressure drop. As a result enthalpy reduces in the two phase region of the capillary tube as part of the total energy is transformed to kinetic energy.

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Use of Shearing Operation for MS Bar Cutting by Pneumatic Bar Cutting Machine

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Abstract: The bar cutting machine is used to cut mild steel bar by using shearing operation. Shearing operation uses punch and die. A punch (or moving blade) is used to push the work piece against the die (or fixed blade), which is fixed. Usually the clearance between the two is 5 to 10% of the thickness of the material, but dependent on the material. Clearance is defined as the separation between the blades, measured at the point where the cutting action takes place and perpendicular to the direction of blade movement. This causes the material to experience highly localized shear stresses between the punch and die. The material will then fail when the punch has moved 15 to 60% the thickness of the material, because the shear stresses are greater than the shear strength of the material and the remainder of the material is torn. Two distinct sections can be seen on a sheared work piece, the first part being plastic deformation and the second being fractured. Because of normal in homogeneities in materials and inconsistencies in clearance between the punch and die, the shearing action does not occur in a uniform manner. The fracture will begin at the weakest point and progress to the next weakest point until the entire work piece has been sheared.

Keywords: Shearing operation, punch, die, cutting edge, pneumatic equipments.

I. INTRODUCTION

Shearing, also known as die cutting, is a process which cuts stock without the formation of chips or the use of burning or melting. Strictly speaking, if the cutting blades are straight the process is called shearing; if the cutting blades are curved then they are shearing-type operations. When the stress reaches beyond the ultimate strength of the material, the fracture starts from both the sides of plate along the cutting edges of both die and the illustrated a complete shearing operation. The most commonly sheared materials are punch, and as the punch continuous to descend; the fractures meet at the centre of plate. The metal is now completely severed from the sheet metal and drops out through the die opening. The fig.1
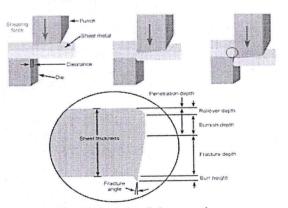
Fig.1 Principle of shear cutting

in the form of sheet metal or Plates; however rods can also be sheared. Shearing-type operations include: blanking, piercing, roll slitting, and trimming. It is used in metal working and also with paper and plastics. A punch (or moving blade) is used to push the work piece against the die (or fixed blade), which is fixed.

II. MATERIALS USED FOR THE PUNCH AND DIE

A. HCHCr-

HCHCr Material also known as High Carbon High Chromium Steel or simply as D2, it is created by vacuum process. This is developed by raising the steel temperature to a high degree and then letting it cool suddenly. Due to its immovability during processing, very thin parts are also manufactured. In spite of not being classified as stainless steel, this has many properties similar to stainless steel like the following:

- Economic, Good Hardness High wear resistance
- Stainless steel properties
- Thin manufactured parts
- High abrasive wear applications
- Edge holding properties
- Accurate dimensions

Thread rolling dies, Hobs, Cold extrusion tools and dies, Punches, Draw plates and dies, Cutters, Measuring tools, Pressure casting moulds, Blanking, Reamer, Finishing rolls for tyre mills. This type of steel has high dimensional stability with added wear resistance coupled with excellent edge holding qualities.

TABLE I Typical analysis of (HCHCr) in %

Steel Type	High Carbon High Chromium Die steel
Quality	HCHC

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Performance Improvement of Roller Burnishing Process– A Review

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Abstract: This paper presents a review on performance improvement of roller burnishing process. Roller burnishing is a surface finishing process which is economical as compared to other surface finishing process. Roller burnishing along with good quality surface finish also gives improved surface properties. The process parameters mostly considered are burnishing speed, feed rate, number of passes and depth of penetration. Roller burnishing does not require any special arrangement for the process and can be easily carried out on a conventional lathe machine also.

Keywords: Burnishing, depth of penetration, feed rate, speed, surface hardness, surface roughness.

I. INTRODUCTION

Machining is the process of material removal in order to get the component into desired shape and size. The properties of machined components have gained a large importance. The properties such as surface finish, surface hardness, wear resistance, corrosion resistance, etc are to be considered. The surface finishing operations such as honing, lapping, grinding, etc can be replaced by burnishing process as the other processes exert tensile force on the component which reduces life of component due to fatigue, tension, etc. Thus, compressive stresses are found beneficial over tensile stresses on component surface. Compressive stresses can also be produced by processes other than burnishing which are shot peening, laser shock peening, etc. But these stresses were found to be relaxed when exposed to heat. This thermal relaxation of compressive stresses shortens the component life and reduces its performance. So burnishing came up as a process that could impart compressive stresses that remain unaffected also in thermal variations.

II. BURNISHING PROCESS

Burnishing could be a surface finishing method that involves no chip formation. In conjunction with giving finer surface finish it additionally enhances surface properties like hardness, wear resistance, fatigue life, corrosion resistance, etc. Roller Burnishing will facilitate users eliminate secondary operations for substantial time and price savings, whereas at an equivalent time rising the standard of their product. Roller burnishing could be a technique of manufacturing associate degree accurately sized, finely finished and densely compacted surface that resists wear. Hardened and extremely smooth steel rollers are brought into pressure contact with a softer work piece, as shown in figure 1. As the pressure increases beyond the yield point of the work piece material, the surface is plastically unshaped by cold-flowing of submerged material.
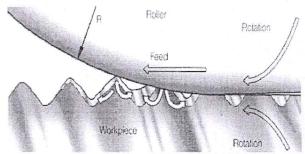
Fig. 1 Roller burnishing process [14]

III. ADVANTAGES OF ROLLER BURNISHING

- Roller burnishing is a quicker, cleaner, a lot of effective and a lot economical methodology of sizing and finishing elements to required specifications.
- Fantastic mirror like surface.
- Consistent dimensional tolerance and repeatability.
- Single pass operation offers terribly less cycle time.
- Will increase the surface hardness of parts.
- Reduces reworks and rejections. [15]

IV. APPLICATIONS

Roller burnishing has long been used on a large type of automotive and significant instrumentation parts (construction, agricultural, mining so on) as well as piston and rod bores, brake system parts, transmission elements and converter bulbs. Burnishing tools are also widely applied in non-automotive applications for a range of benefits; to give higher and longer lasting seal surfaces; to enhance wear life; to cut back friction and noise levels in running parts and to boost cosmetic look. Examples embody valves, pistons of hydraulic or gas cylinders, field and garden instrumentation parts, shafts for pumps, shafts running in bushings, bearing bores, and plumbing fixtures. [15]

Parametric Evaluation of Melting Practice on Induction Furnace to Improve Efficiency and System Productivity of CI and SGI Foundry- A Review

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Abstract: We provide some recommendations for the productivity improvement. Due to non-availability of the proper instrumentation the effect of the ill practices cannot be precisely judged. If this is properly measured, the percentage of productivity improvement in steel melting Induction Furnace can be calculated. The review is carried out from the literature in the various journals and manuals. The aim of this paper is to study the overall performance of induction furnace and to suggest the method to improve melt rate with optimum use of electricity. This paper mainly put attention on induction furnace as these are main consumer of electricity in foundry. In case of induction furnace efficiency is sensitive to many controllable features lie in operational practices, coil height; charge mix, furnace utilization etc. So with the help of recommendation, it is easy to find out the ways to lower the specific energy consumption in this furnace. So, in this paper we are trying to develop certain relationship between input and output parameters to improve the Whole process.

Keywords: Induction Furnace, Molten metal, Productivity, Melt rate, Energy Consumption.

I. INTRODUCTION

The development of Induction Furnaces starts as far back as Michael Faraday, who discovered the principle of electromagnetic induction. However it was not until the late 1870's when De Ferranti, in Europe began experiments on Induction furnaces. In 1890, Edward Allen Colby patented an induction furnace for melting metals. The first practical usage was in Gysinnge, Sweden, by Kjellin in 1900 and was similar to the Colby furnace with the primary closest to the core. The first steel made in an induction furnace in the United States was in 1907 in a Colby furnace near Philadelphia.The first induction furnace for three –phase application was built in Germany in 1906 by Rochling-Rodenhauser. The two basic designs of induction furnaces, the core type or channel furnace and the coreless, are certainly not new to the industry. The channel furnace is useful for small foundries with special requirements for large castings, especially if off-shift melting is practiced. It is widely used for duplexing operations and installations where production requirements demand a safe cushion of readily available molten metal. The coreless induction furnace is used when a quick melt of one alloy is desirable, or it is necessary to vary alloys frequently. The coreless furnace may be completely emptied and restarted easily [1].

Induction furnaces have increased capacity to where modern high-power-density induction furnaces are competing successfully with cupola melting (Fig.1).

II. METHODOLOGY STUDY OF INDUCTION FURNACE - A REVIEW

The working of induction furnaces is based on the principle of electromagnetic induction and basic concept is same as that of a transformer but with a concept is same as that of a transformer but with, a single turn short circuited secondary winding. The charge to be heated and melted forms the secondary while the hollow water cooled copper coils excited by the A. C. supply from the primary. In the core type furnaces, in order to maintain the electric path there must always be a sufficient molten metal the furnace. This is called the molten heel. In the core less induction furnaces, the primary coils surround a refractory crucible in which the charge to be melted is put. The eddy currents induced by the primary winding generate heat in the charge. Since there is no core, a large current is required to

Fig.1: Schematic of induction furnace [1]

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Review of Design Optimisation and Analysis of Anti Roll Bar in Automotive Vehicle

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Abstract- *The anti-roll bar is a rod or tube that connects the right and left suspension members. It can be used in front suspension, rear suspension. The ends of the anti-roll bar are connected to the suspension links while the center of the bar is connected to the frame of the car such that it is free to rotate. The ends of the arms are attached to the suspension as close to the wheels as possible. Body roll is an unwanted motion. First reason for this is the fact that, too much roll disturbs the driver and give feeling of roll over risk, even in safe cornering. Thus, driver cannot drive the vehicle with confidence. To reduce this body roll of vehicle anti roll bar is used in suspension system. Optimization of anti-roll bar is to analyze the main geometric parameter which affect rolling stiffness of anti-roll bar. By optimization of geometric parameters, we can increase the rolling stiffness and reduce mass of bar. Changes in design of anti-roll bar are quite common at various steps of vehicle production and a design analysis must be perform for each change. To calculate rolling stiffness mass von-mises stresses ANSYS parametric design languages (APDL) is used. The effect of anti-roll bar design parameters on final anti roll bar properties are also evaluated by performing sample analysis with FEA program developed in this paper.*

Keywords- Anti-Roll Bar, APDL, FEA, Rigid axle, Rolling Stiffness

I. INTRODUCTION

Ride comfort, handling and road holding are the three aspects that a vehicle suspension system has to provide compromise solutions. Ride comfort requires insulating the vehicle and its occupants from vibrations and shocks caused by the road surface. Handling requires providing safety in maneuvers and in ease in steering. For good road holding, the tires must be kept in contact with the road surface in order to ensure directional control and stability with adequate traction and braking capabilities. The anti- roll bar, as being a suspension component, is used to improve the vehicle performance with respect to these three aspects.

The anti-roll bar is a rod or tube that connects the right and left suspension members. It can be used in front suspension, rear suspension or in both suspensions, no matter the suspensions are rigid axle type or independent type. A typical anti-roll bar is shown in Figure 1. The ends of the anti-roll bar are connected to the suspension links while the center of the bar is connected to the frame of the car such that it is free to rotate. The ends of the arms are attached to the suspension as close to the wheels as possible.

A. Suspension System

Suspension is the system of tires, tire air, springs, shock absorbers and linkages that connects a vehicle to its wheels and allows relative motion between the two. Suspension systems serve a dual purpose contributing to the vehicle's handling and braking for good active safety and driving pleasure, and keeping vehicle occupants comfortable and a ride quality reasonably well isolated from road noise, bumps, vibrations etc. These goals are generally at odds, so the tuning of suspensions involves finding the right compromise. It is important for the suspension to keep the road wheel in contact with the road surface as much as possible, because all the road or ground forces acting on the vehicle do so through the contact patches of the tires. The suspension also protects the vehicle itself and any cargo or luggage from damage and wear. The design of front and rear suspension of a car may be different.

B. Body Roll

When a vehicle is fitted with a suspension there is compliance between the mass of the vehicle and the vehicle's contact with the ground. Body roll is the noticeable (either perceived or measurable) deflection produced when load transfer acts on the compliant elements of the suspension. Anti-roll bars directly impact body roll but their design intent is actually to act as a tool to adjust roll couple percentage or roll moment distribution.

C. Anti-Roll Bar

Anti-roll bar, also referred to as stabilizer or sway bar, is a rod or tube, usually made of steel, that connects the right and left suspension members together to resist roll or swaying of the vehicle which occurs during cornering or due to road irregularities. The bar's torsional stiffness (resistance

Design, Development & Analysis of Non-IBR Vertical Fire Tube Boiler for Improving the Efficiency

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Abstract :-This paper contains the information about design and development of non-IBR vertical fire tube boiler. This boiler works on the thermodynamic principle. Many factories and plants already have this type of boiler which is capable of providing steam of required quantity to production line. The main advantage of vertical boiler is it is economically comparatively cheap and simple in design, also reducing maintenance cost it can also have an outstanding advantage in terms of safety. The main objective of our work is to increase efficiency of boiler by increasing temperature.

Keywords:-*boiler, efficiency, production, steam, temperature, thermodynamic.*

I. INTRODUCTION

A boiler[1] is an enclosed vessel that provides a means for combustion heat to be transferred to water until it becomes heated water or steam. The hot water or steam under pressure is then usable for transferring the heat to a process. Water is a useful and inexpensive medium for transferring heat to a process. When water at atmospheric pressure is boiled into steam its volume increases about 1,600 times, producing a force that is almost as explosive as gunpowder. This causes the boiler to be an equipment that must be treated with utmost care. The boiler system comprises of: a feed water system, steam system and fuel system. The feed water system provides water to the boiler and regulates it automatically to meet the steam demand. Various valves provide access for maintenance and repair. The steam system collects and controls the steam produced in the boiler. Steam is directed through a piping system to the point of use. Throughout the system, steam pressure is regulated using valves and checked with steam pressure gauges. The fuel system includes all equipment used to provide fuel to generate the necessary heat. The equipment required in the fuel system depends on the type of fuel used in the system. The water supplied to the boiler that is converted into steam is called feed water. The two sources of feed water are:

(1) Condensate or condensed steam returned from the processes and

(2) Makeup water (treated raw water) which must come from outside the boiler room and plant processes. For higher boiler efficiencies, an economizer preheats the feed water using the waste heat in the flue gas.

