

IEI EPITOME

A Century of Service to the Nation

INSIDE THIS ISSUE

- 2** Notification on the R&D
- 3** Members in the News
- 3** Notification on Know-Your-Member (KYM)
- 4** Notification of IEI Young Engineers Award 2026
- 5** Publication by Members
- 5** Notification on Professional Engineers (PE) Certification by IEI — A Pathway towards Success
- 6** Notification on Be Proud to be a Certified International Professional Engineers (IntPE) by IEI
- 7** Notification on IEI-Springer Journals
- 8** Notification on Corporate Air Ticketing for IEI Members
- 10** Notification on World Engineering Day for Sustainable Development 2026
- 10** Notification on Discount at the Samsung e-store for IEI Corporate Members
- 11** Nota Bene
- 15** Notification on Advertisement in IEI Epitome
- 16** Continuing Professional Development Programmes of ESCI

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

President

Er Manish Mahendra Kothari

Editor

Maj Gen (Dr) MJS Syali, VSM (Retd)

Secretary & Director General

Special Contribution

Mr S Chakraverty, Dr K Sen, Mr D Nath,
Mr S Dasgupta, Mr S Bagchi, Mr B Mukherjee,
Mr P Barik, Ms P Nath, Ms T Kumar,
Mr S K Mishra

Design & Outlay

Ms H Roy

Published by:

The Institution of Engineers (India)

8 Gokhale Road, Kolkata 700020

Telephone: 91-33-40106299/248,

Email: newsletter@ieindia.org,

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

IEI R&D Grant-in-Aid

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) has instituted the R&D Grant-in-Aid programme way back in 2001.

Like every year, the Institution invites applications for the session 2025-26 for funding industry-oriented R&D projects and research initiatives aimed at improving the lifestyle of common people from engineering students pursuing full-time Diploma/UG/PG/PhD engineering programme in AICTE/UGC/NAAC approved Institutions/Colleges/Universities. The application form and guidelines are available on 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 investigator(s), guide(s) and Institution(s) are as follows:

Project Category	Student/Applicant Membership	Guide(s) Membership	Institutional Membership	Quantum of Grant (INR)
1. Diploma	Exempted [Membership of Student Chapter is desirable]	AMIE/MIE/FIE	Not Mandatory	Not exceeding ₹15,000/- for a single project
2. UG (BE/ BTech/ AMIE/ Equivalent)	SMIE	AMIE/ MIE/ FIE	Applicant's Institute should preferably be an Institutional Member with NBA/NAAC Accreditation	Not exceeding ₹50,000/- for a single project
3. PG (ME/ MTech/ Equivalent)	AMIE/ MIE/ FIE	MIE/FIE	Applicant's Institute should preferably be an Institutional Member with NBA/NAAC Accreditation	Not exceeding ₹1,00,000/- for a single project
4. PhD	AMIE/ MIE/ FIE	MIE/FIE	Applicant's Institute should preferably be an Institutional Member with NBA/NAAC Accreditation	Not exceeding ₹1,50,000/- for a single project

The soft copy of the duly filled-up applications (in editable format), as per the pro-forma 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:

The Deputy 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. Kindly go through the guidelines (visit link <https://shorturl.at/BiAOQ>) carefully before filling up the application.

The grant is not intended for the faculty members / working individuals 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.



Dr Kaarthik Manoharan, MIE
Assistant Professor – Senior Grade
Coimbatore Institute of Technology, Coimbatore
✉ kaarthi@cit.edu.in

The **Patent** of the **Design** titled “**AI Powered Construction Site Monitoring Robot,**” filed by Dr Kaarthik Manoharan and others, has been accepted for registration as per the details given below.

Serial Number : 215421
Design Number : 465637-001
CBR Number : 214954
CBR Date : 14/07/2025
Date of Issue : 11/12/2025
Name of other Applicants : 1. Sandip Baburao Chavan, 2. Dr A Anitha, 3. Mr S Vadivelan, 4. Dr Rajiv Gandhi R, 5. Dr.M Archana, 6. Dr M Priyanka, 7. Mr G Mahaboob Basha, 8. Dr D Jagan Mohan & 9. Ms Pratheba S
Application Status : Design Accepted and Published, Journal No is 50/2025 and Journal Date is 12/12/2025
Issuing Authority : Controller General of Patents, Designs and Trademarks, Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, The Patent Office, Government of India, Chennai.

The **Patent** of the **Design** titled “**Road Pothole Inspecting Device,**” filed by Dr Kaarthik Manoharan and others, has been accepted for registration as per the details given below.

