ROHINI

COLLEGE OF ENGINEERING AND TECHNOLOGY

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The "International Journal of modern Trends in Engineering and Research" (IJMTER) is a peer-reviewed, monthly, online international research journal, which publishes original articles, research articles, review articles with top-level work from all areas of Engineering Research and their application including Computer Science, Cyber Security, Neural Network, Computer Network, Mechanical, Civil, Electrical, Chemical, Electronics etc. It's a leading e-journal, under which we encourage and exploring modern ideas of emerging trends in Engineering by publishing papers which containing pure knowledge. It's started with noble effort to help the researchers in their field and also share knowledge and research ideas. The journal reviews papers within two weeks of submission and publishes accepted articles on the internet immediately upon receiving the final versions.

ABOUT THE COLLEGE

Rohini College of Engineering and Technology (RCET) - a temple of learning, is an ISO certified institution was founded in the year 2012 by the great Industrialist and Philanthropist, Shri. K.Neela Marthandan and now managing by his son Dr.N.NeelaVishnu. It is located at Palkulam near Anjugramam junction & Kanyakumari, the southernmost town in India. RCET is about 5 km from the Kanyakumari railway station and 14 km from Nagercoil junction. RCET is approved by All India Council for Technical Education (AICTE), New Delhi & affiliated to ANNA University, Chennai since 2012. The main feature of the college comprises world-class infrastructure with experienced and talented faculties, excellent pass percentage, good placement records and society-oriented products/projects developed by the students. The main objective of our college is to advance the knowledge base of the engineering professions and to influence the future directions of engineering education and practice.

RCET - Best Engineering College in Nagercoil, Kanyakumari District. We believe not only in educating the students but also in grooming characters, with moral and ethical values to build the nation. Since the beginning, the college has been providing world-class facilities & infrastructure in education and learning. The emphasis is on transformational leadership rather than directional leadership. We aim to establish new trends, introduce innovative training methodologies, and thus guide students towards the road to success.

ABOUT THE DEPARTMENT

The Department of Mechanical Engineering started in the year 2012 with an initial intake of 60 students to the B.E Program and increased to an intake of 120 students from 2013 and 180 students from 2014. The Department offers ME - Thermal Engineering programme from 2015 with an intake of 24 students. The Department is a recognized research centre by Anna University Chennai from the year 2019. The department accomplishes outcome Based Education which helps the students to learn, develop and serve to the society. The Department has experienced and dedicated faculty with a wide range of specialization namely Thermal Engineering, Engineering Design,

Manufacturing Engineering, Energy Engineering, CAD/CAM, Industrial Engineering and Mechatronics.

The faculty members have published more than 100 papers in National/International journals/Conference and had written books, filed patterns during the last 3 years and received many awards. The students were motivated by providing a lot of opportunities like a technical presentation in Symposium, conferences for skill development. The department provides value-added knowledge to undergraduates and postgraduate students. Apart from curriculum students were motivated to participate in sports. The department has well-established laboratory facilities to conduct research work on different specialized areas like Material Science, Renewable Energy, Thermal Science. The students of the department have received external research funding from Tamil Nadu State Council for Science and technology in recent years. The students of the departments have joined in reputed industries through placements and some of them are turned to be an entrepreneur.

ABOUT THE CONFERENCE

Engineering as a major innovative and creative area for the necessary of the nation. every day to day life becomes a challenge due to technology development availability of resources and its utilisation. mechanical engineering please a vital role in the present scenario due to design fabrication and Research it motivates the researches and Industrial Estate for developed efficient Technologies to reduce time cost and increases the efficiency to sustain the world for better excellence.

The objective of International Conference on Advanced Research in Science and Technology (ICARST-18) is to provide an intellectual forum for the professionals and exports of different environments to expose its and Emphasis the application of science in tutorial practical existence of human life. the conference offers a chance for leading researchers, engineers and scientist to exchange their thoughts and its relations with the latest technology and to find Global experts to work together for the betterment of society.

CONFERENCE MESSAGE BY A PATRON

Warm and Happy greeting to all. I am immensely happy that the department of Mechanical engineering of our college is organizing an International Conference on Advanced Research in Science and Technology (ICARST-18) presented collection of various technical papers in the proceedings.

Under the able guidance of our management, RCET continues to march on the way of success with confidence. The sharp, clear-sighted vision and precise decisionmaking powers of our management have benefited our college to say competitive.

The dedicated faculty members and disciplined students of RCET are the added features of our college. I also congratulate the faculty members, students of Mechanical departments, Participants from our colleges and other colleges for their efforts in organizing and participating in this conference and wish the conference all the success.

Best Wishes,

Dr.R.RAJESH, M.E., Ph.D.,
Principal
Rohini College of Engineering and Technology, Kanyakumari, Tamilnadu, India.

INTERNATIONAL CONFERENCE ON ADVANCED RESEARCH IN SCIENCE AND TECHNOLOGY

CONFERENCE MESSAGE BY THE CONVENER

This International Conference on Advanced Research in Science and Technology (ICARST-18), Organized by ROHINI College of Engineering and Technology, Kanyakumari, Tamilnadu, India. is an attempt to focus the attention of all concerned professionals to discuss at length concerned with the Emerging trends in engineering & technology, to seek solutions wherever possible and identify areas, where further are research, are needed. Invited contributions from experts on various topics with separate divisions on Energy, Aerospace, Marine, Composite Materials, Material Science & Alternative Fuels are presented in the proceedings.

Around 50 participants have confirmed their registration and presentation at the conference. The issue of the proceedings contains 35 papers accepted and presented in the conference. New materials with fascinating possibilities are being explored. Conducting polymers to smart materials would offer enormous shortly. Micro and Nanomaterials are likely to change our lifestyle and become part of our daily life and not just the subject of seminar or talks.

Information provided in various papers and reproduced in the proceedings is aimed at benefiting the Engineers and professionals. It is expected that the purpose would be served satisfactorily through in-depth discussion and interaction among participants during the conference. I take this opportunity to record my heartfelt appreciation and gratitude to all the authors, delegates, and all others participating.

Best Wishes,

Dr.D.PRINCE SAHAYA SUDHERSON, M.E., Ph.D.,
Professor/Head,
Department of Mechanical Engineering, Rohini College of Engineering and Technology, Kanyakumari,
Tamilnadu, India.

INTERNATIONAL CONFERENCE ON ADVANCED RESEARCH IN SCIENCE AND TECHNOLOGY

CONFERENCE MESSAGE BY THE ORGANIZING SECRETERY

As the Research Director of RCET the International Conference on Advanced Research in Science and Technology (ICARST-18), I would like to cordially welcome all interested academicians, researchers and engineers in the broad disciplines of Mechanical Engineering to attend and/or present at this conference. The topics cover research in the area of solid mechanics, fluid mechanics, thermodynamics and heat transfer, aeronautical engineering, automotive engineering, material science, marine and ocean engineering, manufacturing engineering, control and automation, industrial and systems engineering and also mechanical design as well as other related topics. Originally, this international conference is intended to boost the publication of our Mechanical Engineering staff as well as becoming a platform for UG/PG students and research scholars to learn some experience in presenting technical articles in an international virtual conference. However, this virtual conference is also open to all postgraduate students, faculties and researchers throughout the world to share their research findings. It will be a good research findings forum and is expected to be an annual event of the mechanical department in the future.

Best Wishes,

Dr. S. INDRAN, M.E., Ph.D.,
Director - Research,
Rohini College of Engineering and Technology, Kanyakumari,
Tamilnadu, India.

Contents

IC A 01 ADVANCED CHOCK REMOVAL FOR LARGE SIZE PIPE LINES

ABILESH V, PRADEESH G

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— This Project Explain About Detect and Remove the Chock in The Pipe Lines. At Some Industries or Power Plants the ash from the boiler was mixed with water and the Ash-Water mixture was discharged into the sea by means of Pipeline. Due to the Semi Solid Mixture there occurs a Block in Pipeline and thus sometimes the ash was Not Properly Disposed. In this Project a Sensor was used to detect the Ash Block in the ash pipe line, then the Compressed Air was allowed to break the Blocks for the Continuous Discharge of Ash through the pipe lines into the Sea.

KEYWORDS: Ash handling; Ash-water mixture; Ash block; Sensor; Break ash block; Continuous discharge.

IC A 02 EXPERIMENTAL DESIGN APPROACH TO PROCESS PARAMETER OPTIMIZATION FOR THE LASER WELDING

PRADEESH G, ARJUN S T

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— This project work proposed an experimental design approach to process parameter optimization for the laser welding of 304 stainless steels. To determine the optimal laser-welding parameters, a set of mathematical models will developed relating welding parameters to each of the weld characteristics. These will validate experimentally. Laser welding is a high energy density welding process and is well known for its deep penetration, high speed, small heat-affect zone, fine welding seam quality, low heat input per unit volume. Stainless steels normally used in the automotive industries for making, respectively, inner and outer shells of a fuel injector are selected as base metals for the constrained overlap weld fabrication. This study is, therefore, focused on development of mathematical (RSM) models for all response factors of the weld made of 304 stainless steel, Visual Inspection of weld quality, and finally, determination of optimal range of welding parameters that minimize the weld zone (WZ) width and maximize the weld penetration depth, and weld shearing force.

