IEI Epitome

Volume 8 | Issue 9 | September 2023

A Century of Service to the Nation

IN THIS ISSUE ...

announcements ...

Editor

Maj Gen (Dr) MJS Syali, VSM (Retd)
Secretary & Director General

Special Contribution

Mr S Chakraverty, Dr K Sen, Mr D Nath, Mr A Deb, Mr A Das, Mr S Bagchi, Mr P Barik, Ms P Nath, Ms N Sikdar, Mr S K Mishra

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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 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.

Er Manmath Kumar Badapanda, FIE
Scientific Officer H and Head,
RF Power Supplies Laboratory, Raja Ramanna Centre for Advanced Technology, Indore, Madhya Pradesh
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Er Manmath Kumar Badapanda holds a **Patent** for the application of '**High Voltage DC Power Supply for High Power Radio Frequency Amplifiers**'.

Patent Number	:	436206
Application Number	:	201621014164
Date of Filing	:	20/04/2016
Date of Grant	:	28/06/2023
Post Grant Journal Date	:	30/06/2023
Applicant Name	:	The Secretary, Department of Atomic Energy
Field of Invention	:	Electrical
Issuing Authority	:	The Patent Office, Government of India

Er Vishnu Rajaram Bankar, AMIE
Manager
HOD- Systems & Policies Department, Yazaki India Pvt Ltd, Pune, Maharashtra
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Er Vishnu Rajaram Bankar honoured with **IEI Young Engineers Award** for his outstanding contributions in the field of Production Engineering on the occasion of the **Thirty-seventh National Convention of Production Engineers** organised by **The Institution of Engineers (India), West Bengal State Centre** at Kolkata on 18-19 August 2023..

IEI Industry Excellence Award 2023

Request for Participation

The IEI Industry Excellence Award has been instituted to recognize industry leaders for their innovation, excellence in engineering operations and thereby, to lead their industry in competitive manner. The benchmarks created by the industries in India have included productivity, quality, safety and performance assurance thereby giving India the rightful place in the global markets. Realizing that such industries can provide the leadership to a large number of other industries in the country, it has been considered appropriate by the IEI Council to institute the IEI Industry Excellence Awards in the year 2008.

Applications in specified format (visit link: ***https://www.ieindia.org/webui/IEI-Activities.aspx#industry-excellence-award***) are invited from prospective applicants for **IEI Industry Excellence Award 2023**. The last date of receipt of application for the Award 2023 is **31 October 2023**.

Interested applicants are requested to send their applications (Two hard copies & One soft copy in Pendrive/CD) to the below mentioned address.

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

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Cdr Prof Dr Ashok Kumar Dua, FIE
Independent Researcher
All India Management Association (AIMA), Aligarh Muslim University (AMU) PhD Program
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Title of Paper: **Ethical Leadership and its Influence on Employee Voice Behavior: Role of Demographic Variables**

International Journal of Ethics and Systems, Emerald Publishing Limited, 39(2), 2023, pp. 213-235, ISSN: 2514-9369
DOI: https://doi.org/10.1108/IJOES-10-2021-0200

Co-authors: Ayesha Farooq & Sumita Rai

Abstract: *Purpose: The purpose of this paper is to examine the nature of relationship between ethical leadership and employee voice behavior. Study of employee voice behavior is important, because leaders in organizations make numerous decisions based on employees' work-related inputs which do influence the decision quality and team performance.*

Design/methodology/approach: Survey data were collected through structured questionnaire from Indian organizations. Data were analysed through statistical techniques such as confirmatory factor analysis and structural equation modeling.

Findings: The findings showed that ethical leadership did impact the employee voice in a positive and significant but moderate manner. The study also found no significant differences in ethical leadership and voice behavior across demographic variables such as gender, age, educational qualification and job level in the Indian context.

Research limitations/implications: The study is conducted using single cross-sectional research design, and for better causal inferences of the relationship between various variables, future research studies may be conducted with longitudinal research design, multiple data sources and variety of industries with large sample size.

Practical implications: With erosion of ethical values and corporate scandals, managers need to develop and display ethical leadership as employees emulate their leaders' ethical behavior because ethical leadership, or its perception, relates positively and significantly to employee voice behavior.