Serial Number : 215691
Design Number : 467581-001
CBR Number : 216318
CBR Date : 28/07/2025
Date of Issue : 11/12/2025
Name of other Applicants : 1. Dr R Sathyanarayan Sridhar 2. Mr J Cyril Santhosh 3. Mr S Karthik Kumar 4. Mr U Bala Vignesh 5. Ms E Jayanthimani 6. Mr P Leeban Joseph & 7. Dr N Saranya
Application Status : Design Accepted and Published, Journal No is 50/2025 and Journal Date is 12/12/2025
Issuing Authority : Controller General of Patents, Designs and Trademarks, Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, The Patent Office, Government of India, Chennai

Know-Your-Member (KYM)

Is your mobile number & email updated with us? If not, then please forward your **Know-Your-Member (KYM) form immediately to participate in the Elections of IEI from 2026 onwards.**

You are requested to forward your KYM along with the self-attested copy of photo ID proof to the address given below:-

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

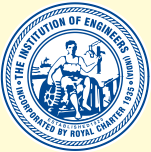
The form is available on IEI Website at <https://shorturl.at/8Q5tF> or **scan the code** below:





Dr Prakash Chand Jain, FIE
Scientist
DRDO, Ministry of Defence, Government of India
✉ jainpcj@yahoo.com

Dr Prakash Chand Jain was elected as a **Fellow** of American Society of Mechanical Engineers (ASME) in recognition of his outstanding engineering achievements and contributions to engineering profession.



The Institution of Engineers (India)

IEI YOUNG ENGINEERS AWARD 2026

Notification

The Institution of Engineers (India) is a multi-disciplinary professional body of engineers with 15 engineering disciplines and over 9,00,000 members in India and abroad. The Institution was established in 1920 and was incorporated by Royal Charter in 1935. It has been in the forefront of engineering profession addressing the socio engineering problems for progress of the country. IEI functions among professional engineers, academicians, research workers to update their professional knowledge through continuous professional development. With its large international linkages and a network of 124 Centres in India and Six Overseas Chapters, the Institution has built up wide reach and large infrastructure to meet its objectives of promoting engineering in all aspects.

With a view to promote the pursuit of excellence in the field of engineering, IEI has instituted 'IEI Young Engineers Award'. The Award consists of a Plaque and a Certificate. The purpose of the Award is to recognize outstanding achievements/contributions made by young engineers in engineering research, excellence in engineering technology development, technology transfer, etc. Any engineer citizen of India not older than **35 years** of age/women engineer citizen not older than **37 years** of age as on **March 31, 2026** is eligible for the Award, provided that he/she is a Corporate Member of IEI or has applied for IEI Membership. The IEI Young Engineers Award is presented to awardees for all the 15 Engineering Divisions of the IEI during the respective National Conventions.

The Application Proforma may be downloaded from IEI website <https://www.ieindia.org/webui/IEI-Activities.aspx#young-engineering-awards> or scan the **QR code** below. Soft copy of the filled-in application proforma should be forwarded to award@ieindia.org by March 31, 2026. Further, six copies of the duly filled application form, along with all supporting documents, endorsed by appropriate authority should be sent to the below mentioned address so as to reach us latest by April 15, 2026:

Deputy Director (Technical)
The Institution of Engineers (India)
8 Gokhale Road, Kolkata 700020

The envelope containing the application should be superscribed at the top as 'IEI Young Engineers Award 2026' and name of the engineering division under which the applicant desires to be considered for the Award.





Dr Vijay Shivaji Gadakh, FIE

Associate Professor

Automation & Robotics Engineering, Amrutvahini College of Engineering, Sangamner, Ahilyanagar, Maharashtra

✉ vijay.gadakh@avcoe.org

Title of Paper: **Microstructural Evolution and Mechanical Performance of Y-Doped Zn-3Mg-0.5Zr Composites for Biodegradable Implants**

Journal of The Minerals, Metals & Materials Society (JOM), Springer, 01 December 2025, Electronic ISSN: 1543-1851, Print ISSN: 1047-4838