]IC A 03 IMPROVEMENT IN THERMEL STORAGE BY USING PCM AND NANOADDICTIVE'S

JEBIN SUNDARA RAJ G, MANOJ J K

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— The present paper investigate the conventional thermal storage device largely depends upon the varying local weather condition, the result is poor performance at low weather condition. To eliminate the fluctuation in this system. The increase in thermal storage is the main objective of this project. The effect of three different phase is handled out in this project. The solar collector is designed based on the requirement of area about 2.63m^2. The radiation incident on the solar collector is calculated by using the ambient temperature. The experimental setup consists of the solar collector and a thermal storage unit. The temperature readings are noted down by the thermometer. Three sets of readings are taken corresponding to the time and the temperature difference (i) without PCM (ii) with PCM (iii) with PCM and Nano addictive's and the corresponding change in temperature is noted down with the time of a day. For each half an hour the readings are taken. It is found that thermal storage with PCM and Nano addictive's is more efficient and the temperature output is high compared to the other thermal storage systems. And the efficiency of the collector, latent heat and the total heat stored is calculated

IC A 04 EXPERIMENTAL INVESTIGATION OF TRIBOLOGICAL BEHAVIOR OF FRICTION SURFACING MILD STEEL WITH AL5083-CD ALLOY

SUNESH N, LOGANATHAN V

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— Friction surface is the solid phase cladding technique, it uses a combination of both heat and deformation of tool metal.in this process which improves the material bonding between the base metal and tool material. This process is used to enhance the application of material, which also increase the flexibility of various material and also provide better price and reliability of material. In this study, aluminum material is imposed on the mild steel material, cadmium particles are casting with the aluminum to form the tool rod (Al5083/cd) which improve the hardness and wear behavior of the base metal. Processed sample material of Al5083-Cd alloy coated on mild steel treated in pin on disc apparatus. Tested consumables, subtract, and coatings were examined by both weight measurement and SEM techniques for samples of size 10x10 was observed with the prolonging of testing time. The results from above tested specimen are compared with the results of base metal. Thus the changes in the hardness and wear resistance properties are investigated and concluded that bonding strength of the coated metal are higher than the base metal.

Keywords: Friction surfacing, mildsteel, Al(5083)/Cd, Tool profile, wear test, Microstructure, Micro hardness..

IC A 05 INVESTIGATION OF CORROSION PROPERTIES OF FRICTION SURFACED MILD STEEL WITH ALUMINIUM 5083/CD ALLOY

.**STANLY SELVAKUMAR M , DAVID R**

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— Friction surfacing is a method used to produce an overlay over any metal to improve its properties.This paper deals with friction surfacing of mild steel and investigation of corrosion properties.Friction surfacing is done on modified lathe. All engineering fields require mild steel with improvisation in its properties. so, friction surfacing is employed. The consumable rod used for friction surfacing is Al 5083/cd alloy.Consumable rod is prepared by means of Stir casting method. Friction surfaced mild steel is tested for its corrosion behavior. The samples are immersed in solutions of various ph(3,5,7,9) value for certain time and the corrosion rate is found. Also pitting corrosion is evaluated. The results are analyzed by weight loss method, SEM analysis and EDX methods. The resuts shows that friction surfaced mild steel is likely to have more corrosion resistance than mild steel. Also, the corrosion rate is high in low ph solutions due to its acidic nature. However the corrosion rates are comparatively less when compared to mild steel.

Key words : FRICTION SURFACING, CORROSION, SEM, EDX

IC A 06 HYBRIDIZATION EFFECT ON THE MECHANICAL PROPERTIES OF SPINTEX/GLASS FIBER COMPOSITES

RAJA KUMAR M, JEBASINGH T

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— The aim of this paper was to evaluate the effect of hybridizing spindex and fibers on the mechanical properties of their composites. These composites were produced by compression molding manually, with distinct overall fiber volume fraction, being either pure Spindex fiber, pure fiber or hybrid. Specimens were cut from the fabricated laminate according to the ASTM standards for different experiments. The mechanical characterization was performed by tensile, flexural, impact and also SEM analysis. From the obtained results, it was observed that the tensile strength and modulus increased with fiber incorporation and for higher overall fiber volume fraction (40%). Hybridization has been successfully applied to natural & synthetic fiber reinforced polyacetate composites in a way that the various properties responded satisfactorily to the incorporation of a third component.

Keywords: Hybridizing, Spindex, Volume fraction, SEM analysis

IC A 07 **ALUMINIUM REINFORCED METAL MATRIX COMPOSITE**

DAVID R , KAILAINATHAN S

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— In this work an attempt is made to fabricate "Aluminium reinforced metal matrix composites",using pure "ALUMINIUM" as metal and "MULLIATE" as reinforcement material.Stir casting method is employed to fabricate 10% of mulliate reinforced aluminium composite. The fabricated composite is tested for distribution of reinforcement (micro structure)using "Scanning Electron Microscope".

The porosity of the fabricated composites is measured and compared with the theoretical density.It is found that, mulliate particles are uniformly distributed and porosity of the composite is also very low. The hardness of the composite is also measured by"VICKERS HARDNESS MACHINE".

IC A 08 CHARACTERIZATION OF NEW NATURAL CELLULOSIC FROM SEA GRASS AND MECHANICAL PERFORMANCE OF CHEMICALLY TREATED POLYESTER COMPOSITE

LOGANATHAN V
Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— Natural fiber reinforced polymer composites are one such advanced material which is capable of replacing the conventional and synthetic materials due to its sustainable, biodegradable, lightness and some better mechanical properties. The newly identified sea grass fibers are extracted by water immersion technique followed by manual shaving process. The physical, chemical, XRD, FTIR and mechanical properties of sea grass fibers were described for the first time in this work. The results are very encouraging for its application in automotive, aerospace and composite manufacturing etc. The high cellulose content of the fiber (76.20%) and very little wax (1.28%) provides better tensile strength and good bonding with the matrix. In addition, the less density of the fiber (1.03 g/cm^3) gives rise to an effective substitute for unsafe synthetic fibers. In the present paper also focuses on the study to improve the interfacial bond between Spinifex littoreus fibers and polyester matrix, chemical surface treatments have been carried out on the fibers. The fiber surface was modified by treatments including NaOH, Calcium hydroxide, Potassium permanganate, and Silane. Calcium hydroxide treated Spinifex littoreus polyester composite showed optimum tensile strength among the treated sea grass polyester composite. Scanning Electron Microscopic (SEM) analysis was performed to identify the failure mechanism for the tensile fractured samples.

Keywords: Spinifex littoreus fibers, XRD, FTIR, SEM, Cellulosic Fiber

IC A 09 ABRASIVE WATER JET MACHININGON INCONEL-718

KAILAINATHAN S. MONIKANDAN N

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Abstract— Abrasive water jet machining (AWJM) is the process of material removal from the work piece by the application ofhigh speed stream of abrasive particles carried in waterfrom a nozzle. The material removal process is mainly by erosion. It is mainly used for brittle materials. The machine will be automated to have three axis movements.The different components of AWJM are compressor, vibrator, filter, pressure regulator, nozzle,pressure gauge, etc. The experiments were conducted using Taguchi L9 orthogonal array. The surface quality of Inconel-718 alloy is investigated after abrasive water jet machining. The machined surfaces were examined with scanning electron microscope (SEM). It was found that, the surface roughness decreases with the increase of material grain size, the surface roughness increases with the increase of stand of distance, the surface roughness increases with the increase of nozzle speed. Taguchi's L9 orthogonal array design method is suitable to analyze the surface roughness problem, the parameter design of the Taguchi method provides a simple, systematic and efficient methodology for the optimization of the cutting parameter, to obtain the smaller SR, the following parameters are recommended pressure 200MPa, speed 30mm/sec, SOD-1mm.

Keywords:

AWJM, Machining, wear, optimization, orthogonal array, response surface methodology, surface quality

IC A 10 RECENT DEVELOPMENT OF FLAX FIBRES AND THEIR REINFORCED COMPOSITES BASED ON DIFFERENT POLYMERIC MATRICES

Dr.V.SIVARAMAKRISHNAN, Dr.P.ANAND

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— This work describes flax fibre reinforced polymeric composites with recent developments. The properties of flax fibres, as well as advanced fibre treatments such as mercerization, silane treatment, acylation, peroxide treatment and coatings for the enhancement of flax/matrix incompatibility are presented. The characteristic properties and characterizations of flax composites on various polymers including polypropylene (PP) and polylactic acid, epoxy, bio-epoxy and bio-phenolic resin are discussed. A brief overview is also given on the recent nanotechnology applied in flax composites.

