IEI EPITOME

Volume 9 | Issue 8 | August 2024

A Century of Service to the Nation

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Notification for IEI R&D Grant-in-Aid

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To promote appropriate technology, assist in building up design & research talents and, most importantly, to help in nurturing potential R&D venture amongst engineering students pursuing Diploma/UG/PG/PhD courses. The Institution of Engineers (India) had instituted the R&D Grant-in-Aid program way back in 2001.

Every year, the Institution invites applications for funding industry-oriented R&D projects and research initiatives aimed at improving the life-style of common people from engineering students pursuing full time Diploma/UG/PG/PhD engineering program in AICTE/UGC/NAAC approved Institutions / Colleges / Universities. The application form and guidelines are available in our website https://www.ieindia.org. The projects should be carried out under the guidance of faculty members who are Corporate Members of IEI. Membership criteria for student(s), guide(s) and institution(s) are as follows:

Project Category	Student/Applicant Membership	Guide(s) Membership	Institutional Membership
1. Diploma	Exempted [Membership of Student Chapter is desirable]	AMIE/MIE/FIE	Not Mandatory
2. UG (BE/BTech/ Equivalent)	'Student Member' (SMIE)	AMIE/MIE/FIE	Applicant's Institute should preferably be an Institutional Member with NBA/NAAC Accreditation or valid NIRF Rank
3. PG (ME/MTech/ Equivalent)	AMIE/MIE/FIE	MIE/FIE	Applicant's Institute should preferably be an Institutional Member with NBA/NAAC Accreditation or valid NIRF Rank
4. PhD	AMIE/MIE/FIE	MIE/FIE	Applicant's Institute should preferably be an Institutional Member with NBA/NAAC Accreditation or valid NIRF Rank

The soft copy of the duly filled-up applications (in editable format), as per the proforma available on our website www.ieindia.org, should be sent through email to **research@ieindia.org** and one printed copy of the same should reach the following address:

The Deputy Director (Technical)
The Institution of Engineers (India)
8 Gokhale Road, Kolkata 700 020

Kindly go through the guidelines (visit link: **https://www.ieindia.org/webui/IEI-Activities.aspx#RnD-Initiative**) before filling up the application.

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Dr Suresh Vishwakarma, MIE
Senior Engineer
BC Hydro, Canada
✉ sureshvishwakarma@hotmail.com

Dr Suresh Vishwakarma obtained the **Certificate of Presentation** for presenting the paper titled 'Challenges and Opportunities for Energy Efficiency and Sustainable Practices in Small Island Nations' in the 1st International Conference on Smart Energy Systems and Artificial Intelligence (SESAI 2024) organised by the University of Mauritius, in collaboration with the Universite de Lorraine, France, during 03-06 June 2024, at Balaclava, Mauritius

57TH ENGINEERS' DAY: 15 SEPTEMBER 2024

Theme: **Driving Sustainability with AI-driven Engineering Solutions**

Sir M Vivesvaraya

The Institution of Engineers (India) will celebrate the 57th Engineers' Day on September 15, 2024, commemorating the 163rd birthday of Bharat Ratna Sir Mokshagundam Visvesvaraya. This day is celebrated not only to honor his pioneering spirit but also serves as a tribute to engineers worldwide, whose innovations and dedication shape our modern world. This year's theme, "**Driving Sustainability with Engineering Solutions Embracing the Latest AI-driven Technologies**", underscores the pivotal role of engineering in solving global challenges.

AI is revolutionizing our journey towards sustainability. In the fight against climate change, AI enhances predictive models, enabling better preparation for extreme weather and optimizing renewable energy use. In agriculture, AI-driven analytics are transforming crop management, leading to higher yields and a smaller environmental footprint. Urban areas benefit immensely from AI-powered traffic systems that reduce congestion and emissions, while intelligent waste management systems ensure efficient recycling.

Furthermore, AI is the key to optimizing resource management, from water to manufacturing processes, ensuring maximum efficiency and minimal waste. These advancements highlight the profound impact AI has on creating sustainable solutions for a brighter future. The integration of AI interfaces in sustainable engineering solutions has unlocked new realms of innovation. AI-driven platforms enable real-time monitoring and analysis, providing engineers with critical insights for informed decision-making. From smart grids that balance energy loads to adaptive systems that respond to environmental changes, AI interfaces enhance the effectiveness of sustainable engineering practices.

The Institution of Engineers (India) calls upon all State and Local Centres and associated entities to celebrate Engineers' Day in a grand and befitting manner. Let us honour the innovative spirit and contributions of engineers who are driving sustainability through cutting-edge AI-driven technologies. Together, we can pave the way for a greener and more sustainable tomorrow. Join the movement, celebrate innovation, and be part of the change!