DOI: <https://doi.org/10.1007/s11837-025-07936-5>

Co-authors: K. S. Kadam & S. Ponnareddy

Abstract: The biocompatibility and appropriate degradation rates of zinc-based alloys have garnered increasing attention for their potential application in biodegradable implants. However, their limited mechanical performance restricts their broader utilization. This study aims to enhance the performance of Zn-3Mg-0.5Zr composites, fabricated via spark plasma sintering (SPS), for biomedical applications by examining the effects of yttrium (Y) addition on their mechanical properties and microstructure. Yttrium was incorporated into the Zn-Mg-Zr matrix in varying weight percentages (0.1–0.5 wt.%). Microstructural analysis employing X-ray diffraction (XRD), energy-dispersive spectroscopy (EDS), and scanning electron microscopy (SEM) revealed Y-rich intermetallic phases and significant grain refinement. These phases contribute to strengthening through mechanisms such as dispersion hardening, solid-solution strengthening, and grain boundary pinning. The sample with 0.3 wt.% Y exhibited the highest ductility, with an elongation of 4.59%, whereas the composite with 0.5 wt.% Y demonstrated the greatest compressive strength (241.87 MPa) and Vickers hardness (48–50 HV). The XRD peak shifts further confirmed the lattice deformation and the onset of precipitation hardening. However, SPS-induced texturing was identified as the cause of mechanical anisotropy. The addition of Y significantly enhanced the mechanical properties of the Zn-3Mg-0.5Zr composites through synergistic strengthening mechanisms. These improvements suggest that Y-alloyed Zn composites are promising as bioresorbable implant materials. Nonetheless, further investigation into the tensile and fatigue behaviors, as well as comprehensive biological evaluations, is required to confirm their therapeutic efficacy.

Keywords: Yttrium Alloying; Rare Earth Elements; Zn-Mg-Zr Composites; Microstructural Refinement; Mechanical Enhancement; Biomedical Implant Materials

cont. to next page

Professional Engineers (PE) Certification by IEI — A Pathway towards Success

Get the **Professional Engineers Certification** by IEI to enhance your knowledge, skill and competency and also elevate your career by becoming a member of an elite group of engineers.

Who can be a Professional Engineer —

- Having Bachelor's in Engineering or equivalent recognized by Statutory Authority or Government of India;
- Having experience of at least 5 years in engineering practice.

Why become a Professional Engineer (PE) —

- Improved career prospects and employability;
- Makes you suitable to attain higher levels of authority and responsibility;
- It is envisaged that in future, only a professional engineer would be empowered to prepare, sign, seal and submit engineering plans and drawings to a public authority for approval, or to seal engineering work for public and private clients;
- With growing economy and large scale expansion of infrastructure, the demand of PE certified engineers are expected to be much higher.

How to apply for Professional Engineers?

The details are available on IEI Website

<https://shorturl.at/mRIYu>

or

scan the code



For any query and assistance, please send email to: pe@ieindia.org or contact (033) 40106275

cont. from previous page

Title of Paper: Friction Stir Welding of Dissimilar Metals: Investigating the Role of Interlayers in Aluminium-Steel Butt Joint Performance

Materials Today Communications, Elsevier, 50, 29 November 2025, Online ISSN: 2352-4928

DOI: <https://doi.org/10.1016/j.mtcomm.2025.114421>

Co-authors: Y. R. Gunjal, M. Sahu, V. J. Badheka, L. H. Shah, N. S. Khemnar & V. B. Shinde

Abstract: This study explores the improvement of the mechanical properties of friction stir-welded (FSW) butt joints between aluminium and steel in a butt configuration by incorporating nickel (Ni), zirconium (Zr), and titanium (Ti) interlayers based on the Miedema model. The joint without an interlayer exhibited a tensile strength of 100 ± 8 MPa. However, the introduction of interlayers significantly enhanced joint strength. The Ti interlayer exhibited the highest tensile strength, reaching 147 ± 15 MPa, which corresponds to a 49 % increase. The Zr interlayer followed, achieving 115 ± 8 MPa, a 17 % improvement, while the Ni interlayer reached 105 ± 12 MPa, a 7.5 % increase. The optimal conditions for the Ti-interlayered joint were determined to be a tool rotational speed of 765 rpm, weld speed of 50 mm/min, and tool tilt of 1° . Microstructural analysis revealed that the superior performance of the Ti interlayer was due to the formation of a ductile AlFeTi₂ phase and a refined microstructure with ultrafine equiaxed grains and approximately 75 % high-angle grain boundaries, facilitated by extensive dynamic recrystallization. In contrast, the Ni interlayer led to the formation of brittle Al-Ni-Fe compounds with approximately 74 % low-angle grain boundaries, whereas the Zr interlayer resulted in Al₁₃Fe₃Zr₈ intermetallics and a mixed microstructure. Transmission electron microscopy analysis confirmed the presence of a crystalline nanofibrous AlFeTi₂ network in the Ti joints, which enhanced load transfer and crack resistance. These results highlight the importance of interlayer selection for optimizing the interfacial microstructures and enhancing the performance of dissimilar Al-steel FSW joints.

Keywords: Friction Stir Welding; Aluminium Alloy 6061-T6; IS 2062 FE410WA Steel Alloy; Miedema Model; Mechanical Properties; Recrystallization

Title of Paper: Process Parameter Optimization for Dissimilar Friction Stir Welding of Aluminium and Steel

Transactions of the Indian Institute of Metals, Springer, 78, 26 August 2025, Electronic ISSN: 0975-1645, Print ISSN: 0972-2815

DOI: <https://doi.org/10.1007/s12666-025-03708-6>

cont. to next page

Be Proud to be a Certified International Professional Engineers (IntPE) by IEI

Who can apply for International Professional Engineers?