Keywords:flax composites; mechanical properties; modifications

IC A 11 **A REVIEW ON MACHINING STUDIES OF CFRP COMPOSITES**

MONIKANDAN N, NAVIN JASS P

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— The use of carbon fiber reinforced polymer composites had attracted more industrial applications because of its different potential advantages such as high strength, flexibility etc., but at the same time the major problem which they face is during the machining of the composites, so with this point in mind here a complete review is presented on the machining studies of carbon fiber reinforced polymer composites. The extensive review has been done with special reference to various machining parameters such as feed rate, depth of cut, machining speed etc, also in addition the failure mechanism of the composites had also discussed briefly in this review.

Keywords :CFRP, Drilling, Abrasive water jet Machining, Laser Machining

IC A 12

STUDY ON WIRE-CUT EDM PROCESS

ARJUN S T, JUSTIN LEO Y

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— Wire-cut electrical discharge machining (WEDM) is one of the most emerging non-conventional manufacturing processes for machining hard to machine materials and intricate shapes which are not possible with conventional machining methods. This is more efficient and economical for machining hard to machine materials. The effects of various WEDM process parameters such as pulse on time, pulse off time, servo voltage, peak current, dielectric flow rate, wire speed, wire tension on different process response parameters such as material removal rate (MRR), surface roughness (Ra), Kerf (width of Cut), wire wear ratio (WWR) and surface integrity factors are specified. The effect of various parameters and setting of various parameters at their optimal levels is very much required for manufacturers. As the wire feed rate increases, the consumption of wire and cost of machining will increase. Low wire speed will cause wire breakage in high cutting speed. If the wire tension is high enough the wire stays straight otherwise wire drags behind. Within considerable range, an increase in wire tension significantly increases the cutting speed and accuracy. The higher tension decreases the wire vibration amplitude and hence decreases the cut width so that the speed is higher for the same discharge energy. However, if the applied tension exceeds the tensile strength of the wire, it leads to wire breakage.

Key words: Optimization, Process Parameters, Wire-cut EDM, Pulse.

IC A 13

STUDIES ON EFFECT ON SLIDING VELOCITY ON DRY SLIDING WEAR OF CURAUA FIBRE POLYESTER COMPOSITES.

JUSTIN LEO Y, DAVID R
Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract—

Natural fibres like curaua fibres (pine apple fibre) extracted from plants are gaining attention as polymer matrix composites(*pmc*). curaua is perennial plant with 1-2 m height and width.it chiefly cultivated in coast and tropical region mainly for its fruit purpose later it converts in to 3 ft long,2-3inch wide sword shaped and arranged fiberous leaf edges. Its chemically treated like as sodium hydroxide, ethoxy methoxy silane etc..to increase its mechanical properties. The friction and wear performance of pure LDPE and 10%, 30%, 70% of basalt filled with weight of LDPE composites where evaluated under dry sliding condition the result shows that the wear rates for pure LDPE and basalt filled composites increase with increasing loads and sliding speeds the property of this fibre is soft to touch with a very high mechanical resistance to producing high tensions, making it a natural substitute for glass fibre. The coefficient of friction with sliding velocity for curaua fibre reinforcement polymer composites sliding against steel surface. It can be seen that the coefficient of friction for 40% curaua having initially higher value, when treated with NaOH it increases in sliding velocity.

KEYWORDS: Curaua fibre, wear test, sliding velocity, Low density polyethylene.

IC A 14 STUDY OF EFFECT OF MECHANICAL RESPONSE OF PALMYRA WASTE / COIR FIBRE COMPOSITES

Dr.KAMALAKANNAN.V, Dr.P.PRADEEP

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— There has been keen interest in the development of natural fiber reinforced composite fiber due to its abundant availability and eco-friendly nature compared to the other carbon or synthetic fibers. This increases the application of natural fiber today which makes the urgency to test its mechanical properties.

This paper indicates how the Palmyra waste/coir fiber reinforced composite is manufacturing from the compression moulding technique. This also focuses mainly on the tests of composite on mechanical properties such as tensile, hardness, flexural, moisture and impact tests. The results of those tests were taken and graphs were drawn from those readings. The results shows that the addition of coir fiber to the palmary waste increases all mechanical properties compared to the Palmyra composite alone.

Keyword – Palmyra, coir, compression moulding, mechanical tests

IC A 15 TENSILE AND STRUCTURAL CHARACTERIZATION OF ALKALI TREATED SPINIFEX LITTOREUS FINE FIBERS

RETNA SIGA E, JEBA SINGH T

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— Spinifex littoreus fibers possess superior tensile properties and are an important renewable, natural reinforcement material for composites. This paper reports the improved tensile properties of natural fibers extracted from Spinifex littoreus. Changes occurring in Spinifex littoreus fibers when treated with a 5% concentration sodium hydroxide solution for different periods (1, 4, 8 and 12 h) were characterized using tensile testing, chemical analysis, Fourier transform infrared spectroscopy, X-ray diffraction, scanning electron microscopy and thermogravimetric analysis. The tensile properties (strength, modulus and % elongation) of the fibers improved by 40, 62 and 39% respectively, after 8 h of alkali treatment. Based on the properties determined for the Spinifex littoreus fibers, we expect that these fibers will be suitable for use as a reinforcement in green composites.

Keywords: Spinifex littoreus fibers, XRD, FTIR, SEM, Cellulosic Fiber

IC A 16 ANALYIS OF COMPRESSOR LESS SOLAR REFRIGERATION SYSTEM WITH THERMAL STORAGE

MANOJ J K, JEBIN SUNDARARAJ P G

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— This is a experiment on the solar refrigeration system with thermal energy storage. The mechanical compressor used in the vapour -compression cycle is replaced by a thermal compressor in the solar refrigeration cycle. The thermal compressor consists of a solar collector & thermal storage copra oil. The objective of this project is to analysis the solar air-conditioning system by determining the solar collector efficiency, coefficient of performance (COP) of the system, heat storing capacity of copra oil and overall system efficiency and also the electrical energy consumption and operation cost for the system and compare it with the conventional air-conditioning system from the previous case study. Also using Fresnel lens for improving solar energy. The existing solar air-conditioning system is not competitive with electricity driven air-conditioning system because of their high investment and installation cost.

IC A 17 **FAILURE STUDY OF GLASS FIBERS REINFORCED COMPOSITES UNDER MIXED MODE**

YUGENDRA RAJAN D, PRADEESH G

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract A mixed mode delamination test procedures was developed combining double cantilever beam (DCB) mode I loading and end notched flexure (ENF) mode II loading. Delamination between layers in composite materials is a major source of structural failure. Delamination resistance is quantified by the critical strain energy release rate, G.Mixed-mode bending (MMB) tests were performed on glass/epoxy specimens with delaminations in 0/0 and 0/90 type interfaces. This mixed mode bending test was analysed using both finite element procedures and modified beam theory to calculate the mode I and mode II components of strain energy release rate GI and GII, respectively. A wide range range of GI/ GII ratios can be produced by varying the load position on the lever. As the delamination extended, the GI/ GII varied by less than 5%,beam theory equations agreed closely with the finite element results and provide a basis for selection of GI/ GII ratios and a basis for computing the mode I and mode II components of measured delamination toughness.

IC A 18 **PROPERTIES OF AL6063 MMC REINFORCED WITH ZIRCON SAND AND ALUMINA**

CHANJITH CHARLES C, ABILESH V

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— The present study deals with the investigating the wear behavior of Aluminium6063 alloy composites reinforced by Zircon sand(Zr_2SiO_4) and Alumina(Al_2O_3) particles with a total reinforcement in Wt% is 8, and in this hybrid reinforcement the variations (0+8)%, (2+6)%, (4+4)%, (6+2)%, (8+0)% were taken in to account for investigating the wear behaviour of the composites synthesized by Stir casting technique. the wear investigation is done by analysing the wear against constant load, sliding distance and varying sliding velocity. From the experimental studies and structure analysis done after the wear test, it is found that the hybrid reinforce composite having 6%$ZrSiO_4$ + 2%Al_2O_3 having a good wear resistance.

IC A 19 **OVERALL EQUIPMENT EFFECTIVENESS (OEE) ANALYSIS AND IMPROVEMENT IN BOLT MANUFACTURING UNIT**

P.NAVIN JASS, Dr.INDRAN S

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract—The purpose of any manufacturing enterprise is to consistently make a profit. Being world-class in manufacturing means that the company can compete successfully and make profit in an environment of international competition, not only now, but also in the future. The TPM component of World Class Manufacturing (WCM) is linked to both TQM and the concepts of continuous-flow manufacturing, which are embodied in cellular manufacturing. TPM incorporates the strategies of operator ownership and systematic planned preventive maintenance (PPM) activities to keep machines from breaking down or malfunctioning during production. An investigation was conducted in collaboration with a first tier bolt module to determine the Overall Equipment Effectiveness (OEE) of a semi-automated assembly cell. The big losses associated with equipment effectiveness were also identified. The production output of the cell over the observed. This represents 97% good components, 0.33% scrap and 2.67% rework. Availability and Performance are also observed. The number of stoppages recorded, where the most common causes were identified. The OEE was 62% and the six big losses represent 38% loss of the productive time. Based on the findings, it was recommended that a pilot project to be conducted to implement a TPM program for the cell to improve the OEE by improving the Availability, Performance & Quality and further it can be expanded to the other cells in the factory.

