

IEI EPITOME

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MEMBERS in the NEWS



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Editorial, authored by Er Amitabha Ghosal, was published in the Proceedings of the Institution of Civil Engineers — “**Engineering History and Heritage — Calcutta: A Benchmark in City Vitality**”, Volume 173, issue 3, pp 77–79, ICE Publishing, ISSN 1757-9430, DOI: <https://doi.org/10.1680/jenhh.2020.173.3.77>.



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He has been appointed as the **Honorary Advisor** of **Burdwan Development Authority (BDA)**, under the Ministry of Urban Development & Municipal Affairs, Government of West Bengal

Announcement



36th

INDIAN ENGINEERING CONGRESS

Delhi, December 26-27, 2021

Theme:

Engineers for Viable Technology and USD 5 Trillion Economy

Organized by

The Institution of Engineers (India)

Hosted by: **Delhi State Centre**

PUBLICATION by MEMBERS



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HANDBOOK FOR MECHANICAL MAINTENANCE ENGINEERS

Maintenance Engineering is the discipline and profession of applying engineering concepts for the optimization of equipment, procedures, and departmental budgets to achieve better maintainability, reliability, and availability of equipment.

Mechanical maintenance engineering is increasing in importance due to rising number of equipment, systems, machineries and infrastructure. Maintenance is to ensure a unit is fit for purpose, with maximum availability at minimum costs.

The personnel for maintenance should possess significant knowledge of statistics, probability and logistics, and additionally in the fundamentals of the operation of the equipment and machinery.

The book broadly deals with:

- Optimization of the maintenance organization structure
- Analysis of repetitive equipment failures
- Estimation of maintenance costs and evaluation of alternatives
- Forecasting of spare parts
- Assessing the needs for equipment replacements and establish replacement programs
- Scheduling and project management principles to replacement programs
- Maintenance tools and skills for efficient maintenance of equipment
- Skills for maintenance personnel
- Reviewing personnel transfers to and from maintenance organizations
- Safety hazards associated with maintenance of equipment

This book provides extensive data, figures, standards and detailed information related to maintenance. Sufficient information and overview enabling the maintenance engineers to take an informed and confident decision is also provided.

Each chapter and topic dealt with in this book has been provided with a brief and crisp overview and synthesis of pertinent information.

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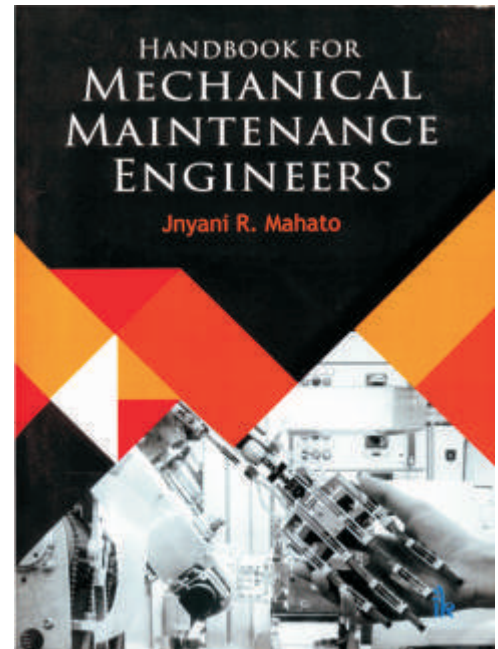
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PUBLICATION by MEMBERS

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Title of Book Chapter: Design and Analysis of Fractal Monopole Antennas for Multiband Wireless Applications

Smart Computing Techniques and Applications, Proceedings of the Fourth International Conference on Smart Computing and Informatics, Volume 1, Chapter 11, Part of the Smart Innovation, Systems and Technologies book series (SIST), Springer, Singapore, Satapathy S C, Bhateja V, Favorskaya M N, Adilakshmi T (eds), First Online: 08 July 2021, Volume 225, pp. 103-116, Print ISBN: 978-981-16-0877-3, Online ISBN: 978-981-16-0878-0

DOI: https://doi.org/10.1007/978-981-16-0878-0_11

Co-author: Siddhi Oja

Abstract: A design of Fractal Monopole patch antenna using metamaterial-based substrate and Minkowski fractal has been presented in this paper. The antenna has been designed for a frequency range from 1 to 6 GHz which is mainly covering the wireless fidelity and Wi-Max ranges. Antenna parameters like VSWR, Return Loss, and Bandwidth have been analyzed for the proposed antenna. The overall results of proposed antenna in design after carrying out parametric study are found; Gain above 4 dB, Return Loss (S_{11}) -37.11 dB ($f_L=0.3$) and -59 dB ($f_L=0.2$), VSWR -1.02, Bandwidth -77.01%. The simulated characteristics of the antenna along with the 3D radiation patterns and gain are presented and discussed by using CST Simulation Software.

Keywords: Minkowski fractal, Voltage Standing Wave Ratio (VSWR), Gain, Return loss, Bandwidth, Wi-Fi Wi-Max, Flexible patch, Multilayer patch antenna

Title of Paper: Metamaterials in Electro Magnetic Wave Absorbers

Proceedings of 2021 Fourth Biennial International Conference on Nascent Technologies in Engineering (ICNTE), IEEE, Date Added to IEEE Xplore: 30 July 2021, Electronic ISBN: 978-1-7281-9061-7, Print on Demand (PoD) ISBN: 978-1-7281-9062-4

DOI: 10.1109/ICNTE51185.2021.9487690

Co-author: R S Sandhu

Abstract: Metamaterials show properties different from the properties present in the natural occurring materials. In ordinary way, materials are constructed at the chemical level but metamaterials are constructed at the macroscopic level and derive their properties from geometry. Metamaterials simultaneously exhibit negative permittivity and permeability resulting in negative refractive index. It is because of these unusual properties that metamaterials change the electric and magnetic property of electromagnetic waves. The reflection pattern as displayed by metamaterials has been a field of research worldwide with various theories and models being suggested. However, development of the desired commercially viable metamaterials is directly dependent on advancement in the field of nano-technology as even the best conventional photolithography techniques are not able to fabricate the element at the molecular levels. Metamaterial are expected to impact most of the technological fields where electromagnetic radiation are used. They provide a fast emerging flexible platform for technological advancement. Metamaterials have a prominent role in Aerospace and Defence which enable its application in enhanced communication, radar improvement, drones, light aircrafts, next generation composites and invisibility cloaks. Research undertaken for design of low density but high strength radar absorbing materials has been limited due to key factors such as mechanical strength, environmental resistance, thickness, absorptivity and weight. Research efforts have now shifted towards radar absorbing structures, a field which enables multiple military application, wherein metamaterial offer one such lucrative option. COMSOL Multiphysics Electro Magnetics RF Module software has been used in order to simulate various metamaterial designs. The aim of the paper is to study various designs of metamaterials and its applications as Electromagnetic wave absorbers

Keywords: Metamaterial, Absorbers, Simulation, COMSOL

PUBLICATION by MEMBERS

Title of Paper: Alignment of Fire Control Radar with Gun in Non Line of Sight

Published in 2021 Fourth Biennial International Conference on Nascent Technologies in Engineering (ICNTE), IEEE, Electronic ISBN: 978-1-7281-9061-7, Print on Demand (PoD) ISBN: 978-1-7281-9062-4

DOI: 10.1109/ICNTE51185.2021.9487665

Co-authors: Gunmeet Singh Mallan, Rachna Sangwan & Sachin Sharma

Abstract: An aerial Fire Control Radar controls the aiming, movement and fire of one or more guns on a flying target when they are spatially separated. To calculate the bearing and elevation angle of a gun, the radar needs to know the position of the gun in 3 Dimensional co-ordinates with respect to its own position. This is carried out by pointing the gun barrel and radar track antenna towards each other i.e. aligning them and initiating the system during initial set up when both are in Line of Sight of each other. Two new methodologies were adopted to align the radar antenna and gun barrel when in Non Line of Sight. The methods and results obtained are presented in this paper.

