IEI Epitome

April 2020, Volume 5, Number 4

A Century of Service to the Nation

Contents

Members in the News

Dr R Selvaraj, FIE
Immediate Past Chairman, Tiruchirapalli Local Centre, IEI

Addressed the audience during observation of International Women's Day on 7 March, 2020 at MAM College of Engineering and Technology, Tiruchirapalli, organized by MASTeR Group Of Institutions, Tiruchirapalli in association with Tiruchirapalli Local Centre, IEI.

Dr. G.S. Mukherjee, FIE
Defence Research & Development Organization

Delivered Lead Lecture on the topic 'Polymer Composites including Nanocomposite Materials for Advanced Technological Applications' on 23rd Punjab Science Congress, held during February 07-09, 2020 at Sant Longowal Institute of Engineering & Technology, Sangrur, Punjab.

Prof (Dr) Vinay Mohan, FIE
Former Director (Finance) and CMD, Instrumentation Ltd. Kota and presently Founder Promoter, FIDCO, Jaipur

Appointed as Honorary Chair Professor for the "University CV Raman Chair" by Jayoti Vidyapeeth Women's University, Jaipur in recognition to his contribution towards Academic, Research, Training and Achievements in the field of Science and Technology.

Dr A Krishnaraju, MIE
Department of Mechanical Engineering, Anna University, Chennai

Awarded PhD Degree from Anna University, Chennai on the research topic 'An Investigation on Quadruped Reconfigurable Mechanism in Surveillance Applications'.

Dr Omkar Suresh Vaidya MIE
Assistant Professor, Department of Electronics & Telecommunication Engineering, Sandip Institute of Technology & Research Centre, Nashik, Maharashtra

Awarded PhD degree on research topic "Enhancement of Panoramic View using Novel Hybrid Image Stitching Method" under guidance of Dr Sanjay T Gandhe, Department of Electronics and Telecommunication Engineering, Sandip Foundation's Sandip Institute of Technology & Research Center, Nashik under Faculty of Science & Technology, Savitribai Phule Pune University, Pune on 14 March, 2020.

Mr Digambar Ramchandra Parkale, FIE
General Manager, Utilities & Chemical Maintenance, M/s Century Enka Ltd, Pune

Spoke on the topic 'Energy Conservation Tips for Boiler Operation Engineers and Boiler Attendants' on 2 November, 2019 during Awareness Programme arranged by 'The Maharashtra State Co-operative Bank Ltd in association with 'Shikhar Training and Research Institute ,Mumbai '.

Addressed to the Employees of M/s Century Enka Limited on the topic ' Care of Lifting Tools, Tackles and Pressure Vessels used in Industries' on 5 March, 2020 during observation of 'National Safety Week -2020'.

Dr Suresh Vishwakarma, MIE
Senior Electrical Engineer, Vancouver, Canada

Re-elected as the Chairman, Chartered Engineers Pacific (CEP), Vancouver for the year 2020. CEP is a group of almost a thousand internationally trained engineers from British Columbia, Washington State, Alaska and the Yukon. The esteemed five UK based engineering institutions are the members of CEP, namely Institution of Civil Engineers, The Institution of Engineering & Technology, Institution of Mechanical Engineers, The Institution of Structural Engineers, and Chartered Institution of Building Services Engineers.

Publication by Members

Dr G Venkatesan, MIE

Department of Civil Engineering, University College of Engineering, Tiruchirappalli, Anna University, Tiruchirappalli

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Title of Paper: "Experimental Investigation on Natural Fiber Along with Silica Fume in Conventional Concrete", *South Asian Journal of Engineering and Technology, 9(1), 2019, pp 1-9.*

DoI: https://doi.org/10.26524/sat1

Co-authors: Bharat P Kapgate, Rajkumar K

Abstract: Concrete is globally recognized for its long term service period in the application of concrete. In the region of five billion tons of concrete are utilized more or less in the planet and increasing every year. In view of the environmental problems faced today considering the fast reduction of natural resources like sand and aggregate. Owing to the growth of Science and Technology in recent decades, there is a modification in the practice of concrete along with some additives as the complement for strength and workability. Basalt Fiber is categorized under the Mineral additive and brought into usage in early 1920's in the period of World war for Military purposes. Silica fume is hugely known for its durability and it increases the density of concrete. On Another hand, the building are often subjected to risk of corrosion and Sustainability, the application of any element in the proportions of concrete will possess the property of Resisting and rejuvenating the nature of Concrete.

