ICAMES-2K20

2nd International Conference on Advances in Mechanical Engineering Sciences

Mandya, karnataka

28th - 29th February, 2020

Organized By

P.E.S. College of Engineering (PESCE), Mandya

in Collaboration with

Institute For Engineering Research and Publication (IFERP)

Twinning Partner

UNSIET, VBSPU, Jaunpur, UP

in Association with

Binghamton University, State University of New York

Rudra Bhanu Satpathy
Chief Executive Officer
Institute For Engineering Research and Publication.

On behalf of ***Institute For Engineering Research and Publications (IFERP)*** in association with ***PES College of Engineering(Mandya), Binghamton University(State University of New York), Uma Nath Singh Institute of Engineering and Technology, Veer Bahadur Singh Purvanchal University, Jaunpur*** am delighted to welcome all the delegates and participants around the globe to **PES College of Engineering (PESCE)** for the ***"International Conference on Advances in Mechanical Engineering Sciences"*** Which will take place from ***28th- 29th February'2020***

It will be a great pleasure to join with Engineers, Research Scholars, academicians and students all around the globe. You are invited to be stimulated and enriched by the latest in engineering research and development while delving into presentations surrounding transformative advances provided by a variety of disciplines.

I congratulate the reviewing committee, coordinator **(IFERP, PESCE, UNISET, Binghamton University and TEQIP** and all the people involved for their efforts in organizing the event and successfully conducting the International Conference and wish all the delegates and participants a very pleasant stay at ***Mandya, Karnataka.***

Sincerely,

Rudra Bhanu Satpathy

Preface

The ***"International Conference on Advances in Mechanical Engineering Sciences (ICAMES 2K20)"*** is being Organized jointly by ***PES College of Engineering, Mandya*** along with our twinning partners ***Uma Nath Singh Institute of Science and Technology, Binghamton University(State University of New York), TEQIP*** in Association with ***IFERP-Institute for Engineering Research and Publications*** *on the 10th – 11th January, 2020.*

PES College of Engineering, Mandya has a sprawling student –friendly campus with modern infrastructure and facilities which complements the sanctity and serenity of the major city of Guntur in Andhra Pradesh.

The ***"International Conference on Advances in Mechanical Engineering Sciences (ICAMES 2K20)"*** was a notable event which brings Academia, Researchers, Engineers, Industry experts and Students together.

The purpose of this conference is to discuss applications and development in area of **"Recent Advances in Mechanical Engineering Sciences and its allied fields"** which were given International values by ***Institute for Engineering Research and Publication (IFERP).***

The International Conference attracted over 139 submissions. Through rigorous peer reviews 54 high quality papers were recommended by the Committee. The Conference aptly focuses on the tools and techniques for the developments on current technology.

We are indebted to the efforts of all the reviewers who undoubtedly have raised the quality of the proceedings. We are earnestly thankful to all the authors who have contributed their research works to the conference. We thank our Management for their wholehearted support and encouragement. We thank our Principal for his continuous guidance. We are also thankful for the cooperative advice from our advisory Chairs and Co-Chairs. We thank all the members of our local organizing Committee, National and International Advisory Committees.

ICAMES 2K20

Message from Hon'ble Chairman, PESCE, Mandya

Dr. H. D. Chowdaiah

Hon'ble Chairman

PESCE, Mandya

I am pleased to welcome you to the **2nd "International Conference on Advances in Mechanical Engineering Sciences (ICAMES-2K20**)" on 28th & 29th February 2020. The conference is being jointly organized with Twinning Partner UNSIET, VBSPU, Jaunpur, UP (under TEQIP-III), in association with State University of New York (SUNY), Binghamton, New York, USA, in collaboration with IFERP and is funded by TEQIP-III.

The intent of any conference is not only to discuss the emerging issues of a particular domain but also dissemination of the awareness among other learned folks. Over the years, dramatic improvements have been made in the field of Mechanical Engineering Sciences. I hope ICAMES-2K20 will become surely the most important International conference dedicated in bringing out latest trends in Engineering and Technology.

I hope ICAMES-2K20 will make you aware of state-of-the art systems and provide a platform to discuss various design issues and challenges.

With best regards

Dr. H. D. Chowdaiah

Keynote Message from Principal, PESCE, Mandya

Dr. H. V. Ravindra

Principal

PESCE, Mandya

Dear colleagues and guests,

I am delighted to note that the PESCE, Mandya is organizing the 2nd International Conference entitled **"International Conference on Advances in Mechanical Engineering Sciences (ICAMES-2K20)"** on 28th & 29th February 2020. The conference is being jointly organized with Twinning Partner UNSIET, VBSPU, Jaunpur, UP (under TEQIP-III), in association with State University of New York (SUNY), Binghamton, New York, USA, in collaboration with IFERP and is funded by TEQIP-III.

Certainly, this type of conference not only brings all the researchers, students at one platform, but it also inculcates the research culture among the entire fraternity of Education in the country, thereby, contributing to the development of nation.

The various thematic sessions will showcase important technological advances and highlight their significance and challenges in a world of fast changes. I welcome all of you to attend the Keynote speech sessions, plenary sessions, oral presentations and invite you to interact with the conference participants.

I hope that this conference would certainly induce innovative ideas among the participants paving way for new inventions and technologies in Mechanical Engineering Sciences.

I wish the conference a grand success.

Dr. H. V. Ravindra

Message from Chief Guest and Keynote Speaker, ICAMES-2K20

Prof. Michael Testani

Director of Industrial Outreach and Continuing Professional Education
Binghamton University's Thomas J. Watson School of Engineering and Applied Sciences.

MESSAGE

Dear colleagues,

On behalf of State University of State University of New York (SUNY), Binghamton, USA as MoU Partner, it is heartening to participate in the second **"International Conference on Advances in Mechanical Engineering Sciences (ICAMES-2K20)"** at PESCE, Mandya, Karnataka and to meet experts in the field of Mechanical Engineering Sciences.

It is a great platform to gather researchers from academia, industry and at the same time students to attend the conference. This combines three important ingredients to succeed as a technical society developing technology to make our lives better.

I thank Dr. H V Ravindra, Principal for his constant support and encouragement to conduct such a prestigious conference in the state of Karnataka, India. My sincere gratitude's are towards our vibrant Mechanical Engineering Sciences faculty and staff members for their un-tired efforts towards the conference.

I should take the ICAMES-2K20 event as an excellent opportunity to share my advances in the field, to create synergies between different researchers in academia and industry, to analyze how technology is evolving, and finally to motivate our young engineers to do it better than us.

I wish you the best experience.

Message from Chief Guest and Keynote Speaker, ICAMES-2K20

Prof. (Dr.). Rohit Y. Sharma

Associate Professor

Dept. of Electrical Engineering,

IIT Ropar, India

MESSAGE

2nd "International Conference on Advances in Mechanical Engineering Sciences (ICAMES-2K20)" of PESCE, Mandya, Karnataka, India, has a vision to make the researchers to have good social networking in the areas of Mechanical Engineering Sciences, and bring forward to the society their contributions. The conference provides platform for researchers exchange the ideas for further progress in research and development.

I thank Dr. H. V. Ravindra, Principal, PESCE, Mandya for inviting me as a chief guest and keynote speaker for the prestigious conference in PES College of Engineering, Mandya. I have a great opportunity to share my expertize to the distinguished participants.

The conference has peer reviewed process for all the articles to maintain the quality interactions and keynote sessions have been arranged to benefit the researchers to work on recent challenges in emerging technical areas. The organizing committee of PESCE, Mandya has done a good job in bringing out the proceedings, thanks to committee.

I wish all the conference participants and organizers a big success!

Message from Keynote Speaker, ICAMES-2K20

Dr. Somashekhar S. Hiremath

Associate Professor

Department of Mechanical Engineering

IIT Madras

MESSAGE

Distinguished Participants,

It is an honor for me to join all of you at the **2nd International Conference on Advances in Mechanical Engineering Sciences**, and Family of PESCE, Mandya.

I would like to congratulate the PESCE Mandya for convening this Conference and for asking me to speak on a topic of my expertise: Advanced Machining Processes.

"Advances in Mechanical Engineering Sciences" is the Conference theme. The intent behind the multidisciplinary international conference is to provide a common platform, where academia, delegates from industry and nominees from various Government and Private Universities and Institutions can sit together, and cherish about achievements so far, as well as deliberate upon futuristic approaches along with major bottlenecks.

Thank you all for your presence and participation. And you are the very important part of the Conference success.

Thank you and enjoy the Conference and your stay in Mandya.