Keywords: Synthetic Aperature Radar (SAR), Confusion Matrix, Lee Filter Method, Pauli Decomposition Method

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**Title of Book Chapter: Renewable Energy Systems**

Chapter: 2, Book: Microgrids, CRC Press, Taylor and Francis, 26 pages, eBook ISBN: 9780367815929

URL: <https://www.taylorfrancis.com/books/mono/10.1201/9780367815929/microgrids?refId=57673718-8a4e-4dc6-b58b-5ce608a62972>

Co-authors: A Amudha & Senthil Prabu Ramalingam

Abstract: In this chapter, we have developed a simulation model to carry out an analysis for optimizing the dimensions of photovoltaic (PV)-wind and battery systems for a hybrid unit in a place, the use of a distribution of load, wind speeds, and installation. The developed module strategies involve the received information inclusive of the wind speed, sun insolation, load distribution, type of load (commercial or industrial or village), type of supply (alternating current or direct current), type of backup components (fuel cell or diesel generator set), maximum annual capacity shortage constraints (0% or 5%), wind and PV device parameters like latitude and longitude of location, lifetime of PV panel, de-rating factor, slope of PV panel, azimuth angle, ground reflections and hub height, rated speed, and rotor diameter of wind turbine system. The energy generating capacities of PV-wind and battery systems for every second for a location are computed, and we recommend the combination of the hybrid system. The optimal size of the hybrid system is determined based on the calculated values of initial cost, operating cost, and cost of energy.

Keywords: Optimization, HOMER, Power system, Residence load, Hybrid power system

Title of Paper: IoT Based Control of Hybrid Energy Storage System for an Electric Vehicle using Super Capacitor and Battery

International Conference on Recent Trends in Computing (ICRTCE-2021), Journal of Physics: Conference Series, Volume 1979, 20-22 May 2021, IOP Publishing

DOI: 10.1088/1742-6596/1979/1/012032

PUBLICATION by MEMBERS

Co-authors: Amudha A & M Mansoor Ali

Abstract: This main objective of this project is to control the hybrid energy storage system in order to increase the lifetime and performance of an electric vehicle battery source. This can be achieved by utilizing the powerful super capacitors in order to satisfy the peak power demand in an electric vehicle. When there is sudden raise in acceleration the peak power demand raises and hence the battery life gets reduced when there is sudden peak in discharge. In order to overcome this drawback, the super capacitor based auxiliary energy storage system comes into the role. We have used ARDUINO as a brain of this operation and it smartly identifies the excess power demand, cruise and normal mode of acceleration and rapidly switches between the battery storage and super capacitor storage accordingly in order to increase battery lifetime.

Keywords: IoT, Hybrid, Energy Storage, Electric Vehicle

Title of Paper: Battery Management System for E-Vehicle using Kalman Filter

International Conference on Recent Trends in Computing (ICRTCE-2021), Journal of Physics: Conference Series, Volume 1979, 20-22 May 2021, IOP Publishing

DOI: 10.1088/1742-6596/1979/1/012018

Co-authors: Amudha A & Naveen K T

Abstract: For safe and proper battery management system the main aspect is to do a optimization of SOC which is State-of-Charge estimation. This paper gives you the maximum achievement of BMS with the electric vehicle Lithium-ion Battery. Kalman filter design is implemented in this in order to reduce the mechanical noise and further voltage and current ripples where the main aim of this research work using Kalman is that it must have some proper sequence like a proper electronics and electrical model to get rid of the noises and ripples, thus the models current state and its system design is verified where it can apply to all sorts of problems and can apply to all such current manufacturers. From this point of view, we implemented a design which matches the output source of Kalman filter design and takes the less time for giving the accurate output. Hence the simulation with the Kalman filter design and its respective needed electronics components are therefore simulated and programmed by the MATLAB Simulink.

Keywords: BMS, Kalman filter, Electric vehicle

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Title of Book Chapter: Solid-State Air-Conditioning System using Photovoltaic Module

Electrical and Electronic Devices, Circuits, and Materials: Technological Challenges and Solutions, Suman Lata Tripathi, Parvej Ahmad Alvi and Umashankar Subramaniam (eds), Part-II: Design, Implementation and Applications, Chapter 21, 11 March 2021, pp.393-410, ISBN: 9781119750369

DOI: <https://onlinelibrary.wiley.com/doi/pdf/10.1002/9781119755104.ch21>

Co-authors: S Karthikeyan, K Santhosh, M Keerthana & Gabriel Gomes de Oliveira

Abstract: The all-around expanding interest for thermoelectric cooling in the field of refrigeration and cooling prompted the creation of greater power and, thusly, more CO₂ everywhere throughout the world, which is the essential driver for a worldwide temperature alteration and environmental change. The thermoelectric climate control system is another elective strong state heat siphons that work as indicated by the Peltier impact ("Heating or cooling impact happens when an electric flow go through two transmitters").

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This activity is finished with the assistance of a PV board and a battery. A 12V Peltier module is utilized as the essential actuator to deliver cooling and warming. With this innovation, the cooling framework and water warming framework were built up that can perform ideally. The principle point is to structure and build up a working thermoelectric cooler inside cooling volume of 3L that utilizes the Peltier effect on cool and keep up a picked temperature of 20°C. Therefore, a productive cooling framework utilizing strong state parts that are controlled by solar energy (Renewable) is introduced.

Keywords: Peltier effect, Humidity sensors, Thermoelectric cooling, Photovoltaic panel (PV), Thermoelectric coolers (TEC)

Title of Paper: Development of an Iron Powder Metallurgy Soft Magnetic Composite Core Switched Reluctance Motor

Materials Today: Proceedings, Elsevier, Volume 41, Part 5, 2021, pp. 1195-1201

DOI: <https://doi.org/10.1016/j.matpr.2020.10.346>

Co-authors: K Vijayakumara, R Rajendirakumar, A Joseph Basanth, R Karthikeyan & S Kannan

Abstract: Soft Magnetic iron powder material and electromagnetic devices based on it underwent prominent development. Basis for soft magnetic composites is tightly packed iron powder using a die into a solid material. However, the properties will in most cases be different from those obtained from compaction and machining process. This paper addresses the development of a switched reluctance machine (SRM) employing pre-form iron powder blanks (Somaloy 1000 3P) of low mass density to address the vibration and acoustic noise issues. This can be a fast and low cost approach which aim to machine the components from a pre-form blank. Finite Element Analysis (FEA) study has been conducted to determine key parameters which can be validated through experiments on the prototype motor.