Members in the News

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The following esteemed corporate members were conferred with the prestigious **Professional Engineers (PE) Certificate** from IEI after successful completion of the assessment process and they have been authorised to use the style and title of **P Eng (I)** by virtue of expertise in their field:

Er Pramod Kumar, MIE & PE 7007006 (Certified Professional Engineer, IEI)
ASME Authorised Inspector Surveyor, DNV Dubai
✉ pramodrishit@gmail.com
Field : Mechanical Engineering
Valid from: 02 January 2024
Valid up to: 31 January 2029

Er J T Vinodrai, AMIE & PE 7007014 (Certified Professional Engineer, IEI)
Engineer, Bhilosa Industries Pvt Ltd, Mumbai, Maharashtra
✉ tvjaviya@omeducation.edu.in,tushar.javiya107@gmail.com, tushar.javiya111@gmail.com
Field : Mechanical Engineering
Valid from: 02 January 2024
Valid up to: 31 January 2029

Er Pushpasen Nathubhai Mistry, MIE & PE 7007022 (Certified Professional Engineer, IEI)
Director, Engineering Project, Diebold Nixdorf India Pvt Ltd
✉ pushpasen@hotmail.com
Field : Computer Engineering
Valid from: 17 January 2024
Valid up to: 31 January 2029

ANNOUNCEMENT

Elevate your status as a Certified Professional Engineers (PE) and International Professional Engineers (IntPE)

Professional Engineers (PE) Certification by IEI

Eligibility Requirement

To attain the Professional Engineers (PE) certification through The Institution of Engineers (IEI), you must meet the following eligibility criteria:

1. Hold a BE/BTech or equivalent degree recognized by a Statutory Authority or the Government of India.
2. Have accumulated five years or more of professional experience.
3. Be a member of a recognized professional engineering institution or association.
4. Maintain a satisfactory level of Continued Professional Development (CPD).

Please visit the following link :

https://www.ieindia.org/webui/IEI_PE_Certification.aspx

International Professional Engineers (IntPE) Certification by IEI

Eligibility Requirement

To be eligible for IntPE Certification by IEI, candidates must meet the following criteria:

1. Hold a BE/BTech or equivalent degree recognized by the Statutory Authority or the Government of India.
2. Possess seven years or more of professional experience.
3. Have a minimum of two years of professional experience in a significant engineering activity.
4. Be a member of a recognized professional engineering institution or association.
5. Maintain a satisfactory level of Continued Professional Development (CPD).

Please visit the following link:

https://www.ieindia.org/webui/IEI_IntPE_Certification.aspx

The eligible candidate can submit application in the prescribed format to: The Deputy Director (Technical), The Institution of Engineers (India), 8 Gokhale Road, Kolkata 700020;
For any query and assistance, please send email to: pe@ieindia.org

Members in the News

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Er R K Tiwari, AMIE & PE 7007057 (Certified Professional Engineer, IEI)
Assistant Manager (Technical), Garden Reach Shipbuilders & Engineers Ltd, Kolkata
✉ rajjanuchera@gmail.com
Field : Mechanical Engineering
Valid from: 01 March 2024
Valid up to: 31 March 2029

Er Ganesh Ramesh Akkar, MIE & PE 7007065 (Certified Professional Engineer, IEI)
Lead Engineer, Mechanical Component, Baker Hughes, Coimbatore
✉ ganesh.akkar@gmail.com
Field : Mechanical Engineering
Valid from: 01 March 2024
Valid up to: 31 March 2029

Er Mohammed Hunaiz P, AMIE & PE 7007073 (Certified Professional Engineer, IEI)
Mechanical Engineer, Doha Petroleum Construction Co Ltd, Doha, Qatar
✉ hunaizparakkal@gmail.com
Field : Mechanical Engineering
Valid from: 01 March 2024
Valid up to: 31 March 2029

Er Jeyamurugan Sivasami, MIE & PE 7007227 (Certified Professional Engineer, IEI)
Senior Engineer (Instrumentation), RITAJ Engineers & Consultants, Muscat, Oman
✉ jey85siva@gmail.com
Field : Electronics & Telecommunication Engineering
Valid from: 20 June 2024
Valid up to: 30 June 2029

ANNOUNCEMENT

Know-Your-Member (KYM)

The Institution of Engineers (India) is **updating the database of all its Corporate Members** along with their achievements for which a Know-Your-Member (KYM) form has been introduced.

Every Corporate Member is requested to kindly fill up the form and forward it along with the self-attested copy of photo ID proof to the address given below:-

The Deputy Director (Membership)
The Institution of Engineers (India), 8 Gokhale Road, Kolkata 700020
Email: datamemb@ieindia.org

The form can be accessed & downloaded at :
https://www.ieindia.org/WebUI/ajax/Downloads/WebUI_PDF/HIGHLIGHTS_DOCUMENT-3332.pdf

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Dr Visvanathan Rangaraju, FIE
Formerly Professor and Head,
Department of Food and Agricultural Process Engineering, Agricultural Engineering College and Research Institute, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu
✉ drrviswanathan@gmail.com

Title of Paper: **Uni-axial Compression Loading and Cutting Behaviour of Cocoa Pods (Theobroma cacao L.) as related to Pod Breaking**

Journal of Agricultural Engineering (India), The Indian Society of Agricultural Engineers, New Delhi, 61(2), April-June 2024, pp 169-180, ISSN (Print): 0256-6524, ISSN (Online): 0976-2418