IC A 20 **DESIGN ANDANALYSIS OF HELICAL BAFFLES SHELL AND TUBE HEAT EXCHANGER TO INCREASE RATE OF HEAT TRANSFER**

Dr.INDRAN S

Department of Mechanical Engineering, Rohini College of Engineering and Technology

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Abstract - Heat exchanger is a device that is used to transfer thermal energy between two or more fluids. To design and analysis a shell and tube heat exchanger with continuous helical baffles to improve the shell side performance of shell and tube heat exchanger Considering same flow area for both new helical design and the existing design (i.e.) conventional segmental baffle to compare the both result. However, the traditional shell and tube heat exchangers with segmental baffles has many disadvantages such as low heat transfer coefficient due to the segmental baffle arrangement, large back mixing, fouling, high leakage flow, and large cross-flow. Especially, segmental baffles bring on significant pressure drop across the exchanger when changing the direction of flow. With the help of research facilities and industries have shown much better performance of helical baffle heat exchangers as compared to the conventional ones. This results in relatively high value of shell side heat transfer coefficient, low pressure drop, and low shell side fouling, reduced bypass effects, and prevention from flow-induced vibration.

Keywords : shell and tube heat exchanger, heat transfer, helical baffles, segmental baffles, FLUENT ANSYS, Copper material

IC A 21 BIOGAS IN SMALL-SCALE RURAL ELECTRICITY GENERATION

Dr.M.EZHILAN , Dr.K K AJITH KUMAR

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— Small-scale anaerobic fermentation of organic wastes, particularly cattle manure, to yield both methane-rich fuel gas (biogas) and fertiliser is discussed and found to be potentially beneficial in rural African situations. An experimental study on the fueling of a portable engine-alternator set with simulated biogases (mixtures of methane, CHO, and carbon dioxide, CO) is then presented. The only modification required for gas-fueling of the engine (a normally petrol-fueled, side-valve machine rate data 5.2 k w mechanical output) is the fitting of a simple commercially available gas feed adaptor. The engine runs reasonably smoothly on gases containing up to 3l% CO2, at higher CO, concentrations simultaneous fueling with a pilot quantity of petrol is necessary. Replacement of petrol with pure CHO is found to result in a 17% loss in maximum power output. Increasing CO, content of the gas leads to further losses of maximum power, with a 35oh loss at 3loh CO2. Specific fuel consumption data are presented and the overall efficiency of the unit (electrical output divided by calorific input) is found to be higher with gas-fueling than with petrol. USM with the collaboration with Enerbon Sdn Bhd had set up this mini biogas power plant as an education and research and development tools to professionals and researchers and at the same time giving opportunities to people who are interested with this system to witness and experience it themselves by looking at how this mini biogas power plant works. There are 2 main objectives of this study being carried out; firstly to determine whether food wastes (canteen and cafeterias wastes) can produce methane gas (biogas) that can generate heat and electricity and secondly to establish how much methane gas (biogas) can be produced with the certain amount of the feedstock. It should be pointed out that this MBPP can generate 600kW electricity per day as this system can generate electricity about 25kW/h. The methane produced per day is approximately 180 cubic metres. The higher the wastes, the higher the amount of methane gas produced. The cow dung is used to increase the bacteria in the tank; the methane gas production will be higher if the bacteria breed.

IC A 22 POWER FACTOR CORRECTED ZETA CONVERTER BASED IMPROVED POWER QUALITY SWITCHED MODE POWER SUPPLY

Dr.D.F.MELVIN JOSE

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— Multiple output switched mode power supplies (SMPS) for personal computers (PCs) normally depict extremely bad power quality indices at the utility interface such as total harmonic distortion of the input current being more than 80% power factor being lower than 0.5 and output voltage regulation being very poor. so, they violate the limits of harmonic emissions set by international power quality standards. Inthis paper, A Non-isolated power factor corrected (PFC) converter is being proposed to be used at the front-end to improve the power quality of an SMPS for a PC. The front end converter is able to reduce the 100 Hz ripple in its output that is being fed to the second stage isolated converter. The performance of the front-end Zeta converter is evaluated in three different operating conditions to select the best operating condition for the proposed SMPS system. The performance of the proposed SMPS is simulated and a laboratory prototype is developed to validate its performance. Test results are found to be in line with the simulated performance under varying input voltages and loading conditions and all the results demonstrate its enhanced performance.

Index Terms – Power factor corrected Zeta converter, unity power factor, power quality, SMPS, multiple outputs.

IC A 23 FINITE ELEMENT BASED SURFACE WEAR ANALYSIS OF CAM AND FOLLOWER

P.NAVIN JASS

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Abstract—A particular type of contact condition, known as cam and follower contact, exists in the direct valve train system of a Diesel engine and is partly responsible for wear. In this thesis the wear analysis of cam and follower contact system are carried out and finite element modelling of cam and follower assembly is done using the ANSYS software. The contact pressure, von misses stress are calculated theoretically and the ANSYS results are computed. The results showed that the cam rotational angle and the pressure angle had an effect on the contact pressure, on von misses stress distribution and also plays a great role on the surface wear of the contact. The results also showed that the contact pressure, principal stress and the wear increases with the cam rotational angle and the wear increases linearly with the contact pressure. Based upon the theoretical analyses and ANSYS analysis, a theoretical model for evaluating the tribological performance of the valve train was developed. A multi-aspect comparison between theoretical and ANSYS results was made. A good agreement between theoretical and analysis results showed that the model provided a reliable prediction of the tribological characteristics of the cam/roller follower. Three critical portions of the cam could be identified these are the cam basic surface region, cam flank and cam lobe region.

Keywords : Cam; Follower; Valve train; Diesel engine; Contact Pressure; Von misses stress; Wear.

IC A 24 **PERFORMANCE EVALUATION OF TITANIUM NITRIDE COATED AND UNCOATED CARBIDE CUTTING TOOLS IN TURNING PROCESS**

Dr. K. SASI

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Abstract— Hard coatings are well known to improve the performance of cutting tools in machining applications, such as high-speed machining and machining of MMC etc. Unfortunately, the development of cutting tool for high-speed machining of hard and difficult-to-cut material has remain a problem for quality and economy of production. The present work studies the performance of coated tool in machining of hardened steel (AISI 4340 Steel) under high speed turning and compared with that of uncoated tool were turned using CNC lathe. The influence of cutting parameters (speed, feed, and depth of cut) on cutting forces, surface finish and tool wear has been analyzed. Under the different cutting conditions, forces were measured both for coated and uncoated tools. For coated tools the forces obtained of resulted in relatively low values. For comparison, uncoated tool was also tested under the similar cutting conditions. The surface roughness of the workpieces was find out using Taylor Hobson (Surtronic 25) Surface Roughness Tester. Tool wear measurements demonstrate the capability of such tools in turning hard materials with reasonable tool life. The wear mechanism at the end of tool life was investigated in detail. It has also been found that the machining of hard materials at higher speeds and lower feeds is improved by using coated tools as compared to uncoated tools. Turning with coated tool is more economical than the uncoated in terms of energy and power requirements

Keywords: CNC; Machining; Surface Roughness; Depth of Cut; Contact Force; Tool life.

IC A 25 EFFECT OF ISOBUTANOL IN COTTONSEED OIL METHY ESTER-A COMPARISON STUDY OF THE FUEL WITH AN WITHOUT ADDITIVE

Dr. AJITH KUMAR K K, LOGANATHAN V

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Abstract— Global warming and other environmental problems forced the humans to think about new fuels having least impact on the environment. The alternative fuels are the solutions for the future scarcity of the fossil fuels as well as a solution to the pollution due to automobiles. The biodiesels produced from various vegetable oils are used now a days as alternative fuel for IC Engine. In this paper the biodiesel produced from transesterification process of cottonseed oil is explained. The experiment was carried out for various blends B10,B20 and B30 with and without the additive. Isobutanol is used as the additives. The performance of IC Engine reveals that the efficiency is improved for blends with additive and Emission is also reduced for blends with additive.

Keywords: Cottonseed oil, Isobutanol, Transesterification, Blends.

