

IEI

Epitome



October 2020, Volume 5, Number 10

A Century of Service to the Nation

Contents

Members in
the News

2

Publication by
Members

3

Announcement

13

Annual Technical
Volumes
of IEI

14

IEI-Springer
Journals

15

Members

in the News

Dr Wooday P Krishna, FIE

Council Member, IEI & Chairman, Research & Development Committee, IEI



Dr Wooday P Krishna has been nominated as a Member of the Advisory Council of Mahatma Gandhi Centre for Sustainable Development of Karnataka Rural Development & Panchayat Raj University, Gadag.

Dr G Ranganath, FIE

Council Member, IEI and Principal, Adhiyamaan College of Engineering, Hosur



Has been nominated by the Government of Tamil Nadu as SYNDICATE MEMBER to the Anna University, Chennai for the period of 3 Years (2020-2022).

Prof Biman Gati Gupta, FIE

Head, Department of Civil & Env. Engineering, Elitte College of Engineering, Sodepur, Kolkata



Obtained Ph.D. (Ecological Studies) from the University of Kalyani, West Bengal in the year 2018.

Nominated as a Fellow of the American Society of Civil Engineers (ASCE) in October 2019.

Nominated as a Fellow of the Environmental and Water Resources Institute (EWRI) in February 2020.

Dr Kaarthik M, MIE

Assistant Professor, Department of Civil Engineering, Coimbatore Institute of Technology, Coimbatore



Delivered Lecture on the Webinar on the topic "Engineering Errors by Man", organised by the Assertion of Consulting Civil Engineers(India) Coimbatore Centre on 24 July 2020.

Delivered Lecture on Technical Webinar on the topic "Importance of Quality Control in Concrete Structures", organised by Coimbatore Civil Engineers Association on 23 August, 2020.

Mr Hrishav Bakul Barua, AMIE

Embedded Systems & Robotics, Cognitive Robotics, TCS Research & Innovation Labs, Kolkata



Invited Speaker in AICTE sponsored Short Term Training Programme Online on the topic 'Big Data Analytics using Soft Computing Tools', organised during October 05 - October 10, 2020.

Received CSI STPI Young IT Professional Award 2020, at it's National Round, held at Bhubaneswar on 17 January, 2020 for the Project, 'Sathi: A Telepresence Robotic Avatar for a Convenient, Safe and a High Tech Society in Future'.

Mr Jaydeep Bhadra, AMIE

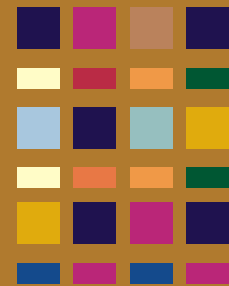
Doctoral Researcher, Centre for Doctoral Training in Energy Resilience and the Built Environment, School of Architecture Building & Civil Engineering, Loughborough University, UK



Offered the Research Studentship in the School of Architecture, Building and Civil Engineering, Loughborough University, UK, funded by the Engineering and Physical Sciences Research Council (EPSRC) and Loughborough University.

Publication

by Members



Mr Pemmada Suresh Kumar, MIE

Research Scholar, Veer Surendra Sai University of Technology, Burla, Odisha

Email: reshu.suri@gmail.com



Title of Paper: “Advancement from Neural Networks to Deep Learning in Software Effort Estimation: Perspective of Two Decades”, *Computer Science Review*, 38.

DoI: 10.1016/j.cosrev.2020.100288

<https://www.sciencedirect.com/science/article/abs/pii/S1574013720303889>

Co-authors : H S Behera, Anisha Kumari K, Janmenjoy Nayak, B Naik

Abstract: In the software engineering, estimation of the effort, time and cost required for the development of software projects is an important issue. It is a very difficult task for project managers to predict the cost and effort needed in the premature stages of planning. Software estimation ahead of development can reduce the risk and increase the success rate of the project. Many traditional and machine learning methods are used for software effort estimation by researchers, but always it has been a challenge to predict the effort accurately. In this study, different Artificial Neural Network (ANN) used for effort estimation is discussed. It is observed that the prediction of software effort by using ANN is more precise and better compared to traditional methods such as Function point, Use-case methods and COCOMO etc. Models based on neural networks are competitive in nature as compared to statistical and traditional regression methods. This paper explains the overview of various ANN such as basic NN, higher order NN, and deep learning networks used by the researchers for software effort estimation.

Keywords: Software Effort Estimation; Artificial Neural Networks; Higher Order Neural Networks; Deep Learning Neural Networks.

Mr Sharad A Bhad, AMIE

Assistant Professor, E/TC Dept. Sinhgad Institute of Technology, Pune

Email: sharadbhad@gmail.com



Title of Paper: “An Overview of Fault Tolerant Methods in Power Circuits of Photovoltaic Applications”, *International Research Journal of Engineering and Technology (IRJET)*, 7 (6), 2020, e-ISSN 2395-0056, p ISSN 2395-0072, pp 1-5.

<https://www.irjet.net/archives/V7/i6/IRJET-V716931.pdf>

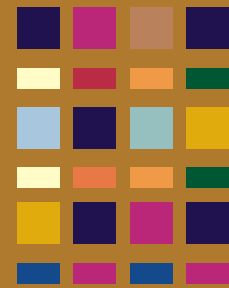
Co-author : Dr Shamkumar B Chavan

Abstract : In this paper an overview of the research work done in fault tolerant power electronics circuits in photovoltaic applications has been presented. The demand of renewable energy is growing and solar PV modules are preferred choices for renewable energy. Solar power is abundant on earth and it can be converted to electrical signal by using PV modules. Considering this lot of research has been done in design and development of converter and inverter circuits. Large numbers of topologies are suggested which provides efficient power however since the optimized power processing circuits are used in these topologies, any fault in component particularly power switches malfunctions the circuit. This requires repairing, replacement etc. Researchers worked on development of fault tolerant topologies, this paper reviews the techniques used to obtain fault tolerant capacity.