DOI: https://doi.org/10.52151/jae2024612.1841

Co-authors : R Arulmari & Paris Ashok Yadav

Abstract: *Information on rupture force by uni-axial compression and cutting force of cocoa pods, is required for the design of pod breaker. These forces were determined for cocoa pods of F1 progeny varieties in a Universal Testing machine. The uni-axial compressive rupture load increased with increase in pod length. Rupture load was 0.43, 0.58 and 0.67 kN along transverse axis and 0.52, 0.65 and 1.03 kN along longitudinal axis for small (less than 120 mm), medium (120 – 140 mm) and large size pods (above 140 mm), respectively. The cutting force to cut the pods was determined with 15, 30, 45 and 60° sharp (bevel angle) knives at the stem end and apex with a straight edge one side sharp blade, and along the length (longitudinal axis) with a curved blade of 150 mm radius sharpened at both sides, with cutting speed of 10 mm min-1 for all cutting experiments. The minimum force required to cut the pods near stem end for the pod sizes, small, medium and large, ranged from 0.11 to 0.18 kN with one side beveled 15° sharp blade. The minimum force required to cut the pods near apex for the pod sizes, small, medium and large ranged from 0.08 to 0.13 kN with one side beveled 15° sharp blade. The minimum force required with 45°double side beveled sharp curved blade ranged from 0.06 to 0.19 kN to cut along the length.*

Keywords: *Curved Blade; Cutting Force; Longitudinal Axis; Pod Size; Sharp Blade; Transverse Axis*

Publication by Members

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Er Ritu RajLamsal, FIE
Research Scholar
University of Malaga, Spain
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Title of Paper: **Implementing Internet of Things for Real-Time Monitoring and Regulation of Off-Season Grafting and Post-Harvest Storage in Citrus Cultivation: A Case Study from the Hilly Regions of Nepal**

AgriEngineering, Section: Pre and Post-Harvest Engineering in Agriculture, MDPI, Basel, Switzerland, 6(3), July 2024, pp 1-19, ISSN: 2624-7402

DOI: https://doi.org/10.3390/agriengineering6030122

Co-authors : Umesh K Acharya, Periyasami Karthikeyan, Pablo Otero & Alfonso Ariza

Abstract: *Citrus fruit cultivation, especially mandarin oranges, is crucial to the economy of Nepal's hilly regions due to their ideal geoclimatic conditions. Despite its economic importance, the sector faces several challenges, such as inadequate grafting techniques, low-quality saplings, and ineffective post-harvest storage. This paper explores these issues and proposes innovative solutions through the use of Internet of Things (IoT) technology. To address these challenges, we identified key areas for improvement. First, we focused on extending grafting practices during the off-season to ensure a higher success rate and better-quality saplings. Second, we examined different post-harvest storage methods to determine their effectiveness in terms of shelf life, decay loss, and quality of fruit. In addition to exploring post-harvest strategies, this paper provides preharvest recommendations for farmers, emphasizing methods to enhance fruit quality and longevity through effective pre-storage practices. Our IoT-based approach introduces off-season grafting in polyhouses and advanced monitoring for post-harvest storage. The results are promising: We achieved grafting success rates of 91% for acid lime and 92% for local mandarin orange varieties. Additionally, our research compared different post-harvest storage methods for mandarin oranges, including room, cellar, and cold chamber. We assessed these methods based on shelf life, physiological weight loss, and the total soluble solids (TSS) to titratable acidity (TA) ratio. The cold chamber proved to be the most effective method, offering superior conditions for storing mandarin oranges. The IoT-based monitoring system played a crucial role in maintaining optimal temperature, humidity, and gas content within the cold chamber, resulting in reduced post-harvest losses and extended shelf life. These findings highlight the transformative potential of IoT technology in mandarin orange cultivation and post-harvest storage.*

Keywords: *Internet of Things Technology; Polyhouse Citrus Grafting; Post-harvest Storage; Shelf Life; Physiological Weight Loss; Total Soluble Solids; Titratable Acidity*

Dr Jitendra Mohan Giri, FIE
HoD-ME Department
Lloyd Institute of Engineering and Technology, Greater Noida
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Title of Paper: **Optimization of Tribological Behavior of Aluminium (A356) Composites using TGRA Technique**

Matéria (Rio de Janeiro), SciELO, Brazil, 29(3), July 2024, pp 1-13, ISSN: 1517-7076

DOI: https://doi.org/10.1590/1517-7076-RMAT-2024-0129

Co-authors : Suvvari Chinni Krishna Venkata Ramana Murty Naidu, Suresh Vellingiri, Saravana Murthi Chinnasamy, Shanmugasundaram Brindavanam, Allwin Ebinesar Jacob Samuel Sehar, Srinivasnaik Mukuloth, Yuvaraj Kunnathur Periyasamy & Javvadi Eswara Manikanta

Abstract: *Lightweight materials are the great demand in the aerospace sector to enhance system performance. The automotive, aerospace sector has utilized the composite materials to strengthen the physical and mechanical qualities of less weight materials and to improve their functionality. In this study, three different base matrix alloy combinations comprise the specimens being examined. Selective laser melting was used to combine boron carbide, graphite, and iron oxide powder (2.5, 5 and 7.5 wt.%) with an aluminium alloy matrix. Use the ASTMB-557M standards, specimens are prepared for testing the hybrid composite including such wear, and scanning electron microscopy. The purpose of the current study is to use Taguchi-based gray relational analysis (TGRA) to improve the wear parameters of aluminium matrix composite. Grey relationship study has shown that the optimal combinations for determining the hybrid composite's wear rate and coefficient of friction are 40 N load(level 3), 6 m/s sliding speed (level 3), and 1000 m sliding distance (level 1). Hybrid composites are said to have better wear properties and to offer enhanced components for the automotive, marine, and aerospace industries as compared to earlier metal matrix composites.*

Keywords: *Aluminium Alloy; Selective Laser Melting; Wear; Grey Relational Analysis*