IC A 26 **EXPERIMENTAL ANALYSIS ON HYBRIDIZATION EFFECT OF SPINDEX &BASALT FIBER GREEN COMPOSITES**

Dr.P.ANAND

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Abstract— The aim of this paper was to evaluate the effect of hybridizing spindex and basalt fibers on the mechanical properties of their composites. These composites were produced by compression molding manually, with distinct overall fiber volume fraction, being either pure Spindex fiber, pure Basalt fiber or hybrid. Specimens were cut from the fabricated laminate according to the ASTM standards for different experiments. The mechanical characterization was performed by tensile, flexural, impact and also SEM analysis. From the obtained results, it was observed that the tensile strength and modulus increased with basalt fiber incorporation and for higher overall fiber volume fraction (40%). Hybridization has been successfully applied to natural& synthetic fiber reinforced polyacetate composites in a way that the various properties responded satisfactorily to the incorporation of a third component.

Keywords: Hybridizing, Spindex, Basalt, Volume fraction, SEM analysis

IC A 27 STUDY OF HYBRID CAR AND ITS ENVIRONMENTAL EFFECTS

Dr.PRADEEP.P

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Abstract— This paper focused on hybrid vehicle technology and its integration into society. The encompassing issue answered in this project was whether hybrids meet the expectations for environmental benefits suggested by many people. Research was done is the areas of types of hybrids, consumer trends, and the future of hybrid technology. Hybrid production and efficiency data were analyzed to examine the technical aspects of the technology. A focus group of people who recently bought cars, both hybrids and non-hybrids, revealed what consumers look for in their cars. Analysis of the needs of hybrid technology helped determine how feasible widespread change to hybrids would be in future. With all information taken into account, we concluded that hybrids have several drawbacks that offset their fuel efficiency. Their higher price both turns consumers away and makes the vehicles a less attractive economic investment. Energy efficient processing techniques need to be developed before the advanced materials in hybrids can help add to their clean image. Widespread change to advanced hybrid technologies is not a feasible option in the near future because of both cost and the limited amount of hybrids on the road today. Overall, hybrid technology has a lot of potential in the distant future, but as for right now they are not a significant improvement over today's internal combustion engine.

IC A 28 EXPERIMENTAL ANALYSIS OF NEEM SEED OIL AND COTTON SEED OIL BLENDED WITH DIESEL IN DIESEL ENGINE WITH ADDITIVES

JUSTIN LEO Y, DAVID R

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— This paper focused on hybrid vehicle technology and its integration into society. The encompassing issue answered in this project was whether hybrids meet the expectations for environmental benefits suggested by many people. Research was done is the areas of types of hybrids, consumer trends, and the future of hybrid technology. Hybrid production and efficiency data were analyzed to examine the technical aspects of the technology. A focus group of people who recently bought cars, both hybrids and non-hybrids, revealed what consumers look for in their cars. Analysis of the needs of hybrid technology helped determine how feasible widespread change to hybrids would be in future. With all information taken into account, we concluded that hybrids have several drawbacks that offset their fuel efficiency. Their higher price both turns consumers away and makes the vehicles a less attractive economic investment. Energy efficient processing techniques need to be developed before the advanced materials in hybrids can help add to their clean image. Widespread change to advanced hybrid technologies is not a feasible option in the near future because of both cost and the limited amount of hybrids on the road today. Overall, hybrid technology has a lot of potential in the distant future, but as for right now they are not a significant improvement over today's internal combustion engine.

IC A 29

EXPERIMENTAL ANALYSIS OF COTTON SEED OIL AND SOYA BEAN OIL BLENDED WITH DIESEL IN DIESEL ENGINE WITH ADDITIVES

Dr.SATISH KUMAR R

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— Environmental concerns and energy crisis of the world has led to the search of viable alternatives to the fossil fuels, FAME (Fatty Acid Methyl Ester) is environment friendly, alternative, nontoxic, safe, biodegradable has high flash point and is termed as biodiesel. Trans-esterification is the process that is used for producing biodiesel which is accepted worldwide because of its efficiency. This process is done to reduce the viscosity of the cottonseed oil and the soya bean oil. This paper is an attempt to produce biodiesel from cottonseed oil and soya bean oil through the trans-esterification process and to use the byproducts of this process for various other activities. The trans-esterification was done on the mixture of cottonseed oil and soya bean oil using Potassium Hydroxide (KOH) as catalyst and Methanol (CH3OH) as Alcohol. It was found that the change in proportion of alcohol (10%, 20%, 30%, 40%) added changes the amount of Ester as well as the glycerol produced. Fuel additives are successfully being used to improve operability by preventing oxidation and thermal degradation of B100 and Biodiesel blends.

IC A 30 **HEAT TRANSFER CHARACTERISTICS OF SILVER/WATER NANOFLUIDS IN A PLATE HEAT EXCHANGER**

Dr.S.SIVAGANESAN

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— An experimental study is carried out to investigate the heat transfer characteristics of silver/ water nanofluids in a plate heat exchanger. The test matrix is worked out in the turbulent regime with Reynolds number varying between 5000 and 20,000, particle volume concentrations of 0.01%, 0.02% and 0.03% and for heat flux varied between 600 W/m2 and 800 W/m2, The influence of mass flow rate, inlet temperature and volume concentration on the LMTD, effectiveness, convective heat transfer coefficient and pressure drop are studied. The results showed an increase in convective heat transfer coefficient and effectiveness of silver/water nanofluids as the particle volume concentration is increased. A maximum enhancement in convective heat transfer coefficient of 11.8% and effectiveness of 5.87% is recorded. It is also observed that the apparent increase in the heat transfer coefficient is due to the enhanced thermo-physical properties of the nanofluids, and delayed development of boundary layer in the entrance regions due to the addition of nanoparticles.

IC A 31 MINIMIZING TRANSPORTATION AND INVENTORY COST USING ARTIFICIAL IMMUNE SYSTEM ALGORITHM FOR A PROPOSED THREE LEVEL SUPPLY CHAIN SYSTEM

Dr.PRADEEP.P

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Abstract— This study considers the problem of distributing the products from suppliers to warehouse and from warehouse to production units based on a constant demand rate with the help of the vehicles. The main objective of the paper is to minimize the total costs incurred in the system. In this three level supply chain, a group of suppliers supply products to the warehouse based on the overall demand of the production units and the warehouse will distribute the products to each production units based on their individual demand. The problem considered here is to determine the optimal sequence in which the products can be delivered by multiple vehicles in order to minimize the total cost including the sum of transportation cost and the inventory carrying cost of the whole supply chain. The distribution of products will be done by homogeneous vehicles for both cases in multiple trips based on the vehicles capacity and availability. The total cost will be reduced by effectively integrating the supplier and production units in a three level supply chain.

IC A 32 PNEUMATIC MATERIAL HANDLING SYSTEM

SUBRAMONIA PILLAI N

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Abstract— This paper proposes a cheap and effective method for design and manufacturing of a three degree of freedom revolute jointed robotic arm. The design process begins by specifying top–level design criteria and passing down these criteria from the top level of the manipulator's structure to all subsequent components. With this proposed approach the sequential design intents are captured, organized and implemented based on the entire system objectives, as opposed to the conventional design process which aims at individual components optimization. By considering the mechanical arm's performance objectives, the design starts with modelling the integration of all the individual links constituting the manipulator. During the design process, modifications are made based on integrated information of kinematics, dynamics and structural analysis of the desired robot configuration as a whole. An optimum assembly design is then achieved with workable sub designs of the manipulator components. As a result, the proposed approach for manipulator design yields substantially less number of iterations, automatic propagation of design changes and great saving of design efforts. Further with best machining process and cheapest material, catering the strength and machining requirements suitable materials are selected to fulfil the objective.

IC A 33 EXPERIMENTAL INVESTICATION OF COATING ON MAGNESIUM BASED COMPOSITE

Dr.KARUNAKARAN.K

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Abstract— Magnesium is an excellent readily available light metal alloy for engineering applications when weight is a critical design element. It is a strong and light material that can be cast into thinner parts than aluminum. However, it can be volatile at high temperatures and extremely corrosive in wet environments. Magnesium parts have specific benefits that are required in design applications when magnesium is in alloyed form and has a protective coating. Sometimes only a coating or alloyed magnesium is needed in design, but both have benefits. When alloys and coatings are introduced into the design there is more evaluation required by the designer. Coatings may not offer enough protection depending on applications or may endanger the health and safety of the part manufacturers or operators. This paper evaluates different coatings for magnesium parts and the advantages and disadvantages to each type.

IC A 34 DESIGN AND ANALYSIS OF MODIFIED ENERGY BRICKS FOR GREEN BUILDING APPLICATIONS

JAYAKUMAR J

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Abstract— In this current scenario, consumers usually prefer normal fired clay bricks, pre-stressed concrete blocks for building constructions. The consequence of using those results in environmental degradation, energy loss and minimizes human thermal comfort. Green building concept deals with the optimum use of natural resources for the development of infrastructure Energy bricks which are durable and massive pave a solution for reducing those factors that degrades the environment. Energy brick fulfills all the criteria to save time and cost gives the maximum energy savings while building construction. Green Energy Bricks deliver the new innovation in building construction. The bricks are structural but also light weight, have superior properties with a massive insulation rating, and will withstand temperatures of 1000°C by using appropriate natural fibres. Energy Bricks are a sustainable product that saves construction and energy costs. The low cost eco-friendly natural resources are used in the modern construction of energy bricks. Usage of fibers, recycled aggregates and municipal wastes will increase efficiency of manufacturing process. The project continues with CAD design and physical modeling of energy brick. Testing and Analysis were also expected to be done using appropriate techniques prioritized in given sections.