Basic Requirements for certification as International Professional Engineer

- ⊙ Bachelor's Degree in Engineering or equivalent recognised by Statutory Authority or Government of India;
- ⊙ Experience of 7 years in engineering practice. Out of 7 years of experience 2 years in a responsible position of significant engineering activity.

How to apply for International Professional Engineers?

For details
please visit the link:
<https://shorturl.at/j36fo>
or
scan the code →



Why become an International Professional Engineer ?

International Professional Engineer (Int.PE) Certification enables engineering professionals to advance their career aspiration in wide ranging ways.

- ⊙ The International Professional Engineers, registered with IEI, may receive credit when seeking registration or licensure in the jurisdiction of another member, i.e, this will facilitate an engineer in mobility across member jurisdictions;
- ⊙ Empowered by International Professional Engineers Agreement (IPEA), IEI maintains the Register of International Professional Engineers (IntPE) in India;
- ⊙ Enhances an engineering professional's stature and gives confidence to employer/ prospective employer about competency of Certified Engineer;
- ⊙ IntPE Certificate facilitates an engineer in Professional Mobility.

For any query and assistance, please send email to: pe@ieindia.org or contact (033) 40106220

cont. from previous page

Co-authors: Yogesh R. Gunjal, Mrinal Sahu, Vishvesh J. Badheka & Manank M. Patel

Abstract: The demand for steel–aluminum multi-material structures are rapidly growing in the transportation industries, including the automobile, aerospace, and shipbuilding sectors. In this study, a 3 mm thick AA 6061-T6 alloy and IS 2062 FE410WA steel alloy were butt-welded using the friction stir welding (FSW) process. The objective of this study was to investigate the effects of tool rotational speed (TRS), tool tilt angle (TTA), and welding speed (WS) on weld quality. Each variable was tested at three distinct levels using the Taguchi L₉ orthogonal array. For the characterization of the welded coupons, visual inspection, tensile testing, and macro-analysis of the weld cross sections were carried out. Confirmation tests were conducted under optimal conditions (TRS = 1070 rpm, WS = 50 mm/min, TTA = 1°), yielding an average UTS of 167.9 ± 2.8 MPa, indicating good repeatability. This study uniquely examines the influence of process parameters on tensile properties, and the integration of the Taguchi design with microstructural correlation and micro hardness mapping presents a distinctive approach to joint optimization. The novelty of this study lies in the integrated optimization of friction stirwelding parameters for AA6061-T6 and IS 2062 FE410WA, with a comprehensive analysis of microstructural and microhardness correlations, a topic not extensively addressed in previous studies.

Keywords: AA 6061-T6 Aluminium Alloy; IS 2062 FE410 WA Steel; Taguchi Analysis; Mechanical Properties; Microstructure; Dissimilar FSW

Title of Paper: Study of Steel-Aluminium Alloy Joint using Friction Stir-Assisted Scribe Technique

Journal of Materials Engineering and Performance, Springer, 14 August 2025, Electronic ISSN: 1544-1024, Print ISSN: 1059-9495

DOI: <https://doi.org/10.1007/s11665-025-11803-4>

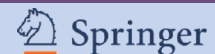
Co-authors: N. S. Khemnar, M. Sahu & V. J. Badheka

Abstract: This study examines the dissimilar joining of AA 6061-T6 aluminum and HSLA 340 steel alloys using the friction stir-assisted scribe technique (FaST) on a cost-effective conventional vertical milling machine. Two distinct single-material tools, AISI H13 tool steel and WC-12%Co, were employed to assess the impact of tool material and geometry on joint formation, intermetallic compound (IMC) development, and mechanical performance. In contrast to previous studies that employed bi-material tooling and specialized CNC-position and force-controlled setups, this study explored the feasibility of implementing FaST in resource-constrained manufacturing environments. Three welding trials were conducted using various process parameters. The joint fabricated with the WC-12%Co tool at a tool rotational speed of 900 rpm, weld speed of 20 mm/min, and tool tilt angle of 0.5° exhibited superior tensile strength (~260 MPa), which was approximately 84% of the base strength of the aluminum alloy. Microstructural analysis using XRD and SEM-EDS confirmed the presence of Fe₂Al₅ and Fe₂Al₉ IMCs with a maximum thickness of ~1.8 μm, uniformly distributed across the weld interface. The hook geometry analysis indicated a minimized hook height and improved mechanical interlocking under the optimized conditions. Furthermore, the use of WC tooling mitigated the tool wear issues observed in the H13 tool steel trials, thereby enhancing the weld consistency. Hardness measurements revealed higher values on the advancing side owing to severe plastic deformation. This study demonstrates that FaST, when optimized with simplified tooling and appropriate parameters, facilitates robust Al-steel joints without the need for advanced equipment, underscoring its potential for industrial-scale applications in lightweight hybrid structures.

