The Institution of Engineers (India)

TAMILNADU STATE CENTRE

BULLETIN

Dr. V. KARTHIKEYAN, FIE.
Chairman

Er.D.GOKUL, MIE
Honorary Secretary

Vol. 24 : No.01 Januarv 2025

From the Chairman's Desk……

Dear Fellow Engineers,

It gives me immense delight to reconnect you all once again through this news desk.

I am delighted to share that the Institution of Engineers (India) Tamilnadu State Centre celebrated the Founders Day on 25th January 2025 at IE(I), TNSC Auditorium, Chennai. Dr. Arivuoli Dakshanamoorthy, Professor (Retd), Former Director, Crystal Growth Centre (UGC- National Facility for Crystal Growth) Anna University, Chennai was the Chief Guest and he appreciated the activities of IE(I), TNSC for uplifting the Engineering Community.

I express my heartfelt gratitude to the Immediate Past President, Dr.G.Ranganath, for sanctioning a greater number of One Day Seminar, All India Seminars and National Conventions for IE(I), TNSC.
I am eager to significantly boost the membership of the Tamilnadu State Centre and establish students' chapters in Universities, Engineering and Polytechnic Colleges across Tamil Nadu. I earnestly seek the support of all our members to accomplish these objectives. Members can easily apply for membership through the online portal (ieindia.org) and the membership registration process is now highly user-friendly.

The Tamilnadu State Centre is organizing a One Day Seminar on "Harnessing Solar Energy for Sustainable Marine Development: Aligning with SDG 14" in association with AMET University College on 21 Feb 2025. Additionally, an All India Seminar on the theme "Design and development of public fast charging infrastructure for electric and hybrid Electric vehicles" at Anna University on 28-29 March 2025. I invite all corporate members to participate in both seminars.

I request all current corporate members to complete the "Know Your Membership (KYM)" form to assist us in updating and maintaining an accurate database. Your cooperation in this matter is vital for ensuring seamless communication and access to member benefits. Once completed, please submit the form to the IE(I) Tamil Nadu State Centre office in person, or email it to ieitamilnadu@gmail.com or tnsc@ieindia.org.
Regards

Dr.V.Karthikeyan,FIE.,
Chairman, IE(I) TNSC
Chairman, ENDB IE(I)

From the Hon.Secretary's Desk……

Dear Corporate Members,

It is my pleasure indeed to meet all of you through our News Bulletin.

The Tamilnadu State Centre of the Institution of Engineers (India) is organising the One Day Seminar on "Harnessing Solar Energy for Sustainable Marine Development: Aligning with SDG 14" in association with AMET University on 21st Feb 2025 at Chennai. I invite all corporate members to participate in the seminar.

I request all our committee members to submit the proposals for organizing technical activities in their respective divisions.

Our technical lecture programs will be conducted in both online and offline modes. The details of these programs will be communicated to all members via email and social media. I encourage all our members to actively participate in the meetings, seminars, workshops, and conferences.

All the meetings are available in our IEI TNSC You Tube Channel. I request all our corporate members to visit our IEI TNSC You Tube Channel and SUBSCRIBE for further notification of technical events and kindly visit our website (ieitnsc.org) for more information.

Thank you all for your continuous support and participation. I look forward to our continued journey of growth and success together.

Er. D. Gokul, MIE
Honorary Secretary
IE(I) TNSC

Elevate your status as a Certified
Professional Engineer (PE) and International Professional Engineer (IntPE)

Professional Engineers (PE) Certification by IEI

ELIGIBILITY REQUIREMENT

To attain the Professional Engineers (PE) certification through the Institution of Engineers (IEI), you must meet the following eligibility criteria:

1. Hold a BE/BTech or equivalent degree recognized by a Statutory Authority or the Government of India.
2. Have accumulated five years or more of professional experience.
3. Be a member of a recognized professional engineering institution or association.
4. Maintain a satisfactory level of Continued Professional Development (CPD).

For more information and details, please visit the following link :

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

International Professional Engineers (IntPE) Certification by IEI

ELIGIBILITY REQUIREMENT

To be eligible for IntPE Certification by IEI, candidates must meet the following criteria:

1. Hold a BE/BTech or equivalent degree recognized by the Statutory Authority or the Government of India.
2. Possess seven years or more of professional experience.
3. Have a minimum of two years of professional experience in a significant engineering activity.
4. Be a member of a recognized professional engineering institution or association.
5. Maintain a satisfactory level of Continued Professional Development (CPD).