Keyword: Basalt Fiber; Split Tensile Strength; Compressive Strength; Silica Fume

Mr Vishnu Rajaram Bankar, AMIE

Manager, S M Auto, Chakan, Pune, Maharashtra

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Title of Paper: "Barriers in Implementation of IoT Based World-Class Manufacturing", *International Conference on Mechanical Engineering for Sustainable Development-2020, Mechanical Engineering Department, AISSMS College of Engineering, Pune, Maharashtra,Feb. 17-18, 2020.*

Co-author : Dr K N Nandurkar

Abstract: Nowadays, Internet of Things (IoT) gained a great attention from researchers, since it becomes an important technology that promises a smart human being life, by allowing communications between objects, machines and everything together with peoples. IoT represents a system which consists things in the real world, and sensors attached to or combined to these things, connected to the Internet via wired and wireless network structure. This paper aims to highlight the difficulties faced by organizations in implementing Internet of Things (IoT) Technology based World-Class Manufacturing. The authors with their study and experience in the IoT and the automotive industry have attempted to understand the factors that hinder implementation of IoT. The paper first explains in brief the concepts of IoT, WCM and why IoT, WCM is a must for organizations in this complex dynamic business environment. It then takes up the various issues that hamper implementation of IoT in industries. Solutions to overcome the barriers are discussed briefly.

Keywords : Internet of Things (IoT); World Class Manufacturing (WCM); Implementation; Barriers; Smart Manufacturing

Publication
by Members

Mr Sangram Keshari Puhan, MIE
Lecturer, Tolani Maritime Institute, Talegaon Chakan Road , Induri Village, Pune , Maharashtra

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Title of Paper: "Design Analysis and Comparative Performance of Variable PitchTube in Tube Conical Spiral Heat Exchanger for Parallel Flow". *International Journal of Management, Technology And Engineering, 9(9), 2019, ISSN No : 2249-7455, pp 124-135.*

DoI:16.10089.IJMTE.2019.V9I11.19.35214

Co- authors : Dr Kiran C More, Bhushan Rane

Abstract: Lower heat transfer rate in heat exchangers as a result of fouling is a common problem in process industry. Shell and tube heat exchanger are subjected to fouling as result of prolonged use as the materials get deposited on the heat transfer surfaces or wetted area of the tubes and also occupies more space. Fouling brings down the heat transfer rate and effectiveness of the heat exchanger. Requirement of heat exchangers used in process industry, chemical industry applications is that there should be no contamination and lesser fouling. The above problem is addressed in our project. The spiral conical tube in tube heat exchanger offers the best compactness although the pumping power required is slightly on the higher side. The spiral conical tube in tube heat exchanger design is a challenge to manufacture so also difficult to clean over time for maintenance. The problem of fouling is easily dealt with in the project, by addition of variable pitch where in the shape geometry of the spiral will be changed from a flat spiral to a conical frustum. The geometry of the tubes plays a significant part in design and development of the heat exchanger. Paper work discusses the design & analysis of inner and outer tube of the heat exchanger where in the copper tube is wound in a spiral shape and hot fluid is always passed from inside of spiral to outside of spiral, but path of the cold fluid be changed to attain the parallel flow or counter flow configuration. The modeling is done using Unigraphix Nx-8 and analysis has been done using Ansys work bench 16.0. Test and performance comparison has been done in counter flow configuration for three pitch positions namely 0 mm (close coil), 10mm and 20 mm respectively.

Keywords : Heat Exchanger, Parallel flow and Counter flow, Spiral Conical tube in tube heat exchanger, Variable pitch, Shell and Tube

Mr Mahadevan Palanichamy, AMIE
Associate Professor, Department of Civil Engineering, VSB College of Engineering Technical Campus, Solavampalayam (PO), Kinathukadavu, Coimbator

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Title of Paper: "Statistical Studies on Rainfall and Time-based Deviations in Precipitation Trends in Vaigai River Basin, TN State, India", *Indian Journal of Geo Marine Sciences (IJMS),ISSN: 0975-1033 (Online); 0379-5136 (Print); 49 (1); 2020; pp15-23.*

http://nopr.niscair.res.in/handle/123456789/53545

Co-author: Dr Ramaswamy Sankaralingam Narayanasamy

Abstract: Food shortage and water shortage remains the most critical issues throughout the world. Understanding the variability in rainfall will help to make predictions about the rainfall patterns as well as addressing the issues of food-water-energy nexus. Herein, a trend analysis of rainfall was carried out in selected seven rainfall stations of Vaigai river basin in Tamil Nadu state, India. Statistical trend analysis was carried out, to observe the trend pattern for the period from 1959 to 2016. To determine the trend of rainfall, non-parametric Mann-Kendall test and Spearman Rho tests were used. This investigation provides insights about precipitation trends during annual, post-monsoon, pre-monsoon periods. These findings will provide clues for developing efficient water management systems using different simulation techniques and artificial intelligence approaches.