Keywords: Friction Stir-Assisted Scribe Technique; Aluminium Alloy 6061-T6; HSLA 340 Steel; Dissimilar Joining; Mechanical Properties; Intermetallic Compounds



IEI-Springer Journals



ISSN Print 2250-2149
ISSN Electronic 2250-2157

Series A
CiteScore 2024

2.8
Google Scholar: h5 Index 2023
22



ISSN Print 2250-2106
ISSN Electronic 2250-2114

Series B
CiteScore 2024

3.9
Google Scholar: h5 Index 2023
24



ISSN Print 2250-0545
ISSN Electronic 2250-0553

Series C
CiteScore 2024

2.7
Google Scholar: h5 Index 2023
24



ISSN Print 2250-2122
ISSN Electronic 2250-2130

Series D
CiteScore 2024

2.5
Google Scholar: h5 Index 2023
19



ISSN Print 2250-2483
ISSN Electronic 2250-2491

Series E
CiteScore 2024

2.8
Google Scholar: h5 Index 2023
11



All Corporate Members can log into www.ieindia.org to get free e-access of Journal papers



Dr Abhijit Mukherjee, FIE

Associate Professor

National Institute of Fashion Technology, Ministry of Textiles, Govt. of India, Kolkata

✉ abhijit.mukherjee@nift.ac.in, drprofabhijit@gmail.com

Title of Paper: Exploration of Antimicrobial Mechanism of the Bioactive Components of Tulsi Extract against various Microbes and its Future Scope of Development for Application in Textiles

Journal of Textile and Apparel, Technology and Management (JTATM), NC State Wilson College of Textiles, 13(2), Fall 2025, 05 December 2025, ISSN-L: 1533-0915

URL: <https://jtatm.textiles.ncsu.edu/index.php/JTATM/article/view/20800>

Co-author: Swastika Maity

Abstract: This study delves into the significance of antimicrobial finishes on textiles, focusing mainly on the ancient use of Tulsi and advocating for its preference over other herbal antimicrobial finishes. Tulsi, derived from the *Ocimum tenuiflorum* plant, has been historically recognized for its potent antimicrobial properties, making it a compelling choice for textile applications. A comprehensive exploration provides insights into various species of tulsi and their geographical significance in shaping the nature and properties of Tulsi oil.

The diverse composition of Tulsi essential oils imparts robust antimicrobial capabilities by targeting bacterial cell membranes. Mechanisms, including lipid bilayer disruption and interference with basic cellular processes, inhibit bacterial proliferation. This understanding is crucial for leveraging Tulsi oils' therapeutic potential as natural antimicrobial agents, with future research aiming to enhance efficacy against diverse bacterial strains for innovative therapeutic interventions.

An in-depth analysis of the primary bioactive compounds found in Tulsi oil illuminates its potent antimicrobial capabilities, showcasing its efficacy in inhibiting various pathogens. Moreover, this study elucidates the methods and techniques for applying Tulsi oil in textiles, considering its implications across different fiber substrates.

This review underscores the promising potential of Tulsi oil as a versatile antimicrobial agent in textile manufacturing by evaluating its current applications and future prospects. The study contributes to a deeper understanding of the antimicrobial properties and scope of *Ocimum tenuiflorum*, paving the way towards innovative, sustainable, and functional textile solutions that meet emerging consumer demands while promoting health, hygiene, and environmental responsibility.

Keywords: Antimicrobial Mechanism; Bioactive; Essential Oil (EO); Herbal; Pathogens; Sustainable; Tulsi

Title of Paper: Prospects of Mycelium-Based Textile Substrate (Leather Alternatives): A Breakthrough in Bio-Textiles

Annual Technical Volume of Textile Engineering Division Board, The Institution of Engineers (India), theme on "Today's Textile Tomorrow's Future", Volume VII, 21 December 2025, ISBN: 978-81-993673-9-5

URL: <https://www.icindia.org/webui/IEI-Publication.aspx#annual-technical-volume>

Co-author: Rashmi Singh

Abstract: As the demand for plant-based and sustainable alternatives to animal and synthetic products continues to rise, mycelium-based textile substrates (mycelium-based leather) have emerged as a versatile and exciting new development in the textile world. Mycelium, the branching network of fungi, is a renewable, expandable, and adjustable bio-material that can be cultivated into pliable, resilient mats ideal for leather alternatives. This chapter discusses the biological makeup and capability of mycelium to create lightweight, porous, and biodegradable materials with mechanical properties similar to those of animal leather, but with a vastly reduced environmental impact. Sustainability remains a major benefit, as mycelium leather uses less water, emits lower carbon, and eliminates animal cruelty. Research gaps persist in achieving consistent large-scale production, enhancing durability, and integrating bio-based finishing technologies to improve functional performance. These applications are connected to circular economy objectives of resource efficiency and recyclability. By and large, mycelium leather is a game-changer in bio-textiles, bringing together innovation, performance, and sustainability to reimagine material sourcing and production in the textile value chain.