Message from Keynote Speaker, ICAMES-2K20

Dr. L Prasanna Kumar

Professor

Geology, Coordinator for Bio Fuel Centre

PESCE, Mandya

MESSAGE

I am pleased to know that PES College of Engineering, Mandya, Karnataka, is organizing Second **"International Conference on Advances in Mechanical Engineering Sciences, (ICAMES-2020)"**. I am sure that this conference, which brings together Scholars, Academicians and Researchers, will be an influential forum for interesting and productive discussion.

I am sure that sub-themes of the conference will provide an opportunity to student, teachers and researchers to learn some recent developments in this field. I hope the contents of the proceedings will go a long way in dissemination of knowledge in the field of engineering and technology.

I thank Dr. H V Ravindra, Principal for his support and motivation in carrying out a conference in PESCE Campus. My sincere thanks are towards our vibrant Mechanical Engineering Sciences faculty and staff members for their efforts towards the conference.

ICAMES-2K20

2nd International Conference on Advances in Mechanical Engineering Sciences

Mandya, karnataka, 28th - 29th February, 2020

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ICAMES-2K20

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ABSTRACTS

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Experimental Study of Speed Range for a Hybrid Electric Powertrain System

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Abstract:--

In a hybrid drive train initial loads are taken by a motor and after a certain speed internal combustion engine starts working in tandem with the motor to provide load sharing. This transit in power from motor to engine has to be achieved in such a way that there are no vibrations experienced by the passengers and no damage is sustained by either power source or any auxiliary components. In an Internal Combustion Engine there will be an optimum specific fuel consumption range for a particular load and Engine Speed. When the engine is operating in this optimum range of specific fuel consumption, switching from a brushless DC motor to an internal combustion engine will result in a better fuel consumption rate. This paper discusses the specific fuel consumption characteristics in an internal combustion engine to determine the optimum speed range in a hybrid electric system. A four cylinder four stroke 65 hp petrol engine coupled to a hydraulic dynamometer was used to determine engine performance to understand the characteristic curve of fuel consumption at various loads from 4 kg - 8 Kg. The experimental results show a decline in specific fuel consumption characteristic curve for the speed range of 1500-2000 rpm. An interpolation model can be applied to understand the speed range for various loads. The transit in power from a brushless DC motor to an internal combustion engine during the above mentioned speed range is more viable and fuel efficient. The scope of this research extends to the transition from IC to hybrid and electric vehicle segments in current scenario of evolution in the automotive industry.

Index Terms:--

Hybrid Vehicles, Battery electric vehicle, Specific fuel consumption

Multiple Response Optimizations on Performance Characteristics and Emissions of CRDI Diesel Engine Fuelled with Neem Biodiesel Blends

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Abstract:--

Biodiesel is a clean and alternative fuel for replacing traditional petroleum diesel. It has high lubricating property and burns cleaner when compared to diesel in existing unmodified diesel engines. Biodiesel consists of fatty acid esters obtained by transesterification of vegetable oil. The seeds of Neem contain 30-40% of oil and biodiesel is obtained from Neem oil through transesterification process. Tests are conducted for Neem biodiesel blends (NB5, NB10, NB15 and NB20) by varying engine performance parameters such as Injection time, Injection pressure and load on unmodified computerized CRDI diesel engine. Taguchi is used for Design of experiments (DoE) to minimize number of experiments. An L16 orthogonal array was considered for experimentation with four columns (Blend, IT, IP and Load) and 16 rows. Grey relation analysis is used to find the multiple response optimizations and S/N ratios are used to find the significance of independent variables on output responses. S/N ratio mean plot signifies that blend percentage of NB15, IP 480 bar, IT 23˚ bTDC and load of 9kg (A3B2C3D3) is the optimum combination corresponding to low emissions and maximum performance of CRDI engine.

Keywords:

Taguchi, Grey relation analysis, Neem Biodiesel.

Production of Hydrochar from Domestic Kitchen Waste Using Hydrothermal Carbonization

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Abstract:--

Organic waste from household at present is converted to biogas and manure through anaerobic digestion process. Often the digestion process is slow and the obtained products need additional processing further delaying utilization of waste. Hydrothermal carbonization (HTC) is a novel thermochemical process that converts domestic wet waste to useful solid fuel called hydrochar. HTC is a fast process needing only few hours and the products are sterile. This means, the produced hydrochar can be handled safely by waste handlers (paurakarmikas). HTC process involves processing the wet waste in a reactor at temperatures exceeding 180 °C for several hours in the presence of water.

The present work involves application of HTC technique to convert the household wet waste to hydrochar. A batch reactor was designed and fabricated to withstand temperatures above 250 °C, and pressure of about 1.5 MPa. The experiment involves heating the reactor and its contents to temperatures of 200 °C for up to 2.5 hours in an oven. The hydrochar thus obtained was checked for its microstructure and composition using SEM and XEDS analyses. The results from the microstructure analysis shows that the food fibres are not completely broken down at the experimental conditions. Overall, the hydrochar had porous structure with pore diameters in the range of 10 - 100 μm. The XEDS analysis shows the presence of Nitrogen and Oxygen along with Carbon, which indicates hydrochar as an alternative fuel and can lead to safe disposal of wet waste.

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Mechanically Flexible Polymer Based Soft Materials for UV-protective Applications

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Abstract:--

Rapid changes in global atmosphere and thinning of ozone have all contributed to exponential research and development on UV-protective materials. Accordingly, various organic UV absorbents were extensively explored for UV shielding applications, however their low photo-stabilities and related photo-bleaching effects limited their widespread applications. Which in-turn paved way for inorganic nanofillers introduced polymer based mechanically flexible UV shieldants. Besides, most optical applications demand UV shielding polymer nanocomposites with appreciable optical clarities. Consequently, various researchers explored diverse filler/polymer combinations for UV shielding applications. Herein, an attempt is made to shed light on various filler, polymer and composite related factors leading to the successful development UV-protective materials.

Key words:

UV-protective, Mechanically flexible, Visibly transparent, UV shielding.

Risk Maturity Model Framework for Enterprise Risk Management – A Review

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Abstract:--

In today's scenario, every organization is exposed to a diverse range of risks from different sources. Increased unpredictability in the world of business has uncovered the ineffectiveness of traditional risk management approaches. This has given rise to an approach which is integrated in measuring and monitoring risks known as the Enterprise Risk Management. Enterprise Risk Management and its frameworks have been a common agenda for all types of organizations. And adapting it within the organization will help in decreasing the organization's exposure to risks. One of the frameworks is the Risk Maturity Model, which helps in measuring the alignment of risk management practices followed by the organization with the best practices of the maturity model. In this regard, this paper discusses about the Enterprise Risk Management and its generally accepted framework i.e., the Risk Maturity Model. The attributes of Risk Maturity Model and the advantages of implementing it within an organization is also presented.

Keywords:

Enterprise Risk Management, ERM Frameworks, Risk Maturity Model.

FEM Evaluations and Fabrication of Carbon Fiber Reinforced Polymer Laminates with Induced Discontinuities

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Abstract:--

The paper aims to study the possible discontinuities in the laminates resulting due to fiber extension and the influential behavior of the CFRP. The standard pattern of discontinuities is induced initially in the laminates prepared using CFRP prepreg with its impact on the strength is quantified experimentally. Experimental and Numerical studies are proposed to quantify the behavior of CFRP with induced continuities

Development hybrid Composites An approach for Cenosphere filled with Jute, E-glass fibre and comparison with 0 & 5 wt % Cenosphere

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Abstract:--

Composites plays predominant role in the Engineering materials and wide verities of applications in the Universe. The development of new generation of the composites have been undertaken to satisfy with equivalent material properties including Physical and Mechanical behaviour. Advanced composites requires different properties like, good appearance, Light in weight, Stronger than conventional metals and economics. In the present work, Cenosphere is being used with Jute, E-glass fibres and forms a composite. This composite have been developed and tested with comparative studies based on the weight. This studies found that the effect of cenosphere as a particulate filler of mechanical behaviour of woven jute-glass hybrid composites. The hybrid consists of jute and glass fibre as reinforcement and epoxy matrix. The conventional hand lay-up technique is used to prepare composite specimens. Cenosphere of different weight percentage (0 to 5 wt %) have been added to the hybrid composite. The samples were tested as per ASTM standard for their mechanical behaviour's and also compared the effect of filler material. The morphologies of the composites have been studied by using electron microscope. The morphologies results and test results felt found that 10% improved mechanical behaviour in tensile and compression strength.