Keywords: Mann-Kendall test; Precipitation; Rainfall; Spearman's Rho test; Trend analysis.

Publication
by Members

Mr Nitinchandra R Patel, MIE
Assistant Professor, Department of Mechanical Engineering, G H Patel College of Engineering & Technology, Vallabh Vidhyanagar, Gujarat

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Title of Paper: "Analytical Design of Belleville Spring in Context with Load Carrying Capacity by using Different Materials", *International Journal for Research in Applied Science & Engineering Technology, 8 (2), 2020, pp 35-45.*

http://doi.org/10.22214/ijraset.2020.2007

Co-authors : Vatsal K Dabhi, Adnan H Fancy

Abstract : In this project we are going to use different materials which are in correspondence with the most usable material in the market which is used to make Belleville springs now using other materials which are alloys of the same material we will try to enhance the loading capacity and various other parameters which will help to improve the design of Belleville springs and in doing such we will use experimental data which we will gather through our experiments and research and using those data we will see whether the material that we have selected for manufacturing of the spring is really worth it or not.

Keywords: Belleville spring; Poisson's ratio; Young modulus; Spring rate

Title of Paper: "Comparative Analysis of Resilient Grid Coupling by Analytical Design", *International Journal for Research in Applied Science & Engineering Technology, 8 (2), 2020, pp 46-55.*

http://doi.org/10.22214/ijraset.2020.2008

Co-authors : Manthan Paskanthi , Indravadan Makwana, Priyansh Hotchandani, Savan Vasava

Abstract : Resilient Coupling comprises mainly two hubs, grid spring and cover to protect the spring to fly off to centrifugal force and to prevent grease to come out. Grid Spring element is so designed that it provides resiliency for variable flexibility of a coupling and damping properties making the coupling very for drives involving high shock loads to the extent of 80%. Unlike gear and disc coupling, resilient coupling have unique ability to reduce vibration by as much as 30%. Misalignment – Angular, Parallel or Axial, that inevitably occurs between rotating shafts, which are independently supported, is also taken care of by the spring element within allowable limits. The grid is torsional flexible. The circumferential flexibility is progressive due to the curved profile of the grooves – state of the art in resilient coupling design. The grid spring element absorbs impact energy by spreading it over time and thus reduces the magnitude of the peak loads.

Keywords: Torsional shear stress; Stiffness; Deflection; Resultant stress

Mr C P Kumar, FIE
Scientist 'G', National Institute of Hydrology, Roorkee

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Title of Paper: "An Overview of Hydrological Studies by C. P. Kumar", *International Journal of Advanced Engineering Research and Science (IJAERS), ISSN (Print): 2349-6495, ISSN (Online): 2456-1908, 7 (3), 2020, pp 322 - 337.*

https://dx.doi.org/10.22161/ijaers.73.48

Abstract : This article presents an overview of hydrological studies undertaken and published by a Senior Scientist working at National Institute of Hydrology (A Government of India Society under Ministry of Jal Shakti), Roorkee - 247667 (Uttarakhand), India. It covers a wide variety of research outcomes related to groundwater assessment; seawater intrusion in coastal aquifers; numerical modelling of unsaturated flow, groundwater flow and contaminant transport; management of aquifer recharge; and impact of climate change on groundwater etc.

Keywords: Groundwater; Groundwater balance; Groundwater modelling; Hydrology; Hydrologist; Seawater intrusion

Publication by Members

Mr Kumbhar Siddharaj Vijaykumar, AMIE

Assistant Professor, Mechanical Engineering Department, Shree Siddheshwar Women's College of Engineering, Solapur

E-mail: siddharajvk@rediffmail.com

Title of Paper: "Experimental Investigations of Developed Solar Still for Increment in Efficiency and Rate of Distillate", *International Journal of Heat & Technology (IJHT), International Information and Engineering Technology Association (IIETA), 37 (2), 2019, pp.471-480.*