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Associate Professor
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Title of Paper: **Prediction of Electrocoagulation Treatment of Tannery Wastewater using Multiple Linear Regression based ANN: Comparative Study on Plane and Punched Electrodes**

Desalination and Water Treatment, Elsevier, 319, July 2024, p 1-13, Online ISSN: 1944-3986
DOI: https://doi.org/10.1016/j.dwt.2024.100530

Co-authors : Kiran Kumar H S; Lokeshappa B; Farideh Malekdar; Suhas Sapate; Abideen Idowu Adeogun; Sharanappa Chapi; Lalit Goswami; Sayedali Mirkhalafi & Mika Sillanpää

Abstract: *This study investigated the electrocoagulation (EC) treatment of tannery wastewater using plane and punched aluminum and iron electrodes at the optimum condition of pH 9, voltage 20 V, electrode distance of 1 cm and 90 min electrolysis duration. The efficiency of the EC process was determined by evaluating the levels of biochemical oxygen demand (BOD), chemical oxygen demand (COD), and Chromium (Cr) in the treated effluents. The experiment utilized both linear regression and Artificial Neural Network (ANN) models for modeling, with the ANN model validating the predicted model from the experimental design with 95 % confidence. The use of plane aluminum electrodes resulted in an optimum removal efficiency of BOD (89.66 %), COD (96.21 %), Cr (96.05 %), and TDS (95.77 %). On the other hand, the punched electrodes achieved a removal efficiency of 90.86 % (BOD), 98.62 % (COD), 96.94 % (Cr), and 96.92 % (TDS). Similarly, when using plane iron electrodes, the removal efficiency of BOD, COD, Cr and TDS was 87.57 %, 94.77 % 93.42 % and 93.08 %, respectively, while punched iron electrodes removed 89.01 % of BOD, 96.59 % of COD, 94.66 % of Cr and 95 % of TDS. The results demonstrate that the proposed ANN effectively predicts effluent BOD, COD, Cr and TDS, addressing economic and environmental sustainability concerns.*

Keywords: *Tannery Wastewater; Electrocoagulation; Artificial Neural Network; Multiple Linear Regression; Chromium Removal*

Er Anurag Kumar Katiyar, MIE
Technical Officer
CSIR-National Physical Laboratory, New Delhi
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Title of Paper: **Magnetic Field Generator for the Calibration of Magnetometers and Electromagnetic Compatibility (EMC) and Electromagnetic Interference (EMI) Compliance**

Instrumentation Science & Technology, Taylor & Francis, July 2024, pp 1-16, Print ISSN: 1073-9149; Online ISSN: 1525-6030
DOI: https://doi.org/10.1080/10739149.2024.2362195

Co-authors : Alok Prakash & Satya Kesh Dubey

Abstract: *A standard magnetic field generation system from 1 to 30 μT between DC and 20 kHz has been demonstrated for the calibration of DC/AC magnetometers. The system includes a laboratory-designed Helmholtz coil, shunt resistor, digital multimeter, and dedicated power source. The DC coil constant of the Helmholtz coil was determined to be 10.586 μT/A using a single-axis fluxgate magnetometer. The homogeneity analysis was carried out for the Helmholtz coil to identify the uniformity along the x, y, and z axes. The system for DC generation was standardized and compared by measuring the field values using a single-axis fluxgate magnetometer. Further, the system was validated for AC generation by a search coil with a known turn area ($1.3767 \pm 0.0027\ m^2$). Moreover, the measured magnetic field values using a search coil were compared with a commercial magnetometer to identify the variation in generated and measured magnetic fields. The described system can have significant utilities in calibration, electromagnetic interference electromagnetic interference/electromagnetic compatibility (EMI/EMC) testing, magnetic susceptibility testing, and magnetic field therapy applications. The expanded uncertainty of the Helmholtz coil in generating a magnetic field was 0.2–1.6% (at k = 2) from DC to 20 kHz.*

Keywords: *Helmholtz Coil; Magnetic Field Generation; Electromagnetic Compatibility (EMC)/ Electromagnetic Interference (EMI); Magnetic Field Therapy*

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Principal Scientist
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Title of Paper: **Mapping of Atmospheric Corrosion of Steel in Southeast India Using Inverse Distance Interpolation Technique**

Corrosion, AMPP, 80 (7), July 2024, pp 770–780, ISSN: 0010-9312, eISSN: 1938-159X
DOI: https://doi.org/10.5006/4535

Co-author : M Ashok

Abstract: *Reinforced concrete and steel structural elements undergo premature degradation and lose strength primarily due to corrosion. Corrosion is an electrochemical phenomenon and its severity depends on several environmental factors. Experimental data on the corrosion of steel is important for making engineering decisions toward improving the service life of civil infrastructures. No recent dataset on atmospheric steel corrosion in an Indian coastal environment is found to be available in the literature, and hence this research attempts to address some of the literature gap. This paper presents an experimental study conducted to determine the corrosion rate of TMT, high-chromium steel, and stainless steel rebars exposed in actual coastal and inland regions for a period of 1 y. The site locations were located in southeastern parts of Tamil Nadu state in India. Based on the first-year corrosion rate, the corrosion rate after extended exposure (10 y) was determined based on ISO 9224 recommendations. The atmospheric steel corrosion map of Tamil Nadu state was developed using inverse distance interpolation technique. Microstructural studies indicated the formation of lepidocrocite (γ-FeOOH) phase composition in the rust products collected from coastal regions.*