Originality/value : There is less study to understand ethical leadership and its influence on voice behavior in developing countries, especially in India. Ethical leadership behavior encourages employees to voice their work-related constructive opinions and concerns for improved decision-making and reduced unethical practices. Also, there is scarcity of research that explores the impact of demographic variables and this study is an effort to understand this gap.

Keywords: *Employee Voice; Ethical Leadership; Prohibitive Voice; Promotive Voice; India*

IEI Industry Excellence Award for Start Up Initiatives

Request for Participation

The engineering sector is experiencing remarkable growth with Government and private funding, presenting immense commercial potential on a global scale. Technology and innovation are the driving forces behind a vibrant MSME ecosystem, with start-ups acting as a perennial source of inspiration.

We cordially invite **start-up organizations** in Engineering, Consultancy Services, Construction, Healthcare, Utility Services, IT & Telecommunication, and related domains to apply for the prestigious IEI Industry Excellence Award 2023. To be eligible, applicant organizations must be duly registered with DPIIT, IN-SPACe, ISRO, Ministry of MSMEs, Government of India, and relevant State Industrial Development Corporations.

The IEI Industry Excellence Award 2023 aims to recognize and celebrate innovative start-ups that demonstrate exceptional promise and positive impact on society. By participating in this prestigious award, you not only stand a chance to gain industry recognition but also open doors to new opportunities, partnerships, and potential investors.

To participate, submit your applications using the specified format available at ***https://www.ieindia.org/webui/IEI-Activities.aspx#industryexcellence-award***. The application deadline is **31 October 2023**.

Send two hard copies and one soft copy (Pen drive/CD) to:

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

We eagerly await your participation in this celebration of ingenuity and entrepreneurship.

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Er Sanjay Kumar Srivastava, FIE
Chartered Engineers
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Title of Paper: **Experimental Investigation on the Cooking Vessel of Solar Box Cooker**

International Journal of Mechanical Engineering and Technology (IJMET), IAEME Publication, 14(03), 2023, pp 62-69, ISSN Print: 0976-6340 , ISSN Online: 0976-6359

DOI: https://doi.org/10.17605/OSF.IO/5TWGF

Co-author: Ajeet Kumar Rai

Abstract: *Present study is focussed on the performance of a solar box cooker with PCM filled cooking vessels. Solar box cooker is simple to design and easy to operate, but limited availability of sun restricts its use and makes it less popular. Use of energy storage materials make solar box cooker available to be used during off sunshine also. Performance of cooking vessel with PCM is obtained during day time cooking. Fins / Extended surfaces are attached in the cooking vessel on the PCM side to enhance the heat transfer rate from PCM during discharge. Comparison is also made between finned PCM assisted vessel (New Design Pot) and unfinned PCM vessel. It is observed that New Design Pot gives better performance than PCM vessel. Maximum temperature of new designed pot at full load is 16.92% higher than the maximum temperature of PCM assisted cooking pot.*

Keywords: *Solar Box Cooker; PCM; Cooking Vessel*

IEI Industry Excellence Award for Overseas Organizations

Request for Participation

Discover IEI:

Welcome to The Institution of Engineers (India) or IEI – your gateway to engineering excellence and worldwide collaborations. With strong ties to esteemed international bodies, IEI stands as a beacon of innovation on the global stage. For more details, visit www.ieindia.org.

Introducing the IEI Industry Excellence Award:

To recognize industries' crucial role in shaping society and the economy, IEI instituted these awards in 2008. They honour remarkable innovation, excellence in engineering operations, and unwavering commitment to high standards.

Join Us in Celebrating Excellence:

We take immense pride in the global industrial achievements – productivity, quality, safety, and performance assurance that have earned industries a significant place worldwide. At IEI, we firmly believe that industry leaders like you hold the key to shaping a brighter future on a global scale.

Why Participate?

- Elevate Your Status: Gain national and international acclaim for your exceptional achievements.
- Lead the Charge: Set new excellence standards and inspire industries worldwide.
- Unlock Opportunities: Forge invaluable connections with like-minded global leaders.
- Champion the Profession: Participate and uphold engineering's prestige and integrity.

How to Participate: Visit ***https://www.ieindia.org/webui/IEI-Activities.aspx#industry-excellence-award*** and apply easily. Be part of a global celebration of engineering brilliance!

Join the Prestigious Ranks: Don't miss the chance to shine on the world stage. Unleash your organization's potential and celebrate engineering excellence with us.