For more information and details, please visit the following link :

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

The eligible candidate can submit application in the prescribed format to:
Deputy Director (Technical), The Institution of Engineers (India), 8 Gokhale Road, Kolkata 700020
For any query and assistance please send email to: pe@ieindia.org

37TH NATIONAL CONVENTION OF METALLURGICAL & MATERIALS ENGINEERS AND NATIONAL SEMINAR ON "MODERN STEEL MANUFACTURING PROCESS"

(06,07-12-2024)

The Institution of Engineers (India), Tamilnadu State Centre in association with Thiagarajar Polytechnic College, Salem under the aegis of Metallurgical & Materials Engineering Division Board, IE(I) organized 37th National Convention of Metallurgical & Materials Engineers and National Seminar on "Modern Steel Manufacturing Process" on 6th & 7th December 2024 at TPT Alumni Auditorium, Salem.

The event commenced with the auspicious Tamizhthaai Vazhthu, followed by the lighting of the Kuthu Vilakku by dignitaries. **Dr. V. Karthikeyan,** Chairman, IE(I) Tamil Nadu State Center and Chairman, IE(I) Environmental Engineering Division Board delivered the welcome address and outlined the objectives of the convention. **Er. S. Natarajan,** Convener & Committee Member (MM), IE(I) Tamil Nadu State Centre and Member, MMDB, IE(I), delivered about the theme of the convention. **Er. Kishore Kumar Mehrotra,** Chairman, MMDB, IE(I) delivered the conventional address and highlighted that this convention will serve an invaluable platform for exchanging ideas & promoting collaboration for faster & effective use of New Steel Manufacturing Process to create a better tomorrow.

Lighting the Kuthu villakku

Dr. G. Ranganath, President, IE(I) delivered the presidential address and he has highlighted that this convention reflects the Institution's ongoing commitment to fostering collaboration and innovation in the field of metallurgical and materials engineering, a sector critical to India's industrial development. He conveyed his greetings and wished to all for the successful conduct of the Convention. The proceedings of the convention are meticulously compiled and brought out as Souvenir and was released during the inaugural session. **Dr. V. Karthikeyan,** Chairman IE(I) TNSC honoured the Chief Guest, Guest of Honour and MMDB members with shawl and memento.

Honouring the Chief Guest Mr. Thyagu Valliappa, Vice-Chairman, TPT-Sona Institutions by Dr.V.Karthikeyan, Chairman, IEI, TNSC

Releasing of Souvenir

Honouring the President, IE(I)

Mr. Thyagu Valliappa, Vice-Chairman, TPT-Sona Institutions was the Chief Guest and he highlighted that India is the second largest steel producer of steel worldwide. National Steel policy is aiming to increase the capacity to 300 million tons by 2030. This policy encourages modernization, efficiency and sustainability in steel production making India a competitive player globally. Salem known as steel city is a hub for steel production anchored by the Salem Steel Plant – SAIL and JSW Steel Ltd, Salem Works. Both plants are producing high quality Steel.

Inaugural Address by the Chief Guest

Experts from JSW Steel Ltd, Salem Steel Plant, professors & students from Technical Institutions (Government College of Engineering, Sona College of Technology& Thiagarajar Polytechnic College) are participating in the convention. Topics such as automation, energy efficiency and sustainable practices in steel manufacturing to be discussed will integrate digital tools to optimize operations and reduce environmental impact.

Dr.R.Vijayan, Principal, Government College of Engineering, Salem was the Guest of Honour and he explained that India's steel sector accounts for about 12% of India's Carbon di oxide (CO2) emissions with an emission intensity of 2.55 ton of Co2 / tones of crude steel production. The steel industry is responsible for around 240 million tones of Co2 emissions annually and expect to increase in future considering the infrastructure development needs of the nation.

Honouring the Guest of Honour

There are multiple technology pathways that could help in the transition from traditional methods to low emission intensity technology like green hydrogen, renewable energy, carbon capture, usage and storage technology with Blast furnace, Basic Oxygen furnace, Direct reduced iron, Electric Arc Furnace etc., of these technologies,the green hydrogen based route is the demist method of producing steel.