DoI: https://doi.org/10.18280/ijht.370213

Co-author : Basgonda K Sonage

Abstract: The purity of water has become a very important aspect now-a-days by virtue of diminishing and polluted fresh water sources and increased ground water contamination levels due to arsenics and fluorides. Whilst many technological solutions of purification being invented; the most effective and cheapest method worldwide is only been – distillation, which yields about 99-99.7 % pure water. Solar distillation is the best way in terms of availability of energy, as solar energy is freely available throughout the year. But the other distillation processes require high energy to be produced by either burning fuel or at the expense of electricity. Thus solar distills are better than any other means. Over the years, the efficiency of solar stills has been reached to 32-35% and rate of distillate to 2-2.5 litres. An effort has been made for the improvement in design of stills by incorporating the reflectors and phase change material (PCM) for energy storage. The experimental investigations proved that the efficiency of the solar still raised up to 42 % and rate of distillate to 4 litres.

Keywords: Distillate; Efficiency; PCM; Reflectors; Solar still.

Title of Paper : "Failure Investigation of Evacuated Tube Solar Collector of Water Heater", *Journal of Failure Analysis and Prevention (JFAP), Springer, 19 (5), 2019, pp 1202-1206.*

DoI: http://doi.org/10.1007/s11668-019-00730-x

Abstract: The instances of failure of solar tube collectors of water heating systems are seldom reported. The investigation of these failures and deep insights of prevention is required to avoid incurring huge costs at breakdown. The solar water heating systems are designed for longevity and requiring less maintenance. In lights of maintaining systems, only collectors are kept dust free for better performance and up-keeping of efficiency. But often the problems like leakages and high TDS levels of water are neglected. These facts at a later stage affect the longevity and working of systems and cause the breakdown of system. Salts accumulation creates blockages in solar tube collectors and entrap water causing pressure rise due to superheating. This leads to cracking failure of tubes. High temperature failure of sealing gasket leads to leakage and corresponding failure of manifold. Salts accumulation may further lead to bursting of collectors, and manifold leakages may cause damage to it by corrosion. Failure of these collectors is not affordable cost wise, and it is as good as replacing parts with the new ones involving high expenses. This report gives a guide on maintenance and precautions by investigating failures of evacuated tube solar collectors.

Keywords: Evacuated tube solar collector; Manifold; Salts accumulation; Pressure rise; Gasket seal leakage failure; Preventive and breakdown maintenance.

Dr Suresh Babu Daram, AMIE

Associate Professor, Department of EEE, Sree Vidyanikethan Engineering College, Tirupati, Andhra Pradesh

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Title of Paper: "Contingency Ranking in A Power Transmission System Using Zip Load Modeling", *University of Politehnica Bucharest, ISSN 2286-3540, Series C, 82 (1), 2020.*

https://www.scientificbulletin.upb.ro/rev_docs_arhiva/rezd2b_838622.pdf

Abstract: The Load models play vital role in the effect of particular situations. In this paper, the ZIP load modeling is considered and is incorporated in Newton-Raphson load flow technique. The contingencies are ranked for single line outage through constant impedance (Z), constant current (I), constant power (P) and ZIP load models respectively. A voltage stability measure, Condition Number of the Jacobian matrix in N-R load flow technique is computed for every Single line outage condition. The line contingencies are ranked based on the largest value condition number. The results were investigated on IEEE-14 and IEEE-30 bus system using MATLAB Software.

Keywords: Load modeling; Load flow control; Power system analysis computing; MATLAB

Publication
by Members

Dr Reddappa H N, FIE
Associate Professor, Department of Mechanical Engineering, Bangalore Institute of Technology K. R. Road,V. V. Pura, Bengaluru

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Title of Paper: "Influence of Al_2O_3 Nano-particles on Thermal Performance of Closed Loop Pulsating Heat Pipe", *FME Transactions, 48, 2020, pp 143-148.*

https://www.mas.bg.ac.rs/_media/istrazivanje/fme/vol48/1/18_gk_praveennath_et_al.pdf

Co-authors : Babu E R, Nagaraja C Reddy, K V Shivananda Murthy, G V Gnanendra Reddy and P G Koppad

Abstract : With the rapid development of electronic technology, many new promising ideas and technologies were introduced into thermal management, one of which is pulsating heat pipe (PHP), which is different from traditional heat transfer strategy. Hence, an investigation on pulsating heat pipe with multi turns will be conducted in order to examine nanoparticles effect on heat transport ability. The pulsating heat pipe consists of copper tube having inside radius of 1 mm, thickness of 0.5 mm and total length of 1605 mm. The investigation is done with acetone with a filling proportion of 60% for different % mass concentration of 1%, 2%, 3%, 4% and 5% of Al_2O_3 nanoparticles for differed heat contribution from 20 W to 60 W . From the results of different % mass concentration, the most reduced value of thermal resistance is 0.28 K/W at 1% mass concentration. Hence the PHP operates better with 1% mass concentration of Al_2O_3 nanoparticles.

