ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY
(Approved by AICTE, New Delhi. Affiliated to Anna University, Chennai)
ANGUCHETTYPALAYAM, PANRUTI – 607 106.

2018-2019

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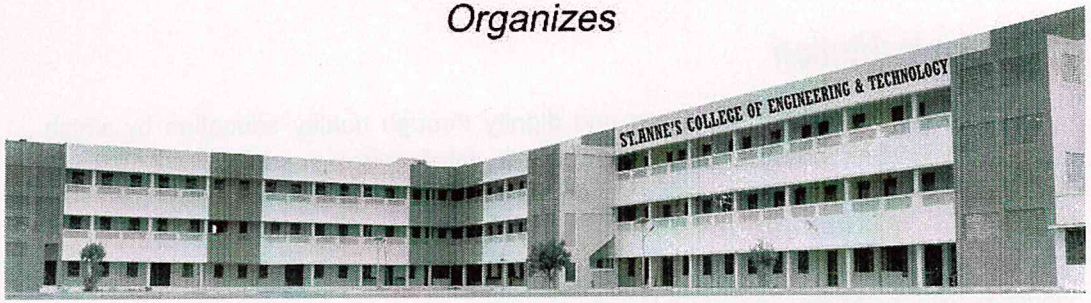

The 5th National Conference on Research and Development in Science, Engineering and Technology (NCRDSET '19)

on 28th February 2019

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About the Congregation of Sister's of St. Anne

The Congregation of the Sisters of St. Anne, Tiruchirapalli, founded by Rev. Mother Annammal in 1958, strives to live up to the Charism of the Foundress, **"Simplicity in life and Service to the poor"** for the past 161 years. Following the footsteps of its Foundress, the Congregation involves in multifarious service like Evangelization, Education, Social work and Medical service with explicit involvement in caring the differently abled. As part of the educational ministry, to uplift the rural youth, St. Anne's CET is established.

About the Institution

Our College aims at giving hope and dignity through quality education by which character is formed, strength of mind is increased, intellect is expanded and confidence is gained to stand on one's feet. We train the youth to see the good in every human being and to take the best out of each individual, to inculcate a sense of values in every student and to help every person to promote justice, peace and love in society. The College functions with the Motto: To build a Holistic Society.

St. Anne's College of Engineering and Technology, approved by AICTE, New Delhi and affiliated to Anna University, Chennai. It is situated at Anguchettypalayam, near Panruti. The surrounding will provide opportunities for our students both for training and employment. Our students can reap the benefits from this Institute with proper coordination.

About the Conference

In the recent days technology has witnessed enormous development in many fields. To import these development, the Fifth National Conference on Research and Development in Science, Engineering and Technology'19 (NCRDSET '19) is organized at St. Anne's College of Engineering and Technology on 28th February 2019. NCRDSET '19 addresses the rapid strides and technological advancements in the fields of Science, Engineering and Technology. This conference offers a platform to track the quality Research and Development updates from Researchers, Engineers, Scientists, Industrialist, Academicians and Students. It also provides them to express their talents and innovative ideas that will contribute to all fields of Engineering and Science in the upcoming years.

CONFERENCE THEMES

Computer Science

1. AI and Deep Learning
2. Big Data Analytics
3. Cloud and Green Computing
4. Cyber Security
5. IoT and Networking
6. Soft Computing

Electrical

1. Smart Grid and Microgrid Systems
2. Renewable Energy systems
3. Special Electrical Machines
4. Emerging Trends in Power System
5. Power Electronics Controllers.
6. Energy Storage and Control Techniques

Electronics & Communication

1. VLSI Design/ Embedded Systems
2. Audio/Medical Signal Processing
3. Recent Trends in Communication
4. Internet of Things (IoT)
5. Advanced Antennas
6. Green/Lifi Comunication

Mechanical

1. Advance Trends in Engineering Design
2. Recent Methods in Manufacturing
3. Emerging Trends in Thermal Engineering
4. Computational Field Dynamics
5. Design Tool and Cutting Materials
6. Composite Material
7. Alternative Fuels

Engineering Science

1. Materials for Energy and Environment
2. Smart Materials and Crystalline Materials
3. Nano Materials and Nano Structures
4. Material Science and Chemistry
5. Coordination Chemistry
6. Environmental Science
7. Mathematical Analysis and Applications
8. Recent Advancements in Applied Mathematics
9. English Language Teaching Methodology

Important Dates

Submission of full paper	:	22-02-2019
Intimation of acceptance	:	24-02-2019
Registration	:	26-02-2019

Paper Submission

Authors are invited to submit full length paper in t prescribed format available in the conference website. the accepted papers will be published in the conferen proceedings with ISBN Number: 9789352548118.