IC A 35 EXTENSIVE ANALYSIS OF WEAR BEHAVIOUR ON ALUMINA-PTFE COMPOSITE

SELIN RAJ , FRIEDRICH BERGIUS PAUL P

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Abstract— Commercially availed implants in the bio-medical region were not comfort on its material cost. In order to overcome this risk, material of poly-tetra-fluoro-ethylene (PTFE) has been identified because of its excellent properties like biocompatibility, corrosion resistance, prevention on chemical reaction and comparatively lower cost. But the wear rate of PTFE is not capable to prevent the material destruction due to cyclic loading developed in the human body. So, an improved wear resistance of PTFE may enrich the suitability of PTFE to replace some other bio implants. Thus, wear resistance can be improved by adding alumina particles as a wear resistive agent. PTFE - alumina particles were blended in various compositions like 95-5%, 90-10% and 85-15% respectively and the samples were prepared by using hot press compression moulding technique. At the end, the wear behavior can be evaluated by using pin on disc wear tester against steel counter-face. After evaluation, wear rate of various compositions were compared and optimized. The improved proportion of PTFE-alumina composite will be proposed for bio-medical applications.

Keywords: PTFE-alumina, wear rate, bio implants, Cyclic loading, Hot Press Compression moulding technique, Pin on disc.

IC A 36 FUTURE ADVANCED COMPOSITE MATERIALS IN AEROSPACE INDUSTRY & ITS APPLICATIONS

ALBERT C , SUNESH N

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— Composites are becoming increasingly important in the aerospace industry. At least 30-40 per cent of modern airframes are now made of composites, and this percentage is increasing rapidly due to technological advances in the field Fibre-reinforced polymer composite materials are fast gaining ground as preferred materials for construction of aircrafts and space crafts. Although several applications in the aerospace vector are mentioned, the emphasis of the review is on applications of composites as structural materials where they have seen a significant growth in usage. Composite technology continues to advance, and the advent of new types such as basalt and carbon nanotube forms is certain to accelerate and extend composite usage. The large scale use of advanced composites airframes and in current programmes of development of military fighter aircraft, NASA aerospace structures, small and big civil transport aircraft, helicopters, satellites, launch vehicles and missiles all around the world is perhaps the most glowing example of the utilization of potential of such composite materials.

IC A 37 **DETERMINATION OF VARIOUS MECHANICAL PROPERTIES OF HYBRID PALM &GLASS FIBER REINFORCED COMPOSITE MATERIAL USING NDT TECHNIQUE**

CHANJITH CHARLES C

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gy

Abstract— Recently there has been a greater inclination towards natural fiber reinforced plastic composites because these are environmental friendly and cost effective to synthetic fiber reinforced composites. The availability of natural fiber and ease of manufacturing have tempted researchers worldwide to try locally available inexpensive fiber and to study their feasibility of reinforcement purposes and to what extent they satisfy the required specifications of good reinforced polymer composite for structural application. Natural fibers were initially used in composite materials to predominately improve bulk and reduce cost rather than improving mechanical properties. In order to conserve natural resources and economize energy, weight reduction has been the main focus of machine parts manufacturers in the present scenario. Weight reduction can be achieved primarily by the introduction of better material, design optimization and better manufacturing processes. The palm and glass fiber reinforced composite is one of the potential items for weight reduction of about 20% - 30%. In this work our ultimate aim is to fabricate the new class of epoxy based hybrid composites reinforced with short palm and glass fibers. Evaluate the mechanical properties such as tensile strength and hardness of prepared reinforced composite and to check the cracks present in the material using Die Penetrant NDT technique.

Keywords: Composites, Natural fibers, Glass fiber, Palm fiber, NDT Technique.

IC A 38 **ANALYSIS OF BIOGAS PRODUCTION THROUGH ANAEROBIC DIGESTION USING COW DUNG AND VARIOUS CO-SUBTRACTS**

KRISHNAVENI K

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Abstract— Biogas or bio energy is one of the most important in renewable energy resource. Now days this bio gas energy is very useful in world because it uses waste as a source. All types of biodegradable wastes can be converted to methane so, Biochemical technology or anaerobic digestion used to produce the biogas. This technique is very useful for waste minimization in in our country, also help full for clean India processes. Anaerobic digestion is a commercial reality for several kinds of waste. Nonetheless, anaerobic digestion of single substrates presents some drawbacks linked to substrate characteristics. Anaerobic co-digestion, the simultaneous digestion of two or more substrates, is a feasible option to overcome the drawbacks of monodigestion. At present, since 60% of the publication has been published in the last two years; anaerobic co-digestion can be considered the most relevant topic within anaerobic digestion research. Anaerobic digestion is a microbial process for production of biogas, which consists of primarily methane (CH4) & carbon di-oxide (CO_2). Biogas can be used as an energy source. This research represents the production of biogas which will be reduce CO2 emission, waste minimization, more cost effective, cut down the landfill waste, to producing high quality alternate fuel, and eco-friendly.

IC A 39 DESIGN ANALYSIS AND QUALIFICATION OF EJECTOR FOR SUB COOLING LIQUID OXYGEN

ALBERT C

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Abstract— The use of evacuation for the mankind is gaining consistent importance and to the development of technology ranging from metallurgy to space research. The industrial use for thermal treatment and oxidation free welding of finer high technology components are few important applications. Liquid oxygen feed line chilling for space vehicle is one such application. The physics involved in this chilling is by evacuation the liquid boiling point is reduced at vacuum condition leading to higher latent heat of evaporation. So higher heat is removed by little quantity of liquid and to the lower temperature. This helps to ascertain the correct liquid quantity matching with the vacuum environment of the space vehicle simulating high altitude testing condition in ground. The design of the ejector to meet the feed line chilling requirement was done during this project. The design fixes the critical dimensions without accounting for any tolerances. But fabrication can not be done without any such tolerances. Also these variations are bound to affect the performance. This necessitates optimizing the geometry, drive gas flow rates and operating conditions including safety aspects and fix the deviation in dimension on unilateral or bilateral side to facilitate realization. The work deals with analyzing for functional aspects of ejector system with designed geometrical and functional parameters. Then qualification of the ejector was done using equivalent air loading and no load trials. This is to estimate the equivalent performance of the ejector corresponding to the real fluid to be pumped, and finally with the actual fluid to meet the process requirements.

IC A 40 **GRAPHENE BASED NANO FLUIDS AS ENGINE COOLANTS**

JAGANRAMDHAS J

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Abstract— Conventional fluids like deionized (DI) water, ethylene glycol (EG) have low thermal conductivity compared to solid counter parts. So in order to overcome this a new type of fluid called Nano fluid wherein nanomaterials are dispersed in base fluids like water or Ethylene Glycol is introduced. The honeycomb pattern of Graphene is the world's thinnest, strongest, and stiffest material, as well as being an excellent conductor of both heat and electricity. Graphene Nano fluids have been prepared by a novel technique based sonication and chemical stabilization and their thermal conductivity and viscosity have been evaluated. The improvement in thermal conductivity for 0.05% volume fraction, is about 16% at 25°C and about 75% at 50°C with water as base fluid. With ethylene glycol as base fluid the enhancement is about 5%. The enhancement of thermal conductivity of the Nano fluid can be linked with the high thermal conductivity of Graphene.

***Keywords*:** Graphene, Nano fluids,Chemical Stabilization

IC A 41 DESIGN AND DEVELOPMENT OF MAGNETO RHEOLOGICAL SUSPENSION SYSTEM USING COMSOL SOFTWARE

JEBA SINGH T

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Abstract— Nowadays different kinds of suspension systems are available. However, there is a necessity of a suspension system to reduce vibration much more. The main objective of this suspension system is to reduce the vibration. There are different types of dampers are used to reduce the shocks and vibrations. In this work, we are using Magneto-Rheological fluid to arrest the vibration. It works with the help of electromagnet by producing the magnetic field. It paved the way to increase the efficiency of the system. In future, it has more scope, and it will be the better suspension system for modern automobiles. In this, we analyze the properties of MR-fluid using advanced COMSOL software. LABVIEW software is used to obtain and record the results (acceleration and Velocity of the vibrations) for analysis. If enough amplifier current could be obtained and the heat dissipation problem is solved then the proposed electromagnetic damper system is excellent in reducing the vibration. Here the distribution of magnetic flux density is determined using COMSOL software. It paved the way to identify the performance of the system.