Keywords: Fault Tolerant Power Electronic Circuits; PV Power Fault Tolerant Circuits; Fault Tolerant Converters/ Inverters; PV Power Stations; Fault Diagnosing Converters.

Publication

by Members



Mr Giridhar Maji, MIE

Faculty Member, Electrical Engineering Department, Asansol Polytechnic, Department of Technical Education & Training, WB

Email: giridhar.maji@gmail.com

Title of Paper: "A Forward Email Based High Capacity Text Steganography Technique using a Randomized and Indexed Word Dictionary", *Multimedia Tools and Applications*, 79, 2020, pp 26549–26569.

<https://doi.org/10.1007/s11042-020-09329-z>

Co-Author: Ms Sharmistha Mandal



Abstract: Text steganography is inherently difficult due to minimal redundant information space to hide secret payload. The same fact limits the hiding capacity and security too. In this study, a novel technique has been proposed using a randomized indexed word dictionary, and a list of email addresses to increase the hiding capacity and security. A forward email platform has been used as the cover, and email addresses in the carbon copy (CC) field contain secret data that are encoded using a randomized index-based word dictionary. The email username list and indexed word dictionary are both pre-shared between the communicating parties. But during every new communication, a random bitstream (temporary stego-key) is generated from the system time and communicated separately using public-key cryptography. This temporary stego-key is used to randomize the index values of the words in the dictionary. Most of the existing state-of-the-art techniques provide a hiding capacity of 6–10%. The proposed scheme achieves a capacity of 12.17% using some common secret text and email body text (cover text) as used in all other studies. The proposed technique provides higher hiding capacity and security by randomizing the word indexes every time using temporary stego-key. It is also free from statistical attacks, OCR based attacks, and does not depend on the use of any particular text processor.

Keywords: Text Steganography; Email Steganography; Indexed Word Dictionary; Data Hiding in Email Cover; High Capacity Steganography; Secure and Robust Text Seganography.

Mr Saurabh Singh, AMIE

Executive Engineer, Construction - II, Northern Railway, Chandigar

Email: saurabh.sgm@gmail.com

Title of Paper: "Field Assessment of Railway Ballast Degradation and Mitigation using Geotextile", *Geotextiles and Geomembranes*, 48(3),2020, pp 275-283.

<https://doi.org/10.1016/j.geotexmem.2019.11.013>

Co-authors : Raghvendra Pratap Singh, Sanjay Nimbalkar, DeepankarChoudhury

Abstract : Rail tracks continue to deform due to degradation of ballast under the application of heavy train traffic. The resulting track deformations often lead to drainage impairment as well as loss of resiliency. For track replenishment, deep screening of ballast is usually adopted by Indian Railway (IR) either after 10 years or passage of 500 MGT traffic, whichever is earlier. To study the effectiveness of geotextile on track stability and assess possible reductions in maintenance costs, a layer of woven geotextile was installed at the ballast-subgrade interface in Bhusawal-Akola central railway section of IR which is the present study area. The results show that the amount of degradation and fouling are different in UP and DN tracks due to inherent variation in traffic characteristics. This study also shows that the placement of geotextile in the track has led to prolonged maintenance cycle with favorable implications on cost and track shutdown periods. The findings of the present case study results will be useful for IR to reduce the ballast procurement and reuse of discarded material during deep screening in future.

Keywords: Geosynthetics; Ballast; Fouling; Degradation; Deep Screening; Railway Track.



Publication

by Members



Mr Saket Totala, SMIE

Department of Textiles, DKTE Society's Textile and Engineering Institute, Ichalkaranji

Email: saket.11012000@gmail.com



Title of Paper: "Studies on Fire Retardant Military Uniforms", *IJIERT - International Journal of Innovations in Engineering Research and Technology, NCST-2K20, ISSN : 2394-3696, pp 35-39, 2020.*

https://www.ijert.org/paper-details.php?paper_id=142024

Co-authors : Siddhant Dinesh Katariya, Anurag Rajendra Jhanwar, Niraj Manojkumar Rathi, Dr. Manjunath Burji

Abstract : Military sector is one of the most textile demanding sector with various special and critical requirements. Application of Nonwovens in the field of Flame Retardant (FR) Uniforms will not only be cost effective but also can be produced at higher production speeds compared to conventional woven technology. In battlefield soldier are exposed to flame threats and thermal radiative, thus it gives need to the use of FR Uniforms in the Military Sector. Paper discusses the current commercially available FR Military Uniforms and material which it is made of, fibres available for forming FR Military Uniforms and Special FR Finishes for Fire Retardancy of the fabric.

Keywords : Fire Retardancy (FR), FR Finishes, FR's, Military Uniforms, Nonwoven

Mr Narayan Kumar Bhagat, MIE

Senior Technical Officer, CSIR-Central Institute of Mining and Fuel Research, Dhanbad, Jharkhand

Email: narayan.cimfr@gmail.com



Title of Paper: "Innovative Directional Controlled Blasting Technique for Excavation of Unstable Slopes along a Busy Transportation Route: A Case Study of Konkan Railway in India", *Mining, Metallurgy & Exploration, 37(3), 2020, pp 833-850.*

<https://doi.org/10.1007/s42461-020-00212-x>

Co-authors : A K Mishra, M M Singh, Aditya Rana, P K Singh

Abstract : Many cases of derailments, train accidents and traffic interruptions due to the slope failure and rockfall have been reported in the past on Konkan Railway trackline because of unstable rock slopes. The authorities installed stability enhancement measures such as wire netting, rock bolting and shotcreting which were found insufficient. The failed geotechnical measures prompted authorities to excavate the unstable slopes. Rock blasting is generally not preferred for the excavation of slopes along the transportation route. Stabilisation and widening of slopes by blasting need closure of the route for a considerable time. Discontinuing traffic on Konkan Railway route was undesirable as it connects two important port cities Mumbai and Mangalore. The paper presents an innovative directional controlled blasting (DCB) technique for excavating three unstable slopes (i.e. cuttings) in hilly terrain without disturbing the traffic. New empirical formulae for small geometry blasting to estimate burden and throw have been developed. A unique sequence of firing and excavation with powder factor varying between 0.04 and 0.39 kg/m³ irrespective of the actual free face was used for rock blasting. The process controlled the throw of blasted material over the track and resulted in a smooth and stable wall. The slope angle has been changed from 80 to 82° to 45–47° and probability of wedge, planar and toppling failures was eliminated. About 100 such accident-prone slopes (52 km cumulative length, 7% of total route) situated at discrete locations along Konkan Railway route were stabilised using the technique. No incident of rockfall and slope failures along these slopes has been observed after the stabilisation.