II. LITERATURE REVIEW

Normally, the chimney is situated at the top of the boiler, but in this type of boiler we redesign the position of chimney. For that, we kept the chimney position at side of the cylinder and kept another cylinder (no. 4 chamber) for chimney. The main purpose of change of direction of chimney is to keep the smoke outside quickly and do not produce sludge inside of chamber and seamless pipes. So, the probability of blast inside boiler reduced. Also during the maintenance time the worker do his work easily and the dust particles or sludge inside seamless tubes remove easily by using round wire brush. And we kept this position of chimney according to expert advice and experience company head. And this redesign of boiler is going successfully.[1] There are several different chemical approaches used to treat boilers and their selection and performance depend upon many factors. Some of these include:

1. Feed water characteristics.
2. The type and reliability of external treatment.
3. Boiler type.
4. Boiler pressure and heat flux.
5. Steam load and variations in load.
6. Waterside condition of the boiler and current and
   long-term goals of the program such as cleaning up scale or maintaining present conditions.
7. Steam purity requirements.
8. Regulatory restrictions such as FDA

Design and Development of Mechanical Solar Tracking System

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Abstract — In recent years, the growing global interest in the conservation of environment has provided a fresh motivation for research in the area of solar energy utilization. Already, installation of solar energy extraction devices such as solar panels, solar water heaters, solar cookers etc. is becoming popular in urban buildings. Most of these devices consist of a solar receptor that is kept facing the sun during the day, but the sun moves from east to west and the efficiency of the panel decreases. If one could trap this extra energy source then the efficiency of the solar panel would be increased. A tracking mechanism following the sun would achieve this aim. An attempt has been made to develop a simple yet efficient sun tracking mechanism using a motor, a speed reduction mechanism and real timer. The mechanism has been designed such that the sunrays falling on the panel are always perpendicular to the panel resulting in increase in efficiency of the electricity generation. This report presents, in detail, the design and construction adopted to develop the functional model that was fabricated and tested for performance which yielded the efficiency increase of 28.41% as compared to the conventional stationary panel position.

Keywords—Motor, real timer, solar energy, speed reduction, sun tracking mechanism.

I. INTRODUCTION

Any physical activity in this world, whether by human beings or by nature is caused due to the flow of energy in one form or other? Energy is required to do any kind of work. Renewable energy is an indigenous resource available in considerable quantities to all developing nations and capable in principle, of having a significant local, regional or national economic impact. The use of renewable energy could help to conserve foreign exchange and generate local employment if conservation technologies are designed, manufactures, assembled and installed locally.

The sun radiates energy uniformly in all directions in the form of electromagnetic waves. When absorbed by a body, it increases its temperature. It provides the energy needed to sustain life in our solar system. It is clean, inexhaustible, abundantly and universally available renewable energy. Solar energy is also used by various well known natural effects and appears in nature in some other forms of energy. Solar energy has the greatest potential of all the sources of renewable energy and if only a small amount of this form of energy could be used, it will be one of the most important supplies of energy, especially when other sources in the country have depleted. Thus, solar energy is a mother of all forms of energy: conventional or non-conventional, renewable or non-renewable, the only exception being nuclear energy. The Sun subtends an angle of 32' at the earth's surface. India lies between 7° and 37° N and receives an annual average intensity of solar radiation between 16,700-29,260 kJ/sq.m per day that is 400-700 Cal/sq.cm per day. Peak values in April or May with parts of Rajasthan and Gujarat is 25,100 kJ/sq.m per day and 16,700 kJ/sq.m per day in monsoon and winter seasons. Daily diffused radiation received by whole country is 7,300 kJ/sq.m per day that is 175 Cal/sq.cm per day. Solar power where sun hits atmosphere is 1017 watts and the total demand is 1013 watts. Therefore the sun gives us thousand times more power than we need. If we can use 5% of this energy, it will be 50 times what the world will require. Solar technologies are broadly characterized depending on the way they capture, convert and distribute sunlight.

II. NEED OF THE SYSTEM

Energy is an important input to all sectors of any country. The energy requirement increases rapidly with the increase in population and increase of standard of living. Presently conventional energy sources such as fossil fuels and coal are being used extensively for power generation. But these sources of energy are depleting and may be exhausted by the end of the century or beginning of the next century. As a result most countries have started to explore and experiment the possibility of using non-conventional energy sources such as solar energy, wind energy, water energy and nuclear energy etc. in large scale. The basic problem associated with the conversion

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Analysis and Efficiency Improvement in Co-generation Power Plant

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Abstract -In the existing background, majority of the electricity produced throughout the world is from steam power plants. Therefore, it is very important to ensure that the plants are working with maximum efficiency. Analysis of the power plant has been manage to increase the efficiency and reliability of power plants. The overall efficiency of a power plant surround the efficiency of some various components of a generating unit. To Minimizing heat losses is the greatest factor affecting the loss of power plant's efficiency, and there are many areas of potential heat losses in a power plant. Efficiency of previous power plant's becomes dissipated over time, and minimize power plant efficiency results in more CO_2 being emitted per unit of electricity generated. CO_2 emissions can be lowered by improving the efficiency of coal fired power plants. Expanding the temperature & pressure in a steam turbine increases the efficiency of the Rankin steam cycle used in power generation. The options most often considered for increasing the efficiency of power plant's involve some equipment refurbishment, plant improvements, and better operations and maintenance plan. The aim of this paper is to find out the amount and source of unrecoverable heat generated in boiler of 18 TPH boiler in 2 MW captive power plant so that any operation in system which having largest energy destruction can be identified that help to Improve efficiency of power plant.

Keywords -Boiler, Efficiency, Rankin Cycle, Coal, Emissions, Refurbishment, Energy.

Abbreviations – Qo= Heat output, Qi = Heat input, Q = Quantity of steam produced per hour (kg/hr), q = quantity of fuel per hour (kg/hr), hg = steam enthalpy (kcal/kg), hf = feed water's enthalpy (kcal/kg) GCV of coal = gross calorific value of coal (kcal/kg), Cp = specific heat of flue gas (0.23 $Kcal/kg^0C$) Tf = temperature of flue gas (^0C), Ta = ambient temperature (^0C), Ts = surface temperature (^0C), m = mass of dry flue gas (kg/kg of fuel), H_2 = percentage of H_2 in fuel = kg of H_2 in 1kg of fuel, Cp = specific heat of superheated steam (0.45 $Kcal/kg$ ^0C), 584 = latent heat of water in Kcal/kg, M= % of moisture present in fuel = kg of moisture in 1kg of fuel, Cp= specific heat of super-heated steam (0.45 $Kcal/kg$ ^0C), AAR = actual air required (kg/kg of fuel), Mbw = mass of blow down water (Kg/hr), Hbw = enthalpy of blow down water at drum pressure (Kcal/kg), Hfw = enthalpy of the feed water (Kcal/kg), Ma = mass of total ash generated/kg of fuel, SBC = Steffen Boltzmann constant (5.67 * 10^{-6}), ε = emissivity factor of surface, A = total surface area (m^2), C = 1.97,2.56,1.32,2.30forvertical surface, for upward facing horizontal surface, for downward facing surface, for horizontal cylindrical surface respectively.

I. INTRODUCTION

The need of performance of the boiler, like efficiency and evaporation ratio reduces with time, due to poor combustion, heat transfer fouling and the poor operation and lastly the maintenance. Deterioration of fuel quality and water quality also leads to bad performance of the boiler. Efficiency testing help us to find out how far the boiler efficiency drifts away from the better efficiency. Any observed unusual deviations could therefore be investigated to pinpoint the problem area for necessary corrective action to take. Hence it is necessary to find out the current level of efficiency for performance analysis, which isrequirement for energy conservation action in industry. To calculate the efficiency of the boiler there are some methods and by using this method we can calculate the efficiency of the boiler. And it will help to increase the efficiency of the power plant. The company is looking for ways not only to improve efficiency of power plant assets but it also to growconcerns regarding the environmental impacts of power generation without compromising their marketcompetitiveness. This report focuses on the efficiency improvements in power plants, and discusses technologies, and other modifications to facility operations which provide the potential to increasepower plant efficiency and reduce CO_2 emissions.

II. LITRETURE REVIEW

A Thermal power plant in which water is heated turns into steam and spins a steam turbine. This turbine is coupled with generator. So, the generator is rotated. After steam passes through the turbine, the steam is condensed in a condenser. After condensing, it is recycled to where it was heated; this is known as Rankin cycle.

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PERFORMANCE EVALUATION OF DIFFERENT TYPES OF CUTTING FLUIDS IN THE MACHINING OF HARDENED STEEL – A REVIEW

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Abstract— This paper presents a review on performance evaluation of different types of cutting fluids in the Machining of various hardened Steel Materials. Knowledge over the performance of vegetable oil based cutting fluids when applied to different work materials and operations is of vital importance in order to improve the efficiency of various conventional machining processes. This Efficiency can be measured, among other parameters, through cutting tool life and surface finish of work piece. In this Review, performances of various vegetable oil based cutting fluids are compared in terms of tool wear, force and surface roughness during various operations of various Hardened steel Material with various cutting tools.

Keywords— Cutting Fluids, Machining, Work Piece material, Tool Material.

I. INTRODUCTION

Cutting fluids are employed in machining to reduce friction, cool the work piece, and wash away the chips. With the application of cutting fluid, the tool wear reduces and machined surface quality improves. Often the cutting fluids also protect the machined surface from corrosion. They also minimize the cutting forces thus saving the energy. These advantages of using cutting fluids in machining are accompanied by a number of drawbacks. Sometimes the cutting fluid costs are more than twice the tool-related costs. Most of the cutting fluids possess the health hazard to the operator. Disposal of the used cutting fluid is also a major challenge.

In the recent past, there has been a general liking for dry machining.On the other hand, several researchers started exploring the application of minimal cutting fluid. In this Paper,a review on performance evaluation of different types of cutting fluids in the machining of hardened steel material is presented.

Cutting fluid (coolant) is any liquid or gas that is applied to the chip and/or cutting tool to improve cutting performance. A very few cutting operations are performed dry, i.e., without the application of cutting fluids. Generally, it is essential that cutting fluids be applied to all machining operations.

Cutting fluids have traditionally been used in machining operations to lubricate the chip-tool and tool-work piece interfaces, remove heat from the work piece and cutting zone, flush away chips from the cutting area, and inhibit corrosion. While each of these four functions can be employed as justification for cutting fluid usage, it is widely believed that the primary functions of a cutting fluid are lubrication and cooling. Seminal contributions to the technical literature in support of this belief are provided below.

II. LITERATURE REVIEW

M. Anthony Xavior, M. Adithan (2008)they determined the influence of cutting fluids on tool wear and surface roughness during turning of AISI 304 austenitic stainless steel. They performed turning operation by using AISI 304 work piece material. They used three different vegetable oil based cutting fluids:1.Coconut Oil 2. Soluble Oil 3. Straight Cutting Oil. They concluded that feed rate affects surface roughness & cutting speed affects tool wear. Coconut oil is better cutting fluid than the conventional mineral oils in reducing the toolwear and surface roughness. [1]

Mohamed HandawiSaadElmunafi, D. Kurniawan& M.Y. Noordin (2015)their study evaluates the performance of MQL using castor oil as cutting fluid & Results are compared with dry cutting. They found that using small amount of lubricant of 50 ml/h during the particular turning process produces better results compared to dry cutting, in terms of longer tool life.They come to know that machining under MQL seems to be limited by cutting temperature, because at high speed the effect of oil mist becomes evaporated. [2]

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PARAMETRIC EVALUATION OF DRILLING OPERATION OF MEDIUM CARBON STEEL USING   RESPONSE SURFACE METHODOLOGY

[1]DHIRAJ V GODASE, [2]ANURAG K CHAVAN, [3]DAYANAND A.GHATGE

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Abstract— To compete world-wide competition manufacturing firm has to be update with respect to science & technological field to transform their product output with excellent qualities with compatible prices. The enhancement of productivity in manufacturing processes effects on the acceleration of the design and evolution in modern cutting tools. Drilling is one of the economical process in which material is removed and create a hole in the vicinity as desired size. Drilling is frequently employed in industries owing to the need for component assembly in mechanical structures. As per the researchers report, the quality of the drilled hole strongly depends on the drilling parameters, tool material and tool geometry. Consider the drilling parameters during processing such as spindle speed, feed rate and tool angle applied on tool which consequently effects. So the prime motive is to optimize the process parameters which then results in terms of best solution. This optimizing combination to minimize the surface roughness, maximize the material removal rate and minimize the drilling time expectance along with maintaining quality of drilled hole by using standard RSM (Response surface Methodology) on medium carbon steel component. The purpose of this research is to study the effect of process parameters such as spindle speed, feed and drill point angles on surface roughness, operation time and material removal rate during the drilling of medium carbon steel part using carbide drill bit. Design of Experiments (DOE) will be adopted and the optimum combination of process parameter settings will be found out using the integration of Response Surface Methodology.

Keywords— Drilling, Optimization, Response Surface Methodology.

I. INTRODUCTION

Drilling is one of the important manufacturing operations that can be carried out on number of parts for assembly work. Drilling operation is essential for manufacturing industries like automobile industry, aerospace industry, medical and electrical related industries etc   Drilling is a frequently employed in industries owing to the need for component assembly in mechanical structures. Many researchers reported that the quality of the drilled surfaces depend strongly on the, drilling parameters, tool material and tool geometry. An inappropriate selection of these parameters can lead to material degradations, such as fiber pull-out, matrix cratering, thermal damage and delamination.

Now a day it is frequently used in automotive, aircraft and aerospace and dies or mold industries, home appliances, medical and electrical equipment industries. As a very important process in different process and manufacturing industry drilling process needs to be cost effective along with the assurance of the quality specifications within the experimental limit. Among various performance parameters for drilling process surface roughness, material removal rate, workpiece temperature tool wear etc are very much important in terms of the quality characteristics of the finished product. Among them surface roughness is of crucial importance due to its effect on some important mechanical properties of the material like fatigue behavior, corrosion resistance, creep life etc. Some other functional attributes of the material

such as friction, wear, heat transmission, light reflectivity, lubrication property, electrical conductivity etc are also affected by the surface roughness of the finished part. That's why the study and optimization of surface roughness in drilling has got research interest by the researchers.

The purpose of this research is to study the effect of process parameters such as spindle speed and feed, drill diameter, material thickness and drill point angles on surface roughness drilling time and material removal rate during the drilling of medium carbon steel Design of Experiments (DOE) will be adopted and the optimum combination of process parameter settings will be found out using the Response Surface Methodology

This study was motivated by a need for a study of forged steel crankshafts, which are the most commonly used manufacturing processes for an automotive crankshaft

II. LITERATURE SURVEY

In this work literature survey is done on various turning and optimization papers.