Index Terms—

Cenosphere, E-Glass fibre, Jute fibre, Epoxy Resign and composite material, UTM

Tribological Properties of Sisal Fiber Reinforced With Basalt and Glass Fiber for Composite Application

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Abstract:--

In a creativity world man will be looking for a easiest method to find a life of daily used things like house hold utensils, construction purposes, moving vehicle purposes and other uses etc. like composite materials it has a long life, less price, easiest way of getting, high strength and so on. In this paper we research a fiber on easily get from nature ie sisal fiber that we can get from the sisal plant and with this two more will be added one is basalt fiber get from basalt rock, and other is glass fiber. The three fibers are using different streams with an epoxy resins like sisal and epoxy; basalt and epoxy; glass and epoxy; sisal, basalt and epoxy: sisal, glass and epoxy and finally glass, basalt and epoxy. For these combination use we can contrasting life of materials by conducting on wear test of two body (pin on disc) and three body abrasive wear test for calculating volume loss and wear rate. In two body wear test can be done by using 2 emery sheets at a grade of 150 & 320. Three body abrasive wear test can be done by varying a loads are 25kgs & 12.5kgs. what we get from the nature sisal and basalt fiber both are biodegradable and improving properties of composite material

Keywords –

Composite material, Sisal fiber, basalt fiber, glass fiber, tribological and epoxy.

Evaluation of Indigenously Developed One-Way Abrasive Flow Machine for Achievable Surface Roughness while Machining Mild Steel Specimen

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Abstract:--

Abrasive Flow Finishing (AFF) is a non -traditional finishing process mainly used to deburr, radius, polish and remove recast layer of components for achieving micro or Nano level finish on varies components. A silicon-based abrasive medium is constrained through the intricate geometries of work piece by piston cylinder arrangement. The medium is a blend of hard abrasive particles, low hardness polymer with proportionate measure of silicone oil to get proper blend similar to dough. The amount of each quantity in the blend influences the removal rate and surface finish. Process parameters such as operating pressure, number of extrusions, size of abrasive particles and its quantity in the mixture; tooling and fixture designs have significant effect surface quality and removal rate. This paper presents the development of indigenous one-way AFF setup and study of surface finish that can be achieved using the developed set-up

Keywords:

Abrasive Flow Finishing, abrasive media, surface roughness

Optimization of Tribological Behaviour of Al7075-B4c Metal Matrix Composites by Taguchi Technique

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Abstract:--

In the current investigation the dry sliding wear behaviour of Al7075 reinforced with Boron Carbide using Taguchi method was investigated. Two step stir casting technique was used to fabricate Al7075-B4C (6%, 9%, 12%) composites. Wear test has been carried out considering Load, Speed, Sliding Distance and Percentage of reinforcement as the parameters and the output responses were Co-efficient of friction and Wear rate. Adhesive wear tests were carried out using pin on disc apparatus as per L27 orthogonal array. The Objective of the model was chosen as "smaller the better" characteristics to analyse the dry sliding wear behaviour. Based on the Taguchi the optimum level parameters for wear rate and COF were identified. Results indicated that Load is the most influencing factor for the wear rate and Percentage of reinforcement is the dominating parameter for the coefficient of friction. Microstructural investigations of the worn surfaces was carried out using Scanning Electron Microscope.

Keywords:

Metal Matrix Composites, Stir Casting, Taguchi Method, Analysis of Variance, Pin-on-disc machine

Experimental Investigation of Mechanical and Tribological Behaviour of Al6061-TiO_2 Processed by Stir Casting Technique

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Abstract:--

Metal matrix composites have created distinct interest as a late adding to the strength to weight proportion, stiffness, good ductility, excellent corrosion resistance, availability and low-cost good creep resistance and fatigue properties over that of conventional engineering for advancement of composite with unique properties. Stir casting is one of the methods for production of MMC's tribological and mechanical properties have not worthy part in production of MMC's utilize extensively in automotive and aircraft industries. The present investigation is an attempt made on Al 6061 base alloy by stir casting technique and studies its effect on wear characteristics of Aluminum 6061 alloy. Addition to Titanium dioxide particulate reinforcement has been varied from 2%, 4% and 6% by weight of base alloy. Stir casting composite specimens are fabricated and machined according to the ASTM standard. The tribological and mechanical properties has been examined and compared with that of base material Al 6061 alloy and significant improvement in wear resistance, hardness is noticeably increasing with an increase in weight percentage of TiO_2 was observed

Keywords:--

Al6061- TiO_2, Tribological behaviour, Stir Casting Technique

Experimental Investigation on Combustion and Emission Characteristics of Single Cylinder Diesel Engine Modified with Fuel Injector Geometry

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Abstract:--

Fuel injection parameters play an important role in diesel engine performance for obtaining proper combustion. The performance and emission characteristics of diesel engine depend on many parameters. An experimental study was conducted on a DI diesel engine at three hole (0.28mm diameter) and four hole (0.23mm diameter) fuel injector nozzle to study its effect on performance and emission by using conventional diesel fuel on the single cylinder four stroke engine with the engine working at different engine loads at compression ratio 16.5. The results obtained revealed that the performance, combustion, and emission characteristics of the modified engine (4-hole nozzle with an orifice diameter of 0.23 mm) were improved except NOX in comparison with those of the conventional diesel engine (3hole nozzle with an orifice diameter of 0.28 mm). The combustion in a diesel engine is governed mainly by spray formation and mixing. Important parameters governing these are droplet size, distribution concentration and injection velocity. Smaller orifices are believed to give smaller droplet size, with increase injection nozzle hole, which leads to better fuel atomization, faster evaporation and better mixing. The performance and emission characteristics were presented clearly to determine that they were found better with four-hole nozzle for the single cylinder diesel engine.

Keywords:

Emission Characteristics, Fuel injector geometry, Injector nozzle, CI engine combustion.

Design and Development of Three DoF Solar Powered Smart Spraying Agricultural Robot

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Abstract:--

In recent years the agricultural industry is revolutionized by automation and robotics that has resulted in reduction of labor and production costs with increased agri produce to meet the market demand. Manual spraying of pesticides and herbicides to crops and weed inhibitors onto the field are harmful to both humans and the environment. This paper proposes a solar powered, flexible, semi-automated pesticide spraying robot with three Degrees of Freedom (DoF) in movement. The micro-spraying system is operated by an Android app via Bluetooth. The robot is designed to spray pesticide/insecticide directly onto individual lesions minimizing wastage leading to reduced consumption of chemicals hence making the system cost effective and environmental friendly. The targeted pesticide delivery prevents dispersion of chemicals in the environment. A prototype is developed and tested on different terrain conditions and is found to operate efficiently.

Keywords:--

DoF, Pesticides, Robot and Spraying sprinklers.

Effect of Cyclic Extrusion and Compression Process on Impact Behavior of Aluminum Alloy AA6060

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Abstract:--

The fabrication of ultrafine-grained (UFG) materials has attracted a great deal of attention in recent years because of the recognition that these materials offer several engineering advantages such as high strength and good ductility at ambient temperature. In this work the effect of severe plastic deformation (SPD) during Cyclic Extrusion and Compression (CEC) on impact toughness of aluminum alloy 6060 is studied. An attempt is made to get an ultrafine grained material using specially designed CEC die. Charpy impact test result shows that the CEC processed samples absorbs more energy compared to sample of base material and also it is found that the impact strength of samples gets incremented upto 3rd cycle of CEC process. After 4th cycle there is not much appreciable increment in impact strength.

Keywords:--

Severe Plastic Deformation (SPD), Cyclic Extrusion and Compression (CEC), Impact Strength.

Integrated of Magnetic, Electrical and chemical analysis for diabetic medicine

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Abstract:--

Many Scientists are considered that Diabetes is Molecular traffic of transport in and out of cell is cannot produce enough insulin. The reason of large molecules not directly pass through the membrane, Vesicle traffic, Molecular collision, Molecular source and destination identification, Electrical charge of cell, Molecular movement, Digestion of large molecules, Attraction between molecules, Ion Channel, Protein signal (molecular signal). Generation of new cells created using preexisting cells. So, from this all phenomenon magnetic, electrical and chemical analytical method is used to solve diabetic disease. The transported of molecules through lipid bilayer using active (simple diffusion, channel mediated, carrier mediated) and passive transport (carrier protein with energy). The integrated method of chemical, magnetic and electrical procedures are easily resolve diabetic to adopt several procedure are explored with new drug creation to solve diabetics are explored.

Keywords:--

Diabetics, Compounds, Molecules, Electrical Conductivity, Magnetic.

A Study on the Effect of Cryotreatment on Copper Based Brass Alloys

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Abstract:--

With the enhancement of research and innovation in manufacturing industry, there comes the high demand for alloy materials that possess high physical and mechanical properties. Copper based alloys have attracted much attention when it comes to physical properties because of heavy demand for high mechanical strength, high electrical conductivity and cost effective materials from industry fields. Pure copper is a ductile material, having excellence resistance to corrosion, and a very high conductivity (%IACS). Pure Cu is so soft that it can be drawn into wires because of its large grain size. It is evident from the literature, that the addition of alloying elements can increase the strength of copper but at the cost of its other properties. The current study is an attempt to investigate the properties of the alloy after addition of brass to copper in various proportions and to carry out a deep cryogenic treatment to investigate the variations in the properties of the material. The study reveals that Deep Cryogenic treated samples have high hardness with a slight reduction in tensile strength and % elongation as when compared to that of non-deepcryotreatedsamples.