Keywords: Non-machinable blank, Finite element method (FEM), Iron powder material, Switched reluctance machine (SRM)

Title of Paper: MPPT-PWM — A Maximum Power Point Tracking (MPPT) Strategy using Variable Speed Wind Turbines (VSWTs)

Proceedings of the Sixth Brazilian Technology Symposium (BTSym2020), Part of the Smart Innovation, Systems and Technologies book series (SIST, Volume 233), Springer, Cham, First Online: 15 June 2021, Online ISBN 978-3-030-75680-2, Print ISBN 978-3-030-75679-6, pp 1016-1026

DOI: https://doi.org/10.1007/978-3-030-75680-2_109

Co-authors: Gabriel Gomes de Oliveira, Vania Vieira Estrela, Henrique Rego Monteiro da Hora, Abdeldjalil Khelassi, Nikolaos Andreopoulos, Maria Aparecida de Jesus & Yuzo Iano

Abstract: Nowadays, wind generators can supply more electric energy for standalone and grid-connected applications. This investigative work emphasizes a new optimal control method design to achieve the Maximum Power Point Tracking (MPPT) using Variable Speed Wind Turbines (VSWTs) termed MPPT-PWM. The VSWT output is initially coupled with a Permanent Magnet Synchronous Generator (PMSG) to transform wind energy to a fixed DC level using a chopper. Later, DC output from the chopper is inverted to obtain AC power using the PWM technique for adequate power flow. Experiments ratify the remarkable performance of the MPPT-PWM framework

Keywords: Variable Speed Wind Turbines (VSWTs), Maximum Power Point Tracking (MPPT), Permanent Magnet Synchronous Generator (PMSG), Direct Current (DC), Alternating Current (AC), Pulse Width Modulation (PWM), Horizontal Axis Wind Turbine (HAWT), Distributed Generation (DG)

Title of Paper: Digital Garbage Bin Monitoring System (DGBMS): A Smart Garbage Monitoring and Management Cyber-Physical System

Proceedings of the Sixth Brazilian Technology Symposium (BTSym'20), Springer Publisher, Switzerland, Part of the Smart Innovation, Systems and Technologies book series (SIST), Volume 233, Published Online: 15 June 2021, ISBN (Online): 978-3-030-75680-2, ISBN (Print): 978-3-030-75679-6, pp. 488-497

DOI: https://doi.org/10.1007/978-3-030-75680-2_54

PUBLICATION by MEMBERS

Co-authors: Vania Vieira Estrela, Thierry Oscar Edoh, Navid Razmjoo, Abdeldjalil Khelassi, Henrique Rego Monteiro da Hora, Gabriel Gomes de Oliveira, Gabriel Caumo Vaz & Yuzo Iano

Abstract: In day-to-day life, all could witness the odour of scattered garbage and unkempt garbage bins because there is no proper time interval schedules and routines, which results in garbage overflow. It also creates hygienic problems, land pollution, and landscape unpleasantness. This scenario demands a system that observes the garbage bin status and provides evidence to the authorities administrating the collection intervals for emptying the bins. The so-called Digital Garbage Bin Monitoring System (DGBMS) is a smart garbage management system relying on the Internet of Things (IoT) technology that can solve this problem. This system monitors the garbage excess and the moisture in the garbage bin. In this project, a sensor network detects the garbage level and the garbage moisture in the dustbin via an Infrared (IR) sensor and then sends evidence to the decision-making party through an IP address. The UNO ARDUINO board interfaces the sensors with the IP address and handles the actuators. An RFID channel constantly monitors the necessary garbage information regarding the different locations of the wastebaskets. Developing countries, especially the rural areas, are severely concerned with these issues that can cause severe health problems among the population. Implementing this solution could contribute to addressing many health-related issues in these countries.

Keywords: Humanitarian engineering, Green design, Smart cities, Infrared sensor, Waste management, Radio Frequency Identification (RFID), Sensor networks, Internet of Things, Cyber-physical system

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Title of Paper: Effect of Yarn Composition and Fabric Weave Design on Microwave and EMI Shielding Properties of Hybrid Woven Fabrics

The Journal of The Textile Institute, Taylor & Francis Group, UK, Published Online: 22 July 2021

DOI: 10.1080/00405000.2021.1954427

Co-authors: Sayed M Abbas & Ashutosh C Abhyankar

Abstract: Ring spun composite yarn (RCY; 755 denier) with linear resistance of 172 X/m is prepared with stainless steel (SS) fibre and polyester fibre in ratio of 80%: 20% (w/w). Sheath core yarn system, core being ring spun yarn and PET fibre as sheath material is prepared in various fibre compositions adopting friction spinning technique. For microwave interaction and EMI shielding, hybrid woven fabrics are prepared using sheath-core yarn in weft and SS/PET blended yarn (20% SS/80% PET) in warp in cell structured and rib structured weave design. Samples of woven fabric were evaluated for microwave and EMI shielding properties in frequency range of 8.2–18.0 GHz in parallel and perpendicular polarisation of electromagnetic wave (em wave). Samples having conducting yarn in warp and weft both have shown high reflection in both polarisation of em wave. Sample containing metal fibre content of 32.58% (w/w) prepared in cell-structured weave design containing 1330 and 2017 denier sheath-core yarn in weft and 165 denier (20% SS/80% PET) blended yarn in warp offered reflection of 89.4922–59.9864% in parallel mode and 92.8135–80.0789% in perpendicular mode. This offered EMI shielding of 30.9601 to 35.4659 dB in perpendicular and 17.0209 to 11.2131 dB in parallel mode in 8.2_18.0 GHz. Woven fabrics are highly breathable, its air permeability lies in the range of 22.5–26.2 ft³/ft²/s. It inherits high aesthetic values. This hybrid woven fabric finds potential applications in radar camouflage, protection of human being from hazardous effect of microwaves, EMI shielding and electrostatic discharging cover materials, etc.

Keywords: Conductive sheath-core yarn, hybrid woven fabric, EMI shielding effectiveness

PUBLICATION by MEMBERS

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Title of Paper: Wavelet-Based Least Common Ancestor Algorithm for Aggregate Query Processing in Energy Aware Wireless Sensor Network

Wireless Personal Communications, Volume 117, No. 2, March 2021, pp. 1-17

DOI: <https://doi.org/10.1007/s11277-020-07938-3>

Co-author: Reeta Bhardwaj

Abstract: *Wireless sensor network (WSN) is developed as a network of sensors, which engage in sensing and transmitting the data to the sink node. The constraints, such as energy, memory, and bandwidth insist the researchers to develop an efficient method for data transmission in WSN. Accordingly, this paper introduces a data aggregation mechanism based on query processing, Wavelet-based Least Common Ancestor-Sliding window (WLCA-SW). The energy-loss and memory-crisis is well addressed using the proposed WLCA-SW through the successive steps of query processing, duplicate detection, data compression using the wavelet transformation, and data aggregation. The proposed WLCA-SWA is developed with the integration of the weighed sliding window and Least Common Ancestor (LCA), which enables the energy-aware aggregate query processing and de-duplication such that the duplicate records are detected potentially prior to the communication of the sensed data to the sink node. It is prominent that the weighed sliding window is the extension of the existing time-based sliding windows. The effectiveness of the proposed aggregate processing approach is evaluated based on the metrics, such as number of alive nodes, data reduction rate, data-loss percentage, and residual energy, which is found to be 33, 85%, 8.222%, and 0.0610 J at the end of 1000 rounds using 150 nodes for analysis. Moreover, the proposed method has the minimum aggregation error of 0.03, when the analysis is performed using 50 nodes.*