Keyword: Directional Controlled Blasting, Burden and Throw formulae, Unstable slope, Railway track.

Publication

by Members



Dr Yogendra Arya, AMIE

Assistant Professor, Department of Electrical and Electronics Engineering, Maharaja Surajmal Institute of Technology, New Delhi

Email: mr.y.arya@gmail.com



Title of Paper: “Integrating Layered Recurrent ANN with Robust Control Strategy for Diverse Operating Conditions of AGC of the Power System”, *IET Generation, Transmission & Distribution*, 14(18), 2020, pp 3886–3895.

<https://ieeexplore.ieee.org/document/9181765>

Co-authors : Gulshan Sharma, Akhilesh Panwar, Manoj Kumawat

Abstract : This study presents the structural, operational and control aspects of doubly fed induction generator (DFIG) based wind integrated power systems. The automatic generation control (AGC) of a meshed power system including DFIG-based wind turbines has been framed and investigations under various system perturbation are presented. The two-area system consisting of non-reheat thermal turbines with DFIG and interconnected through parallel AC/DC tie-lines is considered for the study. The system non-idealities such as governor lag and generation rate constraints are taken into consideration. An AGC strategy using a layered recurrent artificial neural network (ANN) is proposed in this work. The gains of the proposed AGC are obtained by effectively training the ANN using a set of reliable data obtained from a widespread range of operating system conditions using robust control strategy. The study also incorporates the design of AGC for the power system using the fuzzy logic concept and other AGC actions such as integral (I), proportional–integral (PI) and proportional–integral–derivative (PID) calculated via the means of particle swarm optimization (PSO). The results obtained with the proposed ANN created AGC are linked and demonstrated their superiority over fuzzy logic PI and traditional PSO-based I/PI/PID AGC strategies under numerous system operating conditions.

Keywords: AGC; ANN; Two-area System; DFIG Integrated Power System; PSO-based Controller; Fuzzy Logic PI Controller.

Mr Yadvendra Singh, AMIE

Senior Research Fellow, IIT-ISM, Dhanbad

Email: yadvendra.iitdhanbad@gmail.com



Title of Paper: “Fabrication and Experimental Analysis of Reduced Graphene Oxide (rGO) Coated Etched Fibre Bragg Grating Refractometric Sensor”, *IEEE Sensors Letters*, 4(7), 2020, pp 1–4.

DoI: 10.1109/LSENS.2020.3002837

<https://ieeexplore.ieee.org/document/9119133>

Co-authors : Ahana Sadhu and S K Raghuwanshi

Abstract: This letter reports on an etched fiber Bragg grating (FBG) sensor, with particles of reduced graphene oxide (rGO) adhering to the sensor surface, having enhanced refractometric sensing abilities. Effectiveness of developed sensor is investigated with varying salinity, by monitoring the shift in resonant peak of reflection spectra of sensor with interrogator. The presence of rGO has not only reported a 135% increase in sensitivity but has also considerably increased its immunity to surrounding temperature variations. The maximum sensitivity of approximately 3.99 nm/RIU at 20°C for 25% salt concentration (% w/w) with resolution of 3.51×10^3 is reported.

Keywords : Sensor Integration; Chemical Sensor; Dip-coating; Etched Fiber Bragg Grating (eFBG); Reduced Graphene Oxide (rGO); Refractometric Sensing.

Publication

by Members



Dr S Sathees Kumar, MIE

Professor, Department of Mechanical Engineering, CMR Institute of Technology, Hyderabad

Email: shrutishyami@gmail.com



Title of Paper: “Effect of Natural Fiber Loading on Mechanical Properties and Thermal Characteristics of Hybrid Polyester Composites for Industrial and Construction Fields”, *Fibers and Polymers* 21, 2020, pp 1508-1514.

<https://link.springer.com/article/10.1007/s12221-020-9853-4>

Abstract : In the present work tensile, flexural, impact and hardness properties of sorghum bicolor, sisal fiber and jute reinforced with polyester composites are described for the first time. The hybrid composite plates are fabricated for different fiber weights by hand lay-up method. To investigate the mechanical attributes tensile, flexural, impact and hardness tests were performed as per ASTM standard. The mechanical test results revealed a regular trend of an increase in tensile, flexural, impact and hardness properties to adding natural fibers. Good adhesion between the natural fibers and the polyester matrix is also responsible for the effective resistance capability. Further, thermal stability and thermal decomposition of the composite material observed by thermogravimetric analysis (TGA) and differential thermal analysis (DTA). The work concludes that sisal, jute, and sorghum bicolor fiber have high potential as reinforcement for composite production. This type of composite material can be useful for automobiles, industrial applications and construction fields.

Keywords: Composite; Jute; Polyester; Sisal; Sorghum; TGA

Title of Paper: “Dataset on Mechanical Properties of Natural Fiber Reinforced Polyester Composites for Engineering Applications”, *Data in Brief*, 28, 2020.