Keywords: *Atmospheric Corrosion, Actual Coastal Environment, Field Studies, Marine Exposure, Steel Reinforcement, Durability*

Er Vinay Anand, AMIE
PhD Research Scholar
Lovely Professional University, Phagwara, Jalandhar, Punjab
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Title of Paper: **Enhancing Electric Vehicle Efficiency with Induction Motors and Optimized Solar Power Integration**

China Petroleum Processing and Petrochemical Technology, Research Institute of Petroleum Processing, 24(1), June 2024, pp 263-292, ISSN:1008-6234
DOI: https://doi.org/10.5281/zenodo.12618855
URL: https://zgsyjgysyhgjs.cn/index.php/reric/article/view/2024-263.html

Co-authors : Himanshu Sharma & Bhagwan Shree Ram

Abstract: *The study explores the integration of induction motors in electric vehicle (EV) systems, emphasizing their suitability for urban driving due to high torque at low speeds. To enhance sustainability, photovoltaic (PV) panels are incorporated to directly power the induction motor using renewable solar energy. The research employs a modified sandpiper optimization (MSO) algorithm to determine the optimal sizing and placement of PV panels, maximizing efficiency. Additionally, an improved competitive swarm optimization (ICSO) algorithm is used to optimize power interfaces within the PV-powered EV system, addressing limitations of traditional maximum power point tracking (MPPT) techniques. A bidirectional DC-DC converter is implemented to facilitate bidirectional power flow and mitigate voltage imbalance. The methodology includes extensive simulations to validate and compare the proposed induction motor-driven EV system against state-of-the-art EV systems using brushless DC (BLDC) motors. The comparative analysis focuses on system efficiency, power output, torque characteristics, and overall performance. Principal findings indicate that the induction motor-driven EV system, when powered by optimally placed PV panels and fine-tuned through the ICSO algorithm, demonstrates superior efficiency and performance compared to BLDC motor-driven systems. The integration of these technologies offers a substantial improvement in sustainability and efficiency. The study concludes that utilizing induction motors in EV systems, enhanced with advanced PV optimization techniques, provides a viable and environmentally friendly transportation solution. This research contributes significantly to the development of sustainable EV technologies, promoting a greener future.*

Keywords: *Brushless Direct Current (BLDC) Motor; Transportation; Electric Vehicle; Induction Motor; Optimal PV; Solar Energy*

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Aerospace, Marine, Mechanical & Production Engineering

(Electronic ISSN: 2250-0553; Print ISSN: 2250-0545)

[CiteScore: 2.2; h5 Index: 22]

[SCOPUS Indexed & UGC-CARE (India) listed]

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Volume 105, Issue 3, June 2024

Title: **A Solution to Reduce Friction During Shutdown Process of Journal Bearings**

Authors: **Phan Van Tuan & Tuyen Vu Nguyen**

Le Quy Don Technical University, 236 Hoang Quoc Viet Street, Bac Tu Liem, Hanoi, Vietnam

DOI: https://doi.org/10.1007/s40032-024-01060-0

Publication date: 22 May 2024

Pages: 389–399

Title: **An Analytical Framework for Analysing Barriers for the Implementation of Industry 4.0**

Authors: **Hariom, Sonu Rajak & Amit Kumar**

Department of Mechanical Engineering, National Institute of Technology Patna, Patna, Bihar, India

DOI: https://doi.org/10.1007/s40032-024-01072-w

Publication date: 11 June 2024

Page: 401–416

Title: **Analysing the Performance of a Manufacturing Firm Using Hierarchical Approach**

Authors: **A S Ayswer, N Ramasamy, M Dev Anand & N Santhi**

Noorul Islam Centre For Higher Education, Kanyakumari, India, Tamil Nadu, 629180

DOI: https://doi.org/10.1007/s40032-024-01036-0

Publication date: 09 May 2024

Page: 417–426

Title: **Analysis of COP Using Blended R134a and R600a in Refrigeration System as a Replacement to R134a**

Authors: **N K Panda, Srimant Kumar Mishra, Deepak Kumar Samal & B. N. Padhi**

Department of Mechanical Engineering, GIET University, Gunupur, Rayagada, Odisha, India

Department of Chemical Engineering, Haldia Institute of Technology, Haldia, West Bengal, India

Department of Mechanical Engineering, IIIT Bhubaneswar, Bhubaneswar, Odisha, India

DOI: https://doi.org/10.1007/s40032-024-01061-z

Publication date: 23 May 2024

Pages: 427–435

Published Articles in IEI Journals

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Title: **Application of Additive Exponential Distribution in Design of X Control Chart-Statistical and Economic Perspective**

Authors: **Kalisetti Yogendra, Katneni Nirupama Devi & Kraleti Srinivasa Rao**
Department of Statistics, Andhra University, Visakhapatnam, Andhra Pradesh, 530003, India

DOI: https://doi.org/10.1007/s40032-024-01071-x
Publication date: 15 June 2024
Pages: 437–455

Title: **Characterization and Mechanical Testing of Hybrid Metal Composites of Aluminium Alloy (A356/LM25) Reinforced by Micro-Sized Ceramic Particles**