Keywords: Mycelium-Based Leather; Bio-Textiles; Bio-Fabrication; Smart Textiles; Sustainable Fashion; Circular Economy

Corporate Air Ticketing for IEI Members

Corporate Members may book Corporate Air Tickets through M/s EBIX Travels Private Ltd. For details please visit <https://www.icindia.org/webui/IEI-AirTickets.html>



Er Tanmoy Chakraborty, MIE
Assistant Director (Secretariat)
The Institution of Engineers (India), Kolkata
✉ tanmoychakraborty1978@gmail.com

Title of Paper: Next-Generation Materials Enabling Strategic Superiority in Defense, Nuclear, Aerospace, and Energy Sectors

Annual Technical Volume of Metallurgical & Materials Engineering Division Board, theme: Materials for Strategic Areas like Defence, Nuclear, Aerospace and Energy Applications, The Institution of Engineers (India), Volume VI, 21 December 2025, ISBN 978-81-993673-1-9

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

Abstract: Materials science has become the cornerstone of innovation across strategic sectors such as defense, nuclear, aerospace, and energy. The increasing complexity of mission-critical systems demands advanced materials with exceptional mechanical, thermal, chemical, and radiation-resistant properties. This paper presents a comprehensive review of next-generation materials tailored for these high-performance domains, highlighting state-of-the-art technologies, recent breakthroughs, and emerging trends. It examines ultra-high-temperature ceramics, radiation-resistant alloys, lightweight composites, metamaterials, fuel cell materials, and high-entropy alloys that are shaping the future of national security and sustainable energy. Indian initiatives under DRDO, ISRO, BARC, and other public-sector R&D agencies are also spotlighted to showcase indigenous advancements and self-reliance in materials technology. By integrating scientific, engineering, and strategic perspectives, this review aims to provide insights into material innovations that will define India's technological edge and energy security in the coming decades.

Keywords: High-Temperature Ceramics; Radiation-Resistant Alloys; Metamaterials; Solid-State Batteries; High-Entropy Alloys; Fuel Cell Materials; Indigenous Technology; Strategic Materials



Er Dattu Balu Ghane, MIE
Lecturer in Mechanical Engineering
Department of Mechanical Engineering, Government Polytechnic, Awasari (Khurd), Pune, Maharashtra
✉ dattu.ghane@gmail.com

Title of Paper: A Hybrid Statistical Approach for Performance Optimization of Micro-Scale Wind Energy Systems

Applied Engineering Letters, 10(4), 15 December 2025, pp 211-221, ISSN 2466-4677, e-ISSN 2466-4847

DOI: <https://doi.org/10.46793/aeletters.2025.10.4.3>

Co-author: Vishnu D. Wakchaure

Abstract: Micro wind turbines (MWTs) are becoming a promising source of electricity generation for decentralised electricity generation, especially in rural areas. The efficiency of MWTs depends on some design and operational factors, including the number of blades, blade radius and wind speed. This paper seeks to establish the effects of these parameters on the performance of the turbine and determine the best configuration that will yield the highest power and efficiency. The experimental design was done systematically using the Taguchi method with an L16 orthogonal array to reduce the number of experiments required for the analysis. Two dependent variables, namely power output and coefficient of performance (C_p), were recorded for each configuration tested. The results of the experiments were analyzed using Analysis of Variance (ANOVA) to test the significance of each input factor and the Weighted Sum Model (WSM) for multi-objective optimization. As for the WSM method, unequal weights were assigned to power (0.35) and C_p (0.65), with efficiency taking precedence over other factors. The optimization studies revealed that the highest performing turbine was the three-bladed turbine with a radius of 0.26 m and a wind speed of 12 m/s. Confirmation experiments under these conditions also showed the same results with little variability, thus confirming the experimental results. The present work offers a systematic, quantitative approach to improve MWT performance, useful for the design and implementation of small-scale wind energy systems in distributed energy applications.