Selected papers will be published in the followi journals,

Scopus Indexed Journals

1. Bulletin of Electrical Engineering and Informatics.
2. International Journal of Mechanical and Production Engineering Research and Development.

UGC Approved Journal

1. International Journal of Advanced and Innovative Research.

Note: Papers submitted by email, fax or post will NC be accepted.

Registration Fee

UG/PG Students & Research Scholars	:	Rs.500
Faculty & Industry Participants	:	Rs.750

Payment Modes

The registration fee is to be paid by Demand Draft drawn i favour of **"The Principal, St. Anne's College of Engineerin and Technology"** payable at Panruti.

or

Online payment gateway available on conference website.

or

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List of Faculty Members received Financial Support for Conference (2018-2019)

S.No	Name of staff	Title	Support Amount received (Rs)	Signature
1	Mr.S.Balabasker Mr. Radhakrishnan	Marine Monitoring & Early Warning Detection Using Wireless Sensor Networks	750.00	
2	Mrs.D.Umamaheswari Mrs. B. Mary Amala Jenni	An Assorted Novel-Discriminative Based Hashing Method	750.00	
3	Mrs.D.Umamaheswari Mrs. B. Mary Amala Jenni	Hypervisor and Redemption – Awareness Analysis of 5G Networks	750.00	
4	Mr. V. Venkatesan Mr.S.Durairaj	Design of a 60 GHz Power Amplifier utilizing 90nm CMOS Technology	750.00	
5	Mr.S. Balabasker	Design of low-cost CNC plotter machine using arduino Uno	750.00	
6	Mr. V. Venkatesan Mr.S. Durairaj	Design and Comparison of Performance Characteristics of Rectangular Slot and Square Slot Patch Antenna	750.00	
7	Dr.S.Anita	Early diagnosis of parkinson's disease using machine learning techniques	750.00	
8	Mr.B.Arunkumar	Design of Security System for Vehicles	750.00	
9	Mr.R.Sasikumar Mr.K.Shanmuga Elango Mr.R.Jayakumar	Investigation on Utilization of Biogas & Prosopis Juliflora Biodiesel in Dual Fuel Mode in a Single Cylinder Diesel Engine	750.00	
10	Mrs.Annie John	A Review on The Development of Nanotechnology and Nano Materials in Civil Engineering	750.00	
11	Mr.K.Shanmuga Elango Mr.R.Sasikumar Mr.P.Murugan	Analysis of Strength in Unidirctional GRPF Based Fiber Orientations Under Static Loading Using Ansys	750.00	
12	Mr.P.Murugan Mr.R.Jayakumar	Effect of Thermal Spray Coating (SiC) on Fuel Consumption and Emission Control on IC Engine	750.00	
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14	Mr.R.Jayakumar Mr.P.Murugan	Design and Analysis of Composite Catalytic Converter	750.00	
15	F.Pramisha Sr.A.Punitha Jilt	Reliable and Energy Efficient Hybrid Screen Mirroring Multicost System	750.00	
16	D. Sampathkumar	English Language Teaching Methodology	750.00	
17	A.Harikrishnan	Quantum Mechanical Investigations of Molecular Structure Spectroscopic and Molecular Docking Studies of Diosmetin as Potential Anti- Diabtic Agent	750.00	
18	J. Joaquine Arokia Mary	Enhanced Behaviour of Silver Adorned Graphene Polyvenyl Alcohol Composites for High Dielectric Applications	750.00	
19	G. Gurumoorthy	Synthesis of Zinc Sulfide and Zinc-Iron Sulfide Nonoparticals from Zinc Dithiocarbamate complexes and their Utility for Photocatalytic Degradation of dyes.	750.00	
20	G. Gurumoorthy	Synthesis,crystal Growth and Characterization of € Dimethylamina) phenyl -i-phenyl prop-2-cn-1-one an organic crystal.	750.00	
21	A. John peter	Synthesis and Characterization of Materials for Lighting Applications	750.00	
TOTAL AMOUNT			**15750.00**	

27.2.19

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CASH PAYMENT VOUCHER

VOUCHER No.