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Dr Raj Kumar Goswami, FIE
Professor of Electronics and Communications Engineering & Principal
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Title of Paper: **Implementation of Turbo Trellis Coding Modulation Scheme for Fading Channel**

International Journal of Electrical and Electronics Research (IJEER), FOREX Ptrss, 11(3), 2023, pp 669-674 , e-ISSN: 2347-470X

DOI: https://doi.org/10.37391/ijeer.110305

Co-authors: K Srinivasa Rao & Swathi Nambari

Abstract: *In the context of data communication, encountering fading channels can lead to errors occurring at the receiving end due to multipath propagation. To address this challenge, researchers have persistently worked towards developing Error Correction Schemes that effectively manage these errors and guarantee error-free data reception for the receiver. One area of focus lies in the implementation of Forward Error Correction Schemes directly at the transmitter end. Nonetheless, integrating error correction coding using these schemes comes with the drawback of increased bandwidth requirements since additional bits must be included to facilitate error correction. Fortunately, there exists a coding scheme known as Trellis Coded Modulation (TCM), which specifically tackles this concern. In the case of TCM, the modulation scheme has been chosen based on the rate of the convolutional coding scheme. Nevertheless, TCM has certain limitations when it comes to correcting a high number of errors, which prompted the emergence of Turbo Coding. Turbo Coding employs two coders at the transmitter, arranged either in a serial or parallel configuration, along with an appropriate decoder at the receiver. This paper introduces a Turbo Coding scheme design utilizing convolutional coders with a rate of 2/3, arranged in a serially concatenated configuration, resulting in an effective rate of 4/9. For preserving bandwidth, the Turbo Coding is applied to TCM scheme. Consequently, when employing the convolutional coding scheme with a rate of 2/3, the modulation scheme has to be 8-QAM. However, to maintain bandwidth after coding, when utilizing the Turbo coding scheme with a rate of 4/9, the modulation scheme is upgraded to 512-QAM. MATLAB simulations were conducted to evaluate the error correcting capabilities of the designed scheme compared to the convolutional coding scheme that uses the constituent convolutional encoder. The comparison has also been made with the uncoded data communication utilizing simple QPSK modulation scheme. The results indicate that under Rician fading channel conditions, the Turbo Trellis Coding Modulation Scheme provides an approximate gain of 5 dB compared to the convolutional coding scheme and approximately 8 dB gain compared to uncoded one.*

Keywords: *Turbo Code; Trellis Coded Modulation; Convolutional Code; Rician Channel; Fading Channel*

IEI Engineering Education Excellence Award 2023

Request for Participation

The IEI Engineering Education Excellence Award has been instituted to recognize leading Engineering Educational Institutions and encourage for better and more effective engineering education across the country. The engineering education sector has witnessed significant development, setting benchmarks for others to follow. Universities and institutions have expanded their scope beyond pedagogy and now engage in R&D activities, consultancy, patents, publications, skill development programs, industry interface, and the implementation of the New Education Policy (NEP), contributing to India's global prominence. Recognizing that such institutions can lead and inspire numerous others in the country, the IEI Council has decided to establish the IEI Engineering Education Excellence Awards.

Prospective applicants are invited to submit their applications in the specified format (visit link: ***https://www.ieindia.org/webui/IEI-Activities.aspx#engineering-education-excellence-award***) for the **IEI Engineering Education Excellence Award 2023**. The deadline for submitting of applications for the Award 2023 is **31 October 2023**. Interested applicants are requested to submit their applications (**Four hard copies & One soft copy in Pendrive/CD**) to the below mentioned address.

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Er Vinay Anand, AMIE
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Title of Paper: Performance of Induction Motor and BLDC Motor and Design of Induction Motor driven Solar Electric Vehicle (IM-SEV)

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT) International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal, 3(1), 2023, ISSN Online: 2581-9429