<https://www.sciencedirect.com/science/article/pii/S2352340919314106>

Abstract : This dataset comprises the mechanical properties of sisal, sorghum bicolor and coconut coir reinforced polyester composites. The mechanical dataset illustrates the tensile, flexural, impact and hardness strength of natural fiber composites by varying the weight percentages from 5 to 25 wt.% of sorghum bicolor and coconut coir. The composites samples were fabricated by hand layup process. The mechanical properties were determined from in-plane tensile, flexural, impact and hardness of the natural composites. The dataset here helps the readers to understand the important properties of the natural fibers reinforced polyester composites. However, it is revealed that the addition of sisal and coconut coir fiber can enhance the properties.

Keywords : Sisal; Sorghum Bicolor; Coconut Coir; Polyester Composites

Title of paper: “Determination of Static and Fatigue Characteristics of Carbon Fiber Reinforced Polyester Composites for Automobile Applications”, *Materials Research* 22(6), 2019.

https://www.scielo.br/scielo.php?pid=S1516-14392019000600229&script=sci_arttext

Co-author : Velusamy Mugesh Raja

Abstract : In this research, suspension through carbon fiber reinforced polyester fiber has given importance because of its adaptability. Leaf springs were moulded the usage of 20% short carbon fiber reinforced polyester (SF), 20% length carbon fiber reinforced polyester (LF) as well as Unreinforced polyester (UP) are evaluated for the joint strength. For determining energy storage, capability and strain rate sensitiveness of moulded leaf spring static overall performance assessments had been completed. Check joints had been subjected to absolutely reversed fatigue loads, at fixed frequency fatigue; leaf spring performance changed into evaluated, with diverse loads until 2×10^7 cycles. The tensile surface failure morphology of the cracks has exhibited via the Scanning Electron Microscope (SEM). The results confirmed the suitability of carbon fiber reinforced polyester fiber for load utility over other taken into consideration materials.

Keywords: Fatigue; Long Fiber; Thermoplastic; SFPE; SEM; UPFE.

Publication

by Members



Mr Rupesh D Musmade, AMIE

Research Scholar, Dr Vithalrao Vikhe Patil College of Engineering, Ahmednagar, Maharashtra

Email: rdmusmade@gmail.com

Title of Paper: “Compressive and Tensile Behavior of Lime Added Geopolymer Concrete”, *Journal of Structural Engineering and Management*, 6 (3)2019.

<http://engineeringjournals.stmjournals.in/index.php/JoSEM/article/view/1693>

Co-author : Sandeep L Hake

Abstract : Concrete is the most used material, which required large quantities of Ordinary Portland Cement (OPC). OPC production is held responsible for some of the CO₂ emissions, which polluted the atmosphere. Hence, it is inevitable to find an alternative material to OPC. Geopolymer concrete is the best alternative that shall be produced by the chemical action of inorganic molecules. This paper focuses fly-ash based Geopolymer concrete with the addition of lime. In the geopolymer concrete, cement is completely replaced by fly ash (P60). Sodium Hydroxide (NaOH) and Sodium Silicate (Na₂SiO₃) of 13 moles were initially used as an alkaline solution with Na₂SiO₃: NaOH ratio 2.5. Three types of lime samples are used i.e. Quick, Hydrated, and Slaked with variation in lime percentiles as 5%, 10%, 15%, and 20%. Also, 10, 13, 16, and 19 molarity are used along with optimum lime percentage for comparative and tensile behavior study. After specified period samples are remolded and cured at natural sunshade for 24 hours. After natural curing hours, the optimum rest period is taken as 7 days. Sample having size 150 X 150 X 150 mm was tested for compressive strength and split tensile strength.

Keywords: Geopolymer Concrete; Fly Ash



Dr Ankan Bhattacharya, AMIE

Assistant Professor, Department of Electronics & Communication Engineering, Mallabhum Institute of Technology, Bishnupur, West Bengal

Email: bhattacharya.ankan1987@gmail.com

Title of Paper: “Compact, Isolation Enhanced, Band-Notched SWB–MIMO Antenna Suited for Wireless Personal Communications”, *Wireless Personal Communications – An International Journal- ISSN 0929-6212, Online First View.*

DoI 10.1007/s11277-020-07749-6

<https://link.springer.com/article/10.1007/s11277-020-07749-6>

Co-authors : Dr B Roy, Dr AK Bhattacharjee

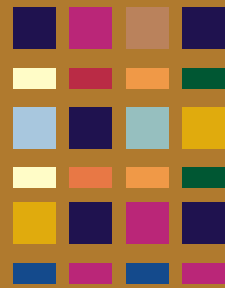
Abstract : Herein, a Conductor Backed Co-Planar Waveguide fed, compact, slotted Multiple–Input–Multiple–Output or MIMO antenna having Super Wideband (SWB) response and tunable band-notching feature is presented. In addition, an improved method for cut-off frequency prediction of the antenna is formulated. A super wide frequency response from 01.21 to 34.0 GHz and notches at Wireless Local Area Networks or WLAN bands (04.92–05.83 GHz) and Worldwide Inter-operability for Microwave Access or WiMAX bands (03.30 GHz–03.70 GHz) are obtained. By fine tuning the dimensions of the Split Ring Resonator Structure introduced in the radiating element, band-notched characteristics centered at 05.50 GHz WLAN band is obtained. A second band notch having centre frequency at 03.50 GHz for the WiMAX band is obtained by the introduction of a Spiral Microstrip Defected Structure in the feeding segment. The antenna is 20×36×1 mm³ in dimension. Acceptable gain all through the functional bandwidth, excepting the notched bands makes the MIMO antenna a novel contender for SWB operations particularly for Wireless Personal Communications.

Keywords: SWB Communication; Slotted MIMO Antenna; Band-notched Features; Spiral Microstrip Defected Structure; Split ring Resonator Structure.