Eminent Engineers in the field of metallurgy engineering were awarded during the convention. **Dr. V Balasubramanian,** Professor of Manufacturing Engineering & Director Centre for Materials Joining & Research (CEMAJOR) Annamalai University, Chidambaram, Tamilnadu, **Er. S M Kumar**, Senior Vice President and Head Operations & Maintenance JSW Steel Ltd, Salem Works Salem, Tamilnadu, **Dr. S Ravi**, Scientific Officer- G, Head, Hot laboratory Ventilation and Operations Section Post Irradiation Examination Division, Metallurgy & Materials Group, Indira Gandhi Centre for Atomic Research, Kalpakkam.

Young Engineer Award were presented to **Dr. Rahul** , Assistant Professor, Department of Mechanical Engineering, Chaitanya Bharathi Institute of Technology, Hyderabad, **Dr. Gaurav Kumar Bansal ,** Scientist, Materials Engineering Division, CSIR National Metallurgical Laboratory, Jamshedpur and Mr. Kumar Abhishek , Manager, Research and Development Centre for Iron and Steel, Ranchi. **Er. D Gokul**, Honorary Secretary, IE(I), TNSC delivered the vote of thanks.

V Subramony Memorial Lecture was delivered by **Dr. Raguraman Munusamy**, Associate Professor & Head School of Interdisciplinary Design and Innovation, Indian Institute of Information Technology Design and Manufacturing (IITDM), Kancheepuram. He delivered on the topic "Optimization of process parameters during Laser powder bed fusion of thin-walled aero engine components". Complex thin-walled components find numerous applications in aerospace, automotive, and marine domains to meet the demands of design, manufacturing, durability, reliability, fuel efficiency, and sustainability due to their superior properties. Although thin-walled components offer several advantages, their manufacturing presents significant challenges, especially when it comes to achieving the required geometric characteristics, uniform distribution of tolerances, surface integrity, consistency and accuracy. Laser Powder Bed Fusion (LPBF) has created interest in industries, particularly aerospace sectors, in producing metallic components with complex geometries directly from the CAD model. In the LPBF process, a thin layer of material is selectively melted and solidified, resulting in the creation of a dense and precise geometric structure. However, the high-temperature gradient developed in this process due to the rapid heating and cooling cycles leads to thermal distortions, which cause dimensional inaccuracies and significant variation in the mechanical performance of the parts. Therefore, the present study is focused on the development of a systematic approach based on the inherent strain method, viz. Ansys Additive Print (AAP) software to predict the residual stresses and thermal distortion induced in thin-walled Ti6Al4V components and to improve the quality of parts produced in LPBF. During the development of the work, a single cantilever beam was initially considered. Subsequently, the study was extended to the aero-engine compressor, as these components are a suitable representation of thin-walled parts. The process parameters, such as laser power, scan speed, and hatch distance, were varied extensively in this study. It can be noted that a 20.4% deviation in residual stress and a 5% deviation in maximum distortion were seen between numerical predictions and the experimental measurements. Additionally, it was found that the lower energy density resulted in a significant reduction in residual stress and thermal distortion in the selected components.

Technical Session – 1

Invited Talk 1: Mr. N. Sai Rama Krishna, Vice President , JSW Steel Ltd., Salem Works presented on the topic "CO2 Reduction in Steel Making Process". The global effects of CO_2 emissions are profound, as carbon dioxide is a major greenhouse gas contributing to climate change. The global steel industry is one of the largest industrial contributors to greenhouse gas (GHG) emissions, accounting for approximately 7 to 9% of total CO_2 emissions. India's steel industry, the second-largest producer globally, is a significant contributor to the nation's greenhouse gas (GHG) emissions, accounting for approximately 10-12% of India's total emissions. On an average, steel production in India emits about 2.5 tCO2/tcs (tons of CO_2 per ton of crude steel), exceeding the global average of 1.9 tCO2/tcs. De-carbonization of the iron and steel industry is thus vital to meet climate change mitigation targets and achieve a sustainable future. Global advances in reducing GHG emissions in the iron and steel industry focus on transitioning to cleaner technologies and enhancing efficiency. Key innovations include green hydrogen production and utilization. renewable energy generation, Carbon Capture. Utilization and Storage (CCUS) technologies, scrap recycling, waste utilization and biomass usage. JSW Steel has outlined a two-phase roadmap to achieve carbon neutrality in its operations. Phase 1, targeted for completion by 2030, aims to reduce emissions from the current level of 2.44 tonnes of CO_2 per tonne of crude steel

(tCO_2/tcs) to 1.95 tCO_2/tcs. This phase leverages energy efficiency, enhanced operational performance, renewable energy adoption, material quality improvements, alternative fuels, and circular material usage focusing on circular economy. Phase 2, culminating in 2050, focuses on achieving net-zero emissions, driven by advanced technologies like green hydrogen and carbon capture. These strategies reflect JSW's commitment to sustainable steelmaking and align with global decarburization goals.