Keywords: Micro Wind Turbine; Performance Evaluation; Taguchi Method; ANOVA; WSM Optimization



Dr Puja Haldar, MIE

Assistant Professor

Sanaka Educational Trust's Group of Institutions, Malandighi, Durgapur, West Bengal

✉ puja.mbc11@gmail.com

Title of Paper: Robust Optimal Controller Design for MIMO Systems on the Basis of Modified Discrete Kharitonov Theorem

Advanced Control for Applications: Engineering and Industrial Systems, Wiley, 13 March 2025, ISSN 2578-0727

DOI: <https://doi.org/10.1002/adc2.70009>

Co-author: Sumit Kumar Pandey

Abstract: *In this paper, a modification in the Kharitonov theorem is proposed to fix the robustness criteria of the discrete time systems. This proposed method is noble and quite simpler than the existing method of the Kharitonov theorem for discrete time plants. In this method, to ensure robust stability, there is no need to check the stability of all four Kharitonov interval polynomials, whether it can be calculated through the much simpler conditions by only knowing the polynomials' maximum and lowest limits up to fourth order polynomials. The proposed method is derived and verified for the different orders of the plants. Further, the proposed method is implemented as a physical example of a four tank MIMO system. A PID controller is designed in this work on this proposed method to find the robust gains, which are further fine-tuned by the TLBO algorithm. Tests of the multi-channel input output gain change, delay variation, and output disturbance to the plant are used to assess the robustness of the developed controller.*

Keywords: Discrete Kharitonov Theorem, MIMO, PID, Robust, TLBO

World Engineering Day for Sustainable Development 2026

The World Engineering Day for Sustainable Development 2026 has to be celebrated by all Centres of IEI on 04 March 2026 on the theme "Smart Engineering for a Sustainable Future".

[Reference Link: <https://worldengineeringday.net/>]

The reference link for World Engineering Day WFEO Hackathon 2026

<https://zealous.co/worldengineeringday/opportunity/wed-wfeo-hackathon-2026/>

Discount at the Samsung e-store for IEI Corporate Members

Exclusive access to the Samsung e-store for IEI Corporate Members. This shall enable the Corporate Members to procure the Samsung Products at a discounted rate. The Samsung e-store can be accessed at www.samsung.com/in/multistore/iei using your Membership No. and email id / Mobile number.

We would like to thank our erudite members for sharing their professional achievements through the IEI Epitome and making the content more abounding and at the same time inspiring many others to share their accomplishments as well. To streamline the process and make it convenient for the member to give their inputs we would like to obtain the information in a more structured and comprehensive manner. We would request our members to send the details of their achievements as per the appended formats only.

FORMAT FOR ACHIEVEMENT BY MEMBERS

A passport size
color photograph
(scanned image)

(i) Prefix (Er/Dr/Prof)	
(ii) First Name	
(iii) Middle Name (if any)	
(iv) Surname (Last Name)	
(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) Details of Award/Achievement#	
(x) Month & Year of Achievement/ Date of Achievement	
(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

FORMAT FOR PATENT / DESIGNS / TRADE MARKS / GEOGRAPHICAL INDICATIONS BY MEMBERS

A passport size
color photograph
(scanned image)

(i) Prefix (Er/Dr/Prof)	
(ii) First Name	
(iii) Middle Name (if any)	
(iv) Surname (Last Name)	
(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) Tick the appropriate BOX	<input type="checkbox"/> Patent <input type="checkbox"/> Designs <input type="checkbox"/> Trade Marks <input type="checkbox"/> Geographical Indications
(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	

* Copy of Certificate of the Grant of Patent

FORMAT FOR PUBLICATION(S) BY MEMBERS — PAPERS

A passport size
color photograph
(scanned image)

(i) Prefix (Er/Dr/Prof)	
(ii) First Name	
(iii) Middle Name (if any)	
(iv) Surname (Last Name)	
(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 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)]	

Note: Publications in local seminar, conference and symposia will not be accounted

FORMAT FOR PUBLICATION(S) BY MEMBERS — BOOKS/ BOOK CHAPTERS

A passport size
color photograph
(scanned image)

(i) Prefix (Er/Dr/Prof)	
(ii) First Name	
(iii) Middle Name (if any)	
(iv) Surname (Last Name)	
(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	
(x) Title of Book Chapter	
(xi) Book Chapter Number	
(xii) Publisher Details	
(xiii) ISBN	
(xiv) Date of Publication (Date-Month-Year)	
(xv) Co-authors (if any)	
(xvi) About the book (100-150 words)	
(xvii) Supporting Documents (complimentary copies for IEI Headquarters)/links [which are clearly indicative of the incumbent's achievement(s)]	

Note: Accommodate works published in journals/reputed conference proceedings/books for the last one year

Notification on Advertisement in IEI Epitome

Volume 11 ● Issue 1
January 2026

The Institution of Engineers (India) reserves a coveted privilege in being the largest multi-disciplinary professional body of engineers encompassing 15 engineering disciplines with a Corporate membership of over 2.59 lakhs maintaining a national/international presence through hundred twenty four Centres and six Overseas Chapters, Fora and Organ (Engineering Staff College of India). The Institution has been disseminating the various information through IEI Epitome and other publications.