Publication

by Members



Mr Vikrant Tapas, MIE

Workshop Superintendent, NMDC, DAV Polytechnic, Dantewada

Email: vikranttapas@gmail.com



Title of Paper: "A Novel Design of an Alternator Tester for Automobiles", *AIP Conference Proceedings 2247, (1), Published Online: 2020.*

<https://doi.org/10.1063/5.0003830>

Co-authors : Mr Rituraj Chandrakar, Mr Prem Shankar Sahu, Dr Anil Kumar, Mr Haldhar Ram Chandrakar

Abstract : The alternator is the most essential equipment in an automobile to charge the battery. A modern vehicle is fitted with new accessories which run on the battery. Hence the health of battery is very important in new vehicles. This research paper gives a detailed study of maintenance of alternator and also suggests an alternator tester which is handy and very useful equipment for Alternator testing.

Title of Paper: "To Analyze the Different Popular Design of Low-pressure Acetylene Gas Welding Generators in India", *AIP Conference Proceedings 2247, 050015, Published Online: 2020.*

<https://doi.org/10.1063/5.0003831>

Co Authors: Mr Rituraj Chandrakar, Mr Prem Shankar Sahu, Dr Anil Kumar, Mr Haldhar Ram Chandrakar

Abstract : The low-pressure gas welding is very popular in sheet welding. The small automobile garages, body repairing workshops used this type of welding extensively in India. This research paper focused on the study of the construction and operation of popular acetylene gas generators models used in low-pressure welding. After studying on different parameters the authors found that prefabricated or readymade generators are found best for safe operational uses after comparing them on different parameters with fabricated generators. The authors firmly believe that the existing fabricated acetylene generators must be changed with a prefabricated model to improve the quality of the weld and safe welding practices.

Mr Jitendra Mohan Giri, AMIE

School of Mechanical, Engineering, Galgotias University, Greater Noida, Uttar Pradesh

Email: jmgiri.me@gmail.com



Title of Paper: "Performance Optimization of Thermoelectric Cooler Using Genetic Algorithm", *Mathematical Modelling of Engineering Problems, 7 (3), 2020, pp 427-435.*

<https://doi.org/10.18280/mmep.070313>

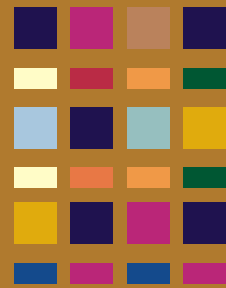
Co-authors : Dr Pawan Kumar Singh Nain

Abstract: Thermoelectric coolers (TECs) use the Peltier effect for thermal management of electronic devices. They offer high reliability and low noise operation but limited in use due to low performance. In the present work, through the use of a genetic algorithm (GA), two single-objective optimizations associated with two separate objectives are carried out, aiming maximization of cooling capacity and maximization of the coefficient of performance (COP) of TEC with space restrictions. Interfacial thermal resistance and electrical contact resistance are taken into consideration to obtain a more realistic model. This paper presents a new approach to finding appropriate solutions by optimally arranging the length of n-type and p-type thermoelectric (TE) elements, the cross-sectional area of TE elements, and input electric current. To validate the GA predictions, three-dimensional steady-state TEC models are prepared, and finite-element simulations are carried out using ANSYS®. Close agreement between the GA and ANSYS® has been observed. This study provides a new mathematical optimization model that is more realistic and is quite close to the physical construction of TEC modules manufactured by industry.

Keywords: Thermoelectric Cooler; Optimization; Genetic Algorithm; Finite-element Method; ANSYS Workbench; Cooling Capacity; COP

Publication

by Members



Mr Basavaraj S S, AMIE

Assistant Professor, Department of Electronics and Telecommunication, Annasaheb Dange College of Engineering & Technology, Ashta

Email: raj.ec008@gmail.com



Title of Paper: "Deposition of ZnO Thin Film at Different Substrate Temperature using RF Sputtering for Growth of ZnO Nanorods using Hydrothermal Method for UV Detection", Control Instrumentation System, Conference Proceeding of CISCON 2018, Springer Nature, Lecture Notes in Electrical Engineering 581, 2020, pp 91-98.

https://doi.org/10.1007/978-981-13-9419-5_8

Co-authors : C R Byrareddy, Nandini A Pattanashetti, Sanjit Varma and Aniruddh Bahadur Yadav

Abstract: The growth properties of ZnO Nanorods was studied on different seed layers by the deposition of Zinc oxide (ZnO) thin film on SiO₂/Si substrate by RF sputtering at two different conditions, i.e., one at room temperature and another at 400 °C substrate temperature. Surface morphology of the seed layer was studied by X-Ray Diffraction and Atomic Force Microscopy (AFM). Low cost hydrothermal method was employed for the growth of ZnO Nanorods on both the seed layers. The structural properties of ZnO nanorods were characterized by Field Emission Scanning Electron Microscope (FESEM). The FESEM images showed the proper alignment and orientation of ZnO nanorods grown on both the seed layers. The I-V measurements were carried out at room temperature under dark light and Ultraviolet (UV) light source. In order to examine the UV detection, MSM (Metal–Semiconductor– Metal) photodetector was fabricated and responsivity was measured for the nanorods grown on both seed layers. The better responsivity and contrast ratio of ZnO nanorods based UV detector was observed in case of 150 nm seed layer deposited at 400 °C.

Keywords: Seed layers; ZnO nanorods; Hydrothermal method; UV detection

Dr Kaarthik M, MIE

Assistant Professor, Department of Civil Engineering, Coimbatore Institute of Technology, Coimbatore

Email: kaarthik@cit.edu.in



Title of Paper: "Characteristic Study of Foundry Sand as Partial Replacement of Fine Aggregate in Self-Compacting Concrete", Compliance Engineering Journal, 11(9), 2020, ISSN NO: 0898-3577, pp. 381-387.