IC A 42 BIODIESEL PRODUCTION AND ITS EFFECT ON ENGINE PERFORMANCE OPTIMIZATION BY DATA AQUISITION SYSTEM

A. JOHNNY VARGHESE

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Abstract— The existing demand and relative ease of production and integration make biodiesel an attractive and alternative fuel source. Biodiesel is gaining momentum and support as a viable way to create domestically produced oil for transportation and energy needs. Biodiesel is an alternative to petroleum based fuels derived from vegetable oils, animal fats, and used waste cooking oil including triglycerides. Biodiesel has very low greenhouse gas emission whereas fossil fuels increase atmospheric carbon di oxide level. Manufacturing of biodiesel is done by Tran esterification process. The raw material is subjected to several processes to yield neat biodiesel. The properties of biodiesel and its blend will be compared with that of diesel.

IC A 43 ADVANCED COMPOSITE MATERIALS AND AEROSPACE ENGINEERING

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Abstract— Advanced composite materials(ACM) have become the basic materials of the aerospace engineering.In this paper,the requirements and the applications of ACM in the aerospace engineering were presented.Some hot-spot technological fields,such as lattice materials and structures,nano-composite materials and multi-functional materials,were introduced.Their potential applications and developments were prospected.Finally,the problems to be resolved about raw materials,low cost,integration of design and evaluation in ACM were discussed.

IC A 44 PERFORMANCE ANALYSIS OF FOUR STROKE DIESEL ENGINE USING COTTON SEED AND ALGAE BIO-FUEL BLENDED WITH DIESEL

FRIEDRICH BERGIUS PAUL P

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— This project investigates the engine performance using a dual bio-diesel (cotton seed and algae) blend with the pure diesel. In the present world scenario, researches are concentrating in development of various types of bio diesel to meet the tremendous demand of fuel consumption due to the increases in automobiles and industries, which in turn increases the fuel price. From the literature study it is clearly identified that various alternative fuels like vegetable oils, animal oils and fish oils where already blended with diesel using various methods and the same was tested in diesel engines to identify the performance characteristics of these oils. From the literatures, it is noted that while blending oil with diesel lot of problems where arises due to the high viscosity of the oils. Therefore various technique where evolved for blending the oil with the diesel. Therefore this work mainly concentrates in extracting the oil from the Cotton and Algae plants and these are blend and mixed with diesel in various proportions (B25, B50&B75). The prepared bio diesel was subjected to various initial testes such as viscosity test, flash and fire point test etc. Then the performance of this bio diesel on the modified IC engines was studied under various operating conditions. The obtained experimental results where compared with the diesel fuel in order to identify the increase in the performance characteristic of the newly extracted bio diesel

Key words: Cotton and Algae biodiesel, Transesterification, Engine performance testing.

IC A 45 EMISSION ANALYSIS OF FOUR STROKE DIESEL ENGINE USING COTTON SEED AND NEEM BIO-FUEL BLENDED WITH DIESEL

SOOSAI PETER SWATHI E

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— This project investigates the engine performance using a dual bio-diesel (cotton seed and neem) blend with the pure diesel. In the present world scenario, researches are concentrating in development of various types of bio diesel to meet the tremendous demand of fuel consumption due to the increases in automobiles and industries, which in turn increases the fuel price. From the literature study it is clearly identified that various alternative fuels like vegetable oils, animal oils and fish oils where already blended with diesel using various methods and the same was tested in diesel engines to identify the performance characteristics of these oils. From the literatures, it is noted that while blending oil with diesel lot of problems where arises due to the high viscosity of the oils. Therefore various technique where evolved for blending the oil with the diesel. Therefore this work mainly concentrates in extracting the oil from the Cotton and Algae plants and these are blend and mixed with diesel in various proportions. The prepared bio diesel was subjected to various initial testes such as viscosity test, flash and fire point test etc. Then the performance of this bio diesel on the modified CI engines was studied under various operating conditions. The obtained experimental results where compared with the diesel fuel in order to identify the increase in the performance characteristic of the newly extracted bio diesel

Key words:Cotton and neem biodiesel, Trans esterification, Engine emission testing

IC A 46 **DESIGN AND ANALYSIS OF EXHAUST COLD-END OPTIMIZATION FOR PASSENGER VEHICLES**

RAJESH E

Department of Mechanical Engineering, Rohini College of Engineering and Technology

Abstract— The aim of this paper is to optimize the cold end of the exhaust system in a 1.2 L gasoline engine passenger vehicle to eliminate the sub-resonator for attaining value targeted results in terms of on-road noise and back pressure performance with a weight reduced exhaust system. Conventional exhaust cold-end system will have two separate parts, muffler and sub-resonator to satisfy the NVH target. In this project, best results are achieved by the Muffler itself without having the sub-resonator. The muffler optimization also helps to keep the Vehicle noise & back pressure within the target criteria .The results helps to reduce the weight of the system hence also increasing the fuel efficiency of the system with satisfying the noise & backpressure target. The increase in fuel efficiency plays an important role in reducing CO2 of the exhaust system.

IC A 47 RECENT TRENDS IN GRAPHENE MATERIAL AND ITS APPLICATIONS

Dr.P.ANAND

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Abstract— Graphene is an atomic-scale honeycomb lattice made of carbon atoms. Graphene is undoubtedly emerging as one of the most promising nano materials because of its unique combination of super properties, which opens a way for its exploitation in a wide spectrum of applications ranging from electronics to optics, sensors, and bio-devices. Graphene based nano materials have many promising applications in energy-related areas. Graphene improves both energy capacity and charge rate in rechargeable batteries, activated graphene makes superior super capacitors for energy storage, graphene electrodes may lead to a promising approach for making solar cells that are inexpensive, lightweight and flexible, and multifunctional graphene mats are promising substrates for catalytic systems. Day by day the trends and scope are increasing. Potential graphene applications include lightweight, thin, flexible, yet durable display screens, electric/photonics circuits, solar cells, and various medical, chemical and industrial processes enhanced or enabled by the use of new graphene materials.

IC A 48 EVALUATION OF PROPERTIES OF GREEN SAND MOLDING USING SILICA STONE POWDER BY VARIOUS BINDERS

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Abstract— A good casting can be produced only with the use of good quality molding sand. The green sand molding is one of the conventional processes of molding techniques usually employed for producing castings in the foundry. The main constituents of molding sand are the sand, binder and additives. The properties of the molding sand depends upon those major constituents. The properties like green compression strength, dry compression strength and permeability can be varied by mixing various additives with the molding sand. The casting quality has been improved with the help of different additives added to the green sand in correct proportions. The main focus of this project is to attempt on investigation on properties of sand mold casting using Silica stone powder. Silica stone powder and oils binder are mixed with the green sand and properties like green strength, dry strength and permeability were tested and tabulated. The standard specimen of AFS (American Foundry Society) size has to be made with different proportions of oils and silica stone powder. The properties like green compression strength and permeability have been checked with help of permeability meter and universal strength testing machine. The strategic points are to be evaluated and the aluminium, brass, gun metal castings were made as per effective points. The sample specimen satisfies industrial requirements. Thus silica stone powder can be used as a best alternative for natural silica sand in industries.

Key words: Silica Stone Powder, Green Compression Strength, Dry Compression Strength, Permeability, Scanning Electro Microscopy, Neem oil, Palm oil.

IC A 49 MANUFACTURING OF ALUMINIUM REINFORCED WITH QUARTZ IN COMPOSITES

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Abstract— In recent years the demand for the light weight material, low cost and high performance material was needed. Due to that the aluminium matrix composite is developed. Stir casting is the simplest and economical way for producing aluminium matrix composite. In present work the production of aluminium matrix composite is reinforced with various weight percentage of quartz by stir casting method. The aluminium alloy was melted in a furnace and quartz particles were added. After adding the quartz the aluminium alloy was stirred to form a vortex.

Quartz particles were observed distributed homogeneously in aluminium matrix composite. The composite melt will solidify as a permanent mould. Reinforcements used are to reduce the melting temperature, increase the fluidity and increase the hardness of the alloy. The resulting composites cast to be test for their mechanical properties. Experimental result shows that addition of quartz in aluminium alloy resulted in improvement in hardness and tensile strength. Dry sliding wear behavior of AMC was analyzed with the help of pin on disc wear and friction monitor.

The wear test revealed the addition of quartz helped to decrease the wear rate. The micro structural of fabricated alloys were analyzed by scanning electron microscopy. From the SEM result the casting defect and improper defect was analyzed. The present analyze reveal the improved hardness which result in increasing the wear resistance.