Ma F, M.A. et.al 2013
Experimentation carried out on Glass-Fibre Reinforced Plastic .Parameters are Spindle Speed , Feed rate and Drill Diameter .Optimization of surface roughness carried out using RSM. The minimum surface roughness measured for the hole was 1.06 Micrometer   at combination of 2000 rpm spindle

PERFORMANCE EVALUATION OF DIFFERENT TYPES OF CUTTING FLUIDS IN THE MACHINING OF HARDENED STEEL – A REVIEW

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Abstract— This paper presents a review on performance evaluation of different types of cutting fluids in the Machining of various hardened Steel Materials. Knowledge over the performance of vegetable oil based cutting fluids when applied to different work materials and operations is of vital importance in order to improve the efficiency of various conventional machining processes. This Efficiency can be measured, among other parameters, through cutting tool life and surface finish of work piece. In this Review, performances of various vegetable oil based cutting fluids are compared in terms of tool wear, force and surface roughness during various operations of various Hardened steel Material with various cutting tools.

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RESPONSE SURFACE METHODOLOGY AND GENETIC ALGORITHM: AN APPROACH FOR PROCESS PARAMETER OPTIMIZATION IN TURNING

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Abstract— The enhancement of productivity in manufacturing processes effects on the acceleration of the design and evolution in modern cutting tools. There is non-linear nature of metal cutting and the intricate connection to deformation, surface roughness along with time elapsed and power consumed. In this case a complete knowledge of the mechanics of metal cutting is still meager. So concentrating on that topic is great deal of recent exploration, which deals with high speed machining, and has been the main objective of the Mechanical Engineering in modern trend. The input parameters include cutting speed, feed rate and depth of cut which are cutting operations. Meanwhile in turning process, these parameters are found having greater impact on responses like surface roughness, power consumption and machining time which are output results. Hence there is a need to optimize the system parameters. So use of combined optimization techniques gives the best suitable values. This paper presents a review and gives optimization technique which is combined use of RSM and Genetic algorithm in turning .

Keywords— Optimization, RSM, Genetic Algorithm.

I. INTRODUCTION

Turning operation is crucial in machine industries where work-piece is rotated along it's axis and cut in form of chips by cutting tools with considering cutting parameters, for instance speed, feed, depth of cut. Despite of that it is difficult even to skilled operator to carry out the job with optimum parameters which avail better characteristics and excellent qualities. For the record optimization is the best suite technique to draw optimum values which reveals to accomplished optimum scenario of economy, performance hence overall profit.

The turning operation is controlled by cutting and the geometry parameters. The cutting parameters include cutting speed, feed rate and depth of cut. Hence there is a need to optimize the process parameters. The objective is study to find out optimization of the process for minimization of surface roughness, power consumption and machining time for turning . Design of Experiments (DOE) will be adopted and optimize combination of process parameter chosen using response surface methodology. Optimization of the process parameters using Genetic Algorithm optimization.

The RSM and genetic algorithm are the tools to measure the performance and calculate most suitable optimistic values.

II. LITERATURE SURVEY

In this work literature survey is done on various turning and optimization papers.

M.A. Amrana,,et al (2013), analysed by using RSM for the minimum surface roughness measured for the hole was 1.06 Micrometer at combination of 2000 rpm spindle speed, 78 mm/min feed rate and 2.5 mm drill diameter. While the maximum surface roughness of 2.59 micrometer was measured at the combination of 250 rpm spindle speed, 153 mm/min feed rate and 3.5 mm drill diameter . [1]

C. Ramudu et al, (2012), this study investigates the use of tool materials and process parameters for machining or selected parameter range and estimation of optimum performance characteristic using integration of Taguchi and RSM . [2]

Murthy B.R.N.,et al., (2012), Full factorial Design of Experiments (DOE) has been adopted using RSM and the results indicate that spindle speed was the main contributing parameter for the variation in the thrust force and drill diameter is the main contributing factor for variation in torque. The optimum combination of process parameter settings has been found out using the integration of Taguchi method and Response Surface Methodology. [3]

S. Madhavan, S. Balasivanadha Prabu, (2012), For correlating the drilling parameters with respect to thrust force a second order response surface model has been developed. The developed model is significant at 95% confidence level, which shows that the developed model can be effectively used for drilling of CFRP composites within the range of the process parameters. Analysis of variance for the developed model revealed that the type of drill and the feed rate are the dominant factors that influence the thrust force. Thrust force recorded for HSS drill

DESIGN AND DEVELOPMENT OF VERTICAL AXIS WIND TURBINE FOR GENERATION OF ELECTRICITY BY USING WIND ENERGY FROM RUNNING VEHICLES

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ABSTRACT- *Nowadays there is increase in the demand of electricity but the rate of production is much less than the demand. The motivation of our project is to generate electricity by using wind energy from running vehicles on highways. The vehicles running on highways generating more amounts of wind and this wind is used for the generation of electricity in our project. Also nowadays the percentage increase in the road accidents are happening due to the insufficient lightening on highways. This problem is overcome by using vertical axis wind turbine. This is a new idea of power generation. In our method the blades are designed in aerofoil shape and it is kept at the middle of the highways divider. The purpose of using divider is we can get wind from both directions. We can achieve higher force in the middle than the side of the road. And this blade is coupled with the generator and this generator will produce electricity. In our project we take wooden material for blades to achieve more efficiency.*
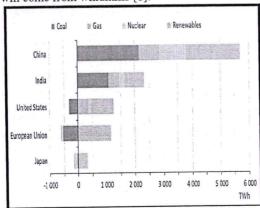
Keywords-Blades, Electricity, Generator, Highway, Wind Turbine, Wind

I) INTRODUCTION

If the efficiency of a wind turbine is increased, then more power can be generated thus decreasing the need for expensive power generators that cause pollution. This would also reduce the cost of power for the common people. The wind is freely available and Power can be generated and stored by a wind turbine with little or no pollution. The main objective of our project is to produce electricity by using the force of wind created by the running vehicle on highways. On highways the vehicle suffers a lot to travel in night time because of lightening problem. This problem can be overcome by using the vertical axis wind turbine. This is a new unique technique of power generation.

In this method the vertical axis turbine blade is designed in an aerofoil shape and it is kept at the middle of the highway divider by a series combination. The force in the middle portion is higher than the side of the road .This force will rotate the vertical turbine blade. And this blade is coupled with the generator and this generator will produce electricity.The main advantage of vertical axis wind turbine is it can generate power in all direction of wind flow. And the other advantages are the maintenance is less and the height of the tower is less. Also the wind is very much eco friendly and very compactable one. So we use this as a fuel in our project. It costs nothing & gives best output.

In 21st century the use of renewable sources which are eco friendly and less pollutant is must. The vertical axis wind turbine plays significant role in renewable energy sector. Wind energy is by far the fastest-growing renewable energy resource. Scientists estimate that, by the 21st Century, ten percent of the world's electricity will come from windmills [1].

Graph no1: Power Generation 2010 - 2013

Machining of Plastics: A Review

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Abstract—Plastic materials have good mechanical properties. Price and weight of plastic products are less as compared to metallic products. Therefore plastic is replacing to metals in various applications. Most of the plastic products are primarily produced by moulding process. For large scale production moulding process is preferred, whereas small scale production and requirement of surface quality, machining is preferred. Turning, drilling and milling these are the machining operations mostly carried out in plastic machining. Study carried out in the field of plastic machining is discussed in this paper.

Keywords—Plastic machining, machining on polymers, plastic composite, plastic materials, processing on polymers, machining methods

INTRODUCTION

Polymers are organic materials having excellent formability and mouldability. The term plastic is synonymously used for polymers. Depending upon the nature of the intermolecular bonding, plastics can be classified as thermoplastics and thermosets. Generally plastic products are manufactured by moulding processes like injection moulding, blow moulding, compression moulding, transfer moulding, etc.

Plastic injection moulding is the process primarily used for manufacturing of large quantities of plastic products and suffers through the problems of warpage, poor weld lines, sink marks and poor surface finish. So, post processing or recycling is required in these cases. In majority of the cases, post processing is limited to removing burr, runners, flash etc. However, wherever dimensional accuracy and surface finish requirements can not be fulfilled by moulded components, they are required to be finished by machining. Also quantity requirement of products does not justify investment in tooling, particularly moulds, plastic components become economical, if produced by machining. Dimensional accuracy and superior surface smoothness are desirable characteristics of plastic products in the applications of precision machinery, electronics and optics. To acquire these characteristics, plastic products need to undergo machining process. Higher form and shape accuracies may be achieved by the precision machining processes like turning, drilling, milling, etc. Machining also enables a high flexibility in the production of asymmetric plastic products.

During turning process, measure of the technological quality such as surface roughness is influenced by cutting parameters. These cutting parameters are like cutting speed, feed rate, depth of cut, etc. For drilling process, thrust force and surface roughness of hole are considered as process and quality measure respectively. While performing milling operation, surface roughness and machining force can be affected by spindle speed, feed rate and helix angle.

This paper discusses plastic machining, particularly, machining processes like turning, drilling, and milling.

LITERATURE REVIEW

Polymers (plastics) are organic materials having long chain carbon molecules. Polymer molecule is formed by number of monomers. As per intermolecular bonding, plastics can be classified as thermoplastics and thermosets. Thermoplastics can be recycled by melting, hence it is widely used. Polyethylene (PE), polystyrene, polypropylene (PP), polyvinylchloride (PVC), nylon (polyamide), teflon are some examples of thermoplastic materials. Thermosets, before moulding, are in partially polymerized state. Cross linking of molecular chain takes place in polymerization process. After polymerization, if thermosets are heated, it does not melt. Epoxies (EP), Phenolic (PF), Polyurethane (PUR), unsaturated polyester are examples of thermosets [1-4].

Generally, plastics and plastic composite materials are used in production of plastic components. Plastics like nylon, teflon, polypropylene have good mechanical properties. These plastic materials have increasing applications for specialty purposes where their toughness, rigidity, abrasion resistance and heat resistance are important. [2-4, 10-11]. Therefore it is widely used in the applications like gears, cams, bearings, bushes, valve seats, etc. [2-4]. On the other hand, plastic materials have few limitations over metals. Such as melting point of plastics is comparatively low, therefore applications of plastics in high working temperature is not favourable. Thermal expansion of plastics is ten times as that of metals, hence it is one of the constraint need to be consider in application. Plastic deformation occurs in plastic materials under heavy stresses [1-4]. Some important properties of material are compared between plastics and metals in table 1. [4].

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Noise & Vibration Worldwide

Design, Manufacturing and Validation of Low Cost, Miniature Acoustic C

Mahesh M. Kanase, Mangesh B. Chaudhari

SAGE Recommends

Abstract

Limiting the noise exposure of people to limit the risk of hearing damage is the prelim   a

hearing conservation programs and regulations of most of the countries. Along with th   f

and aesthetic considerations; noise reduction carries equal importance in product des   r

development as manufacturers are obligated for quieter product due to stringent legis......s

restrictive factor for severity assessment of noise is the cost. This study describes a low cos

test chamber having free working space of 2.28m × 2.28m × 1.12m (7.48ft × 7.48ft × 3.68ft)

with multilayer absorption treatment by giving emphasis on Green Technology (Green Tech)

pressure level measurements of small size sources. The chamber performance has been a

different methods of validation viz. S/N, 1 Watt, 1 kHz, 1m and Inverse square law ($1/r^2$ or 6

Under realistic conditions of ambient noise the A-weighted background noise level is found

which is low enough to make the use of acoustic test chamber for designed purposes. Rese

can adopt these methodologies with the use of common laboratory equipments to validate t

chamber. This study attempts to bridge the gap between optimal acoustic conditions and co

acoustic chamber.

Keywords

Acoustic Test Chamber, Sound Pressure Level (SPL), Green Technology (Green Tech),
Watt, 1 kHz, 1m, Inverse Square Law, Madhyam Saptsur (Saptak)

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✚IJESRT

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY

OPTIMIZATION OF EDM PARAMETERS USING TAGUCHI METHOD AND GREY RELATIONAL ANALYSIS FOR AISI 01 DIE STEEL

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ABSTRACT

Optimization is the best method used in industrial area for increasing quality of product by lowering the cost of product. In this paper, the experimental investigation of material removal rate, electrode wear rate, surface roughness, radial overcut and half taper angle during machining on OHNS Die steel by using Copper electrode on EDM machine is done. The input parameters used for experimental work are Peak Current (I_p), Pulse-On Time (T_{on}), Gap Voltage (V_g) and Sensitivity (Sen).Based on the experiments conducted on L9 Orthogonal array , optimization has been carried out by using Taguchi method (Single optimization) as well as Grey Relational Analysis (Multi-response optimization).Firstly single optimization has been carried out and then Multi-response optimization has been carried out. For that Grey relational generation and coefficient are find out and then Grey relational grade is carried out. Then the confirmation experiments are carried out. And thus according to this machining parameters are carried out to be optimized for combined objectives of higher MRR, lower EWR, lower SR, lower ROC and lower T. The results obtained from this optimization shows that Grey Relational Analysis is very effective optimization technique than Taguchi method.

KEYWORDS: EDM, Taguchi method, Orthogonal Array, ANOVA, Grey Relational Analysis.

INTRODUCTION

Electro Discharge Machining is a thermoelectric process in which removal of material takes place due to spark produced in between work-piece and electrode. For this spark production, both work piece and electrode are conductors of electricity. To understand experimental characteristics of OHNS Die steel , experimental study is carried out on it in this paper. P. Narender Singh, K. Raghukandan, B.C. Pai [1] in their paper carried out the study on the optimization by Grey relational analysis of EDM parameters on machining Al–10%SiCP composites. S V Subrahmanyam, M. M. M. Sarcar [2] in their work , machining on H13 Hot Die steel is carried out by multi-response optimization. In this paper, work is carried out on OHNS Die Steel (AISI-01) with the help of Copper electrode. Through hole of 10mm diameter and 4mm depth is done on the work piece. The process parameters such as Peak Current (I_p), Pulse-On Time (T_{on}), Gap Voltage (V_g) and Sensitivity (Sen) were optimized by using Multi Response optimization method i.e. by Grey Relational Analysis.