DoI: 16.10089.CEJ.2020.V11I9.285311.3341

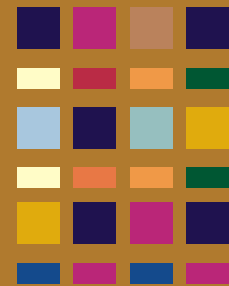
Co-author : R Gokul

Abstract: Foundry sand is high quality silica sand that is a by-product from the production of both ferrous and non-ferrous metal casting industries. It is used for the centuries as a moulding casting material because of its high thermal conductivity. For various foundry operations, raw sand is used and several binders and additives are added into it to enhance its properties. The FS is collected at Hindustan Foundries near Nava India, Coimbatore. The sand, which is used for experiment, is no longer being useful for the foundry industries. The objective of this experiment is to find the chemical properties of foundry sand and to find the optimum replacement of foundry sand as a fine aggregate in the following ratios of 10%, 20%, 30%, and 40% Also super plasticizer is added for self-compaction. Finally, the strength characteristics of concrete casted in foundry sand are being found. The study focuses on providing strength as equal as conventional concrete. Experiment leads to the study of strength parameters in the form of beam. Experiment further leads to the research of chemical and binding properties of concrete.

Keywords: Foundry Sand; Self-Compacting Concrete.

Publication

by Members



Mr Himanshu Pradeep Kohli, AMIE

Assistant Professor, Chemical Engineering Department, R.N.G. Patel Institute of Technology, Bardoli, Gujarat

Email: himanshukohli07@gmail.com



Title of Paper: “Statistical Analysis of Operating Variables for Pseudo-emulsion Hollow Fiber Strip Dispersion Technique: Ethylparaben Separation from Aqueous Feed Stream”, *Chemical Papers, Electronic ISSN: 1336-9075 Print ISSN: 2585-7290.*

<https://doi.org/10.1007/s11696-020-01317-9>

Co-authors : Smita Gupta, Mousumi Chakraborty

Abstract: Ethylparaben (EP) is a member of parabens family which are the esters of p-hydroxybenzoic acid possessing anti-microbial and anti-fungal properties. But studies have pointed towards their endocrine disrupting prospective. Their large consumption as preservatives have made it possible for them to enter in the aquatic streams. In spite of their considerable removal in wastewater treatment plants, parabens are still detected in extremely small amounts in aqueous streams which could be harmful to the aquatic life. EP exists in the range of 0.3–1600 ng/L in aquatic streams like river water, influent and effluent of wastewater treatment plant. So comprehensive investigation were carried out using pseudo-emulsion hollow fiber strip dispersion (PEHFSD) technique with pseudo-emulsion consisting of trioctylamine (carrier), n-heptane (solvent) and sodium carbonate (stripping phase) for the removal of EP from aqueous solution. In this study, emphasis has been given to the use of full factorial design for the optimization of several operational variables like concentration of feed, carrier and stripping phase for EP removal. Statistical analysis of variance was examined to find out the importance of every factor. Interaction plot was used to study the interdependence between the factors and their combined influence on the %extraction of EP. Contour plots provided the optimum concentration range for the maximum EP extraction and 100% removal was achieved by PEHFSD technique at optimum conditions. The mass transfer coefficients were evaluated at optimal conditions.

Keywords: Ethylparaben Removal; Pseudo-emulsion Hollow Fiber Strip Dispersion Technique; Full Factorial Design; Analysis of Variance.

Title of Paper: “Applicability of Hollow Fiber Strip Dispersion for the Removal of Metal Ions from Aqueous Streams”, *Journal of The Institution of Engineers India Series E, 2020, 101(1), pp 91–97, Electronic ISSN: 2250-2491 Print ISSN: 2250-2483.*

<https://doi.org/10.1007/s40034-020-00163-4>

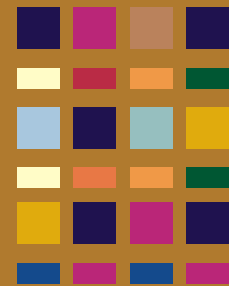
Co-authors: Smita Gupta, Mousumi Chakraborty

Abstract: The present paper focuses on the working and application of hollow fiber strip dispersion system for the removal of metal ions from aqueous streams. Conventional separation methods like chemical precipitation, adsorption, ion exchange and solvent extraction are in use to eliminate and recover heavy metals from aqueous solutions, but suffer from their inherent limitations like less efficiency, high operating costs, secondary sludge production and disposal. Liquid membrane in comparison with these methods offers little investment, high flux, less solvent and energy consumption. Supported liquid membrane is preferred for the removal and reclamation of metal ions as this technique offers simultaneous extraction and stripping. Hollow fiber supported liquid membrane is being used successfully for the separation of various metal ions, but instability and extended functioning are the concerned issues for industrial usage. Pseudo-emulsion hollow fiber strip dispersion system solves the instability issue by maintaining uninterrupted supply of organic membrane phase in pores and successfully removes the metal ions. This paper mainly focuses on the effect of various parameters like concentration of metal, carrier and type of diluent on the removal of metal ions from aqueous streams. Permeation model development and evaluation of mass transfer coefficients are also discussed here.

Keywords: Supported liquid membrane; Pseudo-emulsion hollow fiber strip dispersion; Metal ions; Permeability; Extraction

Publication

by Members



Prof Biman Gati Gupta, FIE

Head, Department of Civil & Env. Engineering, Elite College of Engineering, Sodepur, Kolkata

Email: bimangupta@yahoo.in



Title of Book Chapter: "Toxic Effluent Treatment by Membrane Based Ultrafiltration and Reverse Osmosis for Sustainable Management and Conservation of Ground Water in Industrial Clusters". *Open access peer-reviewed chapter - ONLINE FIRST.*