Paid to _____

Date : 27.02.2019

	Rs.	P.
Financial Support for the Staff to Present papers in the National Conference on Research & Development in Science, Engineering and Technology (NCRDSET'19) on 28.02.2019	15,750/-	
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Rupees Fifteen Thousand and Seven Hundred & fifty Rupees Only

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has participated / presented a paper titled

MARINE MONITORING & EARLY WARNING DETECTION USING WIRELESS SENSOR NETWORKS

n the 5th National Conference on Research and Development in Science Engineering and Technology (NCRDSET '19)

on 28th February, 2019

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A ASSORTED NOVEL - DISCRIMINATIVE BASED HASHING METHOD

in the 5th National Conference on Research and Development in Scien

Engineering and Technology (NCRDSET '19)

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in the 5th National Conference on Research and Development in Science, Engineering and Technology (NCRDSET '19) on 28th February, 2019

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DESIGN OF A 60 GHZ POWER AMPLIFIER UTILIZING 90nm CMOS TECHNOLOGY

in the 5th National Conference on Research and Development in Science Engineering and Technology (NCRDSET '19)

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DESIGN AND COMPARISON OF PERFORMANCE CHARACTERIS

OF RECTANGULAR SLOT AND SQUARE SLOT PATCH ANTENN

in the 5th National Conference on Research and Development in Science, Engineering and Technology (NCRDSET '19)

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Investigation on Utilization of Biogas & Prosopis Juliflora Biodiesel in Dual Fuel Mode in a Single Cylinder Diesel Engine

Mr. R. Sasikumar,
Assistant Professor,
Department of Mechanical Engineering,
St. Anne's College of Engineering and Technology,
Anguchettypalayam, Panruti – 607106.

Mr. K. Shanmugaelango
Associate Professor,
Department of Mechanical Engineering
St. Anne's College of Engineering and Technology,
Anguchettypalayam, Panruti – 607106.

Mr. R. Jayakumar
Assistant Professor,
Department of Mechanical Engineering
St. Anne's College of Engineering and Technology,
Anguchettypalayam, Panruti – 607106.

Abstract *- In this work, experiments were accomplished on a single cylinder DI diesel engine by means of using bio-gasoline as a primary gas and prosopis juliflora biodiesel and diesel oil as secondary fuels in twin gas operation. the experiments were executed to degree overall performance parameters i.e. (brake specific fuel consumption, brake thermal efficiency and exhaust gas temperature) and emission parameters together with carbon monoxide, carbon dioxide, nitrogen oxide unburned hydro carbon and smoke and so forth. At one-of-a-kind load conditions. For the twin-fuel system, the consumption device of the check engine became changed to convert into biogas and biodiesel of a twin-fuelled combustion engine. Biogas turned into injected during the consumption procedure by means of gas injectors. the take a look at confirmed that, the engine performance parameters like BP, BTE and EGT gradually increase with increase in engine load for all check situations the usage of both pilot fuels diesel and PJFO. However, the BSFC of the engine confirmed lowering slope with increase in engine load for all check conditions. Above 40% engine load the BSFC values for all check fuels are very near every other. The engine emission evaluation confirmed that the CO2, CO and NOX emissions increase with boom in engine load for each single and twin gasoline mode operation the usage of both pilot fuels. The NOX awareness of exhaust gases in dual gasoline mode is superior than that of single mode.*

Keywords: *Biodiesel; Biogas; Dual fuel; Engine performance; Exhaust emission.*

A Review on The Development of Nanotechnology and Na Materials in Civil Engineering

Mrs. Annie John
Associate Professor,
Department of Electrical and Electronics Engineering,
St. Anne's College of Engineering and Technology,
Anguchettypálayam, Panruti – 607106.

Abstract-Nanotechnology and Nanomaterials is one of the most active research areas both science and engineering. Thus, this is nanotechnology will help us control the small the material, therefore, avoid the errors occurs or problems in the field of civil engine The Architecture, Engineering, and Construction industry can take the advanta applications of nanotechnology and nanomaterial. This review Paper shows there different uses of nanotechnology in building materials like concrete, carbon, nanotube, wood, coating, glass ,fire protection ,thermal insulation and green building etc. diff nanomaterial are used in the construction material like 'Titanium dioxide (TiO2), silica(ns), polycarboxilates,Zirconium Oxide Nanoparticles (ZrO2),Silver Nanopar (Ag),Aluminum Oxide Nanoparticles (Al2O3),Zirconium Oxide Nanopar (ZrO2),Wolfram (Tungsten) Oxide Nano particles (WO3)etc.by using these materials nanotechnology we can save time and also energy .this is the advanced technology which very useful in the civil or construction industry.