IC A 50 INVESTIGATION ON THE PROPERTIES OF SAND MOLD USING FLUE DUST EXTRACTED FROM STEEL POWER PLANT

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Abstract— Natural silica sand is mainly used in the preparation of moulds and cores by green sand and dry sand moulding processes. Due to its growing demand in different industries, such as civil, abrasive and ceramic industries and lesser availability, the cost of natural silica sand is increasing. For a long time, foundries have been looking for suitable alternative materials and methods for making moulds and cores. It is known that steel industry generating solid waste powders such as iron ore waste and flue dust in large quantities. A safe disposal of these wastes is still a matter of debate and a growing environmental concern. In this direction, the present research work aims to use these industrial wastes in green sand moulds and cores. For the chosen materials, namely iron ore waste, steel industry Flue dust, in comparison to those of silica sand, were studied using SEM analysis, sieve analysis. The waste powders demonstrated similar physical and chemical properties such as weight reduction, elemental composition, refractoriness, etc., as silica sand. An attempt has been made in this work to make moulds and cores using a mixture of waste materials, binders and natural silica sand. Bentonite binder is used. A number of samples as per the American Foundry Society (AFS) standard were prepared with different iv combinations of silica sand, waste powders and binders and their behaviors such as permeability, green compression strength, dry compression strength and flowabilitywere studied and compared. Sample moulds were prepared and molten aluminium was poured for casting. Finally, the aluminium castings were inspected for surface finish (before and after machining), hardness, dimensional accuracy, porosity, etc.

IC A 51 **A NOVEL INVESTIGATION OF HEAT TRANSFER CHARACTERISTICS IN RIFLED TUBES**

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Abstract—

Rifled or ribbed tubes can be used to improve the heat transfer efficiency of heat exchangers. The heat transfer of water flowing in a rifled tube was investigated at different pressures in a rifled tube heat exchanger. The heat transfer characteristics in rifled tubes were analysed under various operating conditions in the experiment. The working fluids used in shell side and tube side are cold and hot water.The inner and outer diameters of the inner tube are 27.8 and 52.6 mm, respectively. The rifled tube was made of the stainless steel with 4 ribs, 27.8 mm outer diameter, 0.95mm rib height, 28^{o} helix angle and the length 1700 mm. The experiment was performed in order to determine the effect of pressure, wall heat flux and friction factor on rifled tube. The results shows an improved performance rate compared with smooth tube. Performance factors likeNusselt number, Reynolds number is also increased with the heat transfer rate when compared to smooth tube.Result also confirms that, the friction factor obtained from the rifled tube is significantly higher than that of smooth tube. Further studies can be made with modified rifled tubes with different helix angles and dimensions and their heat transfer characteristics can be investigated.

Keywords - Heat transfer coefficient, mass flux, rifled tubes, friction factor.

IC A 52 PERFORMANCE ANALYSIS OF SOLAR WATER HEATER USING WASTE HEAT FROM AN AIR CONDITIONING SYSTEM

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Abstract—

The aim of the project is to analyze the performance of solar water heater using waste heat from an air conditioning system

The technology of a solar water heater and a domestic air conditioner in residences will be developed in this project. The earlier water heater suffered from drawbacks like lack of heat source high costs and unreliable operation. This project introduces a novel water heater product that can achieve the multi-functions with improved energy performance. The basic design principles and the fabrication are presented. The results showed that by incorporating a water heater in the outdoor unit of a split-type air-conditioner so that space cooling and water heating can take place simultaneously, the energy performance can be raised considerably.

IC A 53 **GREEN PURIFICATION BY ARTIFICIAL PHOTOSYNTHESIS**

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Abstract— Providing clean and sustainable energy to all degree of people has become an important factor. Production of energy for the people of the world is one criteria. Whereas utilizing the products of the world without any harm to the environment is the most important of all. In this overpopulated world, factories, industries, transportation and even people have decreased the amount of oxygen content in the earth by releasing many emissions and effluents into the atmosphere. In order to increase the amount of oxygen present in the earth's atmosphere, a chemical process called Artificial Photosynthesis is accounted in this project. The artificial photosynthesis mimics the natural photosynthesis taking place in the plants. In artificial photosynthesis, the water molecules are split into its base components, hydrogen and oxygen, with the help of the artificial leaf and sunlight. In this work, a simple artificial leaf with the cell arrangement is made with cobalt acetate coated ITO as the anode and nickel zinc as the cathode. With this cell the waste water is split into hydrogen and oxygen. The decrease in the level of water level when the whole setup is kept in sunlight clearly shows the splitting up of the components.

Keywords: Artificial Photosynthesis and ITO

IC A 54 MECHANICAL PERFORMANCE STUDIES ON PALMYRA WASTE/COIR FIBER HYBRID COMPOSITES

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Abstract— Fiber-reinforced polymer composites have played a dominant role for a long time in a variety of applications for their high specific strength and other mechanical properties. Such as glass, carbon etc., have been used in fiber-reinforced plastics. In this connection, an investigation has been carried out to make use of coir and palmyra as a hybrid in which both the fibers are abundantly
available in India. Natural fibers are not only strong and light weight but also relatively very cheap. Uses of eco-friendly fibers are also known as natural fibers gained importance in the recent years due to its bio-degradable properties. We have considered the mechanical properties of composites that are made up of palmyra waste and coir fiber. In the present days, the utilization of palmyra waste and coir fiber is high strength and low weight. The mechanical properties such as Tensile, Flexural, Hardness, Moisture and impact strength. Fibers are in ratio of 20%,30%,40% and 50%.Length of 30mm and 40mm are taken and compared.composites are made by compression moulding.Moisture test done using salt and distilled water and the specimen were tested for 24,48,and72 hours.

KEYWORDS: Palmyra waste,coir,polyester,flexural.

IC A 55 **EROSION STUDIES ON ALUMINIUM BASED B4C REINFORCED COMPOSITE**

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Abstract— There has been a great interest for improving the composite materials in the scope of nuclear based application. In the present paper, B4C reinforced aluminum based metal matrix composite is prepared to investigate the erosion behavior. The process adapted in this preparation for the composite is stir casting process. The composite has much scope in the industries with reference to the wear of the material. The study showed that the incorporation of B4C particles resisted the material towards erosion. Also, the study showed that the micro grooves and abrasion are present on the surface of the composite.

Keywords: Erosion, Composite, Stir Casting

IC A 56 ABRASIVE WATER JET MACHINING ON INCONEL – 718ALLOY

FRIEDRICH BERGIUS PAUL P

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Abstract— There has been a great interest for improving the composite materials in the scope of nuclear based application. In the present paper, B4C reinforced aluminum based metal matrix composite is prepared to investigate the erosion behavior. The process adapted in this preparation for the composite is stir casting process. The composite has much scope in the industries with reference to the wear of the material. The study showed that the incorporation of B4C particles resisted the material towards erosion. Also, the study showed that the micro grooves and abrasion are present on the surface of the composite.

Keywords: Erosion, Composite, Stir Casting

IC A 57 EFFECT OF DEPOSITION PARAMETERS ON THE EFFICIENCY OF ELECTROLESS DEPOSITION

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Abstract— In this paper, the conventional method of coating is investigated in some detail. The emphasis is on establishing the influence of deposition parameters that will have a bearing on the efficiency of coating. Along with this the quality of the coating produced in terms of the phase composition of the deposit is also investigated. Results of investigations on one of the important effect of concentration of stabilizer on crystallinity, efficiency of coating etc. are presented and discussed.The stabilizer (sodium citrate) plays an important role on deposition of electroless nickel. If the stabilizer content is too low the bath becomes unstable due to the onset of homogeneous chemical reaction over the entire bulk of the solution in preference to the controlled autocatalytic reaction over the specimen surface. On the other hand too high a stabilizer concentration results in the reaction getting inhibited.It is seen that the Nickel Recovery Efficiency (Ni_r) decreases with the increase in the stabilizer concentration. The reason has probably more to do with the kinetics: apparently the rate of reaction slows down with increasing stabilizer content. However the Coating Efficiency (Ni_c) is not affected significantly

Key Words: Electroless Deposition, Stabilizer, Efficiency, Crystallinity

IC A 58 AN IMPROVED MULTI-OBJECTIVE DEA FOR SCHEDULING JOBS USING CLOUD CONCEPTS

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Abstract— The advent of Cloud based technologies in manufacturing industries has changed the way of how the manufacturers perform their business. The concept of cloud computing allows the users to use the services and resources hosted by third party by choosing any one of the pricing model like pay per use, auction based pricing and advertising based pricing. Cloud Manufacturing is a new service oriented paradigm that uses smart technologies to incorporate several manufacturing resources from multiple geographical locations for maximizing profit during production. In this work, a multi-objective scheduling model (MOGA) based on Differential Evolutionary Algorithm (DEA) is used for adaptive task scheduling strategy. This mechanism is used to optimize the virtual machine energy from the perspective of the cloud task scheduling. But when optimizing energy efficiency, execution time of tasks may increase which leads to maximize makespan. Simulation were carried out using cloudsim tool, to evaluate the performance of the proposed approach. The simulation results show that DEA performs well in terms of makespan minimization, convergence speed and robustness and it provides an alternate choice for optimal resource allocation.

Keywords: Cloud Manufacturing; Differential Evolutionary Algorithm (DEA); adaptive; scheduling; Tasks and Resources; makespan