DoI: 10.5772/intechopen.92812

Abstract: The present study attempts to assess the nature of effluents generated from textile bleaching and dyeing units located at Kalikapur area under Maheshtala region, West Bengal, India and to provide a sustainable management of ground water resources through installing CETPs with zero liquid discharge system. Effluent from medium, small and tiny units of this region is estimated at 2000 MLD. Studies with 40 units for 4 years (2012—2016) located in this area exhibited following mean values of different physico-chemical variables: pH (9), Biological Oxygen Demand (610 Mg/L), Chemical Oxygen Demand (1827 Mg/L), Total Dissolved Solids (6411 Mg/L), Total Suspended Solids (927 Mg/L) and toxic metals such as lead Pb (0.43 Mg/L), Chromium (0.031 Mg/L), Zinc (0.74 Mg/L), Nickel (0.07 Mg/L) and Cadmium (0.03 Mg/L). These findings of results surpass the standard allowable limits qualify by FAO (1985) and World Health Organization (2003). The waste water loaded with toxic trace metals is adversely affecting the environmental pollution and anthropomorphic eudemonia and also pollute the quality of both surface and ground water and consequently degraded agricultural and plant yield, vegetable and fruits and causes impairment to aquatic lives. Four to five Common Effluent Treatment Plants are urgently required to install at different areas of the Maheshtala cluster with a capacity of 500 MLD each, so that one in Kalikapur area, to manage sizeable volume of waste water (2000 MLD) and sustainable management of ground water resources in a thickly populated urban area near Calcutta, a principal city of India.

Keywords: Textile; Toxic; Effluent; Water; Contamination; Treatment; Membrane; Ultrafiltration; Reverse Osmosis.

Mr S Saravana, AMIE

Technical Officer 'D', Advanced Data Processing Research Institute (ADRIN), Department of Space / ISRO, Secunderabad

Email: saran_cmd.adrin@yahoo.com



Title of Paper: "Waste to Energy Technologies for Sustainable MSW Management - An Overview", *International Journal of Technical Innovation in Modern Engineering & Science (IJTIMES), e-ISSN: 2455-2585 Volume 6, Issue 1, January-2020.*

http://www.ijtimes.com/papers/finished_papers/IJTIMES06I01151130133648.pdf

Co-authors : Prashant P Angarakh, P Bhaskar Rao, C Vijay Kumar

Abstract: Rapid population growth, Urbanization, Industrial growth is increasing the generation of municipal solid waste (MSW) day by day in developing countries like India. The management of MSW is very severe problem and biggest challenge not only because of environmental and aesthetic concerns but also the potential threat to public health, resulting improper and non-scientific handling of municipal waste due to enormous quantities generated every day. In India the average MSW generation is 450 gm/per capita/day. Inappropriate disposal of waste creates various health effects and pollution in the environment. The preferred Integrated Solid Waste Management System (ISWMS) strategies within the hierarchy includes at-Source Reduction and Reuse, Recycling, Composting, Waste to Energy (WtE) & Landfills. Among these WtE is safe, economical, eco-friendly, minimizes the amount of disposal of MSW, and also accepted socially.

Recovering energy before final disposal of MSW can be achieved through production of heat, electricity, or fuel and WtE technologies viz. Incineration, Pyrolysis (syngas), Gasification, Refuse derived fuel(RDF), fuel in cement kilns/Iron/steel industries, biodiesel, etc. through thermal, biological and chemical processes. Segregation of wastes at source is highly important to make the system more efficient for energy recovery and involvement of all investors and Govt. also in effectively managing MSW to fulfil the objective of zero waste going to landfills. This paper deliberates on how WtE technology is feasible, financially reasonable, environmentally benefit able, analysis of energy generation, revenue from waste, status of WtE plants, issues and challenges of handling waste, separation methods, pollution control, public awareness and selection of suitable disposal technologies ensuring successful integrated MSW management and also consider the future aspects of WtE in India along with a few recommendations for the course of action and for developing better, effective WtE technologies as part of 'Swachh Bharat Mission'.

Keywords: Waste to Energy; Integrated Municipal Solid Waste management; Technologies; Standards; Pollution



The Institution of Engineers (India)

Notification for

R&D Grant-in-Aid (2020-21)

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.

Like every year, the Institution invites applications for the session 2020-2021 for funding 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 from 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
	Preferably 'Student Member' (SMIE)	AMIE/MIE/FIE	Applicant's Institute should preferably be an Institutional Member with valid NIRF Rank
2. UG (BE/BTech/AMIE/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 in 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:

Director (Technical)

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

Applications received in format other than that available on our website will not be accepted. Application should be forwarded through the Guide, Head of the Department or Head of the Institution. Please note that preference will be given to project proposals received from Institutions who are members of The Institution of Engineers (India) and with NBA / NAAC Accreditation or valid NIRF Rank. Kindly go through the guidelines (visit link <https://www.ieindia.org/webui/IEI-Activities.aspx#RnD-Initiative>) carefully before filling up the application.

The grant is not intended for the faculty members who have access to other avenues of research funding. Proposals received will be scrutinized and the recipients of R&D Grant will be informed accordingly.

Be proud to be Certified Professional Engineers (PE) and International Professional Engineers (IntPE)

Professional Engineers (PE) Certification by IEI

ELIGIBILITY REQUIREMENT

Engineers whose qualification is BE / BTech or equivalent, recognized by the Statutory Authority or Government of India and who are having 5 years or more experience, having membership of a recognized professional society and having maintained continuous professional development at satisfactory level, can submit application in the prescribed format to the PE Cell, The Institution of Engineers (India), 8 Gokhale Road, Kolkata-700020.

For details pls visit the following link :

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

International Professional Engineers (IntPE) Certification by IEI

WHO CAN BECOME IntPE?