Keywords: *Wireless sensor networks, Least Common Ancestor, Data aggregation, Energy-constraint, Query processing*

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Title of Paper: Identification and Assessment of Innovative Green Supply Chain Practices the Oil and Gas Industry of the Gulf Cooperation Council (GCC) Countries

International Journal of Electrical Engineering and Technology (IJEET), Volume 12, Issue 7, July 2021, pp. 71-79, ISSN Print: 0976-6545, ISSN Online: 0976-6553

DOI: <https://doi.org/10.34218/IJEET.12.7.2021.008>

Co-author: Sulaiman Al Mujaini

PUBLICATION by MEMBERS

Abstract: Countries in the Gulf Cooperation Council (GCC) have historically been reliant on the output and performance of their oil and gas companies to buoy their respective economies. However, there has been a considerable shift in the global disposition towards the traditional products of this industry. Many countries are adding regulations in view of the growing recognition of the environmental harms that the oil and gas industry accrue across its entire value chain—from discovery to refinement and delivery. To respond to this, firms in the industry are working towards limiting their environmental footprint by adopting sustainable practices. The broad approach towards aligning supply chains towards sustainability is in the development of what is called a green supply chain. In this work, the goal is to evaluate the current state of green supply chain implementation in the GCC by understanding the barriers and drivers that firms face as well as the extent of application in these companies.

To facilitate the goals of research work, 400 employees from oil and gas companies across all countries in the GCC were surveyed to assess the supply chains of their own firms. The results indicate that barriers like access to technology are the primary impediment towards adoption of these practices by the organization. At the same time, it was also found that the impact of the drivers are far more pronounced and, among those considered, the role of external incentives from the public sector along with pressure coming from consumers were the main sources of motivation to transition. Furthermore, the respondents also noted that there has been considerable effort in the oil and gas industry to utilize green supply chain practices although some work can still be done to further expand adoption. Finally, the data also shows that the employees recognize the inherent value of green supply chain practices, indicating that overall supply chain performance is positively affected by their utilization.

Keywords: Supply Chain Practices, Gulf Cooperation Council, Public Sector, Consumers, Oil and Gas Industry

Title of Paper: Extraction of Ethyl Cellulose from Bagasse for Production of Coating Paper

International Journal of Electrical Engineering and Technology (IJEET), Volume 12, Issue 7, July 2021, pp. 80-87, ISSN Print: 0976-6545, ISSN Online: 0976-6553

DOI: <https://doi.org/10.34218/IJEET.12.7.2021.009>

Co-author: Nasr Al Harthi

Abstract: There are several issues confronting the climate, many of which contribute to an imbalance in its equilibrium as a result of various influences. Farm waste, on the other hand, is one of the most harmful forms of environmental threats when it is treated by combustion or leveling. Furthermore, the gases generated by burning these crop residues produce various forms of oxides, which have a detrimental effect on the climate by causing acid rain and global warming due to a rise in carbon dioxide in the atmosphere. Every one of these factors have prompted researchers to search for a way to recycle these pollutants, since recycling is the conversion of waste into usable materials. Bagasse was transformed to ethyl cellulose in this task, which is an important substance in many factories, especially in the dyes section. In addition, ethyl cellulose was extracted through the reactor, where the bagasse was separated into ethyl cellulose deposits, where many alkalis were added, the most important of which was sodium hydroxide. The bagasse was cleaned before the process of separating it and it was chemically neutralized by adding some salts. Several measures were measured, the most important of which are moisture content and ash content. In addition, 2.5 kg of bagasse was collected from the state of Barka, where the experiment was conducted in the laboratories of the National University of Science and Technology, and many results were obtained, where the optimum temperature was 90 degrees Celsius, where the 22.41 % of moisture content, 20.41 % of ash content. In addition, the optimum sieving size is 16 μm and the extract percentage will be 56.50%. In this project, many goals were achieved, as the biomass wastes were converted into important materials in the industrial field. In addition, harmful emissions that disturb the balance of the environment are reduced. Also, ethyl cellulose was produced in large quantities and of high quality by using the distillation. In the future, we will be completely dependent on these materials because they solve an important environmental problem that may cause future disasters.

Keywords: Moisture, Ash, Biomass, Ethyl Cellulose, Coating paper, Environmental, Disasters

Title of Paper: Utilization of Food Waste for Production of Activated Carbon

International Journal of Electrical Engineering and Technology (IJEET), Volume 12, Issue 7, July 2021, pp. 88-95, ISSN Print: 0976-6545, ISSN Online: 0976-6553

DOI: <https://doi.org/10.34218/IJEET.12.7.2021.010>

Co-author: Zuwaina Ali Nasser Alshamsi

PUBLICATION by MEMBERS

Abstract: Environmental issues such as air pollution, waste disposal, global warming, climate change, acid rain, ozone layer depletion, water pollution, and many others are becoming more prevalent, affecting every human, animal, and nation on the planet. The burning of fossil fuels and waste disposal are two of the most significant causes of environmental pollution and human health. To address these issues, carbonization activation developed an activated carbon production system. Activated carbon, which is made from carbonaceous sources such as coal, coconut shells, waste food, and wood, is also available. Sewage cleaning, exhaust gas purification, gas cleaner, solvent recycling, H₂S and other waste gases purification, tooth whitening, hangover protection, and skin treatment are all popular uses for activated carbon. Recycling products from waste streams saves money by reducing renewable resource use and treatment costs, such as landfill and incineration. Prepared activated carbons are thus easy to obtain, less expensive, environmentally friendly and have a high efficiency for the adsorption of dye and materials by using thermal and chemical method. In addition, the paper discussed several of effect of the parameters on activated carbon such as Raw materials and chemical Temperature, Adsorption Capacity and Surface area which effect on final properties of product. Moreover, the activated carbon samples are examined to measure their quality and porosity properties such as absorption surface, pores, density, etc. using methods of measuring and analyzing the quality of the activated carbon produced and comparing it to commercial activated carbon such as BET analysis, SEM analyzer and FTIR analyzer.

Keywords: Tray dryer, activated carbon, Waste food, Adsorption, Chemical activation, Physical activation

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Title of Paper: Point Positioning Capability of Compact, Low-Cost GNSS Modules: A Case Study

IETE Journal of Research, 23 June 2021, pp. 1-14

DOI: <https://www.tandfonline.com/doi/abs/10.1080/03772063.2021.1939801>

Co-authors: Atanu Santra, Sukabya Dan, P Banerjee, Surajit Kundu & Anindya Bose

Abstract: Global Navigation Satellite System (GNSS) provides precise Position, Velocity, and Timing (PVT) information. Various types of receivers of varying cost and complexity are used for collection and use of GNSS data. Currently, cost-effective, compact, low power consuming, multi-constellation enabled, single, or dual-frequency GNSS modules are being increasingly available having the capability of providing modest position solution accuracy. This paper presents the results of GPS, BeiDou, and GPS + BeiDou hybrid positioning capabilities of few commercially available modules based on systematic analysis from data collected during two time periods from two locations of India using geodetic and commercial patch antennas w.r.t. the reference points created through PPP (Precise Point Positioning). The results are compared with those provided a survey-grade GNSS receiver. It is witnessed that, selected single frequency module can provide 3–4 m 2DRMS (Distance Root Means Square) precision and their dual frequency counterparts can provide 2DRMS solution precision around 3 m in GPS-only operation, around 7 m in BeiDou-only operation and around 3.5 m in case of GPS + BeiDou hybrid operation. The performance of the compact modules clearly presents the cost-performance benefit of the compact modules for real-time applications and the results of this study would help in understanding the capabilities of these modules for mass-market applications.