MATERIALS AND METHODS

[A]Material and Machine :-

AISI-01 Die Steel is used as work-piece and copper electrode is used as tool electrode. The photographic view of AISI-01Die Steel is shown in Fig. 1 and material properties are shown in table 2.1:-

Figure(1): Photographic View of AISI-01 Die Steel

Properties	Value
Melting Point	1421^0 C
Elastic Modulus (E)	193 G Pa
Conductivity	30.0 W/Mk
Density	7.81 g/cm^3

Table 2.1: Properties of OHNS Die Steel

Machining was carried out by using ELECTRA PULSE M3 machine in the company named Maharashtra Scooters Ltd. , Satara. Following table 2.2 shows specifications of machines and table 2.3 shows the working conditions and description of EDM machine :-

Description	Details
Supply Voltage	415 V
Discharge Current	35 A
Servo-system	Electromechanical

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Experimental Investigation of Process Parameters Using Molybdenum Wire on Tungsten Carbide in Wire Cut EDM

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ABSTRACT

Wire Electric discharge machine is one of the most commonly used machine which is employed in machining of conductive metals of any hardness or that are difficult or impossible to cut with traditional methods. The objective of the present study is to study the effect of different process parameters viz. peak current, pulse on time, pulse off time and wire feed rate on the response variables such as kerf width using Tungsten carbide as a workpiece and molybdenum wire as electrode (0.18 mm diameter). Taguchi design methodology has been chosen for design of experiment and L9 orthogonal array has been selected for present study. The S/N ratio analysis is used for selecting the optimum parameter level combination for achieving the minimum kerf width in WEDM. Analysis of variance has been used to calculate percentage contribution of factors & to find the significant process parameters and their effect on the response variables.

Keywords-: ANOVA, Design of experiments, Kerf width, S/N Ratio, Taguchi method, Tungsten carbide, Wire electrical discharge Machining

I. INTRIDUCTION

Modernization of mechanical industry has lead to the increase in demand which specializes in cutting complex shapes and geometries of conductive metals of any hardness that are difficult or impossible to cut with traditional machining method. Wire cut electro discharge machining (WEDM), a form of EDM, is a non-traditional machining method which is employed in machining of conductive or hard metals. Non-traditional machining processes like Electro discharge machining (EDM) and

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INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY

OPTIMIZATION OF EDM PARAMETERS USING TAGUCHI METHOD AND GREY RELATIONAL ANALYSIS FOR AISI 01 DIE STEEL

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ABSTRACT

Optimization is the best method used in industrial area for increasing quality of product by lowering the cost of product. In this paper, the experimental investigation of material removal rate, electrode wear rate, surface roughness, radial overcut and half taper angle during machining on OHNS Die steel by using Copper electrode on EDM machine is done. The input parameters used for experimental work are Peak Current (I_p), Pulse-On Time (T_{on}), Gap Voltage (V_g) and Sensitivity (Sen).Based on the experiments conducted on L9 Orthogonal array , optimization has been carried out by using Taguchi method (Single optimization) as well as Grey Relational Analysis (Multi-response optimization).Firstly single optimization has been carried out and then Multi-response optimization has been carried out. For that Grey relational generation and coefficient are find out and then Grey relational grade is carried out. Then the confirmation experiments are carried out. And thus according to this machining parameters are carried out to be optimized for combined objectives of higher MRR, lower EWR, lower SR, lower ROC and lower T. The results obtained from this optimization shows that Grey Relational Analysis is very effective optimization technique than Taguchi method.

KEYWORDS: EDM, Taguchi method, Orthogonal Array, ANOVA, Grey Relational Analysis.

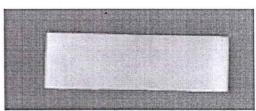## INTRODUCTION

Electro Discharge Machining is a thermoelectric process in which removal of material takes place due to spark produced in between work-piece and electrode. For this spark production, both work piece and electrode are conductors of electricity. To understand experimental characteristics of OHNS Die steel , experimental study is carried out on it in this paper. P. Narender Singh, K. Raghukandan, B.C. Pai [1] in their paper carried out the study on the optimization by Grey relational analysis of EDM parameters on machining Al–10%SiCP composites. S V Subrahmanyam, M. M. M. Sarcar [2] in their work , machining on H13 Hot Die steel is carried out by multi-response optimization. In this paper, work is carried out on OHNS Die Steel (AISI-01) with the help of Copper electrode. Through hole of 10mm diameter and 4mm depth is done on the work piece. The process parameters such as Peak Current (I_p), Pulse-On Time (T_{on}), Gap Voltage (V_g) and Sensitivity (Sen) were optimized by using Multi Response optimization method i.e. by Grey Relational Analysis.

MATERIALS AND METHODS

[A]Material and Machine :-

AISI-01 Die Steel is used as work-piece and copper electrode is used as tool electrode. The photographic view of AISI-01Die Steel is shown in Fig. 1 and material properties are shown in table 2.1:-

Figure(1): Photographic View of AISI-01 Die Steel

Properties	Value
Melting Point	1421^0 C
Elastic Modulus (E)	193 G Pa
Conductivity	30.0 W/Mk
Density	7.81 g/cm^3

Table 2.1: Properties of OHNS Die Steel

Machining was carried out by using ELECTRA PULSE M3 machine in the company named Maharashtra Scooters Ltd. , Satara. Following table 2.2 shows specifications of machines and table 2.3 shows the working conditions and description of EDM machine :-

Description	Details
Supply Voltage	415 V
Discharge Current	35 A
Servo-system	Electromechanical

STUDY OF CAPILLARY TUBE FOR TRANSCRITICAL CO$_2$ SYSTEM

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ABSTRACT : *A review of the literature on the flow of Carbon dioxide refrigerants through the straight capillary tubes of different flow configurations especially adiabatic and non adiabatic, has been discussed in this paper. The paper presents the experimental and numerical analysis of different categories. The paper provides information about the range of input parameters especially tube diameter, tube length, surface roughness.Other information includes type of refrigerants used, correlations proposed and methodology adopted in the analysis of flow through the capillary tubes of different geometries operating under adiabatic and non adiabatic flow conditions.*

Keywords: CO$_2$, Transcritical cycle, Capillary tube, Adiabatic, Non adiabatic (diabatic)

1. INTRODUCTION

In recent years, the pursuit for environmentally friendly refrigerants has caused CFCs (chlorofluorocarbons) and HCFCs (hydro chlorofluorocarbons) refrigerants to gradually fade from use in the refrigeration industry. Research interests in this field turn to fluids with a low GWP (Global Warming Potential) and low Ozone Depleting potential(ODP), the global warming potential (GWP) is an index that relates the potency of a greenhouse gas to the CO$_2$ emission over a 100-year period. The Ozone Deflecting Potential (ODP) is an Deflecting Potency of substance compared to that of R-11 or R-12

Instead of continuing the search for new chemicals, there is an increasing interest in technology based on ecologically safe 'natural' refrigerants. i.e. fluids like water, air, noble gases, hydrocarbons, ammonia and carbon dioxide. Among these, carbon dioxide (CO$_2$, R-744) is the only non-flammable and non-toxic fluid that can also operate in a vapor compression cycle below 0 ^{0}C. In addition to its environmental advantages, the CO$_2$ has attractive thermal characteristics that make it a viable alternative refrigerant.

The commonly reported disadvantages of CO$_2$ were loss of capacity and low COP at high heat rejection temperature, and high expansion losses compared to other common refrigerants, CO$_2$ refrigerant has high operating pressure. Compared to conventional refrigerants, the most remarkable property of CO$_2$ is the low critical temperature of 31.1 ^{0}C. Vapor compression systems with CO$_2$ operating at normal refrigeration, heat pump and air-conditioning temperatures will therefore work close to and even partly above the critical pressure of 7.38 MPa. Heat rejection will in most cases take place at supercritical pressure, causing the pressure levels in the system to be high, and the cycle to be 'transcritical',[1,2] i.e. with subcritical low-side and supercritical high-side pressure as shown in figure 1.
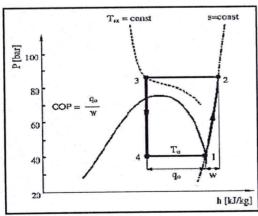

Figure 1 .Transcritical cycle in the CO$_2$ pressure–enthalpy diagram [1, 2]

VALUE STREAM MAPPING: SIMULATION APPROACH

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ABSTRACT: *Value Stream Mapping (VSM) is an improvement tool used to implement lean concepts especially in manufacturing areas. Main focus is on waste reduction and inventory control. VSM sketches flow of material and information for a product or product family moving through manufacturing system (Rother, Shook 1999). Since a map is static in nature, simulation can be used as supporting tool for VSM, to consider dynamic behavior of systems. As implementation of lean may become expensive and time-consuming, researchers considered simulation to improve VSM. This paper reviews literature involving study of VSM and simulation together. Improved steps for VSM are also proposed with implementation plan for application of VSM with simulation for manufacturing industry. It will be helpful to academia and people from industry for future work.*

KEYWORDS: *Inventory control, Lead time reduction, Lean, Value Stream Mapping, Simulation, Waste.*

1.   INTRODUCTION

Lean manufacturing is a philosophy based on waste elimination accepted worldwide across all type of industries. To sustain in current market conditions, manufacturers have understood the importance of change from traditional production systems towards the improvement tools of lean manufacturing. These tools are mostly the outcomes of Toyota Production System (TPS) at Japan, which resulted into the benefits such as reduced inventory, reduction of production lead time, manufacturing times, set up times, change over times and increased customer satisfaction (Womack and Jones 1990, 1994). Finally lean tries for customer satisfaction with continuous improvement of value. Value is voice of customer in terms of features and performance of product for which end customer is actually willing to pay (Womack et al. 2009).

Waste is anything other than the minimum amount of equipment, materials, parts, space and worker's time which is essential to add value to the product. Toyota's view was focused on the reduction of three types of waste; Muda (non value adding work), Muri (overburden) and Mura (unevenness). He used different tools to minimize waste systematically so that ideal manufacturing state could be achieved easily. General manufacturing activities was categorized as value-adding activity (processing, assembling), necessary but non-value-adding activity (sorting, storing) and waste or non-value-adding activity (scrapping, counting) (Hines and Taylor 2000). The original toyata seven wastes (muda) are transport, inventory, motion, waiting, overproduction, over processing and defect. Three wastes were added by Geoffrey Mika in 1999 which are; waste associated with not allowing worker to contribute their ideas, working with wrong metrics or no metrics and improper use of computers or not having the proper software or playing games.

Waste reduction and elimination is prime focus of lean concept. It uses tools like Value Stream Mapping (VSM), single minute exchange of dies (SMED), 5S, layout planning, visual control, Six Sigma, Cellular Manufacturing, One piece Flow Production Systems, Just in time and Kanban. It also includes efficiency improvement methods such as Just in Time (JIT), Total Quality Maintenance (TQM) and Total Preventive Maintenance (TPM). From these all tools, selection of appropriate tool for particular manufacturing environment is difficult for many companies.

VSM sketches flow of material and information for a product or product family. Flow is presented as value stream which include all value adding and non value adding activities used to fulfill the end customer demand (Womack and Jones 1996). VSM can be used to select and determine the opportunities for implementing various lean techniques for particular case. VSM is considered as initial step for lean implementation. However lean tools are difficult to implement which requires high understanding of lean philosophy Implementation of lean with VSM may become expensive and time-consuming. If lean implementation is started at shop floor without linking it to an enterprise goal, it might mislead from desired outcomes (Cutler, 2005). Also while using VSM, process improvements may be focused more, rather than use the tool to achieve overall enterprise goal. So efforts for creating initial maps may result into waste of money or time.

International Journal for Research in Applied Science & Engineering Technology (IJRASET)

A review of genetic algorithm for metal cutting processes and a research agenda

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Abstract —Quality of finished product manufactured by metal cutting process depends on various machining factors. Similarly the chemical composition of work piece material also plays important role .So before processing we must know relationship in between machining parameters and material parameters which is studied by various optimization methods. The genetic algorithm (GA) is the one of optimization technique which generates solutions to optimization problems using techniques inspired by natural evolution, such as selection, mutation, and crossover. GA is a good global optimization tool.

Keywords—Metal cutting processes, Genetic algorithm, Applications

I.   INTRODUCTION

Metal cutting is one of widely used manufacturing processes in engineering industries. The study of metal cutting focuses among others, on the features of tools geometry, chemical composition of work piece and machine (input) parameter settings influencing process efficiency and output quality characteristics (or responses). In today's rapidly changing scenario in manufacturing industries, applications of optimization techniques in metal cutting processes is essential for a manufacturing unit to respond effectively to severe competitiveness and increasing demand of quality product in the market. Optimization operation is one of the important goals of manufacturing systems, also it simple to use and are increasingly used to solve inherently intractable problems quickly. Genetic algorithm (GA) is one of the example of nontraditional optimization technique used as a good global optimization tool. Genetic algorithm is developed by Prof. John Holland, his colleagues and his student at the university of Michigan around 1975. Prof David Goldberg who is illustrious student of Prof. John Holland and author of "Genetic Algorithm in Search Optimization and Machine Learning "Addison Wesley 1989. Goldberg was inspired by Darwin's theory of evolution which states that the survival of an organism is affected by rule "the strongest species that survives". Darwin also stated that the "survival of any organism can be maintained through the process of reproduction, crossover and mutation". A solution generated by genetic algorithm is called a chromosome, while collection of chromosome is referred as a population. A chromosome is composed from genes. These chromosomes will undergo a process called fitness function to measure the suitability of solution generated by GA with problem. Some chromosomes in population will mate through process called crossover thus producing new chromosomes named offspring which its genes composition are the combination of their parent. In a generation, a few chromosomes will also mutation in their gene. The number of chromosomes which will undergo crossover and mutation is controlled by crossover rate and mutation rate value. Chromosome in the population that will maintain for the next generation will be selected based on Darwinian evolution rule, the chromosome which has higher fitness value will have greater probability of being selected again in the next generation. After several generations, the chromosome value will converges to a certain value which is the best solution for the problem. This paper discusses the various concepts and design and applications of genetic algorithms for optimization of process controllers. Section 1 gives the basic introduction of this paper. Section 2 gives brief information of the basic principles of GA and flowchart. In section 3 it clears that GA gives the global minima or global maxima value also shows how GA is best global optimization tool. In section 4 and 5 the various applications of GA in metal cutting processes and in other engineering field are mentioned respectively and in last section 6 the proposed work research agenda is explained in details.

II.   BASIC PRINCIPLES OF GA

Genetic algorithms (GAs) may contain a chromosome, a gene, set of population, fitness, fitness function, chromosome selection crossover and mutation. Genetic algorithms (GAs) begin with a chromosome which is group many genes. A set of solutions represented by chromosomes called population. Solutions from one population are taken and used to form a new population, which is motivated by the possibility that the new population will be better than the old one. Further, solutions are selected according to their fitness to form new solutions, that is, offsprings. The above process is repeated until some condition is satisfied.