We would like to share with you that we are now providing the facility to advertise engineering / technical products/services, information brochures, recruitment notices etc. in our official publication portal IEI Epitome (12 issues - 196000 reach online). Besides, IEI Epitome is also uploaded on our website (www.ieindia.org) on a monthly basis and is accessible to all free of cost. Given its immense footprint in the engineering and technical diaspora spanning the globe, IEI with its distinguished heritage of a century provides you the ideal portal to connect with the National and International Engineering and Technical Community at very competitive rates. We invite you to take this unique and privileged opportunity to advertise and communicate your service and product portfolios under our prestigious banner and make us your brand emissaries in your promotional campaigns.

The booking form containing details of each publication, rates for the advertisements and the advertisement form are appended below.

BOOKING FORM

Publication	Description	Type	Rate (Rs.) including GST	Number of Issues / Volumes	Total (Rs.) including GST
IEI Epitome	Inside Full Page	Colour	30,000		
	Inside Half Page	Colour	15,000		
	Inside Quarter Page	Colour	8,000		

Less discount* @%

Total Cost of Advertisement

- ✚ 5% discount for advertisement in 6 consecutive issues of IEI Epitome
- ✚ 10% discount for advertisement in 12 consecutive issues of IEI Epitome

Payments to be made by **Cheques / Drafts** drawn in favour of "**The Institution of Engineers (India)**".

Cheque / Draft No. Drawn on

Date:

Mobile No.

Email:

GSTIN:

Signature with seal

* Payment can also be done Online through our website: www.ieindia.org, details of which will be provided at the time of Payment.



Engineering Staff College of India

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

Continuing Professional Development Programmes (CPDP) for the Month of February 2026

Sl. No.	Name of the Course	Scheduled Dates
1.	Circular Economy: A Focus on Waste and Waste Water	02 - 04 Feb 26
2.	Mine Geology & Advanced Exploration Techniques & Rock Blasting	02 - 04 Feb 26
3.	Advances in Plasma welding and cutting	02 – 05 Feb 26
4.	Generative AI & Deep Learning Applications	02 - 06 Feb 26
5.	Lean Six Sigma Green Belt	02 - 06 Feb 26
6.	Best Practices in O&M of Hydro Power Plants	03 - 06 Feb 26
7.	Training on Business Communication & Presentation Skills	04 - 06 Feb 26
8.	Mapping and Modelling coastal Protection zones for sediment transport	04 - 06 Feb 26
9.	TPM (Total Productive Maintenance) - The foundation for Manufacturing Excellence	09 - 11 Feb 26
10.	Quality of Life and Work balance	09 - 11 Feb 26
11.	Big Data Analysis Using MS Excel & Power BI	09 - 12 Feb 26
12.	Cyber Security Issues in Power Sector	10 - 12 Feb 26
13.	ArcGIS desktop Hands-on GIS training with live project	11-13 Feb 26
14.	Technical manuscript writing & Publishing in Reputed Journals	11-13 Feb 26
15.	Management Programme: Communication & Presentation Skills, Team Building, Leadership, Skill Development for Executives	11-13 Feb 26
16.	Intellectual Property Rights (IPR) - Patent	11 - 13 Feb 26
17.	Internal Auditor training for AS 9100 Rev D	16 - 18 Feb 26
18.	Water Pollution and Contamination Modelling – Climate Change Impact Analysis	16-18 Feb 26
19.	Organizational Culture Assessment, Change Management & Strategic Leadership (Developing a Positive Culture where People and Performance Thrive)	16 - 19 Feb 26
20.	Construction of Bridge in Hill Area and Challenges	16 - 20 Feb 26
21.	Advances in Design & Optimization of UAVs for Industrial Applications (Defense, Mining & Construction)	16 – 20 Feb 26
22.	Government Policies and Incentives for Plastic-Free Practices	18 - 20 Feb 26
23.	Tariff Policy - Basics of Tariff Calculation & Procedure / Information Required for Preparation of Tariff Petition (ARR) & Energy Scheduling	18 - 20 Feb 26
24.	Quality, Metrology & Standards	23 - 25 Feb 26
25.	Boiler Tube Failure Analysis & Preventive Measures	24- 26 Feb 26
26.	Workshop on NAAC Accreditation	25 - 27 Feb 26
27.	Preparation of Safety Management Plan	25 - 27 Feb 26
28.	Cloud-Based Water Resources Data collation, Analysis and Decision Making	25 - 27 Feb. 26

For detail information please click on <https://esci.org/>