Keywords: Compact modules, Geodetic antenna, GNSS, Low-cost antenna, Position accuracy, Precision

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Title of Paper: Studies on Synthesis of Lactic Acid and Xanthan Gum from Cheese Whey Permeate in Two Phase and Three Phase Moving Bed Biofilm Reactors

Korean Journal of Chemical Engineering, 05 August 2021, Volume 38, No. 09, pp. 1888–1902

DOI: <https://doi.org/10.1007/s11814-021-0821-5>

Co-author: Vikas Narayan

Abstract: The performance characteristics of moving-bed biofilm reactors (MBBRs) have been analyzed both mathematically and experimentally. Both two phase operation (lactic acid synthesis from cheese-whey permeate) and three phase operation (Xanthan gum production) in both batch and continuous flow reactors have been studied. Mathematical simulation has been performed considering the heterogeneous nature of the system with appropriately defined effectiveness factor being incorporated to account for resistance to substrate transfer into biofilm. The flow reactors are modeled based on the tanks-in-series approach. The mathematical models (software packages) developed have been adequately verified by comparing with experimental data. The interesting performance features of these reactors have been highlighted and the dependence of reactor performance on key system / operating parameters such as batch time / space time, catalyst loading and catalyst size has been well – illustrated. The limitation that these bioreactors are best suited mainly for small capacity installations has also been indicated.

Keywords: Moving bed biofilm reactors, Lactic acid and Xanthan gum synthesis, Batch and flow reactors, Two phase and three phase operations, Mathematical simulation, Tanks-in-series model

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Title of Paper: High Gain and High-Efficiency Bidirectional DC-DC Converter with Current Sharing Characteristics using Coupled Inductor

IEEE Transactions on Power Electronics, Published Online: 14 May 2021, Volume 36, No. 11, November 2021, pp. 12819-12833, Print ISSN: 0885-8993, Electronic ISSN: 1941-0107

DOI: 10.1109/TPEL.2021.3077584

Co-authors: Debashis Chatterjee & Tsorng-Juu Peter Liang

Abstract: Application of coupled inductor in designing nonisolated bidirectional dc-dc converter provides flexibility to attain high voltage conversion ratio both in buck and boost mode of operation. In this article, a new coupled inductor bidirectional converter is

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designed with low winding turns ratio ($n = 1$). The proposed topology uses two current path inductor structure which improves voltage conversion ratio and shares current in all operating modes. All the active switches in the proposed topology are soft switched utilizing synchronous rectification concept. Higher efficiency operation is possible as no extra circuit elements are required to achieve soft switching. Leakage energy of coupled inductor is successfully stored in a clamped capacitor which is utilized in the circuit topology. The voltage stress and current stress level of main active switches are low. The proposed circuit is simulated and performance parameters are verified through hardware results. Both simulation and experimental results performed on a 250 W prototype confirm to attain a high efficiency of the proposed converter with simple hardware requirement for practical implementation.

Keywords: Bidirectional dc–dc converter; Coupled inductor

Title of Paper: A Modified Carrier-based PWM Technique for Minimization of Leakage Current in Transformer Less single-phase Grid-tied PV System

Electrical Engineering, Springer Berlin Heidelberg, Volume 103, No.1, February 2021, pp. 447-461

DOI: <https://doi.org/10.1007/s00202-020-01092-6>

Co-authors: Anupam Acharya, Tanmoy Roy Choudhury, Byamakesh Nayak & Chinmoy Kumar Panigrahi

Abstract: This paper discusses the impact of leakage current and its dependency on common mode voltage in transformer less single-phase grid connected photovoltaic (PV) system. Further a new carrier-based PWM method is derived for H bridge single-phase grid-tied PV inverter to minimize leakage current. The proposed modulation strategy is compared with conventional techniques through simulation in MATLAB R2018a. The superiority of the proposed technique is validated in laboratory prototype of a 500 W single-phase grid-tied PV system. The hardware results validate the theoretical findings in appropriate.

Keywords: Common mode voltage (V_{CM}), Leakage current, Parasitic capacitance, Transformer less PV system

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Title of Paper: Modelling Enablers of Efficiency and Sustainability of Health Care: A m-TISM Approach

Benchmarking: An International Journal, Emerald Publishing Limited, Publication date: 8 June 2021, ISSN: 1463-5771

DOI: 10.1108/BIJ-03-2021-0132

Co-authors: Rahul Sindhvani, Abhishek Behl, Punj Lata Singh, Anil Kumar & Tanmay Gupta

Abstract: It would not be an exaggeration to say that healthcare is the most crucial one in today's perspective. The health care sector, in general, is engaged in working on various dimensions simultaneously like the safety, care, quality, and cost of services, etc. Still, the desired outcomes from this sector are far away, and it becomes pertinent to address all such issues associated with healthcare on a priority basis for sustaining the outcomes in a long-term perspective. The present study aims to explore the healthcare sector and list out the directly associated enablers contributing to increasing the viability of the healthcare sector. Besides, the interrelationship among the enlisted enablers needs to be studied, which further helps in setting-out the priority to deal with individual enablers based on their impedance in the contribution towards viability increment.

Keywords: Healthcare sector, Facility improvement, Modified-total interpretative structure modelling approach, Quality services, Patient care

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Title of Paper: Effective Military Communication using Multiband Wearable Antenna

Published in 2021 6th International Conference on Communication and Electronics Systems (ICCES), Date Added to IEEE Xplore: 02 August 2021, IEEE, pp. 459-463, Electronic ISBN: 978-1-6654-3587-1, Print on Demand (PoD) ISBN: 978-1-6654-1182-0

DOI: 10.1109/ICCES51350.2021.9489213

Co-author: Pooja N Kakani

Abstract: *Wearable antennas have become prime consideration for wearable devices as it appears compact, reliable, and robust for any solution. The traditional devices are handheld which increases the weight and systems are fragile. Thus, a wearable communication device can enhance the structure and application usages. Gadgets which is wearable on human and has contact to the body referred as Wireless Body Area Networks (WBAN). Communication applications are vastly used for commercial use and hence a lot of innovation happened on material design, fabrication techniques, material selection, etc. The military communication system is very essential for battlefield operations and so far, wearable devices are few adopted by the Military. This paper proposes a wearable multiband communication system that has been incorporated in the vest and that can be used during the battlefield. Further, the various challenges and issues in designing the wearable antennas are discussed. Multiband communication is faster and efficient hence SATCOM carried by a military person for terrestrial communication could be eliminated.*

Keywords: *Military communication, Wireless communication, Fabrication, Silver, Gold, Technological innovation, Wearable computers*

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Title of Paper: Green IoT-low Cost Device for the Detection of Deep Vein Thrombosis using Edge Computing

Journal of Green Engineering, Volume 11, Issue 2, 27 February 2021, pp. 1266-1276, ISSN (Online): 2245-4586 , ISBN (Print): 1904-4720

URL: <http://www.jgenng.com/volume11-issue2.php>

Co-authors: Immanuel Johnraja Jebadurai, Getzi Jeba Leelipushpam Paulraj & Bastin Rogers Cross Joseph

Abstract: *The detection of Deep Vein Thrombosis (DVT) during the early stage is critical for preventing any adverse effect. DVT is one of the major causes of diseases that are related to the blood circulatory system in humans. This article proposes a methodology for the early detection of DVT through the photographic images captured using smartphones as edge devices. Unlike the traditional methods, the proposed methodology utilizes edge computing as a green computing initiative. The manifestation of telangiectasia is*

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used as the early biomarker. The proposed image analysis model uses image super-resolution (SR) for pre-processing. The telangiectasia in the skin on the legs are detected using hessian matrix based image detection approach. The experiments were done with the globally available DVT and Varicose vein images as well as the photographic images captured through smartphones. The proposed robust approach produces excellent results without requiring any restricted environment for capturing the images.