Keywords: Nanotechnology , Nano material, Titanium dioxide (TiO2), nano silica polycarboxilates, (ZrO2),(Ag), (Al2O3), (ZrO2), (WO3)

I. INTRODUCTION

Nanotechnology is the use of very small particles of material to create new materials. Nanotechnology is use in science as well as in technologies also. It have a in development for many years.The Architecture, Engineering, and Construction ind accommodate broad applications of nanotechnology and nanomaterial. These prod used for design and construction processes in many areas. Nanotechnology is the used to improve the mixture design, performance and production of cement-bas Materials composed of nano-sized particles displays unique physical and chemic compared to those with normal particle sizes. Concrete is stronger, more durable an placed, steel tougher and glass self-cleaning. Increased strength and durability c Nanomaterials can be defined as those physical substances with at least one dimen 1…150 nm (1 nm = 10–9 m). Currently, the use of nanomaterials in construct mainly for the following reasons: the lack of knowledge concerning the suitabl for construction and their behavior; the lack of specific standards for design and construction elements using nanomaterials; the reduced offer ofnanoproduc detailed informations regarding the nanoproducts content; high costs; the unk risks associated with nano materials.

II. NANO TECHNOLOGY IN CONSTRUCTION INDUSTRY

Nanotechnology can be used for design and construction processes. Nanotechnology can generate products with their characteristics to improve the current construction materials. For example, new structural materials with unique properties, lighter and stronger composites, fire insulator, sound absorber, low maintenance coating Nano sized sensors solar cells etc.

The areas of application of nanotechnology in civil engineering and the science & technology behind the improved performance.

2.1 Nanotechnologies for Concrete

Concrete is a macro-material which has its nano-properties. The additions of nano-silica (SiO2) to cement for control the degradation of the calcium-silicate hydrate reaction to improve in durability. Micro and nanostructure resulting in improved mechanical properties. Nanotechnology is used to studying its properties like hydration reaction, alkali silicate reaction (ASR) and fly ash reactivity. For concrete containing large volume fly ash, at early age it can improve pore size distribution by filling the pores between large fly ash and cement particles at Nano scale. It is also been reported that adding small amount of carbon nanotube (1%) by weight could increase both compressive and flexural strength (Mann,2006)

2.2 Nanotechnologies for Steel

Steel is major part in the construction industry since 19th to 20th century and it is widely available for the construction purpose. Fatigue is a issue that can lead to the structural failure of steel subject to cyclic loading, such as in bridges or towers. The stress is lower than the yield stress of the material and due to that shortening of useful life of the structure is occurs. this can be avoided by taking the regular inspection. The addition of copper nanoparticles reduces the surface unevenness of steel and it is more efficient materials use in construction subjected to fatigue issues (Mann, 2006) and The addition of nanoparticles of magnesium and calcium leads to an increase in weld toughness. The carbon nanotubes have little use as an addition to steel because of their inherent slipperiness is occurs ,due to the graphitic nature, making them difficult to bind to the bulk material (Mann, 2006).

2.3 Nanotechnologies for Wood

Wood is composed of nanotubes surfaces at the nanoscale. It is sustainable construction as both the production and the part of a renewable cycle. Due to its natural origins, wood is leading the way in cross-disciplinary research and modelling techniques. wood is highly water repellent coating which result of the combination of silica and alumina nano particles and hydrophobic polymers.

2.4 Nanotechnologies for Glass

Glass is Fire-protective which another application of nanotechnology. Glass panel (an interlayer) is formed of fumed silica (SiO2) nano particles which turns into a rigid and fire shield when heated. Because of the hydrophobic properties of TiO2, it can be applied in self-cleaning windows. To prevent sticking of pollutants, and thus reduce a maintenance costs .Nano-TiO2 glass can be applied to building exteriors.

2.5 Nanotechnologies for Coatings and Paintings

Nanotechnology is applied to paints in order to avoid the corrosion under insulation as of hydrophobic and repels water from the metal pipe and can also protect metal from water attack. Coatings have self healing capabilities through a process of "self assembly". coating. The coatings have Nano particles or Nano layers have been developed for different like protective or anti-corrosion coatings for mechanism; self-cleaning, thermal energy saving, anti-reflection coatings for glass/windows; easy-to-clean, antibacterial for work surfaces; and more durable paints. The coating is consist of two stages. First, "photo catalytic" process, nano sized TiO2 particles in the coating react with ultra-violet

Analysis of Strength in Unidirectional Grpf Based Fibe Orientations Under Static Loading Using Ansys

Mr. K. Shanmugaelango,
Associate Professor,
Department of Electrical and Electronics Engineering,
St. Anne's College of Engineering and Technology,
Anguchettypalayam, Panruti – 607106.

Mr. R. Sasikumar ,
Assistant Professor,
Department of Electrical and Electronics Engineering,
St. Anne's College of Engineering and Technology,
Anguchettypalayam, Panruti – 607106.