Having Bachelor's Degree in Engineering or equivalent recognised by Statutory Authority or Government of India;

Minimum 7 years, professional experience;

Minimum 2 years, professional experience in significant engineering activity;

Membership of recognised professional engineering institution / association;

Maintained Continued Professional Development (CPD) at a satisfactory level;

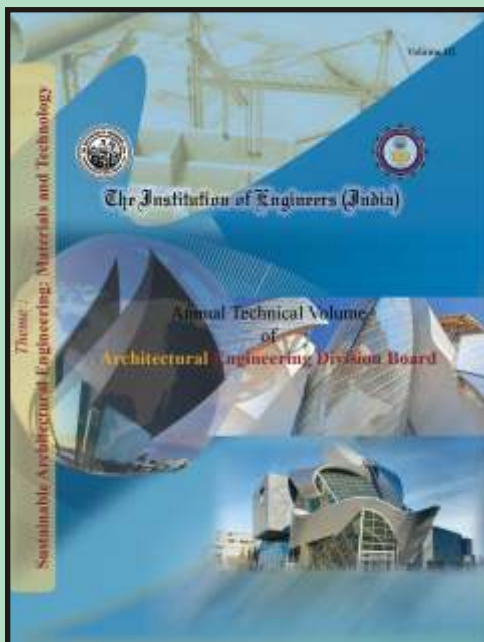
For details pls visit the following link :

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

For any further query and assistance please send email to : pe@ieindia.org

[<https://www.ieindia.org/webui/IEI-Publication.aspx#annual-technical-volume>]

Architectural Engineering Division Board



Theme
**Sustainable Architectural Engineering:
Materials and Technology**

ISBN: 978-81-942561-8-2

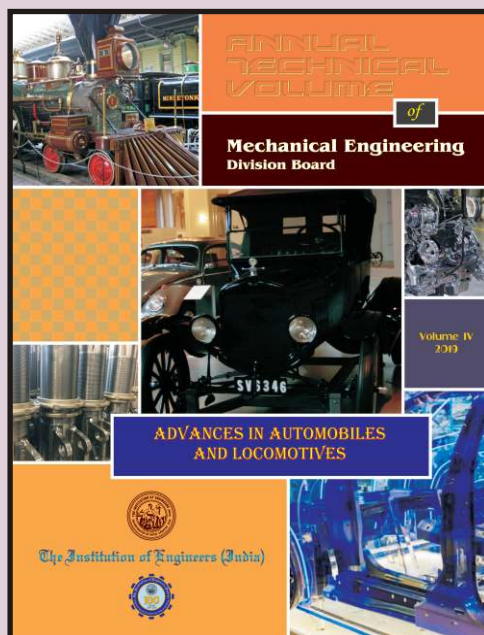
Civil Engineering Division Board



Theme
**Interlinking of Rivers Benefits
Prospects & Challenges**

ISBN: 978-81-942561-1-3

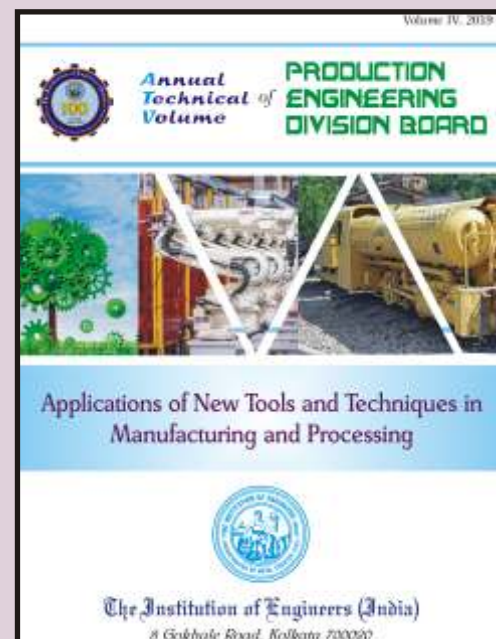
Mechanical Engineering Division Board



Theme
**Advances in Automobiles
and Locomotives**

ISBN: 978-81-942561-6-8

Production Engineering Division Board



Theme
**Applications of New Tools and Techniques
in Manufacturing and Processing**

ISBN: 978-81-942561-3-7

Series A : Civil, Agriculture, Architecture, Environment

URL: <http://link.springer.com/journal/40030>

For Submission of Papers, please visit:

www.editorialmanager.com/ieia



ISSN Print: 2250-2149
ISSN Online: 2250-2157

SCOPUS Indexed

Series B : Electrical, Computer, Electronics & Telecommunication

URL: <http://link.springer.com/journal/40031>

For Submission of Papers, please visit:

www.editorialmanager.com/ieib



ISSN Print: 2250-2106
ISSN Online: 2250-2114

SCOPUS Indexed

Series C : Mechanical, Production, Marine, Aerospace

URL: <http://link.springer.com/journal/40032>

For Submission of Papers, please visit:

www.editorialmanager.com/ieic



ISSN Print: 2250-0545
ISSN Online: 2250-0553

SCOPUS Indexed



ISSN Print: 2250-2122
ISSN Online: 2250-2130

SCOPUS Indexed

Series D : Metallurgical & Materials, Mining

URL: <http://link.springer.com/journal/40033>

For Submission of Papers, please visit:

www.editorialmanager.com/ieid

Series E : Chemical, Textile

URL: <http://link.springer.com/journal/40034>

For Submission of Papers, please visit:

www.editorialmanager.com/ieie



ISSN Print: 2250-2483
ISSN Online: 2250-2491

SCOPUS Indexed

Disclaimer : The information contained in IEI-epitome has been prepared solely for the purpose of providing information about the members of IEI to interested parties, and is not in any way binding on IEI.

IEI-epitome has been compiled in good faith by IEI, but no representation is made or warranty given (either express or implied) as to the completeness or accuracy of the information it contains. You are therefore requested to verify this information with the concerned person / organization before you act upon it.

IEI epitome

President : Er Narendra Singh

Editor : Mr H R P Yadav, Secretary & Director General-I/C

Associate Editor : Mr Kingshuk Sen

Special Contributors : Dr N Sengupta, Dr S Ghosh,

Mr T Chakraborty, Ms A Dutta, Mr P Chakraborty,

Ms H Roy, Mr S Bagchi

Telephones : 91-33-2223 8311/14/15/16

E-mail : newsletter@ieindia.org

Web : <http://www.ieindia.org>