DOI: https://doi.org/10.48175/568

URL: https://www.ijarsct.co.in/A12404.pdf

Co-authors: Himanshu Sharma, Bhagwan Shree Ram & Dharmendra Kr Dubey

Abstract: *The only thing pushing people toward electric automobiles is the rising cost of fossil fuels, which are slowly vanishing from nature or are likely to be and creates noise and pollutants. The several challenges that researchers are encountering with things like initial cost, battery life, and in certain cases how far an electric vehicle can drive are a focus of this research article. Although most of the electric vehicle producers employ BLDC motors, their availability is limited, and they are only appropriate for the smaller size of urban or sophisticated electric vehicles which rarely bear the heavy load and rugged situations. However, induction motors are currently being employed in heavy-duty three- and four-wheel vehicles. The author of this research article looked into and evaluated a significant amount of data before concluding that an electric vehicle's solar roof can help keep energy in a storage cell if solar rooftops are incorporated into the vehicle in the event of open-air parking. The induction of motor-driven solar-powered electric vehicles is suggested in this regard. Two electric motors a BLDC and an induction motor—and their performance are evaluated mathematically in this research article. To learn more about the structural analysis of Induction motor-driven solar automobiles, MATLAB simulations were described. The findings of this study may help researchers better understand Induction motors, which are used to boost the durability, dependability, high speed, and low maintenance costs of electric vehicles. Solar roofing might also improve the battery life and distance running of an electric vehicle.*

Keywords: *Induction Motor; Charging Station; Electric Vehicle; Hybrid Electric Vehicle(HEV); Solar Automotive; BLDC Motor*

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Dr Mukesh Kumar Nag, AMIE
Research Scholar
National Institute of Technology Jamshedpur, Jharkhand
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Title of Paper: **Characterization and Performance Evaluation of Nylon-66 Composite at Various Composition of Carbon Fibers and GNP Reinforcement**

Journal of Reinforced Plastics and Composites, SAGE Publications, 2023, ISSN: 0731-6844, Online ISSN: 1530-7964
DOI: https://doi.org/10.1177/07316844231198923

Co-author: Abhishek Shrivastava

Abstract: *Recycled reinforcements are being utilized more and more to make sustainable composites for load-bearing structural applications, which now dominate the key transportation industries, because they have lower environmental impact than virgin fiber manufacturing and are also less expensive. In order to improve the mechanical properties of composites, a combination of recycled carbon fibers (rCF) and waste tire-derived graphene nanoplatelets (GNP) with oxygen surface functional groups was used as reinforcement for the nylon-66 matrix. The alignment of the rCF and GNP during the injection molding process was monitored using numerical methods in conjunction with the rheological behavior of the compounds. The effective dispersion of the rCF and GNP was obtained using high shear mixing. In contrast, the flexural modulus and strength of the 20% rCF-0.3% GNP reinforced nylon-66 composites increased by 86% and 35%, respectively, while the tensile strength and modulus improved by 43% and 95%. Further, the addition of 0.3% GNP to the composition resulted in a 7.7% increase in Charpy notched impact energy compared to the 20% rCF composite. Moreover, the flow model developed to study the injection molding process of rCF/GNP reinforced composite using the fiber aspect ratio and distribution in the compounds described fiber alignment and provided insight into mechanical strengthening mechanisms.*

Keywords: *Polymer Composite; Carbon Fiber; Graphene Nano Plates; Nylon-66; Characterization*

Title of Paper: **A Comprehensive Study on Various Factors Influences the Mechanical Behavior of Natural Fiber-Reinforced Composite**

Recent Advances in Mechanical Engineering, Select Proceedings of STAAAR 2022, Part of the book series of Lecture Notes in Mechanical Engineering, Springer Singapore, 1(1), 2023, pp 471–481, Series ISSN: 2195-4356, Series E-ISSN: 2195-4364, Softcover ISBN: 978-981-99-2348-9, eBook ISBN: 978-981-99-2349-6
DOI: https://doi.org/10.1007/978-981-99-2349-6_43

Co-author: Parmanand Kumar

Abstract: *Due to the depletion of non-renewable resources and rising environmental awareness in recent years, scientist and engineers are trying to come up with bio-degradable materials as an alternative to synthetic fibers. Synthetic fibers are not recyclable or*

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

bio-degradable. The increasing focus on environmental issues has led to the widespread use of bio-degradable and renewable materials such as natural fiber-based hybrid composites for use in different manufacturing sectors like building and construction industry, automobile industry, marine industry, aerospace industry, sports, and the packaging industry. In light of their wide range of potential applications, the mechanical properties of composites enhance from natural fibers are of particular interest in the present review. Natural fiber-based hybrid composite shows the various properties including low density, abundant availability, bio-degradability, high specific strength, corrosion resistance, low cost, and the bio-degradability. There are several parameters like fiber type, fiber length, fiber orientation, weight percentage loading, surface modification, fiber matrix adhesion, choice of polymer matrix, addition of nanoparticles, and processing conditions that influences the mechanical properties. These parameters significantly enhance the mechanical properties of the fabricated hybrid composite.