Mr .P. Murugan
Assistant Professor,
Department of Electrical and Electronics Engineering,
St. Anne's College of Engineering and Technology,
Anguchettypalayam, Panruti – 607106.

Absract-The Composite materials have found widespread applications in various fiel engineering such as aerospace, marine, automobile and mechanical applications strength of the composites are depends on two factors which are fiber orientation and In our project we are analyzing the effect of fiber orientation in a rectangular lamina under transverse static loading by using the finite element method. The re obtained with the help of five different angle of orientation of GRPF/epoxy. For ANSYS software were used. By comparing the results of five different orientation conclude the better one which will utilize full strength of the fiber composite. It that the stress value is maximum of 14384 N/mm² while considered the boundary at 30⁰. Also the stress value is minimum of 412 N/mm² while considered boundary at 45⁰. It is also observed that displacement value is maximum of 125.409 considered boundary condition 2 at 60⁰. From the result it is observed that the 30⁰ with boundary condition 2 is safe while comparing other boundary conditions.

Keywords: Glass reinforced plastic fiber, Epoxy, Stress, ANSYS.

I. COMPOSITE MATERIAL AND ITS CONSTITUENTS

Composites are a combination of two or more constituent materials wa different physical or chemical properties. The performance of composites is su constituent materials acting alone. The characteristics of resultant composite ma different from the individual constituents and unique. Within the composite materials are apart and they do not dissolve or blend into each other. .

Fillers are added to reduce the cost and increase the modulus. They also r shrinkage and control viscosity. They provide smooth surface to composite

toughness, colorants, flame retardants, ultraviolet absorbers, coupling agents, lubricants, heat stabilizers, and forming agents may also be added to the matrices..

II FILLERS AND OTHER ADDITIVES

Fillers are added to a polymer matrix to reduce the cost (as fillers are less expensive than most of the resins) and to increase the modulus. They produce smooth surface. They control viscosity and reduce mould shrinkage during fabrication. But the problem is they tend to reduce its strength and impact resistance. The most common filler for polyester and vinyl ester resins is calcium carbonate ($CaCO_3$), which is used to reduce cost as well as mold shrinkage. Examples of other fillers are clay, mica, and glass micro spheres (solid as well as hollow).

Also toughness, colorants, flame retardants, ultraviolet absorbers, coupling agents, lubricants, heat stabilizers, and forming agents may also be added to the matrices. Coupling agents act as compatibilizers between the hydrophilic fibers and the hydrophobic polymers and improve the bond between materials by different ways; that is by eliminating weak boundary layers, by producing tough, deformable layers, by developing a highly cross-linked interphone region with an intermediate modulus, by improving the wettability (critical surface tension factor), by forming covalent bonds with both materials, and by altering surface acidity.

III. MATRIX AND ITS TYPES

The high strength of composites is largely due to the fiber reinforcement. But the importance of matrix material cannot be underestimated. Matrix provides support for the fibers and assists the fibers in carrying the loads. It also provides stability to the composite material.

The major types of matrix are metal matrix, ceramic matrix and polymer matrix. Accordingly composites are classified into metal matrix composite (MMC), ceramic matrix composite (CMC) and polymer matrix composite (PMC). Table 1.1 gives the applications of composites classified on the basis of the matrix used.

Following are the requirements of a good matrix material.

- Excellent chemical resistance.
- Low coefficient of thermal expansion.
- Strength at elevated temperature (depending on application).
- Should be easily process able into the final composite shape.
- Dimensional stability (maintains its shape) and Reduced moisture absorption
- Low shrinkage.

IV. SUPERIOR CHARACTERISTICS OF COMPOSITE MATERIALS OVER OTHER MATERIALS

Majority of the composite materials provide a combination of strength and modulus that are either comparable to or better than many traditional metallic counterparts. Owing to their low density, the strength–weight ratios and modulus– weight ratios of these composite materials are superior to most of the other known metals. Fatigue strength as well as fatigue damage tolerance of many composite laminates are extremely good and because of this reason there are emerged as an important class of structural materials and found applications in aerospace, military, some automotive industry. They are useful for making sporting goods and even have bio-medical applications.

V. RESULTS AND DISCUSSIONS

In this chapter, the modeling of the layer using ANSYS and the steps used to solve them are discussed and the results of boundary conditions were analyzed.

Effect of Thermal Spray Coating (SiC) on Fuel Consumption and Emission Control on IC Engine

Mr. P. Murugan
Assistant Professor,
Department of Electrical and Electronics Engineering,
St. Anne's College of Engineering and Technology,
Anguchettypalayam, Panruti – 607106.