Authors: **Rahamthulla Khan Sarvani, Mohd Mohinoddin & L. Siva Ramakrishna**
Mechanical Engineering Department, University College of Engineering, Osmania University, Hyderabad, Telangana, India
Mechanical Engineering Department, Muffakham Jah College of Engineering and Technology, Hyderabad, Telangana, India

DOI: https://doi.org/10.1007/s40032-024-01064-w
Publication date: 11 June 2024
Pages: 457–470

Title: **Computer Aided Industrial Design Technology for Integrating Feature Point Coordinate Calculation in Toy Design**

Authors: **Yubin Wu & Jian Sun**
School of Media and Art Design, Guilin University of Aerospace Technology, Guilin, 541004, China
College of Arts and Sports, Dong-A University, Saha-gu, Busan, 49315, Republic of Korea

DOI: https://doi.org/10.1007/s40032-024-01058-8
Publication date: 27 May 2024
Pages: 471–481

Title: **Coupled Thermo-Mechanical Finite Element Analysis of Cranial Implants Using Micromechanical Representative Volume Element Approach**

Authors: **Altaf Ahmad Lone, Nazir Ahmad Sheikh & Mohammad Mursaleen Butt**
Department of Mechanical Engineering, NIT Srinagar, Hazratbal, Srinagar, 190006, Jammu and Kashmir, India

DOI: https://doi.org/10.1007/s40032-024-01044-0
Publication date: 26 April 2024
Pages: 483–494

Title: **Design and Analysis of Pancake with Different Pitch Coil Heat Exchanger for Low-Grade Heat Recovery**

Authors: **Ajay S. Hundiwale & Sandeep M. Joshi**
Department of Mechanical Engineering, SIES Graduate School of Technology, University of Mumbai, Nerul, Navi Mumbai, India
Department of Mechanical Engineering, Pillai College of Engineering, University of Mumbai,

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New Panvel, India
DOI: https://doi.org/10.1007/s40032-024-01035-1
Publication date: 23 May 2024
Pages: 495–505

Title: **Design and Research of a Hybrid Propulsion System Testbed for Amphibious Vehicles**

Authors: **Xiaojun Sun, Yingbo Gao, Chong Yao & Gang Li**
School of Automobile and Traffic Engineering, Liaoning University of Technology, Jinzhou, 121000, China
Yantai Research Institute, Harbin Engineering University, Yantai, 264000, China

DOI: https://doi.org/10.1007/s40032-024-01055-x
Publication date: 15 June 2024
Pages: 507–521

Title: **Design Optimisation and Manufacturing of an Anthropomorphic Humanoid Skull for Space Applications**

Authors: **Tony M. Shaju, Ishan Meshram, Dhanesh Sivanandan, G. Nagamalleswara Rao, Pradeep Krishnan Nair, Joji J Chaman & D Sam Dayala Dev**
ISRO Inertial Systems Unit, Trivandrum, 695013, India

DOI: https://doi.org/10.1007/s40032-024-01041-3
Publication date: 10 June 2024
Pages: 523–529

Title: **Electro-Mechanical Finite Element Analysis of CNT Based Piezoresistive Composites: A Multiscale Approach**

Authors: **Altaf Ahmad Lone, Nazir Ahmad Sheikh & Mohammad Mursaleen Butt**
Department of Mechanical Engineering, NIT Srinagar, Hazratbal Srinagar, 190006, Jammu and Kashmir, India

DOI: https://doi.org/10.1007/s40032-024-01067-7
Publication date: 07 June 2024
Pages: 531–542

Title: **Evaluating and Prioritizing the Barriers of Industry 4.0 Implementation in Indian SMEs: An ISM Approach**

Authors: **Pratish Rawat, Yashpal & Jayant Kishor Purohit**
Mechanical Engineering, Poornima University, Jaipur, Rajasthan, India
Department of Management Studies, Banasthali Vidyapith, Newai, Rajasthan, India

DOI: https://doi.org/10.1007/s40032-024-01042-2
Publication date: 30 April 2024
Pages: 543–560

Title: **Experimental and Numerical Investigation of Fracture Energy and Size Effect in Carbon Powder Reinforced PLA Parts Manufactured by Fused Deposition Modeling**

Authors: **Sumitkumar Patel & Chaitanya K Desai**
Gujarat Technological University, Ahmedabad, 382424, Gujarat, India

C. K. Pithawala College of Engineering and Technology, Gujarat Technological University, Surat, 395007, Gujarat, India
DOI: https://doi.org/10.1007/s40032-024-01065-9
Publication date: 30 May 2024
Pages: 561–572

Title: **Experimental Study of Gyroscopic Effects on Rotating Disc**
Authors: **Shantanu Sharma, Jiyaul Mustafa & Sangeeta Bhati**
Department of Mechanical Engineering, Bennett University, Greater Noida, 201310, India
DOI: https://doi.org/10.1007/s40032-024-01045-z
Publication date: 24 April 2024
Pages: 573–585

Title: **Finite Element Modeling of Steel Cord in Engineering Radial Tires Using Parametric Equations**
Authors: **Haijian Yin, Qingwei Meng, Peng Chen, Zhenguo Wang & Tao Jing**
Techking (Qingdao) Special Tire Technology Research and Development Co., Ltd, Qingdao, China
DOI: https://doi.org/10.1007/s40032-024-01059-7
Publication date: 18 May 2024
Pages: 587–594