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Mathematical modeling and analysis of process parameters on machining of tungsten carbide in EDM through Response Surface Methodology

Journal

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A Review on Optimization of Machining Parameters in EDM

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ABSTRACT: Electro Discharge Machining or EDM is a machining method primarily used for hard metals or those that would be impossible to machine with traditional techniques. So, Electro Discharge machining (EDM) is one of the important non-traditional machining processes which is used for machining difficult to machine materials like composites and inter-metallic materials. EDM spark erosion is the same as having an electrical short that burns a small hole in a piece of metal it contacts. In the EDM process both the work piece material and the electrode material must be conductors of electricity. Intricate profiles used in prosthetics, bio-medical applications can be done in EDM. Also Electro Discharge Machining (EDM) find a wide range of applications for production of complicated shapes, micro holes with high accuracy in various electrically conductive materials and high- strength temperature-resistant alloys. This paper reviews the various notable works in the field of EDM. And also gives future scope in the EDM.

KEYWORDS: Electro Discharge Machining, MRR, EWR, Surface Roughness, Taguchi method.

I. INTRODUCTION

Electro Discharge Machining is a non-conventional or non-traditional machining process which is used for machining hard materials which are difficult to machine by conventional machining process. EDM can be used in machining difficult cavities and contours.There are various types of products which can be produced using EDM with high precision and good surface quality, such as dies and moulds, parts for aerospace and automotive industry and surgical components.

Working Principle of EDM

EDM is a thermoelectric process in which there is spark production takes place in between tool electrode and work piece. In this process, there is no physical contact between work piece and tool electrode. And for this spark production both tool electrode and work piece should conduct electricity. The electrode is the cutting tool for the EDM process and cuts the work piece with the shape of the electrode. The electrode and work piece are connected to a suitable power supply. The tool (electrode) and the work piece are separated by a small gap and submerged in a dielectric fluid. As the electrode is charge up, it brings near to the work piece. As these two conductors come near enough, the spark will be produced in between these two and the material is removed from work piece due to spark erosion. This process is continued until the shape of electrode is formed into the work piece. The basic components of Electric Discharge Machine are electrodes, work piece, dielectric fluid, power supply and servomechanism. There are various types of electrodes are used in research work such as copper, brass, tungsten etc. The work pieces used for research work are Stainless Steel, Die Steel, Carbide, Inconel etc. Kerosene, EDM oil is generally used as dielectric fluid in EDM. A servomechanism maintains a space of about the thickness of a human hair between the electrode and the work, preventing them from contacting each other.

International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Literature Review on Mathematical Model Based Analysis of Conventional Machining of Ferrous and Non-Ferrous Materials

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Abstract— Conventional machining is a complex phenomenon which includes the workers who operate the machines as well as the working environment. In most of the country majority of the machining operations are still executed manually which needs to be develop a mathematical model to identify the strength and weaknesses of the present method. To maximize the accuracy and minimize the error in the obtained mathematical modelling an artificial neural network (ANN) was used to correlate the various dependant and independent parameters.

Keywords— Mathematical Model, Conventional Machining, Artificial Neural Network

I. INTRODUCTION

Traditional machining is a complex phenomenon which includes the workers who operate the machines and his working environment such as atmospheric parameters, work piece parameters, cutting process parameters, tool parameters, etc. In India and other country the majority of the total machining operations are still executed manually which needs to be focused and develop a mathematical model referred as experimental data based model to correlate the various input parameters with the output parameters.

Turning is a widely used machining process in manufacturing so selection of cutting parameters to satisfy an economic objective within the constraints of turning operations is very important task. The quality of surface is a significantly important factor in evaluating the productivity of machine tool and machined parts. The surface roughness of machined parts is a significant design specification that is known to have considerable influence on properties such as wear resistance and fatigue strength. It is one of the most important measures in finish cutting operations like turning, drilling, milling etc.

In the Indian scenario, conventional machine tools are still extensively used an shop floors .It needs to be focused and develop an approximate generalized mathematical relation which simulate the real input and output data directly from machining field where work is actually being executed.

II. LITERATURE SURVEY

Mangesh R. Phate,et al (2013)[1] Have focused on describing the field data base model (FDBM) considering a case study from real-world production process such as step turning for machine of ferrous and nonferrous materials. A drawing observations has been made in order to determine the selected parameters from the process such as operator, cutting tool, work piece, cutting process parameters as independent parameters while human energy is considered as dependant parameters ANN has been used to simulate the formulated FDBM.

C. Ramudu et al(2012)[2] Have considered many process parameters which directly or indirectly influence the surface roughness and material removal rate of product . Surface roughness and material removal rate in turning process were varied due to various parameters such as speed, feed and depth of cut are important once. Current investigation on turning process is a response surface methodology applied on the most effective process parameters that is speed, feed, and depth of cut while machining aluminium alloy and resin as the two types of work pieces with HSS (High Speed Steel) cutting tool.

A.V.N.L. Sharma et al(2013)[3] Have investigated the use of taguchi parameter design and regression analysis to predict and optimize the surface roughness and material removal rate in turning operations using chemical vapour deposition(CVD) cutting tool. While taking input parameters of cutting speed, feed rate and depth of cut etc. ,where EN553 was taken as work piece material.

M.Kaladhar et al (2011)[4] Have investigated the use of traditional taguchi method to optimize the surface roughness and MRR in turning operations of AISI 202 austenitic stainless steel while consideration of speed, feed, depth of cut and nose radius as input parameters. In current investigation it is concluded that, combination of higher levels of cutting speed, depth of cut and nose radius and lower level of feed is essential to achieve simultaneous maximization of material removal rate and minimization of surface roughness.

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ANALYSIS AND OPTIMIZATION OF GRAVITY ROLLER CONVEYOR USING ANSYS

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Department of Mechanical Engineering, Dhole Patil college of Engineering, Wagholi, Pune, India.

ABSTRACT

The main objective of this study is to explore the analysis of Gravity roller conveyor. This has entailed performing a detailed Study of existing Gravity Roller Conveyor system and optimize the critical part like roller, C-channel etc. by using composite material, so to minimize the overall weight of the assembly without hampering its structural strength. A proper Finite Element Model is developed using Cad software Pro/E Wildfire 5. Results of Static, Modal and Transient analysis of existing design and optimized design are compared. The material used for roller and C-channel frame is a composite material i.e. carbon fiber.

KEYWORDS: structural strength, material handling systems, optimized design, weight reduction, composite material, FEA.

INTRODUCTION

A conveyor system is a common piece of mechanical handling equipment that moves materials from one location to another. Conveyor systems are commonly used in many industries, including the automotive, agricultural, computer, electronic, food processing, aerospace, pharmaceutical, chemical, bottling and canning, print finishing and packaging. Although a wide variety of materials can be conveyed, some of the most common include food items such as beans and nuts, bottles and cans, automotive components, scrap metal, pills and powders, wood and furniture and grain and animal feed. Many factors are important in the accurate selection of a conveyor system. It is important to know how the conveyor system will be used beforehand. Some individual areas that are helpful to consider are the required conveyor operations, such as transportation, accumulation and sorting, the material sizes, weights and shapes and where the loading and pickup points need to be[3].

Types of conveyor

Conveyor

Powered operated operated conveyors — Non Powered conveyor

-Powered Belt Conveyor systems — - Gravity
-Pneumatic conveyor systems
Conveyor systems
- Vibrating conveyor systems
- Live Roller Conveyor systems

Gravity roller conveyor system

Gravity conveyor provides one of the most versatile & economical means of moving product gravity conveyor can quickly move large quantities of items in virtually any direction with a minimum of effort & expense. Fig. 1 shows the application of gravity roller conveyor.

Gravity conveyor move the product in two ways :

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Experimental Investigation of the Damping Behavior of the Particle Damping in the Transient Vibrations

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Abstract
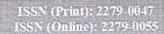
Particle damping is a non linear type of damping in which energy of the vibratory system is dissipated by the impact and the frictional losses made by the particles used for the damping purposes. The particle damping technique is useful over other types of damping as it is temperature independent. So it is reliable over wide temperature range and hence is essentially used in the cryogenic and the gas turbine related applications. For experimentation, cantilever beam with particle enclosure attached to its free end has been extensively used and the effect of the particle material, particle size, mass ratio and enclosure height on the damping performance has been studied [1]. For a small weight penalty, rather large amounts of damping can be achieved [2].

Keywords

Cantilever   FFT analyzer   Mass ratio   Logarithmic decrement

Abbreviations

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International Journal of Emerging Technologies in Computational and Applied Sciences (IJETCAS)

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Characterization of Compressive Strength of Epoxy Basalt

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Abstract: *Composite materials are emerging as an alternative material to the machine tool structure. This work presents the study of compressive strength of composite material epoxy basalt. The epoxy content in the mixture is varied between 10 to 20% in weight. A combination with 15% epoxy resin and 85% aggregates of basalt by weight has given the compressive strength of 108.65 Mpa.*
Keywords: *composite, epoxy basalt, strength.*

I. Introduction

The machine tool structure plays a vital role in accuracy and surface finish of parts produced on it. The vibration encountered during cutting process, get transferred into machine tool stru cture. The conventional material used for manufacturing of it as cast iron, steel possesses some limitation as long manufacturing lead time, low damping, tendency of rusting, high cost etc. so to overcome on these it is necessary to develop alternative material for machine tool structure [1].

II. Literature survey

A. Selvakumar, et.al [1] studied the mechanical characteristics of an epoxy granite beam against cast iron (C.I.) and steel with respect to the constant stiffness and observed that for same stiffness the epoxy granite offers considerable weight reduction along with high damping characteristics. K. Roysarkar, et.al [2] gives the processing study of the epoxy concrete. The ultimate compressive strength of epoxy concrete were determined and its value was 91.900 N/mm^2. For experimentation factorial design were used. S. Subrahmanyaswamy, et.al [3] worked on a role of factors that affect the compression strength of epoxy granite. They have observed that 50% coarse composition has given compressive strength of 120 Mpa, modulus of 30 Gpa and damping eight time higher than that of a cast iron. S. Subrahmanyaswamy, et.al [4] studied the effect of resin content on a vibration characteristics of a granite epoxy composite and found that specimen with 12.5% resin content has excellent damping characteristics. A. Filho, et.al [5] gives the processing study of a polymer matrix composite made from polymeric epoxy matrix and particulate granite. The resin percentages used were 15% and.20 % by weight and experiments were planed according to factorial design technique with a two variables at a two levels. Maximum compressive strength obtained was 114.23Mpa at a 20 % of epoxy.

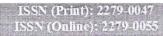T. Erbe, et.al [6] gives the design guideline for mineral cast, the purpose of additives in resin, and the use of shaker plate. The comparison of properties of mineral cast and cast iron were given and recommended mineral cast as a base frame material for precision machine with a precision accuracy of $\geq$ 10μ. H. Kim, et.al [7] investigated the optimal composition of resin concrete for ultra precision machine tool bed. 50% weight fraction of a pebble 42.5%, weight fraction of sand & 7.5% weight fraction of a resin were recommended for ultra precision machine tool bed. D. Ubale, et.al [8] carried out experimental investigation of compressive strength, flexural strength, and modulus of elasticity and damping of epoxy granite. The maximum value of a compressive strength and flexural strength obtained was 92 Mpa and 27 Mpa respectively the average damping of an epoxy granite obtained was approximately two times greater than that of cast iron. P. Mckeown et.al [9] has given the properties and relative merits of more common structural materials as cast iron, steel, granite, hydraulic concrete, epoxy concrete and describes in more details the epoxy granite. A. filho, et.al [10] presented the study of damping behavior of epoxy granite material by adopting logarithmic decrement method and obtained results showed that 80% of granite and 20 % of epoxy by weight gives damping properties approximately 3 times greater than that of a cast iron. A. Selvakumar, et.al [11] studied thermal properties of epoxy granite with varying value fraction of epoxy content in range of 10-22% and found that effective thermal conductivity decreases with increase in epoxy resin content. A. Selvakumar, et.al [12] studied the mechanical characteristics of mineral cast material with varying epoxy content between 10 to 18 % and it was found that the combination of 12% epoxy resin and 88% aggregate material produces favorable mechanical properties at an optimum cost.

Literature revealed that the primary requirement of epoxy basalt composite for machine tool structural application is satisfactory compression strength in its hardened state. Many of the desirable properties like durability, impermeability, abrasion resistant, young's modulus and resistance to creep are highly influenced by magnitude

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Optimization of Power Consumption for CNC Turning Of AISI 1040 Steel Using Taguchi Approach

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ABSTRACT: This study investigated the parameter optimization of CNC turning operation for AISI 1040 steel based on Taguchi approach. AISI 1040 steel has wide application in manufacturing sector. Cutting speed (m/min), feed (mm/rev), depth of cut (mm), nose radius (mm) and cutting fluid concentration (%) are optimized for power consumption as performance characteristic. L_{27} Orthogonal Array was used and analysis of variance (ANOVA) is also applied to identify most significant factor. Optimal parametric combination 200m/min-0.15mm/rev-0.5mm-0.4-9%was obtained and validated. It has been observe that cutting speed has most significant factor followed by depth of cut and cutting fluid concentration on Power consumption. Power consumption decreases with decrease in cutting speed (350 to 200 m/min) and depth of cut (1.3 to 0.5mm) while increase in cutting fluid concentration (3 to 9%).

KEYWORDS: Power consumption, cutting fluid concentration, ANOVA.