Mr. R. Jayakumar
Assistant Professor,
Department of Electrical and Electronics Engineering,
St. Anne's College of Engineering and Technology,
Anguchettypalayam, Panruti – 607106.

***Abstract** - In the age of rapid industrialization, one of the biggest problems faced by the wo fuel economy. The major components of the polluted environment are the increase of Co and CO which is mainly contributed by automobile fuels. This ecological imbalance is the m hazard for human, animals, plants and planets. According to the sources of ONGC (Oil Natural Gas Commission) there will be a great demand for automobile fuels due to incre rate of consumption of fuels and an impact on necessity of providing clean air environme coming years. Hence there is a need arises for the automobile industry not only to alternative fuel sources but also to produce fuel economic and eco-friendly vehicles. Here the rescue of thermal sprayed coating to solve the above problem considerably. A coat surface modification technology allows not only protecting the surface against environments but also improve the performance, extending the life and enhan appearance of materials. Thermal spray coatings are depositions of materials which melted or plasticized immediately prior to projection onto the substrate. The metal use application system used vary but most applications result in thin coating applied requiring improvement to their corrosion or abrasion resistance properties. In this pa the thermal spray coating of I.C engine for reducing the emission and thereby im efficiency of the I.C engine are described. A two wheeler has been taken for test results are analyzed with thermal spray coating.*

Key words: Fuel Consumption, Thermal spray coating, SiC, Emission Control.

I. INTRODUCTION:

In the age of rapid industrialization one of the biggest problems faced by economy. The major components of the environmental pollution are Co_2, So_2 and CC contributed by burnt fuels of automobile fuels. This ecological imbalance is the human, animals, plants and planets. Depleting fossil fuel resources, economic c environmental pollution has compelled to explore newer avenues to improve effic engines. Even though different techniques are used to save the fuel consu optimization, operating the engine at ecological loads and speeds. This paper deals economy in a two wheeler by using thermal spray coating.

A coating and surface modification technology allows not only protecting the surface against hostile environment but also improve the performance, extending the life and enhancing the appearance of materials. The thin coating of metal used depends upon the application results in surface improvement in respect of corrosion or abrasion resistance properties [1]. Thermal spray coating is a mechanical process of melting raw materials (either through the flame or electrical) into the plasma stage. The plasma stage material is loaded in a spray gun and sprayed on piston top.

II. COATING WITH GOOD LUBRICATION

It is essential to have least frictional forces present in between mating and/or reciprocating components. High coefficient of friction leads to higher wear rate affecting the engine life. Besides, mechanical friction has significant effect on the internal combustion (IC) engine fuel economy. In an IC engine, the major sources of frictions are valve train, piston system, crank and bearing system. Mechanical friction represents 10–15% of Indicated Mean Effective Pressure (roughly translates into energy available in a combustion cycle). Of the total frictional loss about 50-65% is accounted in piston system alone. Valve train system contributes 10-20% of friction loss and crank and bearing contributing the rest [2]. There is a pressing need to reduce these frictional losses to improve overall efficiency of the engine, reduce oil consumption and to increase life of engine.

III. TRIBOLOGY PROPERTIES

A coating is applied to improve the wear resistance and scuffing resistance at least as good as the cast iron liner substitute. Fine grained tribologically functional ceramics such as SiC, Al2O3 and Fe-oxides present in a coating can improve surface related properties such as hardness, compressive strength, abrasion resistance and scuffing resistance [2, 4, 9]. Scuffing is the major tribological issue of mass movement of surface elements via contact between two metals, especially when lubrication film breaks down. The coatings should also possess good mechanical and thermal shock resistance, good adhesion and strain compliance with the aluminum alloy substrate to meet the engine durability requirements. The tribological characteristics of the plasma coating lengthen the life cycle of the engine, while emissions decrease as a result of the reduction in fuel and oil consumption. It has been reported that plasma sprayed Fe/FeO as well as stainless steel/BN coatings reduced ring/bore wear by 40% and improved engine oil economy by 13600 km/l [6, 7].