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Natural Convection in a Square Enclosure with Partitions

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Abstract:--

In the present study, the natural convection in a square cavity with partitions is investigated using control volume based computational procedure. The cavity is bounded by uniformly heating left vertical wall, right cold wall and the top and bottom horizontal adiabatic walls. The numerical simulations adopted in the present study yields consistent performance over a wide range of parameters (Rayleigh number $10^3 \leq Ra \leq 10^6$, Height of partition $0 \leq H \leq 0.4$ and $Pr = 0.7$) with respect to uniform heating and cold vertical walls. The Phenomenon inside the enclosure with centrally located and vertically varied partitions are also analyzed through isotherm pattern, streamline pattern, local and average Nusselt number. It is found that the average Nusselt number increases with increase of Rayleigh number. The conduction is dominated for a Rayleigh number up to 5×10^3 and increases further with increase of height of partitions vertically. It is noticed that when height of centrally located partition increased beyond a height of 0.3H, the heat transfer decreased drastically for all Rayleigh numbers.

Keywords—

Heat transfer; Square cavity; Natural convection; Partitioned enclosure; Rayleigh number.

Depth of Penetration and Surface Roughness Analysis of Aluminium 6061 cut by Abrasive Water Jet

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Abstract:--

Aluminium alloy are widely used as a matrix material in the production of metal matrix composites. These materials are gaining importance in aerospace and automobile industries due to their light weight and high specific strength. The present work aims to investigate the cutting ability of abrasive water jet on Aluminium 6061. The effect of input parameters, abrasive flow rate, water jet pressure and traverse speed of jet on depth of penetration and surface roughness are investigated. Trapezoidal shaped specimens have been cut by #80 mesh size garnet abrasives mixed with water jet. The dynamic parameters are varied at three levels making a total 27 cuts. Further, the effects of these have been investigated. Modeling of the average roughness value of aluminium 6061 alloy by dimensional method technique is carried out for both cutting and deformation mode regions. The model equations for both cutting and deformation regions are in good relation with the experimental values.

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Influence of Model Parameters in the Analytical Wake Profile of a Wind Turbine on Wind Farm Design

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A. T. Sriram, Ramaiah University of Applied Sciences (RUAS)

Abstract:--

This research paper compares the predicting capability of four different analytical wake models, namely Jensen, Larsen, Frandsen and Ishihara used in wind farm design. The available wind turbine experimental data was considered for the accuracy of prediction. The influence of various parameters used in the analytical model, particularly turbulence and thrust coefficient are of actual interest to this study. This article also reviews CFD methods for prediction. The simulated results shows that Larsen model predicts better than any other models. The modeling aspects of wind farm is also considered in this study. A 3 by 3 wind turbine forms a model wind farm in this study. Extension of this study on placement of wind turbine in a given area is considered for better power production.

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Estimation and Comparison of Electrode Wear and AE Parameters of Titanium and Stavax Materials in Wire Electric Discharge Machining using ANN

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Abstract:--

Wire Electrical Discharge Machining (WEDM) is a specialized thermal machining process capable of accurately machining parts with varying hardness or complex shapes, which have sharp edges that are very difficult to be machined by the main stream machining processes. Selection of process parameters for obtaining higher cutting efficiency or accuracy in WEDM is still not fully solved, even with most up-to-date CNC wire EDM machine. It is widely recognized that Acoustic Emission (AE) is gaining ground as a monitoring method for health diagnosis on rotating machinery. The advantage of AE monitoring over vibration monitoring is that the AE monitoring can detect the growth of subsurface cracks whereas the vibration monitoring can detect defects only when they appear on the surface. This study outlines the machining of titanium and stavax material using L'16 design of experiment and comparing the electrode status for each material. Titanium is used in engine applications such as rotors, compressor blades, hydraulic system components and nacelles. Stavax finds its application in the molding of medical components such as syringes and analysis vials. Each experiment has been performed varying different process parameters like pulse-on, pulse-off, current and bed speed. Among different process parameters voltage and flush rate were kept constant. Molybdenum wire having diameter of 0.18 mm was used as an electrode. Optimization of these process parameters are carried out to know the effect of most influencing parameters on the responses. Simple functional relationships between the parameters were plotted to arrive at possible information on electrode wear and AE signals. But these simpler methods of analysis did not provide any information about the status of the electrode. Hence more sophisticated method of analysis was used viz., Artificial Neural Network (ANN) for the estimation of the experimental values. EW and AE parameters prediction was carried out successfully for 50%, 60% and 70% of the training set for Stavax material using ANN. Among the selected percentage data, at 70% training set showed remarkable similarities with the measured value then at 50% and 60%.

Keywords

AE, Electrode Wear, ANN

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Stress Analysis of Fuselage Segment with Wing Attachment Bracket

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.

Abstract:--

The main objectives of this project are to present an identification of critical locations in ensuring the safety of aircraft structure and stress analysis is also carried out on structure. Finite element0analysis is overall used for stress analysis of the structure and to find out fatigue critical locations. Due to fluctuating loads, fatigue cracks are main problems which occurred during service life of aircraft. Generally, fatigue cracks may occur at maximum tensile stress locations in the aircraft structure. The current study about aircraft includes the local and global stress analysis of the fuselage shape near the wing attachment. Here in this paper fatigue and damage tolerance design, analysis, testing and service experience play an important role for the airworthiness of an aircraft during its entire service life. This project also includes fatigue damage calculation for an aircraft load spectrum. In aircraft metallic structure fatigue establishes itself to form a crack, which propagates. Fatigue life calculation also0carried out using constant amplitude S-0N data is used, if the crack in a critical location leads to a catastrophic failure of aircraft

Index Terms:

Aircraft fuselage, catastrophic failure, fatigue crack, FEA, stress.

Lateral Crushing Behaviour of Filled Aluminium Square Tubes

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H K Govindraju, BMS Institute of Technology and Management, Bengaluru
Ujval Chakravarthy B N, BMS Institute of Technology and Management, Bengaluru

Abstract:--

The energy absorbing devices are more commonly used in the fields like automobile structures and aerospace structures in order to convert the impact energy partially or totally into deformation energy. The objective of this project was to the study of lateral crushing behaviour of 6063 Aluminium thin walled tube filled with periodic structure and polyurethane foam under transverse loading. The lateral crushing behaviour of aluminium 6063 thin walled empty tubes and tubes filled with periodical structures and polyurethane foam were studied. From the lateral crushing test, it was observed that, when the lateral crushing load increases the tube was folded axially and tube undergoes large plastic deformation. The maximum force for empty tube is 94kN and the energy absorption was 546J, the maximum force for tube filled with polyurethane foam is 110kN and the energy absorption is 528.19J. The maximum force for tube with tetrahedral structure is 101kN and the energy absorption is 731.05J. The maximum force for tube with pyramid structure is 105kN and the energy absorption is 739.34J. The maximum force for tube with tetrahedral structure and filled with polyurethane foam is 119kN and the energy absorption is 1015.2J and the maximum force for tube with pyramid structure and filled with polyurethane foam is 3.6kN and the energy absorption is 1379.30J.

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A Comprehensive Survey on Energy Efficient Routing Techniques and Various Attacks in Wireless Sensor Networks

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Abstract:--

Demand and application of Wireless Sensor Networks (WSN) has grown rapidly during last decade. Along with real-time application scenarios, WSNs have attracted researchers also due to their significant impact on communication and wide range of applications. Wireless sensor networks follow distributed nature of sensor deployment, these networks are vulnerable to various threats which can affect the communication performance and functioning of WSN. These threats are widely known as security attacks on sensor nodes. Along with security threats, Quality of Service and energy efficiency is also considered as challenging task for researchers in WSN. For real-time applications, packet delivery and energy consumption is an important task which can improve the performance of wireless sensor network communication. Recent works are focused on the security, QoS and energy efficient communication in wireless sensor networks. In this paper, we present recent studies in the field of WSN which includes security, sensor node localization and energy aware communication for better quality of communication. a comparative study is also presented by considering various threats on WSN architectural layers. Similarly, energy aware approaches are also compared based on the recent advancements in the WSN. This study shows the current drawbacks of WSN communication.