I. INTRODUCTION

Turning is one of the most common methods for cutting and especially for the finishing of components. The goal of the modern industries is to manufacture low cost, high quality products in short time. In turning, to achieve high cutting performance, selection of optimum parameters is very essential[1].It has long been recognized that cutting conditions such as feed rate, cutting speed and depth of cut in machining operation should be selected to optimize the economics of machining operations as assessed by productivity, total manufacturing cost per component or some other suitable criteria. Because of the high cost of numerically controlled machine tools compared to their conventional counterparts, there is an economic need to operate these machines as efficiently as possible in order to obtain the required payback [2].In machining processes, saving money and improving sustainability performance can be achieved by reducing power consumption because power is an essential resource for production. The strategies to reduce power consumption are obtaining emphasis due to the constant increase in electricity prices, and concern of manufacturing companies and clients about the environmental impact that results from activities related to the production of goods. Computerized Numerical Control (CNC) machine tools, including those that perform turning operations, contribute significantly to the power consumption in the manufacturing sector [3]. Of the many goals focused in a manufacturing industry, power consumption plays a vital and dual role. One, it cuts down the cost per product and secondly the environmental impact by reducing the amount of carbon emissions that are created in using the electrical energy [4]. In order to minimize such machining problems, scientific methods based on Taguchi design of experiments were used. The experimentation for this work was based on Taguchi's design of experiments (DOE) and orthogonal array. A large number of experiments have to be carried out when the number of the process parameters increases. To solve this task, the

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Study of Adiabatic Capillary Tube in Carbon Dioxide Refrigeration System

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Abstract- **A review of the literature on the flow of various refrigerants like R134a, R22, R410a, and CO_2 through the straight adiabatic capillary tubes has been discussed in this paper. Since CO_2 is natural and environment friendly study has concentrated on this refrigerant. The paper presents the correlation among thermodynamic properties of CO_2 refrigerant and geometric properties (length and diameter) of adiabatic Capillary tube. The paper provides information about the selection of capillary tube for optimum performance of CO_2 refrigerant**

Keywords – Capillary tube; Transcritical CO_2; Adiabatic; Correlation

I. INTRODUCTION

Environmental control is one of the major requirements of a healthy and non-pollutant living condition. Hence the sagacious strategy would be to use advanced technologies that are eco-friendly. Refrigeration, heat pump and air conditioning systems play an important role in modern civilization. Over the last few decades, refrigeration, air conditioning and heat pump industries have seen major changes caused by restrictions on specific refrigerant use due to their detrimental effects on our climate. Two successive international agreements; Montreal Protocol and Kyoto Protocol were introduced to combat the twin menace of ozone layer depletion and global warming. The Montreal Protocol (MP) on substances that deplete the ozone layer was adopted in September 1987 to phase-out the use of Ozone Depleting Substances (ODSs) within a fixed time period[1-3]. Ozone depleting Potential (ODP), a comparative measuring index, is fraction of the ozone depleting potency of a substance compared to that of R11 or R12. The Kyoto Protocol (KP) was adopted at the third conference of the parties to the United Nations Framework Convention on Climate Change (UNFCCC) in December 1997, which has imposed restrictions on refrigerants on the basis of GWP. Global warming Potential (GWP) is an index that relates the potency of greenhouse gas to the CO_2emission over a 100-year period. The CFC refrigerants, although once considered to be the best refrigerants, were abandoned due to high ODP. The chlorine free synthetic refrigerants based on HFCs, which were taken as a permanent replacement of CFCs, are also in the list of regulated substances due to their considerably high GWP.In such context the carbon dioxide was revived as a natural refrigerant since it is the environmentally benign nature and largely beneficial heat transfer and safety characteristics compared to currently used refrigerants. Flow inside the capillary tube of a refrigeration system is complex in nature. Numerous combinations of bore and length can be provided to obtain the desired flow restriction. Tube geometry (diameter and length) at a given operating condition is the main concern in the design of a capillary tube. In redesigning the system using alternative refrigerants, therefore, it is vital and critical to select a capillary tube which is compatible with the system components. In a transcritical CO_2 refrigeration cycle where pressure and temperature are two independent parameters unlike the conventional subcritical cycle, the flow factor of the expansion valve determines the gas cooler pressure, which is no longer related to the temperature of the heat transfer process[4]. Therefore, it is desirable to investigate the flow characteristics in the capillary tube for carbon dioxide refrigerant, where the flow is transcritical in nature.

A significant volume of work has been carried out by several researchers on flow Characterization of adiabatic capillary tube with halocarbon and hydrocarbon refrigerants.

Bansal and Rupasinghe(1998)[5]	Developed a homogeneous two -phase flow model to study the Performance of adiabatic capillary tubes for HFC- 134a[5]

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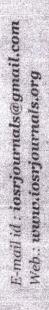
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NDL India:A useful e-resource for academic libraries

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Satara, Maharashtra

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Abstract:-

The 21st century has introduced so many new trends in the technology which results in new scenario of today's libraries. It is now mandatory to keep e-collectionin the library for various accreditations such as NAAC, DTE, NBA &AICTE.Also itis the demand of technosaavy users'. By subscribing different e-resources library professional can solve the problems of less space, limitedbudget, security of materials and various demands of users. This paper focuses on the definition of NDL India, itscontent, membership & advantages of NDL INDIA.

Keywords:-NDL, IIT Kharagpur, NPTEL, NCERT, Krishikosh, LibriVox, Shodhganga, Shodhgangotri, N-List, world e-book library.

What is NDL India:-
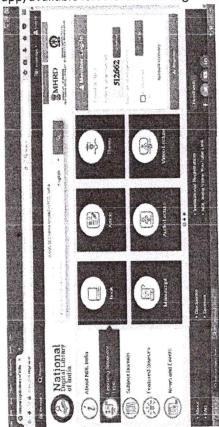
The **National Digital library of India (NDL):**MHRD, under its NMEICT project, has assigned IIT Kharagpur to host, coordinate and set-up National Digital Library (NDL) towards building a national asset. The Library was launched in pilot form in May 2016. As of 2017, NDL hosts 7,203,195 items in its repository.The objective of this project is to integrate all the existing digitized and digital contents across educational institutions of the nation to provide a single-window access with e-learning facility to different groups of users ranging from primary level to higher education level of our county. NDL will harvest metadata and contents from all the Institutional Digital Repositories (IDR) of Universities and Institutions, all other digital library initiatives, & NMEICT projects and index in the National Digital Library Server so that all the e-contents can be searched and accessed in the full-text by the users through a single window.

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A Feminine Reality & Sylvia Pla[...]

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Abstract :

The paper depicts a feminine rea[...] through the analysis of the poem 'Daddy'. Sy[...] Plath plays the part of masculine in the soc[...] in many of her works. This paper explores [...] literary life and thought of Sylvia Plath towards [...] dominating society. The paper describes her sta[...] mind with the help of her work "Daddy".

Keywords : Feminine, Mannersism, Sylvia Pl[...] Psychic reality, injustices, etc.

Meaning of Feminine:

"Having qualities or an appeara[...] traditionally associated with women espec[...] delicacy and prettiness"- To make out the t[...] 'Feminine', we need to understand w[...] femininity is. It embodies a constellatio[...] meanings, it generally refers to the attrib[...] behaviours, interests, mannerism, appeara[...] roles and expectations that we have com[...] associate with being female during [...] socialization processes.

Introduction :-

In this paper, the poem Dadd[...] analysed as a feminine reality of a poet. Sy[...] Plath's short but talented life of 30 years (1[...] 1963) covers a very crucial time in [...] development of American poetry. "Daddy",[...] poem which was composed by Plath in Oct[...] 1962. During the last phase she had bec[...] disillusion with love and Ted Hughes. By [...] time Ted Hughes has separated himself f[...] Sylvia Plath. After their marriage in 1965, [...] Hughes & Plath lived in America for someti[...] They stayed for two years up to 1959. Late[...]

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Theme : Design Thinking in Library

Social Media : A Useful Marketing Tool for Libraries

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ABSTRACT :

The 21ˢᵗ century has introduced so many new trends in the technology which results in new scenario of today's libraries. Library services need to improve, modernize its services to cope up with the needs of the users. Also it is the demand of technosaavy users'. The social media applications such as, Facebook, WhatsApp, Twitter, LinkedIn, Wikis, blogs, RSS Feeds, YouTube & Teacher Tube can be widely used in libraries due to its vast popularity in users. It is essential to libraries to promote its product using social media. Social sites are the popular ways to share information and knowledge .It enables the library professionals to share videos, audio files, texts and images amongst its users. This paper deals with what is social media, its features, the different marketing techniques used in the academic libraries using social media.

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Keywords : Social Media, Facebook, WhatsApp, Twitter, LinkedIn, Wikis, Blogs, YouTube

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What is Social Media?

1. Social media are computer-mediated technologies that facilitate the creation and sharing of information, ideas, career interests and other forms of expression via virtual communities and networks. Users typically access social media services via web-based technologies on desktop computers, laptops, or download services that offer social media functionality to their mobile devices (e.g., smartphones and tablet computers). The variety of stand-alone and built-in social media services currently available introduces challenges of definition; however, there are some common features:

    1. Social media are interactive Web 2.0 Internet-based applications.

    2. User-generated content, such as text posts or comments, digital photos or videos, and data generated through all online interactions, are the lifeblood of social media.

    3. Users create service-specific profiles for the website or app that are designed and maintained by the social media organization.

    4. Social media facilitate the development of online social networks by connecting a user's profile with those of other individuals or groups.

2. According to Computing Dictionary (2011), "Social networking site as any website designed to allow multiple users to publish content of them. The information may be on any subject and may be for consumption by friends, mates, employers, employees just to mention a few".

3. Powell (2009) defines "Social networking as a community in which individuals are somehow connected through friendship, values, working relationships, idea and so on".

Why Social Media implementation in libraries?

1. **Marketing of Library services:** It is very much essential to market one's product in this modern era to reach your customers. Libraries provide information & investing more amounts. As, 'Information is commodity& it can be sold', Library professional should make a good plan for the marketing of their services to draw attention of library users as the users are getting their information on one click. They carry the library in their mobile.

2. **Drastic change in library scenario**: The 21st century has introduced so many new trends in the technology which results in new scenario of today's libraries. It is now essential to provide & to market library services/products using social media. It is one of the nice opportunities to show library professionals that how effectively they will market their services using social media.

   Social media is very rapidly becoming regular part of day today life. Almost all the youngsters are active on the social media. So, it is necessary & easy to deliver library services through Social Media e.g.. reference service, referral service, e-books, e-journals, previous year's question papers, different library circulars regarding students, different links of the websites which are useful for students, lecture notes, videos can be share through social media.

Uses of Social Media for the libraries?

Library professionals can deliver following library services through social networking sites.

1. Library notices and quick updates can be sent through WhatsApp & mail.

2. New arrivals list, images of the books can be shared through WhatsApp and Facebook.

3. Videos of different activities organized by the different departments, guest lectures can be share through Facebook, YouTube & WhatsApp.

4. Social Networking sites can be used to promote events organized by the library as well by the other departments of the Institute.

5. Discussion groups /forums can be formed for the scholarly discussion regarding the research amongst the researchers.

6. Libraries can provide reference services, referral services, CAS & SDI by using social networking tools.

7. Pdf files of question papers of various subjects & different links useful for the users can be displayed on the Facebook & on the website of the library.

8. Ask a Librarian and Twitter can be used to ask queries of the users.

9. Social Networking sites can be used for giving complaints, suggestions, enquiries, feedback.

Let us see how social media can be implemented in libraries effectively.

1. **WhatsApp:-**Librarian can make different WhatsApp groups of faculties & students according to their classes & departments & circulate the library related information among the groups.

2. **Facebook:-**By creating facebook page of the college library, librarian can disseminate the current & update notices, videos, photos of the different activities conducted by the college & different departments.

3. **Blogs:-**Librarian can create blogs for the healthy discussion of various topics such as current issues can be discussed which will be helpful for the students who are preparing for the competitive examination.

4. **Youtube**: - YouTube can be very effectively used to share the different videos of the lectures taken by the faculties, guest lecturers which will be results in easy understanding of the topic.

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5. **Wikis:** It is a free online encyclopedia that gives a background knowledge and definition of concepts. It offers a platform for users to access, edit and contribute to content. This is a collaborative web page for developing web content. You can use this tool to share your knowledge by editing. You can also host your library websites on wiki software like PB Wiki.

6. **Teacher Tube:** Teacher Tube, which is a YouTube for teachers, presents an excellent opportunity for instructor-librarian collaboration. Instructors can guide students to helpful library resources, and vice versa.

7. **Twitter:** Librarian can keep the faculties, staff & students updated on daily activities / issues like frequently updated collections, new arrival, and current content services of library.

Users can send Instant Messages like feedback, complaints or ask questions on a particular issue.

Advantages of using Social Media :

1. Quick & fast delivery of the information.

2. It is the cheapest way to market the library products & services & draw attention of the users towards library.

3. Social networking sites are globally accessed hence libraries can get closer to the users.

4. Quick responses /actions from the users can be done. Thus active participation of the users can be done which helps in to develop library services.

5. Knowledge sharing can be done effectively through social media.

6. Social Media promotes effective distance learning.

7. Implementation of social networking tools in library fulfils all the five laws of library and information science.

Disadvantages of using Social media :

1. Lack of awareness of using social media.

2. There are so many social media sites available hence all are not acquainted with all the sites.

3. Main issue is privacy of the users is not maintained.

4. Electricity failure & low internet speed are the main barriers in the communication.

5. Less library staff & less training offered to them.

6. Lack of interest of library professionals.

7. Insufficient library funds.

Conclusion :

The changing technology, explosion of information and the changed face of academic libraries from print to electronic have influenced the user behavior. New technology is really helpful for library professionals. In this electronic era social networking sites play an important role to meet the user's requirement within a stipulated time and to provide innovative services to user's doorstep. Social media is boon to the library professionals when it will be implemented wisely otherwise it will be curse also as there are some disadvantages of it. Now its library professionals' turn to use the technology effectively and market the library services to reach to the doorstep of the users.

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Study & Performance of Coated Cutting Tool

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Abstract: The use of coated cutting tools in the machining of various materials now represents state of the art technology. Developments in coating equipment and processes now enable us to produce a wide range of different hard nitride, carbide and oxide films and to deposit them on various tool substrates as monolayer, multilayer, or composite coatings. A total coating thickness between 3-10 µm is generally appropriate. The challenge of modern machining industries is mainly focused on the achievement of high quality, in terms of work piece dimensional accuracy, surface finish, high production rate, less wear on the cutting tools, economy of machining in terms of cost saving and increase the performance of the product with reduced environmental impact. This paper reports a case study on the AISI 4340 alloy steel cylindrical work pieces of 50 mm diameter hardened steel of 45HRC with coated tungsten carbide tool and gives the detail about the performance of coated cutting tool and their parameters at different cutting conditions.

Keywords: Coatings; Cutting tools; Tool wear; Cutting parameters; Wear resistance.
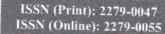
I. Introduction

Cutting tools are subjected to high stresses in modern machining practice like dry, high-speed or high-performance machining. The development of new processes demands adapted cutting tools. An ideal cutting material combines high hardness with good toughness and chemical stability. In particular, hardness and toughness represent opposing properties and there is no single cutting material, which achieves all three conditions simultaneously. In order to merge the mentioned characteristics, wear resistant coatings with tough substrate materials are combined. The research of a correlation between the results of the most common laboratory tests and the cutting performances of the coatings is of great interest not only for the cutting tool makers, but also for the end users, since this could lead to the formulation of a test protocol to forecast cutting tool life. Furthermore, in the case of the nanocomposite coatings, for which the cutting tests can be very expensive due to their high cutting life, a set of laboratory tests can be cheaper than an extensive experimental plan of cutting tests. Surface engineering recently became a major way to improve cutting tools wear resistance and productivity. There are several ways of cutting tool surface engineering evolution. First one (and most commonly used) is a development of advanced PVD coating compositions. But application of an advanced coating for HSS tools cannot guarantee the optimal result without the special substrate surface treatment prior to the hard coating deposition [1] [2].