IV. HEAT TRANSFER

Heat transfer to the block is to be kept to an absolute minimum, since this represents major heat loss. The coating should have low thermal conductivity, insulating the combustion chamber from conduction mode of heat transfer through aluminum or super alloy. Thermal barrier coating (TBC) was developed with an aim to reduce heat transfer. Computer simulations of internal combustion (IC), diesel and rocket engine as well as experimental data of diesel engine have shown that if the engine cylinder wall is coated externally by 2 mm thin layer of an insulating oxide, the heat loss is reduced by [5,8]. If a coating is applied on inner diameter of cylinder bore, then the thermal gradient is lower conduction mode heat transfer and the heat loss is further reduced. In a thermal barrier coating ng), a bond layer is applied above nickel-based super-alloy to improve the adherence of oxide ng. The thermally grown oxide has good coherency with the bond layer, on which another oxide (zirconia or titania-alumina) is plasma coated. The oxide layers also act as insulating resulting in um heat loss due to conduction [7, 9]

IX. RESULTS AND DISCUSSION

After this experimentation, various points are come out from the operation of FSW and testing of welded joints.

- The pin diameter and shoulder diameter are increased with the increase in thickness of the plates or specimen undergoing the process of FSW.
- The speed of the tool is one more important parameter to be selected for the process. It is selected as per the thickness of the plates and diameter of the tool. Also suitable higher speed helps to generate higher temperature which is important requirement for the FSW process.
- Also for the effective welding process the suitable higher temperature should be created during the process, so that weld quality is to be increased. The higher speed of the tool give more better quality of the weld aesthetically. As the temperature reaches to its high range the quality of weld increased i.e. quality of weld directly proportional to the temperature created during the process.

X. CONCLUSION

After the study of Experimentation of friction stir welding of aluminium alloys some of the good points were came out. There are also some other points that also taken in consideration for the extra work to be done. The some of concluded points regarding this study as:

- The process cost gets minimized automatically as the experimentation is done within the available tools and machines.
- The health hazards are decreased to zero whether the fusion welding has many health hazards affected on operator due to ultraviolet rays, also production of harmful gas during the process.
- With the use of conventional milling machine the FSW can carried out successfully materials for those fusion welding is not possible.
- Use of backing plate to specimen gives the support and useful to avoid the movement plates during the process. Also it helps to form good weld and also it decreases the back side of the welded plate.

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Prediction of Minimum Surface Roughness and Tool Wear in End Milling of Metal Matrix Composites Using NSGA-II

Dr. R. Arokiadass
Professor,
Department of Mechanical Engineering
St. Anne's College of Engineering and Technology,
Anguchettypalayam, Panriti,

Abstract - Particulate metal matrix composites (PMMCs) are being widely used in the aerospace and automotive industry due to their favorable properties, mainly high specific strength and Wear resistance. However, machining of particulate metal matrix composites presents a great challenge to the industry as the reinforcing particles easily abrade most of the common cutting tool materials. Being a complex process, it is very difficult to determine optimal parameters for improving machining performance. Tool flank wear and surface roughness are the most important output parameters, which decide the machining performance. A multiple regression model was used to represent the relationship between input and output variables and a multi-objective optimization method based on a non-dominated sorting genetic algorithm-II (NSGA-II) was used to optimize end milling process parameters. A non-dominated solution set was obtained.

Keywords: end milling, tool flank wear, surface roughness, optimization, non-dominated sorting genetic algorithm (NSGA-II)

I. INTRODUCTION

The end milling process is one of the most fundamental metal removal operations used in the manufacturing industry because of its ability to remove material faster and giving reasonably good surface quality [1]. It is widely used in a variety of manufacturing industries including the aerospace and automotive sectors, where quality is an important factor in the production of slots, pockets, precision moulds and dies [2]. Greater attention is given to dimensional accuracy and surface roughness of products in the industry these days. Moreover, surface finish influences mechanical properties such as fatigue behavior, wear, corrosion, lubrication and electrical conductivity. Thus, measuring and characterizing surface finish can be considered for predicting machining performance [3]. CBN cutting tools have greater wear resistance than other tool materials due to their high degree of hardness [4]. Cubic boron nitride (CBN) coated end mill are expensive compared to uncoated, the cost of the cutter can be recovered by a longer tool life and higher productivity. They are used to machine non-ferrous materials at high speeds and have high thermal conductivity. It has low thermal conductivity but higher compressive strength, which makes them conducive to machine hot at higher speeds. Kumar Reddy et al. [5] studied quality of components produced during end milling of Al/SiC particulate metal matrix composites (PMMCs). Results showed that the presence of the reinforcement enhances the machinability in terms of lower surface roughness and lower tendency to clog the cutting tool, when compared to a non-reinforced Al alloy.

Alanddin et al. [6] established a mathematical model that predicts the surface roughness of CBN steel after end milling. The prediction model was expressed via cutting speed, feed rate

Design and Analysis of Composite Catalytic Converter

Mr. R. Jayakumar
Assistant Professor,
Department of Mechanical Engineering,
St. Anne's College of Engineering and Technology,
Anguchettypalayam, Panruti – 607106.