Keywords: Deep Vein Thrombosis, Edge computing, Green computing, Hessian Matrix; Internet of Things, Low Cost Screening, Pulmonary Embolism, Super-resolution, Varicose Vein

Title of Paper: **A Comprehensive Study of Prospective Cohort Diseases using Deep Vein Thrombosis**

Journal of Cardiovascular Disease Research, Volume 12, No 4, 30 June 2021, pp. 189-194, ISSN (Online): 0976-2833, ISSN (Print): 0975-3583

URL: <https://www.jcdronline.org/fulltext/207-1624932928.pdf?1629104548>

Co-author: Bastin Rogers Cross Joseph

Abstract: Subarachnoid hemorrhage a major subtype of hemorrhagic stroke and is a common complication in these patients with deep vein thrombosis. Among other known risk factors, early activation of blood coagulation systems in patients with subarachnoid hemorrhage may play a role in the development of deep vein thrombosis. Diagnosis of ipsilateral recurrent deep vein thrombosis (DVT) is difficult because persistent intravascular anomalies after previous DVT prevent ultrasound from diagnosing compression. Magnetic resonance direct thrombus imaging (MRDTI) with a detection time of 10 minutes accurately detects recurrent acute DVTs from chronic thrombotic debris. In this review, a prospective, international, multicenter diagnostic management study was performed in which patients with clinically suspected recurrent acute ipsilateral DVT participated. Patients were treated based on the MRDTI result, which was achieved within 24 hours of the start of the study. Industry experts have tried to robotize the path to identify and diagnose diseases where the healthcare system can benefit from DVT innovation. Accordingly, various tests have suggested a one-sided framework for predicting and diagnosing internal cerebral DVT for disease using a safe and unambiguous optimization algorithm. Extensive studies were conducted to obtain a variety of research papers from all disciplines of Cerebral DVT and to examine key commitments and their priorities. The prognosis for this disease is excellent when diagnosed and treated early. However, if diagnosis and treatment are delayed, the process can be fatal. This shows the importance of maintaining this diagnosis on the differential of unilateral thalamic lesion. The 25 logs are shared here. In addition, this survey provides a detailed reflection on the prognosis of the disease and the diagnostic system.

Keywords: Venous thrombosis Implanted, Vascular access devices, Deep vein thrombosis (DVT) and diseases

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Title of Paper: **An Analysis of Rainfall Variability and Drought over Barmer District of Rajasthan, Northwest India**

International Journal of Water Supply – IWA Publishing (SCI Indexed), Volume 21, No 5, August 2021, pp. 2505–2517, ISSN (Online): 1607-0798, ISSN (Print): 1606-9749

DOI: <https://doi.org/10.2166/ws.2021.053>

Co-author: SM Yadav

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Abstract: Climate variability, mainly the annual air temperature and precipitation, have received great attention worldwide. The magnitude of this climate variability changes with variation in location. Rajasthan comes under the arid and semi-arid zone of India in which monsoon is a principal element of water resource. Due to erratic and scanty rainfall in this zone, agriculture is totally dependent on the monsoon. The objective of the present study is to assess the meteorological drought characteristics using Drought Indices Calculator DrinC from the historical rainfall records of the Barmer District of Rajasthan State by employing the criterion of percentage departure (D%), rainfall anomaly index (RAI) and standardized precipitation index (SPI). Trend analysis of seasonal and extreme annual monthly rainfall was carried out for the Barmer District of Rajasthan State using the data period between 1901 and 2002 at the 5% level of significance. Sen's slope estimator was also applied to identify the trend. Temporal analysis is useful to predict and identify the possible drought severity and its duration in the study region. It also helps in understanding its effect on groundwater recharge and increasing the risk of water shortage. Trend analysis of rainfall over 102 years shows an increasing trend in pre-monsoon, post-monsoon, southwest monsoon and annual rainfall and a decreasing trend in winter rainfall. Through this study, policy makers and local administrators will be benefitted, which will help them in taking proactive drought relief decisions in the drought-hit regions.

Keywords: Barmer District, Drought indices, Percentage departure, Rainfall anomaly index, Standardized precipitation index

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Title of Paper: Texture Development in 304LN Austenitic Stainless Steel during Post-hot-axisymmetric Compression

Proceedings of Institute of Mechanical Engineers, Part B: Journal of Engineering Manufacture, Volume 235, Issue 6-7, 01 May 2021, pp. 1131-1143, ISSN (Online): 2041-2975, ISSN (Print): 0954-4054

DOI: <https://doi.org/10.1177/0954405420978036>

Co-authors: Shiv Brat Singh & Surjya K Pal

Abstract: In the present work, 304LN austenitic stainless steel has been considered for the texture evolution study after the hot-deformation process. The axi-symmetric compression tests, with post-deformation isothermal holding at the same temperature, were performed at 900°C, 1000°C and 1100°C with a strain rate of 0.1 s⁻¹. Texture evolution during the post-hot-deformation was studied through electron back scattered diffraction. Effect of temperature and holding time on texture evolution were studied. At low deformation temperature and lesser holding time <100> and <110> fibre textures were observed. At high deformation temperature and/or high holding time the texture becomes random. Texture intensity along α fibre, for all the temperatures, is chaotic whereas along β and τ fibres it is uniform at low temperature and becomes chaotic with the increase in deformation temperature. Goss component was found to be a major texture component with significant amount of ND and RD rotated cube components.