II. Theory of Metal Cutting

Metal cutting process forms the basis of the engineering industry and is involved either directly or indirectly in the manufacture of nearly every product of our modern civilization. The cutting tool is one of the important elements in realizing the full potential out of any metal cutting operation. Over the years the demands of economic competition have motivated a lot of research in the field of metal cutting leading to the evolution of new tool materials of remarkable performance and vast potential for an impressive increase in productivity. As manufacturers continually seek and apply new materials for products that are lighter and stronger and therefore more efficient employing that cutting tools must be so developed that can machine new materials at the highest possible productivity. The main properties which any cutting material must possess in order to carry out its function are: Hardness, Hot strength, sufficient toughness etc. In general, increasing hardness brings with it a reduction in toughness and so those materials in the higher hardness region of the list will fail by breakage if used for heavy cuts, particularly with work pieces which have holes or slots in them which give rise to interruption in the cut [3].

III. Tool Wear

Cutting tools are mostly assessed in terms of wear studies during and after the manufacturing processes. The prediction and control of wear is one of the most essential problems emerging in the design of cutting operations. A useful definition for a worn out tool is: "A tool is considered to be worn out when the replacement cost is less than the cost for not replacing the tool". Tool failure is said to occur when the tool no longer performs the desired function whereas total failure (ultimate failure) is defined as the complete removal of the cutting edge, a condition

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Smart Materials & its Applications

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Abstract: Application of smart materials in various industries offer new opportunities for safety enhancement, life-cycle cost reduction, and performance improvement. Smart materials have been around for many years and they have found a large number of applications. The use of the terms 'smart' and 'intelligent' to describe materials and systems came from the US and started in the 1980's despite the fact that some of these so-called smart materials had been around for decades. Many of the smart materials were developed by government agencies working on aerospace and military projects but in recent years their use has transferred into the civil sector for applications in the construction, transport, medical, domestic areas, manufacturing. There are many groups of smart materials, each exhibiting particular properties which can be controlled in a variety of high-tech and everyday applications. This paper provides an overview of present smart materials and describes the different types of smart materials in terms of how they work, what types of materials are used and where they are used.

Keywords: life-cycle cost reduction, intelligent, high-tech

I. Introduction

Smart materials are materials that have one or more properties that can be significantly changed in a controlled fashion by external stimuli, such as stress, temperature, moisture, pH, electric or magnetic fields. For example, photochromic materials that change colour in response to light; shape memory alloys and polymers which change/recover their shape in response to heat and electro magneto-rheological fluids that change viscosity in response to electric or magnetic stimuli. Smart Materials can be used directly to make smart systems or structures or embedded in structures whose inherent properties can be changed to meet high value-added performance needs. Smart Materials technology is relatively new to the economy and has a strong innovative content. In construction, smart materials and systems could be used in 'smart' buildings, for environmental control, security and structural health monitoring e.g. strain measurement in bridges using embedded fibre optic sensors. Magneto-rheological fluids have been used to damp cable-stayed bridges and reduce the effects of earthquakes. In aerospace, smart materials could find applications in 'smart wings', health and usage monitoring systems (HUMS), and active vibration control in helicopter blades. In marine and rail transport, possibilities include strain monitoring using embedded fibre optic sensors. Smart material can exist in two phases at different temperatures: Austenite, which exists in high temperature, and Martensite, which exists in low temperature. When the external temperature or stress condition changes, these two phases will transform to the other phase, depending on what change appears. Smart material exhibits many special properties during the transformations between these two phases, such as shape memory effect, super elasticity effect, and two-way memory effect, etc.

With the development of material science, many new, high-quality and cost-efficient materials have come into use in various field of engineering. In the last ten decades, the materials became multifunctional and required the optimization of different characterization and properties. With the last evolution, the concept has been driving towards composite materials and recently, the next evolutionary step is being contemplated with the concept of smart materials. Smart materials are new generation materials surpassing the conventional structural and functional materials. These materials possess adaptive capabilities to external stimuli, such as loads or environment, with inherent intelligence. (Rogers, 1988; Rogers et al., 1988) defined smart materials as materials, which possess the ability to change their physical properties in a specific manner in response to specific stimulus input. The stimuli could be pressure, temperature, electric and magnetic fields, chemicals, hydrostatic pressure or nuclear radiation. The associated changeable physical properties could be shape, stiffness, viscosity or damping. Takagi (1990) explained it as intelligent materials that respond to environmental changes at the most optimum conditions and reveal their own functions according to the environment. Smartness describes self-adaptability, self-sensing, memory and multiple functionalities of the materials or structures. These characteristics provide numerous possible applications for these materials and structures in aerospace, manufacturing, civil infrastructure systems, biomechanics and environment. Self-adaptation characteristics of smart structures are a great benefit that utilizes the embedded adaptation of smart materials like shape memory alloys. By changing their properties, smart materials can detect faults and cracks and therefore are useful as a diagnostic tool. [1] This characteristic

"Study on process parameters for CNC turning using Taguchi Methods for EN24 alloy steel with Coated/Uncoated tool inserts"

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Abstract: The tool inserts, coated/uncoated offers a certain degree of control on the desired rate of material removal or the surface roughness to an extent. This work will helps to compare the results in terms of effectiveness of the performance of coated and uncoated tool inserts by varying process parameters at dry cutting condition. Levels shall be manipulated over the given range of operation while results would be recorded for analysis further. ANOVA & Taguchi methods are being considered to address the statistical treatment to the data. Significant input parameters shall be identified through the analysis of this data and the Design of experiments shall be performed to seek solution towards finding an optimal setting for the operation. The result shall be validated for a single optimal setting recommended towards the concluding phase of this work.

Keywords: Turning, Taguchi methods, ANOVA, coated/uncoated inserts, surface roughness

I. Introduction

Nowadays, Machining industries continuously demanding for higher production rate and improved machinability as quality and productivity play significant role in today's manufacturing market. The extent of quality of the procured item (or product) influences the degree of satisfaction of the consumers during the usage of the procured goods. Higher production rate can be achieved at high cutting speed, feed, depth of cut which is limited by tool wear, capability of tooling, surface finish and accuracy required selection of cutting parameters is generally a compromise between several variables and it can be easily possible to determine by using Response surface methodology. CNC machines are commonly used in industry. The operation of this machine is expensive because it has many parameters to consider. Optimization of cutting parameters is usually a difficult work where the following aspects are required: knowledge of machining; empirical equations relating the forces, power, surface finish, and dimensional accuracy etc. It has been long recognized that conditions during cutting, such as feed rate, cutting speed and depth of cut.

Trends in manufacturing industry have drive trends in metal cutting inserts developments. Changes in cutting parameters catalyze parallel advances in metal cutting tooling technology. Coated tools have found widespread use in today's metal cutting industry, bringing about significant improvements in tool performance and cutting economy through lower tool wear reduced cutting forces and better surface finish of the work piece. Coated and uncoated tools are widely used in the metal-working industry and provide the best alternative for most turning operations.

Figure.1 Uncoated and Coated tool inserts

Figure 2 Insert holder tools

A Review on Analysis and Optimization of Parameters for Spheroidal Graphite (SG) Iron Casting

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Abstract— The quality of SG Iron casting is fully depends on its parameters like melting of base iron, nodulisation treatment, inoculation process as well as pouring practices etc. The quality of casting checked with hardness, elongation & tensile strength also microstructure analysis. Microstructure analysis is a process to be carried out on ready castings. The main purpose of this paper is to present literature survey regarding measuring parameters of SG Iron casting process including image processing methodology for microstructure analysis of Spheroidal Graphite Iron (SGI) castings to determine the quality assessment parameters of SGI casting such as nodularity, nodule count, nodule size and percent of ferrite-pearlite. The strength and hardness of the SGI castings is dependent on these quality parameters.

Key words: Spheroidal Graphite, Iron Casting

I. INTRODUCTION

Production of SG iron involves firstly melting of base iron of right chemical composition and of right physical condition followed by treatment with either pure magnesium or an alloy containing magnesium with or without cerium, so as to leave a residual magnesium content of 0.03 to 0.05 percent in the treated iron. Magnesium is essentially a desulphuriser and its addition to the base iron first reduces the sulphur content to a very low level and then results in the formation of graphite in a spheroidal form instead of the flake form present in the normal grey iron. The magnesium treatment is invariably followed by the late addition of ferro-silicon as inoculation treatment in order to ensure good ductility in the SG iron produced. Simultaneous addition of spheroidizing and inoculating agents is also sometimes practised.

Nodulisation – Nodulisation is a process for converting flex to nodules of graphite present in metal. For this Nodulisation process treatment of FeSiMg (Ferro Silicon Magnesium) is done in the ladle at time of tapping & pouring.

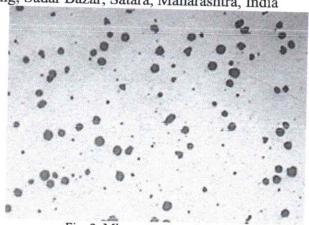Fig. 1: Microstructure of Cast Iron

Fig. 2: Microstructure of SG Iron

A. Inoculation

Inoculation is the means of controlling structures and properties of cast iron by minimizing undercooling and increasing the number of nucleation sites during solidification. Inoculation changes the structure of cast iron by altering the solidification process. The first metal to solidify in hypoeutectic grey iron is primary austenite. As cooling continues, the remaining iron grows richer in dissolved carbon. Eventually, the liquid reaches the eutectic composition of 4.3% carbon equivalent, at which final or eutectic solidification would start under equilibrium conditions Inoculation is the means of controlling structures and properties of cast iron by minimizing undercooling and increasing the number of nucleation sites during solidification. Inoculation changes the structure of cast iron by altering the solidification process. The first metal to solidify in hypoeutectic grey iron is primary austenite. As cooling continues, the remaining iron grows richer in dissolved carbon. Eventually, the liquid reaches the eutectic composition of 4.3% carbon equivalent, at which final or eutectic solidification would start under equilibrium conditions

II. LITERATURE REVIEW

A. Miss. ShilpaGodbole, Dr. (Mrs).V. Jayashree [1]

The microstructure analysis is a process to be carried out on ready castings. The main purpose of this paper is topresent image processing methodology for microstructure analysis of Spheroidal Graphite Iron (SGI) castings to determine the quality assessment parameters of SGI casting such as nodularity, nodule count, nodule size and percent of ferrite-pearlite. The strength and hardness of the SGI castings is dependent on these quality parameters. Sample images of SGI casting obtained from inverted microscope were subjected to segmentation and boundary detection algorithm to find the nodules present.

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Study and Observation of Process Parameters for Spheroidal Graphite (SG) Iron Casting

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Abstract

The quality of SG Iron casting is mostly depends on its process parameters like melting of base iron, nodulisation treatment, inoculation process as well as pouring practices etc. The quality of casting checked with hardness, elongation & tensile strength also microstructure analysis. Microstructure analysis is a process to be carried out on ready castings. The main purpose of this paper is to present literature survey regarding measuring parameters of SG Iron casting process including inoculation percentage, FeSiMg percentage with constant chemical composition range. Observe image processing methodology for microstructure analysis of Spheroidal Graphite Iron (SGI) castings to determine the quality assessment parameters of SGI casting such as nodularity, nodule count, nodule size and percent of ferrite-pearlite. The strength and hardness of the SGI castings is dependent on these quality parameters.

Keywords: SG Iron casting process parameters, Percentage of FeSiMg, Percentage of Inoculant, Chemical composition, Mechanical properties, Microstructure

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I. INTRODUCTION

Production of SG iron involves firstly melting of base iron of right chemical composition and of right physical condition followed by treatment with either pure magnesium or an alloy containing magnesium with or without cerium, so as to leave a residual magnesium content of 0.03 to 0.05 percent in the treated iron. Magnesium is essentially a desulphuriser and its addition to the base iron first reduces the sulphur content to a very low level and then results in the formation of graphite in a spheroidal form instead of the flake form present in the normal grey iron. The magnesium treatment is invariably followed by the late addition of ferro-silicon as inoculation treatment in order to ensure good ductility in the SG iron produced. Simultaneous addition of spheroidizing and inoculating agents is also sometimes practised. [1]

A. SG Iron Mostly Depends On Following Processes:

1) Nodulisation

Nodulisation is a process for converting flex to nodules of graphite present in metal. For this Nodulisation process treatment of FeSiMg (Ferro Silicon Magnesium) is done in the ladle at time of tapping & pouring.

2) Inoculation

Inoculation is the means of controlling structures and properties of cast iron by minimizing undercooling and increasing the number of nucleation sites during solidification. Inoculation changes the structure of cast iron by altering the solidification process. The first metal to solidify in hypoeutectic grey iron is primary austenite. As cooling continues, the remaining iron grows richer in dissolved carbon. Eventually, the liquid reaches the eutectic composition of 4.3% carbon equivalent, at which final or eutectic solidification would start under equilibrium conditions Inoculation is the means of controlling structures and properties of cast iron by minimizing undercooling and increasing the number of nucleation sites during solidification. Inoculation changes the structure of cast iron by altering the solidification process. The first metal to solidify in hypoeutectic grey iron is primary austenite. As cooling continues, the remaining iron grows richer in dissolved carbon. Eventually, the liquid reaches the eutectic composition of 4.3% carbon equivalent, at which final or eutectic solidification would start under equilibrium conditions. [1]

Optimization of Process Parameters for CNC Turning using Taguchi Methods for EN24 Alloy Steel with Coated/Uncoated Tool Inserts

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Abstract—*Coated and uncoated tool inserts offers certain degrees of control on the desired rate of tool wear and surface roughness to an extent. This work pursues the quest for realizing the optimal values for the significant process parameters that bears an influence on the response parameters. Experiments were conducted on the samples of EN 24 alloy steel material with the help of PVD coated TiAIN insert and uncoated carbide insert. The experimental runs carried out with proper variation in the levels. Levels are selected with the help of manufacturing catalogue and by pilot experimentation and results are recorded for further analysis. For this study, 9 runs designed using L9 orthogonal array of Taguchi Design of Experiment. Surface roughness was measured using a Mitutoyo surface tester at test lab and material removal rate is calculated by mathematical equation. The data was compiled into Minitab 17 software for analysis. The relationship between the machining parameters and the response variables were analyzed using the Taguchi Method. Optimization of process parameters is carried out by Grey Relational Analysis method (GRA). GRA method is a powerful and most versatile tool which can manipulate the input data as per requirement and comes with results that can be used to have best multi-objective in respective concerns.*
Keywords—*Coated and uncoated tool inserts, Surface roughness, Material removal rate, ANOVA, Grey relational analysis.*

I. INTRODUCTION

Machining industries continuously demanding for higher production rate and improved machinability as quality, and productivity play significant role in today's manufacturing market. The extent of quality of the procured item (or product) influences the degree of satisfaction of the consumers during the usage of the procured goods. Higher production rate can be achieved at high cutting speed, feed, depth of cut which is limited by tool wear, capability of tooling, surface finish and accuracy required selection of cutting parameters is generally a compromise between several variables and it can be easily possible to determine by using Response Surface Methodology [18].