Keywords: Nanoparticles; Pulsating heat pipe; Thermal performance.

Mr P Sivakumar, MIE
Senior Instructor, Department of Civil Engineering, North Eastern Regional Institute of Science and Technology(NERIST) Nirjuli, Arunachal Pradesh

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Title of Paper: "Dynamic Pressure-Dependent Simulation of Water Distribution Networks Considering Volume-Driven Demands based on Noniterative Application of EPANET 2", *Journal of Water Resources Planning and Management (ASCE), 146 (6), 2020.*

DoI: 10.1061/(ASCE)WR.1943-5452.0001220

Co-authors : Gorev N B, Tanyimboh T T, Kodzhespirova I F, Suribabu C R, and Neelakantan T R

Abstract: EPANET 2 software is widely used among researchers and practitioners from its inception for hydraulic analysis. This article presents a method to simulate pressure-dependent volume-based demands in a single extended period simulation run of EPANET 2. In the proposed method, artificial strings made up of a pipe with a minor loss, pressure-sustaining valve, pipe of negligible resistance, and tank are added to the demand nodes before running the hydraulic analysis. The time required to satisfy a volume-based demand is determined as the time required to fill the artificial tank connected to the demand node for normal and pressure deficient conditions. All the simulations are carried out using the available functions of the graphical user interface of EPANET 2. The proposed method is applied to a two-source looped network available from the literature and additionally compared with an existing method available in the literature using two example networks.

Keywords: Pressure-driven analysis; Pressure-deficient network; Simulation models; Volume-driven analysis; Water distribution network

Programmes by Institutional Members

World Engineering day for Sustainable Development

Department of Civil Engineering, Gayatri Vidya Parishad College for Degree and PG Courses, Rushikonda, Visakhapatnam observed World Engineering Day for Sustainable development on 4 March, 2020. During the function, Guest Lecture was presented by Prof K Veerabhadram, Director –Student Affairs, GITAM. Prof Veerabhadram in his address explained about different processes of utilization of waste materials. He further explained Case studies on water treatment for plantation and its composition of nutrients compared to potable water.

A Poster Competition was also organised during the occasion.

Principle ACS Engineering India Pvt Ltd celebrated World Engineering Day for Sustainable Development on 4 March, 2020. On this occasion an Awareness Program on sustainable Development was organised highlighting the role of engineering and technology towards Sustainable Development through technical sessions and Quiz Competition on Sustainability concept.

A Poster Session was also organised during the occasion.

TKM College of Engineering, Kollam, Kerala in association with The Institution of Engineers (India), Kollam Local Centre observed World Enginerring Day for Sustainable Development on 4 March, 2020. During the occasion, Mr Yogesh Karnapooshanam, Energy Management Centre, Kerala delivered Lecture on the topic 'Sustainable Building Design' and Mr Johnson Daniel, Energy Management Centre, Kerala on 'Energy Efficiency and Energy Management'. Earlier, Mr K Sivadasan, Chairman, Kollam Local Centre welcomed the audience. The program was well attended by students and Faculties.

Announcement

The Institution of Engineers (India)

Appeal

Dear fellow Engineers,

As we are all aware the ' lockdown' has been further extended till 3 May 2020. I request you all to follow the Government guidelines and specially the 7 points mentioned in the Hon'ble Prime Minister's address to the Nation. Through our collective efforts, we will definitely overcome the COVID -19 pandemic.

I take this opportunity to request all engineers to contribute generously in this noble cause by donating to PM-CARES FUND directly, with an intimation to IEI at director_finance@ieindia.org

Prevention is better than cure. Please take care & stay at home.

I look forward to your encouraging response.