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CFD Simulation of Direct Injection CI Engine Combustion and Optimization of Omega-shape Toroidal Piston Bowl Geometry for Emissions

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Dr. Jayashankara B, Professor (Retd.), PES College of Engineering, Mandya, India

Abstract:--

Flow fields are generated prior to combustion in internal combustion engines during the induction process in suction stroke and they undergo changes during the compression stroke. It is very essential to understand the fluid motion during suction and compression strokes for developing new engine designs with the best performance and emission characteristics. Therefore, computational studies have been carried out to comprehend the role of in-cylinder flow structure. In this 3D CFD, Ansys Forte V18 is used to study the incylinder fluid motion and performance and emissions of the direct injection compression ignition engines with flat piston bowl and Omega-shape toroidal piston bowl. The validation of the CFD results is done with the experimental results available for flat piston bowl. The optimization of the bowl geometry for Omega-shape toroidal piston bowl with fixed compression ratio has been carried out by varying the central pip height and toroidal radius. The obtained results are plotted during the compression stroke and expansion strokes and are analysed. The results showed that, the bowl shapes plays a significant role in the incylinder fluid motion, performance and emissions of compression ignition engines. It controls the fuel-air mixing and burning rates in compression ignition engines.

Index terms –

Compression Ignition Engine, Computational Fluid Dynamics (CFD), Optimization, In-cylinder Flow Structure, Bowl Geometry.

Development of Eco-Friendly Silencer

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Abstract:--

Automobile Silencer is a device used to reduce the noise produced by the engine. Silencer is used in automobile vehicles to reduce the noise produced by the exhaust gases of the engine. Silencer is also used in many other engines and generators. The size, shape and construction vary according to the type and size of the engine. The main pollutants contribute by automobiles are carbon monoxide (CO), unburned hydrocarbon (UBHC), oxides of nitrogen (NOx) and Lead. In the present work, an eco-friendly silencer is developed to reduce the pollution level from automobiles. As the exhaust smoke enters into the eco-friendly silencer system, the perforated tube converts high mass bubbles in to low mass bubbles, after that it is made to pass through the activated carbon layer which is embedded between glass fiber membranes to make filter like structure that surrounds the perforated tube which purify the gases. Activated carbon is highly porous and possesses extra free valences so it has high adsorption capacity. Hence eco-friendly silencer reduces pollution.

Keywords

Silencer, Exhaust gases, Activated carbon, Adsorption

Design Using Reverse Engineering and Analysis of Garden Tiller

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P Chinna rao, Assistant Professor, Mechanical Engineering, RGKUT- Srikakulam, A.P

Abstract:--

Garden tiller is used to plow the garden. Tiller means lifting up the soil, breaking apart the clods of dirt. This study is aimed at design of tiller blades using reverse engineering, fabrication of garden tiller and Analysis of tiller blade using ANSYS. The main process of reverse engineering consists of data acquisition system, data preprocessing, surface fitting and making a CAD model. In reverse engineering, we mainly handle point data of the surfaces of a model acquired by measuring devices such as co-ordinate measuring machine (CMM). Tiller blades with different dimension were developed by using co-ordinate measuring machine (CMM). Appropriate blade tip and length, the main dimension of blade is designed which reduce the energy requirement for tiller blade. Based on the dimension of tiller blades are fabricated and static analysis is done by using ANSYS software to get optimum results. Static analysis calculate the effect of steady loading condition on a blade, while ignoring inertia and damping effects such as those caused by time varying loads. Static analysis is to calculate the stresses, deflection and reaction force of a blade when subjected to a steady loading.

Index Terms -

ANSYS, CMM, Garden tiller, Reverse Engineering.

Analysis of Ergonomics for Making Precision Work in Indian Manufacturing Industry That Consider for Productivity

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V Sridhar, Assistant professor, Professor Nitte Minakshi Institute of Technology, Bengaluru, Karnataka, India

Abstract:--

Manufacturers are determining for automated equipment to accelerate and improve their productivity, but implement an ergonomically designed environment, further increases the productivity. In this context small scale manufacturers are lagging behind due to neglecting the ergonomics consideration. It is essential to consider ergonomics and production when designing workplace for manual material handling tasks. Process quality, costs and productivity highly influenced on the human postures (e.g. Mental and Physical work load, comfort, personal satisfaction etc.). In this study, we consider carrying the Multi-pin crankshaft in the container to load for CNC lathe machine. Present study made an endeavour to assess and improve the lifting height with respect to constant mass of the component in the digital environment using DHM (digital human models) for the prevention of work-related musculoskeletal disorders (MSD). The different postural score of body part obtained from an eminent validated posture analysis tools called rapid upper limb assessment (RULA) and Lower Back Analysis (LBA) are used for ergonomic design improvement for 50th and 95th percentile male workers.

Index Terms:--

Ergonomics, Lifting height, Lower back, RULA, Simulation.

Studies on Mechanical Investigation of Carbon Fiber/Fly Ash Reinforced Epoxy Hybrid Composites

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Abstract:--

EDAX and SEM images studies of fly ash reveals the chemical constituents present as spherical formed particles with diameter of less than 5 μm. The constituents of fly ash are calcium, alumina, silica and traces of other elements. The use of polymer matrix namely the epoxy (thermosetting) has been prepared by many researchers to develop polymer matrix fly ash particulate composites by using the basic properties of fly ash and light weight of polymers. Such composites have some poor mechanical properties stability. To prevail over these drawbacks, in carbonaceous matrix, the carbon fibers were added as additional reinforcement along with the fly ash formed particles at varying weight percentage. The hybrid composite laminates were fabricated by hand layup method. The mechanical characters of samples prepared as per ASTM were studied, such as tensile, flexural, impact and hardness. Among the samples fabricated and tested involving optimized percentage of fly ash filler present in hybrid, the mechanical assessment revealed to have higher strength, hardness and lower impact strength as compared to other of hybrid fly ash filled particulate composites.

Keywords:--

Carbon fiber, Fly ash filler, Thermosetting, Hybrid.

Effect of Hybrid Reinforcement on Mechanical Behavior of Al7075 Based Composites

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Abstract:--

This paper reports on the synthesis of Al7075 alloy-based hybrid composite added with multiple reinforcements such as mica (2 to 6%), fly ash (1 to 5%) and red mud (1 to 3%). Hybrid composites with varied weight percentage of reinforcements were synthesized by liquid metallurgical route and then machined to the required shape and size to carryout different tests. The produced composite specimens were subjected to microstructure study, hardness and tensile tests. Microstructure study revealed that the reinforcement particles are distributed uniformly throughout the matrix alloy with good bond between alloy and particles. Substantial improvement is observed in the hardness when compared with unreinforced Al7075 alloy. Tensile test reveals tremendous enhancement in ultimate tensile strength and yield strength of the composites, whereas ductility decreased with addition of reinforcement for all the composition studied when compared with unreinforced Al7075 alloy. Tribological properties like adhesive wear behavior of these composites are also studied. Influence of the heat treatment (solutionising and ageing duration) of hybrid metal matrix composites have shown remarkable improvement on mechanical and tribological properties.

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Man Power Reduction in Moulding Operations through SWCT study technique

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Abstract:--

This paper discusses Standardized Work Combination Table technique which aims at reducing the Non-Value-Added activities and in turn leading to reduction of Manpower. This technique is carried out in a moulding process of an automobile manufacturing unit. SWCT is an effective tool which can help companies to reduce the manpower without automation and without affecting the work by complete utilization of Man hours. Standard work combination tables shows exactly how all the activities of work are performed. Standardization of work includes TAKT time calculation, U-shaped lines, Kaizen, visual management and time analysis. Basic information about man and machines are recorded and analyzed to arrive at an effective and efficient utilization of the facilities without stopping the production activity. Further, this paper discusses the use and application of Line balancing techniques to meet required production rate with minimum or zero idle time. Finally, the paper reports a solution to improve the productivity in a manufacturing company by improving the line balancing.

Index Terms

Line balancing, Material handling, SWCT, TAKT Time.

Fabrication and Study of Mechanical Properties of Al 6061-B_4c Metal Matrix Composites

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Abstract:--

This work focuses on influence of reinforcements on microstructure and mechanical properties when compared to the base material (Al 6061). Boron carbide (B4C) was the reinforcement by varying the weight percentage as 0%, 2%, 4% and 6% using stir casting technique. Tensile and Hardness tests were carried out to evaluate the mechanical properties. XRD studies show the chemical composition of Boron carbide (B4C) particles and micro structural images reveal uniform distribution of reinforcement in the matrix. It is concluded that tensile strength and hardness of the cast composites increases with increase in the B4C particle wt.% in the cast composites.

Keywords

Al6061, Boron carbide, Stir Casting, XRD, SEM, Mechanical properties.