CNC machines are commonly used in industry. The operation of this machine is expensive because it has many parameters to consider. Optimization of cutting parameters is usually a difficult work where the following aspects are required: knowledge of machining; empirical equations relating the forces, power, surface finish and dimensional accuracy etc. Trends in manufacturing industry have drive trends in metal cutting inserts developments. Changes in cutting parameters catalyze parallel advances in metal cutting tooling technology. Coated tools have found widespread use in today's metal cutting industry, bringing about significant improvements in tool performance and cutting economy through lower tool wear reduced cutting forces and better surface finish of the work piece. Coated and uncoated tools are widely used in the metal-working industry and provide the best alternative for most turning operations [18]. The manufacturing industry is constantly striving to decrease its cutting costs and increase the quality of the machined parts as the demand for high tolerance manufactured goods is rapidly increasing. The increasing need to boost productivity, to machine more difficult materials and to improve quality in high volume by the manufacturing industry has been the driving force behind the development of cutting tool materials. Today, there are two obvious trends in cutting tool developments. Dry machining is desirable to avoid the extra costs and environmental problems associated to cutting fluids. High speed machining of hardened steel has the potential of giving sufficiently high quality of the machined surface to make finishing operations such as grinding and polishing unnecessary. Both cases tend to intensify the heat generation along the tool surfaces, and consequently the

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Drilling on Glass Fiber Reinforced Composite Material for Enhancement of Drilling Quality: A Review

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Abstract:

A composite material can be distinct as a mixture of a matrix and a reinforcement, which when combined gives properties higher to the properties of the individual components. In the case of a composite, the reinforcement is the fibres and is used to fortify the matrix in terms of strength and stiffness. The reinforcement fibres can be cut aligned placed in different ways to affect the properties of the resulting composite. The matrix, normally a form of resin, keeps the reinforcement in the desired orientation. It protects the reinforcement from chemical and environmental attack, and it bonds the reinforcement so that applied loads can be effectively transferred.

Keywords: Reinforcement, Environmental attack, stiffness-to-weight

I. Introduction

Engineering materials are changing faster and the choice is wider than ever before. This is mainly because of the expansion in materials, processes, and computational abilities. Advanced high – tech industries adopted new materials and processes; replacement of mild steel with high strength steel, lighter non – ferrous alloys, such as aluminium and magnesium alloys, plastics, and composites. Many industries developing high strength, low weight materials for wide applications such as composite materials. The machining of composite materials is a growing problem in various fields such as aeronautical, automotive, wind turbine industries. In particular, the drilling of these materials, required to assemble different parts, is difficult to control and often leads to delaminating at the exit of the laminates. This can affect the strength of the structure. This project involves experimental and analytical investigation of drilling on Glass fibre reinforced plastic material [2].

GFRC mostly used in the industries due to their high mechanical properties such as high strength-to-weight and stiffness-to-weight ratios. Our objective is to reduce delimitation of GFRC work piece by selecting process parameters and tool parameters. By selecting suitable ranges of the parameters as per the convenience and by selecting the drilling machine as per availability we made the drilled holes. Inspecting the drilled holes on tool makers' microscope, analysis of delimitation factor for each drilled hole was done. By comparing the delimitation factor of various drill holes we found the suitable range of parameter in which the delimitation was least. By improving the quality of drill we can improve the life of the work piece. Classification of composite according to matrix the composite may classify as follows:

1. Metal Matrix Composites (MMCs)

2. Polymer Matrix Composites (PMCs)

3. Ceramic Matrix Composites (CMCs)

4. Intermetallic Matrix Composites (IMCs)

5. Carbon Carbon Composites (CCCs)

The technological and commercial interest in composite material lies in their superior properties of strength-to-weight, stiffness-to-weight, fatigue and thermal expansion compared to metals. Extensive use of composite in application such as rockets, satellites, missiles, light combat aircraft, advanced light helicopter and trainer air craft has shown that India is on par with the advanced countries in the development and use of composites in this area.

The machining of composite materials is a growing problem in various fields such as aeronautical, automotive, wind turbine industries [3].

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Experimental and Analytical Investigation of Drilling on GFRC Material for Enhancement of Drilling Quality: A Review

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Abstract: A composite material is made out of a mixture or a combination of two or more distinctly differing materials which are insoluble in each other and differ in form or chemical composition. The machining of composite materials is a growing problem in various fields such as aeronautical, automotive, wind turbine industries. In particular, the drilling of these materials, required to assemble different parts, is difficult to control and often leads to delamination at the exit of the laminates. This paper aims at the comprehensive analytical and experimental investigation work done on the drilling on GPRP composites material. The conclusion of the paper discusses the development and outlines the trends for the research in this field.
Keywords: Drilling on GFRP, Delamination, Surface Roughness, Design of Experiment, Taguchi Analysis

I. Introduction

Engineering materials are changing faster and the choice is wider than ever before. This is mainly because of the expansion in materials, processes, and computational abilities. Advanced high – tech industries adopted new materials and processes; replacement of mild steel with high strength steel, lighter non – ferrous alloys, such as aluminium and magnesium alloys, plastics, and composites. Many industries developing high strength, low weight materials for wide applications such as composite materials [1, 2]. A composite material can be distinct as a mixture of a matrix and a reinforcement, which when combined gives properties higher to the properties of the individual components. In the case of a composite, the reinforcement is the fibres and is used to fortify the matrix in terms of strength and stiffness. The reinforcement fibres can be cut aligned placed in different ways to affect the properties of the resulting composite. The matrix, normally a form of resin, keeps the reinforcement in the desired orientation. It protects the reinforcement from chemical and environmental attack, and it bonds the reinforcement so that applied loads can be effectively transferred. The technological and commercial interest in composite material lies in their superior properties of strength-to-weight, stiffness-to-weight, fatigue and thermal expansion compared to metals. Extensive use of composite in application such as rockets, satellites, missiles, light combat aircraft, advanced light helicopter and trainer air craft has shown that India is on par with the advanced countries in the development and use of composites in this area [3]. The machining of composite materials is a growing problem in various fields such as aeronautical, automotive, wind turbine industries. In particular, the drilling of these materials, required to assemble different parts, is difficult to control and often leads to delamination at the exit of the laminates. This can affect the strength of the structure.[4] This paper involves study on experimental and analytical investigation of drilling on Glass fibre reinforced plastic material. GFRP mostly used in the industries due to their high mechanical properties such as high strength-to-weight and stiffness-to-weight ratios. Our objective is to reduce delamination of GFRP work piece by selecting process parameters and tool parameters. By selecting suitable ranges of the parameters as per the convenience and by selecting the drilling machine as per availability we made the drilled holes. Inspecting the drilled holes on tool makers' microscope, analysis of delamination factor for each drilled hole was done. By comparing the delamination factor of various drill holes we found the suitable range of parameter in which the delamination was least. By improving the quality of drill we can improve the life of the work piece [5, 6]

II. Delamination Theory

Delamination is a critical failure mechanism in laminated fiber-reinforced polymer matrix composites, and is one of the key factors differentiating their behavior from that of metallic structures. It is caused by high inter laminar stresses in conjunction with the typically very low through-thickness strength. The phenomenon arises because fibers lying in the plane of a laminate do not provide reinforcement through the thickness, and so the composite relies on the relatively weak matrix to carry loads in that direction. This is compounded by the fact that matrix resins are typically quite brittle. Delamination failure may be detected in the material by its sound. Fig. 1 shows the delamination in the entry and exit of the material.

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Optimization of CNC Milling Process by using Different Coatings - a Review

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Abstract: Quality and productivity play important role in today's manufacturing market. In machining operations, achieving desired surface quality features of the machined product, is really a challenging job on CNC machine. Now a day's due to very stiff and cut throat competitive market condition in manufacturing industries. The main objective of industries reveal with producing better quality product at minimum cost and increase productivity. CNC milling is most vital and common operation use for produce machine part with desire surface quality and higher productivity with less time and cost constrain. To obtain main project an attempt is made to understand the effect of machining parameters such as cutting speed (m/min), feed rate (mm/min),depth of cut (mm) that are influences on responsive output parameters such as Surface Roughness, material removal rate, diamentinal accuracy in this the flatness can be measured by using optimization philosophy. In this work three levels and three parameters are considered; and L27 orthogonal array should be carried out by using two different insert coatings. For the experimentation the wet conditions is taken. In this optimization of milling process parameters using Taguchi method in machining of AISI 316 stainless steel is carried out.

Keywords: CNC milling, Taguchi method, Surface roughness, MRR, AISI stainless steel 316.

I. INTRODUCTION

Machining is process of producing work piece by removing unwanted material from in the form of chips. This process is very important since almost all the products get their final shape and size by metal removal. Machining offers important benefits such as excellent dimensional tolerances, external and internal geometrical features, surface finish, Removal of heat treat distortion. The machining efficiency is improved by reducing the machining time with high speed machining.

Milling is the process of removing extra work piece material with a rotating multi-point cutting tool, called milling cutter. The machine tool employed for milling is called milling machine.

Milling machines are basically classified as vertical milling machine or horizontal milling machine. These machines are also classified as knee-type, ram-type, planer-type and bed type. Most milling machines have self-contained electric drive motors, coolant systems, variable spindle speeds, and power-operated and table feeds. The three primary factors in any basic milling operation are speed, feed and depth of cut. Other factors such as kind of material and type of tool materials have a large influence, of course, but these three are the ones the operator can change by adjusting the controls, right at the machine vary from one make of controller to the next. The metal cutting inserts have found wide spread use in today's manufacturing industry especially for hard
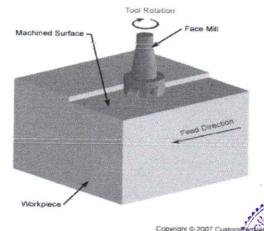

Fig.1 Milling operation

Fig.2 CNC Machining Center (VMC 850)

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Optimization of Process Parameters in Milling of Stainless Steel 316 Using Coated Insert and MEGA Coated Inserts

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Abstract – In today's manufacturing world it is very necessary to build up bridge between quality and productivity. This study highlights optimization of face milling operation for stainless steel 316 with taguchi orthogonal array. Twenty-seven experimental runs based on an L27 orthogonal array of Taguchi method were performed spindle speed, feed rate and depth of cut are optimized with consideration of multiple performance characteristics namely surface roughness (Ra) and material removal rate (MRR). The analysis of variance (ANOVA) is also applied to identify the most significant factor. The analysis can be done by using two different insert coatings; stainless steel 316 is difficult to machine material so to obtain good surface finish two different coating are used for machining and from that best coating can be find out. Machining can be carried out on CNC vertical milling machine with 25 millimeter cutter diameter. Finally, conformation test were performed.

Index Terms – Stainless steel 316, CNC vertical milling machine, Taguchi, Surface Roughness, Material Removal Rate.

1. INTRODUCTION

Milling is the most widely used process of machining flat, curved or irregular surfaces by feeding workpiece against rotating cutter. Hardik G. Soni [01] studied the optimal machining parameters on surface roughness and tool wear in CNC end milling using AISI 316 as a work piece material and tool used is solid carbide. The machining is done on dry condition. Machining parameters used for optimization are cutting speed, feed rate, depth of cut. In this paper it is studied that there is very few investigator research worked on SS316 stainless steel material. Alpesh R. Patel A et.al [02] to studied the effect of machining parameters such as cutting speed, feed rate, depth of cut, no of cutting flute that are influences on responsive output parameters such as Surface Roughness and Material Removal Rate by using optimization philosophy in CNC end milling. This is review paper in this it is find out that there is very few investigator research worked on SS316 stainless steel material so, they want to do work on this material. Muhammmad Yasiretet.al [03] investigates the effect of cutting parameters on the surface topography of stainless steel AISI 316L with tungsten carbide tool by using response surface methodology. The experiment is conducted in dry condition. The cutting speeds, feed rates were used. Scanning electron microscope (SEM) and Mitutoyo surface tester were used to study in detail the surface topography of stainless steel AISI 316L. A. Shokrani et.al [04] presents one of the very first studies on cryogenic CNC end milling of the Inconel 718 nickel based alloy using TiAlN coated solid carbide tools. Cutting parameters selected were tool diameter, cutting speed, fees rate, depth of cut and immersion rate whereas response factors selected were surface roughness, tool wear and power consumption. Statistical analysis of the results revealed that cryogenic cooling has resulted in 33% and 40%reduction in Ra and ISO Rz surface roughness of the machined parts as compared to dry machining without noticeable (1.9%) increase in power consumption of the machine tool. Cryogenic cooling significantly reduced the tool life of the coated solid carbide end mills. V. S. Thangarasu et.al [05] proposed experimentation on AISI 304 Stainless steel material is taken for the study to determine the parameters and to optimize with Design Of Experiments (DOE) based Response Surface Method (RSM) to find the optimal parameter set as per the requirements of the user of the high speed CNC machine. Machining parameters used for optimization are cutting speed, feed rate and depth of cut. V. S. Thangarasu et.al [06] investigates the AISI 304 stainless steel by using Taguchi based Box-Behnken Response Surface Methodology (RSM) method is used to develop prediction formula and Multi Objective Genetic Algorithm (MOGA) is used for High speed CNC milling process optimization with higher Spindle speed, Feed rate and Depth of cut for better surface finish and material removal rate. Harish Holkar et.al [07] studied the end milling parameters of AISI 321 grade of stainless steel are optimized by using Taguchi method. The tests were carried out with PVD multilayer coated cemented carbide end mill tools coating consists of TiN/TiAlN/TiN coating and the experiments were conducted at three different cutting speeds, with three different

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