Keywords: *Natural Fibers; Bio-degradable; Synthetic Fiber; Hybrid Composite; Mechanical Properties*

Title of Paper: **Fabrication and Characterization of Laminated Natural Fibers and SS303 Wire Mesh Reinforced Epoxy-Based Hybrid Composite**

Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications, SAGE Publications, ISSN: 1464-4207, Online ISSN: 2041-3076

DOI: https://doi.org/10.1177/14644207231183966

Co-author: Parmanand Kumar

Abstract*: In today's world, researchers are actively seeking the most suitable materials to meet the growing industrial demands. These materials need to possess specific characteristics such as lightweight nature, high strength, excellent mechanical properties, and environmental friendliness. Due to these requirements, relying solely on mono fiber composite materials is insufficient. Therefore, it has become necessary to incorporate different reinforcements into polymer matrices to achieve the desired mechanical properties. This study focuses on the fabrication of a novel hybrid composite using jute fibers, luffa fibers, palmyra leaf fibers, and AISI 303 (0.5 mm) wire mesh combined with epoxy resin. The fabrication process involved utilizing vacuum bagging techniques. To assess the mechanical properties of the hybrid composites, two wire mesh orientations (45° and 90°) and a total of 12 stacking sequences of jute/wire mesh/luffa/palmyra (J/W/L/P) were selected. The mechanical characterization of the hybrid composites included tensile, impact, flexural, and interlaminar strength tests. Furthermore, a dynamic mechanical analyzer (DMA-8000) was employed to investigate the elastic behavior, including storage modulus (E'), loss modulus (E"), and damping factor (tan δ). Additionally, the fracture surface's microstructure was examined using a scanning electron microscope (SEM). Among the various stacking sequences and fiber orientations, the 45° fiber orientation and the stacking sequences JWLP, JLWP, JWPL, JPWL, PWJL, and PJWL exhibited superior ultimate tensile strength. Notably, the PWJL stacking sequence displayed the highest average tensile strength (74.83 MPa), flexural strength (131.60 MPa), percentage elongation (1.35%), and interlaminar strength (1.47 kN). Moreover, dynamic mechanical analysis revealed that the hybrid composite sample with 90° wire mesh orientation exhibited a peak energy absorption of 0.820 at the transition region, specifically at a frequency of 0.5 Hz.*

Keywords*: Natural Fibers; Wire Mesh; Hybrid Composite; Stacking Sequence; Mechanical Properties; Dynamic Mechanical Analysis*

Title of Paper: **Lifetime Estimation and Surface Degradation of MCCB Contact Tips due to Multiple Electrical Interruptions**

Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science, SAGE Publications, 2023, ISSN: 0954-4062, Online ISSN: 2041-2983

DOI: https://doi.org/10.1177/09544062231185497

Abstract*: This paper presents the surface degradation analysis of contact tips of commercial (20A, 110 V) molded case circuit breaker due to multiple electrical interruptions during experimental electrical test. In the experimental electric test, and according to the post arc current observation, the arc voltage and current were categorized. Multiple high-current interruption has been identified, and the phenomena that regulate the interruption failure have been established. Also, post-arc current sprinted for a short period of time (10–200 μs) during multiple electrical interruptions. These interruptions cause the failure of the contact tips of MCCB. The metallurgical changes were also observed on the contact tips. The braze joints between contacts tips and copper base is also affected by thermal and electrical conductivity during the electrical interruptions. The optical microscope reveals the typical metallurgical changes that occur during a breakdown, such as surface degradation, wear, cracks adjacent to the braze interface, oxide layer formation, cracks on the contact tips, and cracks that penetrate into the copper base. The experimental investigation of the factors influencing the post arc current was carried out to learn more about the link between the post arc current and the degradation of the interruption characteristics. This investigation's primary objective is to explore the interruption performance and failure analysis of commercial MCCBs.*

Keywords: *Molded Case Circuit Breaker; Contact Tips; Electrical Interruption; Failure; Post Arc Current*

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Title of Paper: Single-Baseline Long-Distance RTK using a CLS GNSS Module and Open-Source Software: A Case Study from India