Mr. P. Murugan
Assistant Professor,
Department of Mechanical Engineering
St. Anne's College of Engineering and Technology,
Anguchettypalayam, Panruti – 607106.

Abstract - The source of pollution and global warming is air pollution. It is to be noted that pollution is mainly caused by the toxic gases from the exhaust of the automobiles. Only percentage of the fuel is converted into energy source to run the engine remaining 70 percent of fuel is of un burnt hydrocarbon carbon monoxide and nitrogen oxides. This toxic content reduced by the invention of catalytic converter. Automotive three way converter have represented over the last 25 years for reduction of prolusion in the atmosphere. Here the performance of catalytic converter is studied and analysis is done by ANSYS FLUENT package. The uniform flow inside the converter is controlled by increasing the cone angle of the converter to utilize maximum amount of substrate in the converter. Economical wastage also reduced by changing the cone angle. Since the substrate is a noble material it is costly by utilizing all the substrate changing the angle will reduce the wastage. Amount of conversion taking place inside converter after maintaining uniform flow is studied by this analysis. The chemical reaction flow of gases inside the converter is discussed here for the analysis purpose. The efficiency of catalytic converter is mainly depend upon the effective conversion of CO, CH4, NO into H2O O2 and N2 which less toxic than the carbon monoxide hydrocarbons and nitrogen. Three way catalytic converter (TWC) is taken for analysis because of its tendency to reduce nitrogen oxides along with reaming toxic content.

I. INTRODUCTION

The source of pollution and global warming is the air pollution. It is to be noted that pollution is mainly caused by the toxic gases from the exhaust of the automobiles. The demand for automotive vehicle is huge. There are numerous automobiles which are used there is a huge air pollution which is affecting our environment. To control the toxic the exhaust of the automobile engine a component is added to the exhaust region. diesel engine. This component is named as catalytic convertor, which is able to gas content into non-toxic content by catalytic reaction.

A catalytic converter is a vehicle emissions control device that converts the exhaust gas to less toxic pollutants by catalytic a redox reaction (oxidation or reduction). converters are used in internal combustion engines fuel by either petrol(gasoline) including lean burn engines. The catalytic converter was invented by Eugene mechanical engineer in 1950. Houdry concerned about the role of smoke automobile exhaust in air pollution and founded a company, Oxy-Catalyst, Houdry

catalytic converters for smoke stacks called cats. Then he developed catalytic converters for warehouse forklifts that used low grade non-leaded gasoline.

In 1950s he began research to develop catalytic converters for gasoline engines used on cars. Catalytic converters are also used on electrical generators, forklifts, mining equipment, trucks, buses, locomotives, motorcycles, and airplanes. They are also used on some wood stoves to control emissions.

1.1 ANATOMY OF CATALYTIC CONVERTER

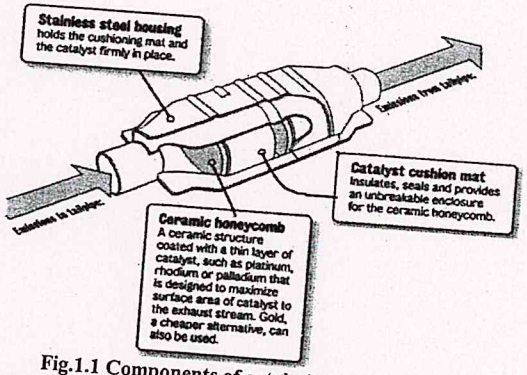

Fig.1.1 Components of catalytic converter

II. COMPUTATIONAL FLUIDS DYNAMICS

Computational Fluids Dynamics (abbreviated as CFD) is a method of calculating fluid flows, heat and mass transfer, chemical reactions and similar phenomena by numerical solving mathematical expression. The accuracy of the solutions is dependent on the following properties Consistency: The discretisation error should approach zero for infinite small grid sizes or time steps. For this case, the algebraic finite difference equations become equal to the original partial differential equations. .Stability: Numerical errors (truncation errors for example) should be bounded for all iteration step and not explode the solution. Convergence: A numerical method is convergent if its solution approaches that of the partial differential equation for decreasing grid and time steps and if numerical errors are bounded. This means that both consistency and stability are required to achieve convergence.

The CFD simulations were performed with the commercial software program Ansys Fluent For the calculation of the particle trajectories, the discrete phase model (dpm) was applied. model is based on the Euler-Lagrange method and uses the following steps:
ve the continuous-phase flow.
ute the discrete-phase injections.
e the coupled flow, if desired.
the discrete-phase injections, using plots or reports.

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