Condition Monitoring of Ball Bearings in Coffee Beans Processing Machineries – A Case Study

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Abstract:--

In today's scenario, the maintenance of any machinery is very important because of the downtime of machinery. The bearing sector is one of the examples without which not single rotating machinery work. Products of the bearing sector are of high value which leads to the aspects of bearing vibration & application in more demanding situations. This present work addresses Design, Experimentation, Finite element and Vibration analysis. Validation of ball bearing related to coffee processing machinery rotor system. Detail analysis using the vibration is measured using a handheld RIOVIBRO vibration meter(Model VM-63). FEM methodology is done to find out the possible deformation and finally validate with ANSYS workbench software19.2. Vibration recognized in Huller, Peeler cum Polisher and Grader in the rotor system test rig. Experimental evaluation & validation of ball bearing related to coffee processing machinery, ball bearing modeling exhausting in CATIA software and FEM analysis using ANSYS workbench 19.2.

Index Terms

Ball bearing , coffee machineries, fem and riovibro

Impact of Motivational Factors on Project Team Performance

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Abstract:--

Motivation is one of the fascinating subjects under organizational behavior science and thus, the study of motivational factors is one of the vital topics chosen by researchers across the globe today. Also, among many human aspects of project management, motivational factors occupies the prominent place in the list and by adopting right motivational strategy companies can benefit with improved project team performance followed by high degree of customer satisfaction. The subject matter of this research paper " impact of motivational factors on project team performance" is an attempt to understand on specific motivational factors considered by the companies while framing their own performance improvement programmes. A study conducted on this subject matter reveals the fact that, specific motivational factors tabulated by the researcher have an impact on project team performance. This paper exhibits and analyses the results of research survey conducted at select large sector companies in India. Based on this research study results, companies will get an opportunity to review their existing plan and to come out with their own motivational strategies to improve the overall performance of project team.

Index Terms

Motivation, motivational-factors, project-management, project-team-performance

Fluid flow and Free Convective Heat Transfer in Porous Trapezoidal Cavity with Non Uniform Heating

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Abstract:--

Steady state free convection heat transfer within a porous cavity trapezoidal shape with sinusoidal heating at constant aspect ratio. The left sidewall of the trapezoidal enclosure is heated and right sidewall of the trapezoidal shape is cooled. The other two parallel top surface and bottom surface of the cavity are adiabatic. The thermal parameters (Stream functions, Isotherms and Nusselt numbers) are performed for range of the Rayleigh number 10^2 to 1500 for an aspect ratio (H/L) of 0.5 of cavity .The present study is carried out for the trapezoidal cavity being heated sinusoidal with sidewall. It is found that constant or uniform temperature at right side wall of the cavity obtained higher Nu as compared to non uniform temperature cases, resulting in better enhancement of heat transfer rate and the results showed excellent agreement with other publications.

Keywords:-

Trapezoidal cavity, Natural convection, Porous medium, Non-uniform heating and Nusselt number.

Fluidization and Combustion Characteristics of Pine Needles in Fluidized Bed Combustor: An Experimental Investigation

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Abstract:--

Pine needle (PN) from the coniferous forest has enormous energy potential in Himalayan territories. The present study investigates the fluidization and combustion characteristics of PN in FBC. It is done in four steps: 1) Thermogravimetric Analysis (TGA) 2) cold-state characteristics 3) combustion tests 4) fly-ash analysis. At first, TGA demonstrates the physicochemical changes and confirms ignition, rapid devolatilization and combustion points for PNs. At second, Experiments on the cold-state show the mixing characteristics of PNs with silica sand indicates that the 3.00 mm PNs with 2% concentration mix well with bed material at fluidization number (FN=4). However, improper mixing was found because of little segregation above and below FN=4. Followed by the combustion tests (third step), in which the temperatures of the dilute phase region were found to higher than the combustion zone and secondary air have no significant effect on flue gas temperature. Additionally, the combustor had achieved combustor efficiency (ηCombustion) over 73.19%. The ash related problem had not appeared at the operating temperature range between 700-940ºC for 16 hours. At last, the fly ash suggests the combustor performance with the help of Scanning Electron Microscopy/Energy Dispersive X-Ray Spectroscopy (SEM/EDS), and Ash Fusion Temperature (AFT).

Keywords:

Pine Needles, Cold-State Behavior, Fluidized Bed Combustor, Ash Study.

Thermal Post-buckling of Composite Plates Subjected to Uniform Thermal Loading using Finite Element Method

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Abstract:--

The non-linear instability of laminated composite plates subjected o uniform temperature increment has been investigated numerically. A non-linear finite element model along with its source codes were established in this work. Applying the Newton-Raphson scheme via the total Lagrangian approach, the post-bifurcation paths were determined. Prior to that, the finite element method governing equation was developed applying the Mindlin's first order shear deformation theory for plates with moderate strains and the Hamilton principle. The model was validated with past results. Investigation was performed on the composite with anti-symmetric angle-ply configuration. Several factors that influence the non-linear thermal instability behaviour of the composite plates were studied on the plate with anti-symmetric and angle ply configuration. The influences of these parameters were found to be substantial. The investigation will thus be useful in applications such as automotive and aerospace vehicles.

Key Words:--

Mindlin's Shear Deformation Theory, Newton-Raphson method, Total Lagrangian Approach, non-linear Thermal instability

Analysis on Wear Properties of Graphene Hydroxyl Reinforced Aluminum Composites

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Sadashiva M, Assistant Professor, PES College of Engineering, Mandya
U N Karthik, PG Scholar, PES College of Engineering, Mandya.

Abstract:--

Aluminum is a noble material for the structural applications in aviation, naval, space and locomotive and automobile industries. The main disadvantage of aluminium is it's low wear strength. Carbon is a substitute for composing with aluminum as reinforcing material for enhancing the properties like hardness, wear strength as it act as self lubricating material. In the present paper the interest is focused on wear behavior of composite material when Graphene is reinforced with Aluminum as matrix which enhances the wear properties of the composition. It is discussed with the properties like co-efficient of friction, friction force and loss of material due to wear.

Key words:

Tribology, wear, co efficient of friction

Monitoring the Performance of Electrode Status and Surface Roughness in WEDM of Al-8% Si_3N_4 using Vision System

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Abstract:--

Conventional machining of composite materials causes serious tool wear due to the presence of abrasive reinforcing particles and thus reduced tool life. Wire electrical discharge machining (WEDM) is quite successful for machining of metal matrix composites. WEDM is one of the most widely used non-traditional machining processes in today's manufacturing industries. The most important performance parameters of WEDM are electrode wear and surface quality. Depending on the machining process, these parameters have varying significance. Recently, increased levels of automation in industries have focused the attention on the application of cost effective, reliable and fast procedures for performance parameters measurement. Due to ease of automatic processing of data, reliability and high resolution, the possibility of using vision system is discussed in this paper. Present study outlines the performance monitoring of electrode status and surface roughness in WEDM of Al-8%Si_3N_4 using machine vision system. WEDM process parameters such as pulse-on time, pulse-off time, bed speed and current were considered. Al-8%Si_3N_4 work materials were machined by varying process parameters. A new technique of electrode wear and surface roughness measurement was developed for use in WEDM. This technique uses computer-based vision system to measure vision parameters of wire wear and surface roughness (Ga) of a machined component. Wire electrode and surface images of machined specimens were captured using machine vision system and performance parameters are measured based on the analysis of the distribution of light intensity.

The result shows that pulse-on time and current have more effect on the vision parameters of electrode wear and surface roughness of Al-8%Si_3N_4. Pulse-off time is less significant parameter in determining the vision parameter of surface roughness of Al-8%Si_3N_4. Electrode wear observed was maximum in machining of Al-8%Si_3N_4. This is due to the presence of abrasive reinforcing particles in Al-8%Si_3N_4 material. Also, results reveal that performance monitoring could be carried out by capturing the information given by wire electrode and the work piece. Finally, the proposed methodology indicates that vision systems can be used to measure wire wear and surface roughness parameters in WEDM. (Todaro, 1980).

Index Terms

WEDM, Electrode status, Surface roughness, Al-8%Si_3N_4.