Title: **Impact of Coating Variables on Micro-hardness in Ni–W–P Electroless Coatings: Experimental Assessment, Modelling and Optimization**
Authors: **Sameer Lamichaney, Rupam Mandal, Nitesh Mondal, Subhashish Sarkar, Buddhadeb Oraon & Gautam Majumdar**
Department of Mechanical Engineering, Jadavpur University, Kolkata, 700032, India
Department of Mechanical Engineering, Ghani Khan Choudhury Institute of Engineering and Technology, Malda, 732141, India
DOI: https://doi.org/10.1007/s40032-024-01070-y
Publication date: 08 June 2024
Pages: 595–606

Title: **Improvements in Fitting Accuracy of Weibull Distribution for Wind Data by Capturing Monthly and Diurnal Variability in Wind Speeds**
Authors: **Sourabh Jain & Nikunj Kumar Jain**
Ivey Business School, University of Western Ontario, 1255 Western Rd, London, ON, N6G 0N1, Canada
Indian Institute of Management Nagpur, MIHAN (Non-SEZ), Plot No.1, Sector 20, Nagpur, 441108, India
DOI: https://doi.org/10.1007/s40032-024-01040-4
Publication date: 30 April 2024
Pages: 607–615

Title: **Modelling Structural Behaviour of the Cartesian, Polar, and Delta Material Extrusion Printers by Finite Element Analysis**

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Authors: **Bobby Tyagi, Abhishek Raj, Hritav Gupta, Gargi Malik, Lakshya Bhardwaj, Gaurang Swarup Sharma, Jinshad Uppukoden, Ankit Sahai & Rahul Swarup Sharma**
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DOI: https://doi.org/10.1007/s40032-024-01066-8
Publication date: 08 June 2024
Pages: 617–634

Title: **Newton-GMRES Method for Thermal Elasto-hydrodynamic Lubrication of Line Contact Problems**
Authors: **B Vishwanath Awati & N Mahesh Kumar**
Department of Mathematics, Rani Channamma University, Belagavi, 591156, India
DOI: https://doi.org/10.1007/s40032-024-01032-4
Publication date: 03 June 2024
Pages: 635–645

Title: **Novel Gas Meter Designs with Improved Accuracy, Reliability, and Cost-Effectiveness**
Authors: **Ishant Jain & Ganesh Bhoye**
Raychem Innovation Centre, Raychem RPG, Halol, Gujarat, India
DOI: https://doi.org/10.1007/s40032-024-01031-5
Publication date: 26 April 2024
Pages: 647–662

Title: **Numerical Analysis of Shock Diffraction over Rounded Corner**
Authors: **Debiprasad Banerjee & Pabitra Halder**
Department of Aerospace Engineering and Applied Mechanics, IIEST Shibpur, Howrah, West Bengal, 711103, India
Mechanical Engineering Department, Heritage Institute of Technology, Kolkata, West Bengal, 700107, India
DOI: https://doi.org/10.1007/s40032-024-01049-9
Publication date: 02 May 2024
Pages: 663–669

Title: **Numerical Analysis of Stenosis Geometry and Stent Effects on the Hemodynamics of Blood Flow Through the Artery**
Authors: **Jiayu Lu, Jing Wang, Weinan Zhao & Daguang Li**
High School Affiliated to Shanghai Jiao Tong University, Shanghai, 200240, China
Jiangsu Yihai Biopharmaceutical Co., Ltd, Taizhou, 225300, Jiangsu, China
DOI: https://doi.org/10.1007/s40032-024-01056-w
Publication date: 23 May 2024
Pages: 671–681

Title: **On the Application of the Mean-Field Homogenization for Non-isotropic Matrix**
Authors: **Mayank Lakhera, Rahul Agrawal, Deepjyoti Dhar & Atul Jain**
Mechanical Engineering Department, Indian Institute of Technology, Kharagpur, 721302, India

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DOI: https://doi.org/10.1007/s40032-024-01062-y
Publication date: 25 May 2024
Pages: 683–692

Title: **Polymer Spring for Heavy-Duty Load Application**
Authors: **Vishal Patil, Ishant Jain, Bhanwar Lal, Pallabi Sarkar, Nitin Pandey & Ganesh Bhoye**
Raychem Innovation Center, Raychem RPG, Halol, Gujarat, India
DOI: https://doi.org/10.1007/s40032-023-01015-x
Publication date: 06 April 2024
Pages: 693–710

Title: **Stress Corrosion Cracking of MIG Welded Mild Steel Joints in 3.5% NaCl Solution Under Different Loads**
Authors: **Jayesh Shanthi Bhavan, William Collins, Ashwath Pazhani & Karthikeyan Ramachandran**
School of Mechanical Engineering, Coventry University, Coventry, CV1 5FB, UK
DOI: https://doi.org/10.1007/s40032-024-01052-0
Publication date: 21 May 2024
Pages: 711–719

Title: **Study on the Aerodynamic Characteristics of Ornithopter with Different Wing Shapes and Wing Materials**
Authors: **Srikar Kavuri, Siva Sudhamsu, Anish Sesham, S Mahendran, R Asokan & S Seralathan**
Department of Aeronautical Engineering, Hindustan Institute of Technology and Science, Chennai, 603103, Tamilnadu, India
DOI: https://doi.org/10.1007/s40032-024-01034-2
Publication date: 24 April 2024
Pages: 721–730