14th April, 2020

Er. Narendra Singh, FIE
President, IE(I)

Call for Papers for Annual Technical Volume

Engineering Division Board / Committee	Theme	Last Date for Paper Submission	E-mail ID for Paper Submission
MRDB	Blue Economy: Challenges and Opportunities in the Field of Marine Engineering	31/7/2020	mrdb@ieindia.org
MCDB	Advances in Thermodynamics and Heat Transfer	31/7/2020	mcdb@ieindia.org

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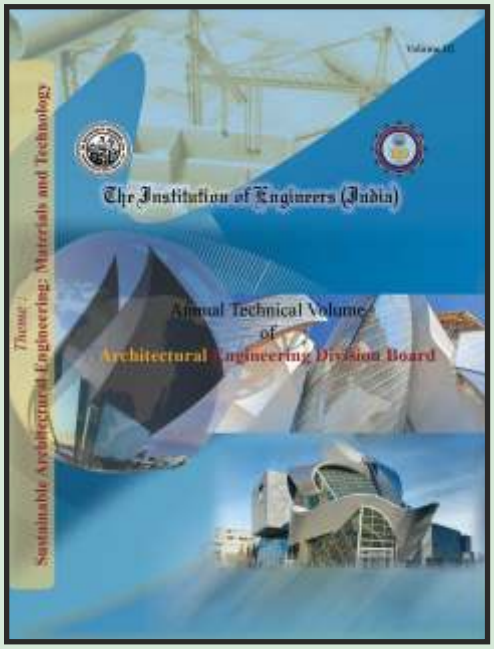

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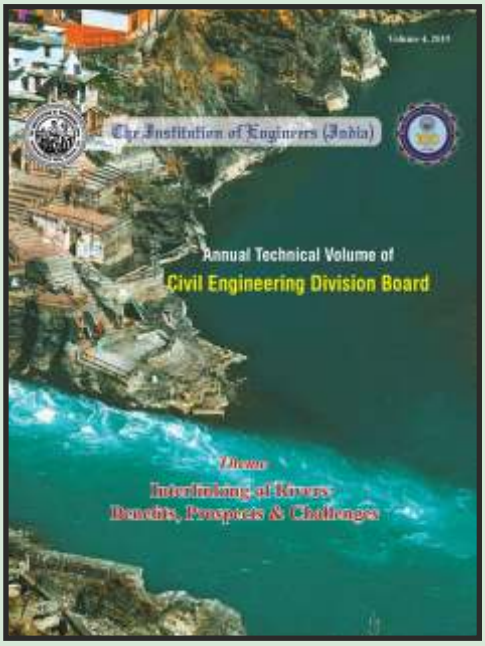

Theme
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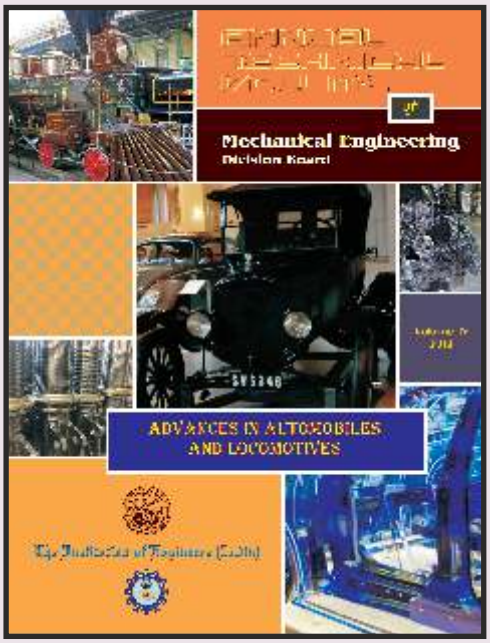

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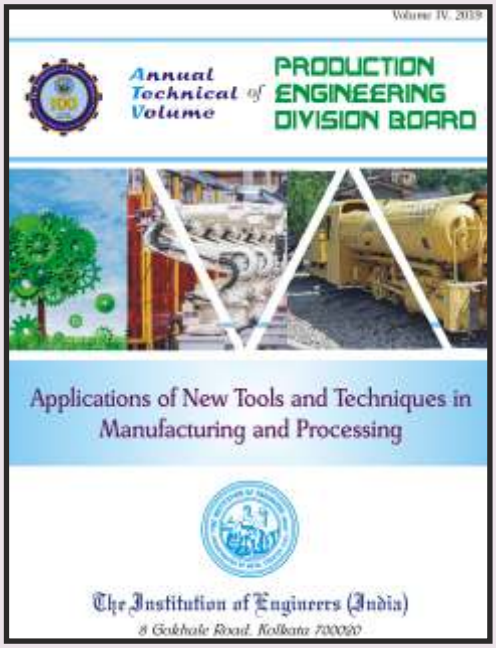

Theme
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IEI epitome

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