Investigation on Heat Transfer Augmentation in Ducts with Rotating Twisted Tape Insert Using Water and Copper Oxide Nanofluid as Heat Transfer Medium

Pavan. K. N, P. E. S. College of Engineering, Mandya

Abstract:--

The heat transfer rate in liquids is mainly dependent on the motion of the molecules. Lower velocity of the liquid results in smaller heat transfer co-efficient. Several researchers have studied various heat transfer augmentation techniques in ducts and they have concluded that the rate of heat transfer may be enhanced by using twisted tape inserts with a smaller twist ratio (y). The swirling secondary motion of the liquid inside the duct increases the rate of heat transfer. In the current research work, a unique method has been adopted to increase the rate of heat transfer. A twisted tape having twist ratio 2.37 is inserted into the duct and it is made to rotate continuously for creating more turbulence in the heat carrying liquid, which results in better heat transfer. Further, a nanofluid (combination of nanoparticles and base fluid) has been used as heat carrying medium. The nanoparticle suspended fluids have higher thermal conductivity than the conventional heat transfer fluids. The heat transfer coefficient is evaluated for the case of duct flow using water as the heat transfer medium with twisted tape inserted into the duct and the rotational speed is varied from 0 to 300rpm with a step of 100rpm. The experiments are conducted for different flow rates (4, 6 and 8lpm). Further, under identical conditions, the experiments are repeated considering copper oxide nanofluid as the heat transfer medium. The results are compared with that of hollow duct without twisted tape insert using water as the heat transfer medium.

Keywords:

Heat Transfer, Rotating Twisted Tape, Copper Oxide Nanofluid

Real-time Scene Flow Estimation and Obstacle Avoidance under Dim-light Condition using Single 3D Sensor

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Abstract:--

In this work, a novel spectrum sensing scheme is developed for cognitive radio networks with unknown and dynamic noise variance. To recover the dynamic noise variance and detect the occupancy of primary frequency band simultaneously, a novel Bayesian solution is developed. The particle filtering technology is used to detect the state of the primary users. The noise parameters are tracked by using finite dimensional statistics for each particle based on marginalized adaptive particle filtering. Simulation results show the significant improvement in sensing performance and accuracy in estimating the dynamic noise variance.

Key Terms

Cognitive Radio Networks, Primary frequency band, Bayesian solution, Dynamic noise variance.

Coupling the Effect of Wind and Pavement Dynamics in Longitudinal Dynamics of Twin Track Vehicle

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Abstract:--

Vehicle Performance, stability and control is not only depending on vehicle parameters like CG location, vehicle speed and tire-parameters, it of an extent influences by many other parameters like wind, pavement and driver inputs. The wind–pavement-vehicle dynamics analysis plays a dominant role in Vehicle Performance, stability and control and it has been considerably developed in the past decades.

In this work, much concentration has been accorded towards the effect of aerodynamic forces on acceleration and braking performance, on the twin track vehicles, comparing the acceleration and braking performance of two different models under different conditions (neglecting the lift and considering the lift) by considering the coefficient of adhesion, aerodynamics characteristics and location of CG.

For the purpose of study two different models were considered namely model-1 and model-2 and they were modeled using CATIA V5 modeling software. Attention is given only to the external design of the cars, while the interior is not modeled. Further, analysis has been carried out using ANSYS-Fluent to determine the aerodynamic characteristics like coefficient of drag and coefficient of lift, by considering coefficient of adhesion, aerodynamics characteristics and location of CG. With the help of flatbed tyre testing machine coefficient of adhesion has been examined on different road conditions by varying the inflation pressure and vertical load on tyres.

In the results it has been observed that model-1 has better acceleration and braking performance than the model-2 comparatively. Acceleration and braking performance are more in the condition of neglecting the lift and comparatively less in the condition of considering the lift. Acceleration of ground vehicles decreases with increase in lift force. Also, the braking performance of vehicles decreases with increase in lift force.

Key words:

coefficient of drag, coefficient of lift, Acceleration and braking performance.

Study of Dry Sliding Wear Behaviour of Eutectic Aluminium-Silicon Alloy Solidified Under the Influence of Mechanical Mold Vibration

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H.M. Nanjundaswamy, P E S College of Engineering

Abstract:--

The present investigation attempts to evaluate the effect of Mechanical vibration on the solidification behavior of eutectic Al-Si alloy. Cylindrical castings of diameter 30mm x 200mm length were produced in a cast iron and graphite mold subjected to low frequency vibration during solidification. Microstructural changes were observed in the as cast specimen. Dry sliding wear tests were carried out under different service conditions, such as varying normal load (4.9 N, 9.8 N,14.7 N), varying sliding speeds (5.494 m/s, 7.326 m/s, 9.158 m/s) and varying sliding distances (9891 m, 19780.2 m, 32968.8 m) for the cast specimen. The presence of vibration influence the microstructure and tribological behavior of the cast specimen.

Keywords:

Mold Vibration, Grain refinement, wear test.

Evaluation of Toughness Properties of Aluminium Based Metal Matrix Hybrid Composites Joined By Solid-State Welding

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Abstract:--

Challenges towards the fabrication of composite materials and joining have some issues related to microstructural behavior. During fabrication, the distribution of minor ingredients in the matrix phase and wettability attains great focus to achieve sound cast products, but real challenge arises during joining of composites. Specially aluminum-based metal matrix has low melting temperature pose sevire problems including heat affected zone, thermal and work strain. This paper focused on to develop, sound cast plates with ingredients of aluminum 6061 alloy, E-glass fiber and SiC particles blended with ASTM standard proposition in traditional stir casting process followed by joining of hybrid composite plates by one of versatile solid-state welding technique called friction stir welding. The welded hybrid composite plates were subjected to impact loading using charpy test and evaluate the toughness characteristics of welded plates and tabulated the results.

Index Terms

Impact loading, Toughness, Friction stir welding, Hybrid composites.

Vibration Simulation at the Pilot Seat through Helicopter Structural Modeling

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Abstract:--

This paper proposes the integration of the pilot- seat model with the structural model of the helicopter that interactively receives the vibration data from the cockpit floor during different flight conditions; to predict the vibration at the seat. The aerodynamic forcing function is integrated to a full-scale structural model of 349 Gazelle helicopter developed in ABAQUS software and then to the lumped-parameter (LP) model of pilot-seat developed in MATLAB. To avoid negative training transfer in flight simulators, the interaction between the pilot seat and the structure has to be simulated in a manner that is precise and approximate to the real values. This needs the consideration of the transfer of the helicopter vibration to the seat and the pilots body with the amplitude and frequency as near to reality as possible. The vibration analysis at the seat shows that the model can predict the frequency and the amplitude in a reasonable range, precisely. The results also confirm that the integrated methodology has the capability to be employed for improving the functional fidelity of the flight simulator and thus reducing the risk of negative transfer while training.

Index Terms

Heliopter, Structural Modelling, ABAQUS, Vi- bration, Pilot Seat

Synthesis and Mechanical Characterization of Aluminium Reinforced With Various Nano-Sized Tio_2 Particulate Composite

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Abstract:--

The Aluminium metal matrix Nano composites can be used in numerous applications because of their Excellent Mechanical, Tribological Properties and Light Weight. To enhance the performance of composite matrix in aluminium alloy metal is reinforced with Nano particles in the matrix of alloy uniformly, which ameliorates composite properties without affecting limit of ductility. The paper presents the results of experimental investigation on mechanical properties of Various Nano sizes of Particles of 25 and 60 Nano meter Titanium-di-oxide (TiO2-p) particles reinforced with LM0 aluminium metal matrix. The influence of reinforced ratios of 0, 4, 8 and 12 wt. % of TiO2-p on mechanical properties was examined. It is commonly accepted that decreasing the reinforcement size improves mechanical properties of the composites for a given particle volume fraction, because of the smaller inter-particle spacing and larger work hardening rate. The decrease in the particle size increases both the effects of direct strengthening and indirect strengthening. The composites were synthesized by Stir Casting method by using bottom pouring muffle furnace and Magnesium was added to the melt in order to improve the wettability of the composites. Care has to be taken while synthesis of composites because as the Particle size decreases the clustering and agglomeration is seen in the composite.

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Investigation on the Effects of Extrusion Honing Process on Acoustic Emission Characteristics of Hastelloy C-22

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Abstract:--

Extrusion honing (EH) is one of the nontraditional micro-machining process to polish, debur, radius, and remove recast layer of components in a wide range of applications. Material is removed from the work-piece by flowing abrasive laden medium under pressure through or past the work surface to be finished. Components made up of complex passages having surface/areas inaccessible to traditional methods can be finished to high quality and precision by this process. Superalloy material Hastelloy C-22 offers resistance to both aqueous corrosion and attack at elevated temperatures and it is a difficult metal to machine using traditional techniques. Hence in this study, Extrusion Honing of Hastelloy C-22 specimen of different passage diameters have been carried out in an indigenously built hydraulic operated extrusion honing setup using patented polymer and abrasive Silicon Carbide of 46 and 60 mesh sizes. This paper presents an investigation report on acoustic emission characteristics of Hastelloy C-22 material during EH. The outcome of this study showed AE signals to be a good sensing method for determining the performance of EH for different passage diameters of Hastelloy C-22. The energy and amplitude of AE signals were mainly influenced by the surface roughness. It was also observed that AE signals are highly dependent on the workpiece passage diameter and also on the abrasive mesh size.