Title: **Suppression of Thermo-acoustic Instability inside a Rijke Tube using an Adaptive Passive Helmholtz Resonator**
Authors: **Nilaj N Deshmukh, Ajinkya Kulkarni & Afzal Ansari**
Department of Mechanical Engineering, Fr. C. Rodrigues Institute of Technology, Vashi, Navi Mumbai, Maharashtra, 400703, India
DOI: https://doi.org/10.1007/s40032-024-01050-2
Publication date: 15 May 2024
Pages: 731–745

Title: **Preliminary Assessment of Tidal Power Potential Along the Andaman Islands, India**
Authors: **Balaji Ramakrishnan, Mandar Gavali, Srikanth Narasimalu & Satheeshkumar Jeyaraj**
Department of Civil Engineering, IIT Bombay, Mumbai, India
Energy Research Institute, NTU, Singapore, Singapore
Formerly With IIT Bombay, Currently at CWPRS, Pune, India
DOI: https://doi.org/10.1007/s40032-024-01054-y
Publication date: 21 May 2024

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Pages: 747–759

Title: **A Few Suggestions to Improve Anti-drone Measures for Combating Against the Drone Menace**

Authors: **Nand Jee Kanu, Eva Gupta, Sourabh M Pendkar, Shreyash A Sakhare, Amartya Munot, Vijay Kumar Gupta & Girish C Verma**
Mechanical Engineering, S. V. National Institute of Technology, Surat, 395007, India
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Mechanical Engineering, Secunderabad, 500010, India
Mechanical Engineering, Indian Institute of Technology Indore, Indore, 453552, India

DOI: https://doi.org/10.1007/s40032-024-01047-x
Publication date: 04 May 2024

Pages: 761–787

Title: **On Comparison of Conventional and Modified Electrochemical Machining**

Authors: **Gurwinder Singh, Rupinder Singh & P S Rao**
Department of Mechanical Engineering, National Institute of Technical Teachers Training and Research, Chandigarh, India

DOI: https://doi.org/10.1007/s40032-024-01043-1
Publication date: 27 April 2024

Pages: 789–794

Title: **On the Modified Electrochemical Machining Process with a Partially Insulating Cathode**

Authors: **Gurwinder Singh, Rupinder Singh & P S Rao**
Department of Mechanical Engineering, National Institute of Technical Teachers Training and Research, Chandigarh, India

DOI: https://doi.org/10.1007/s40032-024-01037-z
Publication date: 27 April 2024

Pages: 795–802

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(x) Title of Book Chapter	
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(xii) Publisher Details	
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(xvi) About the book (100-150 words)	
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Sl. No.	Name of the Course	Scheduled Dates
1.	Engineering Simulation using ANSYS & CFD - With Hands-on Approach	02 - 05 Sep 24
2.	Climate-Resilient Regenerative Agricultural Practices for Conservation of Natural Resources	03 - 05 Sep 24
3.	Water Pollution Monitoring & Modelling using Software Applications – Theory & Practicals.	03 - 05 Sep 24
4.	Flexibilization of Thermal Power Plants	03 - 05 Sep 24
5.	Condition-Based Monitoring & Maintenance for Effective Utilization of Mining Machinery	04 - 06 Sep 24
6.	Disciplinary Proceedings	05 - 06 Sep 24
7.	Concepts on Design, Construction & Maintenance of Bridges	09 - 13 Sep 24
8.	Non – Destructive Testing and Failure Analysis of Castings, Forgings, Weldments, and Tubes	09 - 13 Sep 24
9.	Flood analysis using HEC-RAS Software	09 - 13 Sep 24
10.	Decision Making in the Digital Era.	10 - 12 Sep 24
11.	Power System Protection - Principles, Protection Relays, and Fault Analysis	10 - 13 Sep 24
12.	Engineering Simulation using LS-DYNA	16 - 19 Sep 24
13.	Solid Waste Management System and Sustainable Sanitation	16 - 18 Sep 24
14.	Creativity and Innovation Techniques for Technical Officers, Scientists and Engineers	17 - 20 Sep 24
15.	Information Security Policies & Security Audit	18 - 20 Sep 24
16.	Social Impacts of Mining Projects-Social Impact Assessment, Land Acquisition, Rehabilitation & Resettlement, Pollution Control Measures, Water and Soil Management, Controlled Blasting, Skill Development of Affected Persons	18 - 20 Sep 24
17.	Penetration of Renewables - Technical Challenges and Regulatory Framework	18 - 20 Sep 24
18.	Recent Trends in Design, Construction & Maintenance of Rigid Pavements	23 - 27 Sep 24
19.	Network Administration: Configuring & Securing LANs and WANs	23 - 27 Sep 24
20.	NDT Level II Certification in Ultrasonic Technique (in Accordance with ASNT Document No. SNT-TC-1A 2011)	23 Sep - 01 Oct 24
21.	Planning, Design, Construction, and O&M of Lift Irrigation Schemes	23 - 26 Sep 24
22.	Effective Trade Union Management	24 - 26 Sep 24
23.	Climate Change Adaptation through Agroecology and Organic Farming	25 - 27 Sep 24
24.	Wet Lands Management	25 - 27 Sep 24
25.	Big Data Analytics for Business Decisions (Hands-on on MS Excel & Tableau)	25 - 27 Sep 24
26.	Pilferage of Electricity - Detection & Prevention - Issues & Challenges	25 - 27 Sep 24
27.	Industry 5.0, Quality Aspects	25 - 27 Sep 24