IETE Journal of Research, Taylor & Francis, 2023, Print ISSN: 0377-2063, Online ISSN: 0974-780X

DOI: https://doi.org/10.1080/03772063.2023.2192424

Co-authors: Mrinal Goswami, Surajit Kundu & Anindya Bose

Abstract: *For GNSS Real-Time Kinematic (RTK), the reference Base receiver operating at a precise location together with the wirelessly connected Rover receiver(s) provide(s) high-quality real-time position solutions. This work shows the potential of compact, low-cost, single-frequency (CLS) GNSS modules as the RTK Rover up to large baseline distances. A combination of the uBLOX M8T CLS module and the Tallysman TW2710 patch antenna is used in single and hybrid GNSS combinations for short-to-long single-baseline lengths with the open-source RTKLib as the processing software. The results show that, for up to 288 km baseline distance, GPS, GLONASS and Galileo standalone operation provides below 1, 3 and 2 m precisions, respectively and sub-0.5 m precision is achieved for GPS+GLONASS+Galileo and GPS+Galileo+QZSS operations. The work shows the advantages of CLS modules as Rover those exploits the multi-constellation signal availability from India using open-source RTK processing software for reduction of the overall RTK infrastructure cost.*

Keywords: *Compact GNSS Module; Long Baseline; Multi-GNSS; RTK*

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Er Anshu Agrawal, AMIE
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Title of Paper: Experimental Investigation of Solar Driven Atmospheric Water Generation System based on Air-to-Air Heat Exchanger

Energy, Elsevier, 2023, 271, Online ISSN: 1873-6785, Print ISSN: 0360-5442

DOI: https://doi.org/10.1016/j.energy.2023.127062

Co-authors: Amit Kumar & A D Parekh

Abstract: *The lack of fresh water, especially for the land-locked & arid regions, is becoming a significant barrier to the sustainable development of humanity.This has generated an urgent need to explore the solar-driven atmospheric water generation (S-AWG) technologies with high water yield. This research experimentally compares the performance of silica gel and molecular sieve on a novel S-AWG system. 25 kg of each desiccant material is used in a packed desiccant bed structure. In the nocturnal phase, adsorption is performed followed by regeneration during the day using hot air generated from evacuated tube solar air heater (ET-SAH). An air-to-air heat exchanger is employed for condensing the water vapors released in the process air after the desiccant bed regeneration. The water generated from silica gel is 1790 ml with energy & exergy efficiency of 23.14% & 10.43%, respectively. From the molecular sieve, 350 ml of water is generated with energy & exergy efficiency of 21.74% & 9.58%, respectively. The economic analysis of the system reveals that the cost of water generated from silica gel is 0.21 $/L, while from molecular sieve is 1.21 $/L. Water testing reports of the produced water using both the desiccant materials infers that it is drinkable.*

Keywords: *Atmospheric Water Generation; Adsorption; Evacuated Tube Collector; Renewable Energy*

Journal of The Institution of Engineers (India): Series A

|Agriculture, Architecture, Civil & Environmental Engineering|
(Electronic ISSN: 2250-2157; Print ISSN: 2250-2149)
[SCOPUS Indexed & UGC-CARE (India) listed]
(CiteScore: 2.1; Number of Downloads: 64865)
For download, use Membership ID through: www.ieindia.org

Volume 104, Issue 3, September 2023

Title : **A Novel Fuzzy-Based Modified GAN and Faster RCNN for Classification of Banana Leaf Disease**
Authors : **N Bharathi Raja** & **P Selvi Rajendran**
Department of Computer Science and Engineering, Hindustan Institute of Technology and Science, Kelambakkam, Tamil Nadu
DOI : https://doi.org/10.1007/s40030-023-00743-8
Publication date : 30 June 2023
Pages : 529–540

Title : **Breakthrough in Treatment of Sewage Using TADOX®, By-Passing Biological Treatment with Removal of Micropollutants to enable high end Water Reuse**
Authors : **Nupur Bahadur**, **Nipun Bhargava**, **Shyamal Kumar Sarkar** & **Vibha Dhawan**
TADOX® Technology Centre for Water Reuse, Environment and Waste Division, The Energy and Resources Institute, New Delhi
NMCG-TERI Centre of Excellence on Water Reuse, Environment and Waste Division, The Energy and Resources Institute, New Delhi
DOI : https://doi.org/10.1007/s40030-023-00738-5
Publication date : 03 June 2023
Page : 541–550