Keywords :

Extrusion honing, Hastelloy C-22, Abrasive, Acoustic Emission.

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Numerical Assessment of Noise Generated by Flow through Multi Hole Plate

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Abstract:--

This paper addresses the acoustical behavior, specifically of air flow through a single and multi holed plates. Numerical investigations were performed to understand the noise produced by turbulent pipe flow through orifice plates containing single and multiple cylindrical holes. Number of holes used was 1, 4, 9, 16 and 25. EDR of 0.6 is maintained for the plates used for the test. Two step hybrid approaches consisting of LES and FW-H method has been used for flow and acoustic computation.

From an acoustical view point, the multi holed plate's behavior is identified to be different from that of a plate with single hole, even the total flow area for multi hole plate is maintained as that of flow area of single hole plate. For multi hole expansion as the number of hole increases, pressure power-spectral-density (PSD) decreases throughout the spectrum and hence decreases the one-third octave band sound-pressure-level (SPL). For multiple hole plate the noise is reduced by 1- 3.5 dB with increase in number of holes.

Index Terms—

EDR, FWH, LES, PSD, SPL.

A two wheeler converted to farmer friendly vehicle

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Abstract:--

Indian agriculture comprises a combination of traditional to modern farming techniques. In some parts of India traditional utilization of cattle to plough farms remnants in use as many farmers can't afford current agricultural equipment's for their minor farms leading to the lowest per capital productive and farmer's income. To overcome these difficulties, an attempt to benefit the farmer with their steady usage of vehicle to perform an irrigation which assist the farmer to farming is made. This work is proposed to spotlight an application for the farmer's usage, thus decreasing farmer's efforts. The purpose of this work is to formulate a vehicle for agricultural custom and which can be driven around like any other typical two wheelers.

The current design concepts and accessories were examined and appropriate alterations were made so as to accept added fixtures to the same conventional vehicle. Thus, the altered vehicle would have numerous applications, as it allows to lift the water from a well, which lets the vehicle to lift the water from a channel or well, this vehicle enables to spray insecticides/pesticides in a farm, and also can be utilized as power source. The power is taken from the vehicle engine source itself and through pulley arrangements as it convey the power and this can be used for above mentioned application. Afterwards, the utilization is being incorporated into the vehicle, tested by running it for 40 kilometers and by positioning the vehicle at stationary condition, with idling speed of1000 rpm, the parameters like drivers comfort, gear shifting and braking operation were checked.

Keywords:

Agriculture, vehicle, clutch, water pumping, chemical sprayer

Estimation and Comparison of Welding Performances for ASTM A 106 Material in P-GMAW Using GMDH and ANN

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Abstract:--

Pulsed Gas Metal Arc Welding (P-GMAW) is considered as one of the most important arc welding processes in fabrication, which is used in high-technology industrial applications. In order to control and recognize the P-GMAW process parameters, it is necessary to determine the input and output relationship of the welding processes. P-GMAW offers an enhancement in quality and productivity over regular Gas Metal Arc Welding (GMAW). The process enables low mean current and low net heat input with stable spray transfer. This paper describes the estimation and comparison of welding process parameters viz., current, Gas Flow Rate (GFR) and Wire Feed Rate (WFR) on Ultimate Tensile Strength (UTS), Yield Strength (YS) and Percentage of Elongation. Experiments have been performed by taking ASTM A 106 material based on Taguchi's L16 standard orthogonal array. Estimation of welding performances have been carried out using sophisticated mathematical models viz., Group Method of Data Handling (GMDH) and Artificial Neural Network (ANN) and compared. The output developed by ANN model is used to compare with the output obtained through GMDH. Estimation and comparison of welding performances were carried out using GMDH and ANN techniques.

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Two wheeler self-balanced security system design based on MSP430F5529

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Abstract:--

The aim of this paper is to provide smart bike monitoring system that will help in saving human lives and also avoid robbing of vehicles. Any two wheeler vehicles usually cannot balance by itself when it is in rest or running at a lower speed The purpose of this research is to make a vehicle that would be stable by itself in such situations and can be stabilized against any physical impact. Two heavy rotating disks with hub motors have been used here to develop the mechanism of compensating the tilt of the vehicle and get it stabilized. To measure the tilt angle, an MSB430F5529 device has been used and then the angle of tilt has sent to a Bluetooth receiver which is connected with the vehicle. An MSP430F5529 application has been developed which takes the tilt angle as input from its gyroscope and sends data to that receiver accordingly. This MSP430F5529 controls the motor which has been used to control the tilt direction of both of the rotating disks according to the signal This vehicle is designed to provide the safety that two wheeler vehicle does not have during an impact or at zero velocity. The system has three units that comprises of detecting an accident and providing a SMS to the mobile number stored in the memory. It will also give a vehicle tracking system. The Side Stand automation mechanism will provide balance to the user and keep the user secure from the one minute wear and tear.

Keywords:

MSP430F5529, Two Wheeler, Gyro sensor, Global Positioning System(GPS), Global system for mobile communication(GSM), Antitheft, Sensors.

Minimize of Harmonic Distortion and Power Quality Analisis Using a New Discontinuous SVPWM of Multilevel Inverer

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Abstract:--

The paper proposed space vector pulse width modulation is comparing the author Ramakrishna maheswari and Joan Nicolas reference in the paper. In speed control strategies for the recruitment engine has driven their use in nearly every single electrical drive. For better execution the high control acceptance machines are planned at medium voltage (mv) rating. In the event that single power semiconductor switch is legitimately associated with medium voltage, it might harm. Too, customary inverters produce high recurrence normal mode voltage. Staggered inverter is an elective answer for high control and medium voltage A.C. drive. It begins from three levels. The staggered inverter topology blends a sinusoidal voltage from a few degrees of voltages got from capacitor voltage sources. In this paper, a way to deal with diminish total harmonic distortion utilizing four level diode clamped staggered inverter (DCMLI) for three stage enlistment engine drive is proposed.

Keywords:

Space Vector Pulse Width Modulation, Diode Clamped, DC-AC Converters

Numerical Simulation of Air Cooled Condenser

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Abstract:--
The condenser is heat transfer device used to remove heat from high temperature refrigerant to liquefy it in vapour compression refrigeration system. In present work heat transfer by forced convection is studied in an air cooled condenser. In order to augment performance it is required to study both condensation inside condenser tube and convection outside. Heat transfer coefficient for air cooled condenser using various new refrigerants under same condition is compared. Also effect of various parameters viz. mass flow rate of refrigerant, velocity of air, ratio of finned surface area to outside tube bare area (At /Ao), fin efficiency, refrigeration capacity and air volume flow rate on heat transfer coefficient for refrigerants R404A,R22,R134a and R12 are compared. Under similar operating condition R113 has lowest heat transfer coefficient followed by increasing order the refrigerants are : R114, R11, R123, R12, R141b, R500, R134a, R22, R125, R404A, R600, R600a, R32, R290, R718, R717.

Index terms:
Air cooled condenser, condensation, overall heat transfer coefficient, refrigerant

Physics Based Modeling of Selective Catalytic Reduction System and Corresponding Reduced Order Dynamics

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Abstract:--

This paper focuses on developing the physics based model of the SCR system. Through the use of first principles, governing equations of the SCR physics based model are achieved. The SCR system is modeled in a series of segments. The main reactions are ammonia adsorption, desorption, reduction and ammonia oxidation. The resulting non-linear partial differential equations are discretized and linearized to obtain a state space model. The model is extended to sufficiently large order to achieve accuracy.
The developed model is analyzed and the system dynamics are studied, validated using simulation studies of a Urea-SCR system. In addition, reduced order dynamics of the SCR system are also analyzed in this paper.

Index terms:

Emission reduction in Diesel engines, After-treatment system, SCR, Selective catalytic reduction modelling, Physics based SCR model.

Robust Optimization of Torsional Damper for Manual Transmission

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Guruparan Pitchai, Valeo India Private Limited

Abstract:--

Nowadays optimization is an integral part of design development for any product with the perspective of reducing cost and improving functional characteristics. This paper deals on how to optimize the functional design parameters of a torsional damper used in a typical manual transmission automobile. At initial phase of design, it would be difficult for a designer to choose the functional design characteristics of a torsional damper which would satisfy performance target. So, several calculations need to be done with parametric variation on each functional design parameter to achieve optimum design that consumes high development lead time. This paper explains about a fully automated design optimization by defining design space in damper and driveline variabilities for a complete 1D system of a manual transmission and optimization is carried out by choosing successive sample points to meet the criteria. Design optimization is done on not only nominal design parameters but also including production tolerances, which leads to robust design.

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