Keywords: Texture, EBSD, Compression, Post-deformation, Stainless steel, ODF, Fibre, Recrystallisation

PUBLICATION by MEMBERS

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Title of Paper: Modelling and Parametric Analysis of Wire Finned Coiled Tube Heat Exchanger in a Small J-T Refrigerator

International Journal of Heat and Technology, International Information and Engineering Technology Association, ESCI, Web of Science and Scopus Indexed, Volume 39, No 3, 30 June 2021, pp. 913-918, ISSN 0392-8764

DOI: <https://doi.org/10.18280/ijht.390326>

Co-authors: Nandhanagopal Govindha Rasu & Yarrapathruni V Hanumanth Rao

Abstract: *In the present study, numerical analysis of coiled tube heat exchanger used in J-T refrigerator is carried out. A computer code is developed to estimate the length of the heat exchanger by giving mass flow rate, diameter of tube and shell as input parameters. This code is verified against experimental data. Two different configurations are considered in this study viz., heat exchanger with wire fin wound around the inner tube of heat exchanger and without wirefin. Three different refrigerant mixtures are used to evaluate the performance of heat exchangers. The variations of temperature and heat transfer coefficient are brought out as result. Significant reduction in the length of heat exchanger is observed in all the cases. Mixture-1 causes 33% reduction in length of heat exchanger with wirefin. Similarly, for mixture-2 and mixture-3 the length is reduced by 15% and 30%. Additionally, heat transfer coefficient (HTC) values are also estimated for heat exchanger with wirefin and without wirefin. Considerable increase in HTC values is observed in the heat exchanger with wirefin.*

Keywords: *J-T refrigerator, Wirefin, Coiled tube heat exchanger, Refrigerant mixture*

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Full-length papers for the **Annual Technical Volumes (ISBN numbered)** of different Engineering Divisions are invited by The Institution of Engineers (India) from eminent engineers, technologists, professionals, and researchers on identified themes as appended below.

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The paper (full length) should be submitted to respective email ids as indicated against each engineering disciplines on or before **the respective deadline**. The paper should be prepared following our standard paper template and must be accompanied by the duly filled-in 'Declaration Form' both of which are available on our website (URL: <https://www.ieindia.org/webui/IEI-Publication.aspx#annual-technical-volume>).

Aerospace Engineering Division

Volume No 5

deadline for submission
31 October 2021

Theme : **Small Satellites Initiatives in India**

On the Theme:

The small satellite is envisaged to provide platform for stand-alone payloads, which facilitate earth imaging and science missions within a quick turnaround time. Small satellites are miniaturized satellites with wider range of users, all over the world. Small satellites have several advantages over large satellites namely cost effective ways to test newer technologies, opportunities for local industry, bigger basket of potential users and thus a large variety of mission possibilities. Small satellites are transforming the dynamics and economics of space industry and ensure that space technology is no longer monopolized by nations, but is accessible to smaller and newer entities. As a space-faring nation for over last five decades, India is set to become the hub for the small satellite launch market, which is projected to be valued a substantial amount in near future. Start-ups will be the key drivers in this space, with a few among them on the final stages of developing low-cost solutions that conform to global standards. The recent reforms by the Government of India will further accelerate private sector participation in the sector. Although small spacecraft have existed for decades, in recent years, small satellites have gained considerable importance, particularly in defense sectors, which have recently gained prominence owing to technological advances in their development and integration into the armed services of the major space faring countries across the world.

Sub-themes:

- * Technological Innovations, Business Opportunities and Commercialization of Indian Space Industry
- * Role of MSMEs and Start Ups in Small Satellite initiatives and development
- * Cryogenic Engine Technology and Indian Space Market
- * Design and Advancement in Satellite Launch Vehicle
- * Business Initiatives for Components, Sub-assemblies and Spare Manufacturing in Aerospace Startups
- * Provisions and Norms to initiate Start Ups and Entrepreneurship in Aerospace Sector

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- Original Contribution
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Marine Engineering Division

Volume No 5

deadline for submission
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Theme :

Advancements in Ship Building Technology — Way Ahead towards New Normal

On the Theme:

The COVID-19 pandemic has underscored the global interdependency of nations and set in motion new trends, which is reshaping the maritime transport landscape. The Indian maritime sector is at a pivotal moment facing not only immediate concerns resulting from the pandemic but also longer-term considerations, ranging from shifts in supply-chain design and globalization patterns to changes in consumption and spending habits, a growing focus on risk assessment and resilience-building, as well as a heightened global sustainability and low-carbon agenda. The sector is also dealing with the knock-on effects of growing trade protectionism and inward-looking policies. The shipbuilding industry is now witnessing an unparalleled transformation with growing demand to build new vessels and expand geographic routes, tight budgetary measures, and most importantly, the need to deliver reliable designs at affordable costs. The shipbuilding industry is now characterized with complex value chain, which involves construction of large structures. Moreover, rising demand for flexible ships poses a challenge due to the traditional construction approach prevalent in the industry. In the presence of these demanding market requirements, advanced technologies such as Industrial Internet of Things (IIoT) plays a crucial role in modernizing fleets in a cost-effective manner and also within a shorter time span. IIoT addresses various constraints pertaining to capital allocation, design, and build, and more importantly, supports optimal utilization of vessels during the commissioning and decommissioning phase of new and existing ships.

Sub-themes:

- * Technological Advancement in Shipping Industry in New Normal
- * Global Recovery in Shipping in New Normal: The Way forward
- * Maritime Industry 4.0
- * Digital Transformation of Ship Building Industry – The Way Ahead
- * Advancements in Shipbuilding Value Chain
- * Reorientation of post pandemic marine workforce and Seafarers

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Mechanical Engineering Division

Volume No 6

deadline for submission
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Theme :

Applications of Artificial Intelligence and Machine Learning in Mechanical Engineering — The Post Pandemic Pathway

On the Theme:

Amidst the ongoing global crisis, the engineers, scientists, and professionals have so far played a stellar role and have constantly scaling up their efforts and have been responsive to the challenges posed by the COVID-19 pandemic. The application of Machine Learning (ML) and Artificial Intelligence (AI) during the first wave of pandemic encouraged the researchers to outline new angles to explore different fields of mechanical engineering contributing to uninterrupted industrial growth of the country. The rapid advancements in the field of fluid mechanics leads to, unprecedented volumes of data driven experiments, field measurements, and large-scale simulations at multiple spatiotemporal scales. Moreover, Machine Learning algorithms can augment domain knowledge and automate tasks related to flow control and optimization. Tribology is another area which has been empowered with AI, ML, Big Data tools and led to evolution of 'Tribo-informatics / Intelligent Tribology'. As we embrace the new normal, most of the facets of mechanical engineering will be data driven and AI and ML need to be vectored in to optimize workspace, product and services.

Sub-themes:

- * Study of IC Engine in light of Artificial Intelligence (AI) and Machine Learning (ML)
- * Design, Operation and Maintenance of Turbine: A Machine Learning Approach
- * Advancement in Boiler Design, Operation & Maintenance through AI and ML Approach
- * Advancement in Machine Design through AI and ML Approach
- * Advances in Thermodynamics and Heat Transfer: The Machine Learning Approach
- * Neural Network in Kinematics: Challenges and Opportunities
- * Predictive Maintenance and Failure Analysis: AI and ML Approach
- * Tribology and Condition Monitoring: Supervised and Unsupervised Learning Approach
- * Fluid Mechanics and Heat Transfer: A Data Driven Approach
- * Application of Machine Learning in Mechanical System Modeling and Simulation
- * Assessment of Behaviours of Mechanical Systems through AI and ML
- * Machine Installation and Commissioning through Machine Learning Approach
- * Artificial Intelligence based Heating, Ventilation and Air Conditioning
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- * Bio-medical Engineering: A Machine Learning Approach

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Metallurgical & Materials Engineering Division

Volume No 5

deadline for submission
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Theme: **Integrated Computational Materials Engineering**

On the Theme:

Integrated computational materials engineering (ICME) is an emergent field that aims to integrate computational materials science tools into a holistic system that can accelerate materials development, transform the engineering design optimization process, and unify design and manufacturing. Even though in its nascent state, ICME presents a grand challenge laden with prospects of achieving significant economic benefit and accelerate innovation in the engineering of materials and manufactured products. Papers from eminent engineers and technologists on contemporary issues having technical relevance to the theme shall be included in this volume. It is expected that the articles will be of academic values, and reflect experience of professional engineers.