Title : **Comparison of Wind Speed Probability Distribution Models for Accurate Evaluation of Wind Energy Potential: A Case Study from Kerala, India**
Authors : **Kamlesh Kumar Shukla**, **Narayanan Natarajan** & **Mangottiri Vasudevan**
Department of Mathematics, Noida International University. Gautam Budh Nagar, Uttar Pradesh
Department of Civil Engineering, Dr Mahalingam College of Engineering and Technology, Tamil Nadu
Department of Agricultural Engineering, Bannari Amman Institute of Technology, Sathyamangalam, Tamil Nadu
DOI : https://doi.org/10.1007/s40030-023-00734-9
Publication date : 22 April 2023
Page : 551–563

Title : **Effect of Operating Parameters on O3, O3/UV, O3/UV/PS Process Using Bubble Column**

Volume 8 | Issue 9 | September 2023

Reactor for Degradation of Reactive Dyes

Authors : **Sandip Sharma**, **Nikita Chokshi** & **Jayesh P Ruparelia**
Chemical Engineering Department, Institute of Technology, Nirma University, Ahmedabad

DOI : https://doi.org/10.1007/s40030-023-00735-8
Publication date : 16 May 2023
Pages : 565–578

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Engineering Staff College of India

Autonomous Organ of The Institution of Engineers (India)
(IMS [ISO 9001:2015, ISO 14001:2015, ISO 50001:2018, ISO 45001:2018],
ISO/IEC 17025:2017 Certified, AICTE & CEA Recognized Institution)

CONTINUING PROFESSIONAL DEVELOPMENT PROGRAMMES (CPDP) FOR THE MONTH OF OCTOBER 2023

Sl. No.	Name of the Course	Scheduled Dates
1.	Attaining & Encountering the Challenges in Water Supply & Sewerage System	03 - 06 Oct 23
2.	Information Security Management System (ISMS - ISO 27001) Lead Implementer	03 - 06 Oct 23
3.	Industrial Piping Practice and Maintenance - Problems, Quality Control Measures	03 - 05 Oct 23
4.	Rooftop Solar PV Grid - Design, Erection, Commissioning & Maintenance	03 - 06 Oct 23
5.	Electrical Safety& Energy Audit in Mining Projects	04 - 06 Oct 23
6.	Flood analysis using HEC-RAS Software	04 - 06 Oct 23
7.	Enhancing Structural Durability with Advanced Waterproofing Solutions	09 - 14 Oct 23
8.	Machine Learning & Artificial Intelligence	09 - 13 Oct 23
9.	Effective Utilization of MS Office Applications (Online)	09 - 13 Oct 23
10.	Inter-personal Relations and Assertive Skills	09 - 11 Oct 23
11.	Hands-on Training in ANSYS for Simulating Structural, Fluid and FSI Problems	10 - 12 Oct 23
12.	Gas Insulated Substations - Design Features, Construction, Testing, Operation and Maintenance	10 - 13 Oct 23
13.	Contract Management & E-procurement- GEM at Trivandrum	14 - 16 Oct 23
14.	Climate Change and its Impact on Public Health	16 - 18 Oct 23
15.	Vibrations, Balancing, Alignment and Condition Monitoring of Rotating Equipment (Theory and Practical Orientation with Technical Visit)	16 - 19 Oct 23
16.	Power Trading, Power Exchanges & Merchant Power Plants (Online)	16 - 19 Oct 23
17.	Smart Irrigation Technology for Better Water Use Efficiency	16 - 18 Oct 23
18.	Critical Minerals & Elements: Exploration, Mining & Sustainability	17 - 19 Oct 23
19.	Smart City Solution and Environmental Aspects	18 - 20 Oct 23
20.	Quality Control and Engineering Inspection	18 - 20 Oct 23
21.	Sustainability Auditing of Urban Lakes Restoration and Management.	25 - 27 Oct 23
22.	Fracture and Failure Analysis of Gas Turbine Engines, Naval and Aerospace Materials	25 - 27 Oct 23
23.	Best Practices in O&M of Industrial Valves & Actuators for Heavy Industries & Power Plants	25 - 27 Oct 23
24.	Training on Business Communication & Presentation Skills at Goa	25 - 27 Oct 23