Sub-themes:

- * Computer Simulations at Different Time Scales,
- * Multi scale Aspects of Materials,
- * Creating Newer Materials,
- * Thermodynamics of Materials Engineering,
- * Principles of Engineering Practice,
- * Fundamentals of Materials Science and Engineering,
- * Electronic Structure Theory and Methods,
- * Applications of First-Principles Methods,
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Mining Engineering Division

Volume No 4

deadline for submission
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Theme: **Future of Mining**

On the Theme:

The evolution of technology, from advanced data analytics to artificial intelligence (AI), has always had the potential to transform the mining industry by realizing operational efficiency improvements, enhancing productivity, improving safety performance, empowering employees to do more meaningful work, and allowing communities to be more prosperous. The COVID-19 crisis has exposed the siloed nature of mining companies and highlighted the need for integrated operations. This is likely to accelerate the adoption of digital technologies, artificial intelligence, and analytics in the mining industry. This volume will discuss what future has in store for the mining sector and the likelihood of vectoring in the intelligent, integrated operations in mining in a comprehensive manner. Papers from eminent engineers, technologists, professionals and researchers on contemporary issues having technical relevance to the theme shall be included in this volume.

Sub-themes:

- * Climate-Smart Mining
- * Responsible Sourcing (Decrease environmental footprint, Increase social footprint)
- * Adoption of low carbon product strategies
- * Collaboration to set new mining standards based on environmental, social and governance (ESG) principles
- * Digitalization for more sustainable use of resources & lowering input cost
- * Automation for enhancing productivity
- * Smart mine power distribution and energy management
- * New frontiers: deep sea, space exploration
- * Resilient Mining Practices

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- Article of Professional Interest

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Production Engineering Division

Volume No 6

deadline for submission
31 October 2021

Theme :

Applications of Machine Learning, Deep Learning and Artificial Intelligence in Manufacturing — The Way Forward

On the Theme:

The advent of fourth industrial revolution ushered in huge industrial reforms and a paradigm shift in manufacturing from conventional product oriented labour intensive approach to a customer oriented data driven one and reinstated that promoting digital innovations coupled with intelligent decision making is the way forward. With the introduction of IIoT, Digital Twins, Smart Factories, Cyber-Physical Systems, Indian manufacturing sector has created a niche for itself in terms of productivity, efficiency and overall growth. Smart manufacturing revolution has enabled the manufacturing units to achieve timeless manufacturing goal with the objective to produce products with stated degree of precision and accuracy in a cost effective manner. In this context, Artificial Intelligence and Machine Learning are the core technologies which have provided stimulus for this transformation. These technologies, leveraged by Industry 4.0, namely Internet of Things, Advanced Embedded Systems, Cloud Computing, Big Data, Cognitive Systems, Virtual and Augmented Reality needs to be leveraged further as we prepare ourselves for adopting a newer, resilient and a self-reliant manufacturing ecosystem.

Sub-themes:

- * Data Driven Decision Making in Production Planning and Control
- * Advances in Machine Tools: Artificial Intelligence and Deep Learning Approach
- * Assessment of Industrial Automation in Machine Learning Environment
- * Deep Learning and Smart Manufacturing – The Way forward
- * Application of Big Data Analytics in Manufacturing
- * Smart Warehousing, Warehouse Optimization and Inventory Management
- * Artificial Intelligence and Robotics in Welding Industry
- * Lean and Agile Supply Chain: Machine Learning Approach
- * Digital Fabrication and 3D Printing
- * Industry 4.0 and Project Management: The Way Forward
- * Business Analytics and Knowledge Management
- * Assessment of System Reliability, Availability and Maintainability through Machine Learning Approach

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Textile Engineering Division

Volume No 5

deadline for submission
31 October 2021

Theme:

Development and Application of Functional Textiles

On the Theme:

Functional textiles, as we all know, are textiles with integrated functions of controlling or adjusting according to its application area. Functional textiles, over the years, have developed a niche for itself in textile industry and the associated fraternity. This range includes breathable, heat and cold-resistant materials, ultra-strong fabrics (e.g. as reinforcement for composites), new flame retardant fabrics (e.g. intumescent materials), optimized textile fabrics for acoustic properties, etc. Functional textiles became more and more important materials for various applications and interest in them grew year by year. Papers from eminent engineers, technologists, professionals and researchers on contemporary issues having technical relevance to the theme shall be included in this volume. It is expected that the articles will be of academic values, and will provide a comprehensive coverage of the subject.

Sub-themes:

The said volume will cover major sectors of Development and Application of Functional Textile, and will accommodate manuscripts on the following genre:

- * Based on the type of garment
 - Active wear
 - Performance wear
 - Ready to wear
 - Seamless wear
- * Based on the type of fiber
 - Polyester and advancements
 - Viscose
- * Based on the type of functions
 - Anti-bacterial
 - UV-protection
 - Temperature regulating
 - Water and oil repellent
- * Based on the application area
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 - Sports and Leisure
 - Military/ war
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(xi)	Supporting Documents/links [which are clearly indicative of the incumbent's achievement(s)]	

Reporting of Award of stipend/fellowship at PG/PhD level and awards from esoteric events/communities may be avoided.

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(viii) Membership No (please use the prefix F/M/AM as the case may be)	
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(x) Issuing Authority	
(xi) Serial No	
(xii) Patent No	
(xiii) Date of filing (DD/MM/YYYY)	
(xiv) Date of Grant (DD/MM/YYYY)*	
(xv) Patentee	
(xvi) Details of Patent	
(xvii) Term for which the above (ix) has been granted	
<i>* Copy of Certificate of the Grant of Patent</i>	

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(vii)	Organization of affiliation	
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(ix)	Title of Paper	
(x)	Name of Journal/Proceeding/Technical Volume	
(xi)	Volume No (Not required for Indian Engineering Congress)	
(xii)	Issue No (Not required for Indian Engineering Congress/Annual Technical Volumes of IEI)	
(xiii)	Theme (Only for Technical Volumes of IEI)	
(xiv)	DOI: (Not required for Indian Engineering Congress/Annual Technical Volumes of IEI)	
(xv)	ISSN	
(xvi)	Date of Publication (Date-Month-Year)	
(xvii)	Co-authors (if any)	
(xviii)	Abstract in full	
(xix)	5/6 Keywords	
(xx)	Supporting Documents/links [which are clearly indicative of the incumbent's achievement(s)]	
<i># Publications in local seminar, conference and symposia will not be accounted</i>		

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(v) Email and Mobile Number	
(vi) Designation	
(vii) Organization of affiliation	
(viii) Membership No (please use the prefix F/M/AM as the case may be)	
(ix) Title of Book/Book Chapter	
(x) Publisher Details	
(xi) ISBN	
(xii) Date of Publication (Date-Month-Year)	
(xiii) Co-authors (if any)	
(xiv) About the book (100-150 words)	
(xv) Supporting Documents (complimentary copies for IEI Headquarters)/links [which are clearly indicative of the incumbent's achievement(s)]	

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