Invited Talk – 2 : Dr.A.Kannan, Head of Department / Production Engineering**,** Thiagarajar Polytechnic College delivered on the topic "Advancements and Applications of Composite Materials in Industrial Engineering". This research seeks to discover and analyse the characteristics of composites that contribute to their performance improvement. Moulding techniques are employed in a variety of industries to create composite products. Apart from their light weight and their high relative stiffness and strength, they have other advantages as well. Fundamental concepts comprise the material and physical properties, in addition to their design, tooling repair, inspection, and design. High-strength, lightweight materials helped to make helicopters, aircrafts, and rockets that were used for military purposes. It was evident that the components made of metal until that point were superior in terms of mechanical performance however, their weight rendered their usage ineffective. Numerous companies working in the polymer sector were expanding into new markets and expanding. The improved mechanical properties of polymers could solve a number of problems, and this was the case when researchers created a new light polymer in the laboratory. Composites are engineered materials made from two or more parts that have a wide range of physical, chemical, as well as mechanical characteristics. The distinct features of the individual parts and the arrangement of these components inside the structure lead to a myriad of distinct characteristics in composites. Composites can be altered to meet a variety of mechanical, geometrical, structural and chemical demands. Synthetic materials are utilized in various areas, such as construction (such as bridges and structures) as well as the automotive industry (such as bodywork for automobiles) as well as aviation, military (such as boats and ships) and even biology. Composites are fast becoming popular in the field of medicine, despite the fact that polymeric, metallic, and ceramic biomaterials were used for a long time in processes like tissue repair and replacement.

Young Engineer awardees were presented their presentation during the convention. **Dr. Rahul**, Assistant Professor, Chaitanya Bharathi Institute of Technology (A), Hyderabad presented on the topic "Microstructure and Mechanical Property Evaluation of Friction Stir Welded AA6061-B4C Composite to SS304". **Dr. Gaurav Kumar Bansal** , Scientist, Materials Engineering Division, CSIR presented on the topic "Steel: Tailored Micro structural Engineering for Improved Performance" and **Mr. Kumar Abhishek** , Manager, Research and Development Centre for Iron and Steel, Ranchi presented on the topic "Enhancing Energy Efficiency and Reducing Power Consumption in Ladle furnaces through Foamy Slag Formation with Lime stone Chips".

Paper Presentation - I

Presenter Name	Topic
Mr.Vinothkumar P, Mr.Ravi K, Mr.Venkatesa Perumal A, Mr.Theepan JSW Steel Limited Salem Works, Salem	Generation of Green Power in Captive Power Plant for steel making process at JSW Salem Works
Mr.Bhagyaraj D, Mr.Kalidhasan S K, Mr.Srinivasan M, Mr.Sudharsan V , JSW Steel Limited, Salem Works	Sustainable Iron Making in Mini Blast Furnace through Process optimization and Digitalization
C.Mariabensikar, N.Raja, V.Sudharsan, N.Sairama Krishna JSW Steel Limited, Salem	Reduction of Green House Gas Emission in Mini Blast Furnaces at JSW Salem Works

DAY – 2 07-12-2024

Invited Talk – 3 :

Dr.D.Senthilkumar, Head of Mechanical Engineering, Sona College of Technology delivered on the topic "Incorporating Biochar into fuels system of iron and Steel Industry". Biochar presents a promising renewable energy source that can be integrated into the iron and steel production process to partially replace fossil fuels and reduce high-intensity greenhouse gas emissions. However, uncertainties remain regarding biochar's capacity for emission reduction and its economic feasibility, which are influenced by factors such as the type of biochar precursor, substitution strategies, energy consumption during biochar production, and associated costs. This study aims to explore optimized substitution strategies addressing these challenges. A systematic carbon accounting approach was employed using the material flow analysis (MFA) method. Two iron and steel production routes incorporating biochar—Integrated Production Route (BF-BOF) and Short Production Route (EAF), which account for 71.5% and 28.2% of global production, respectively—were analyzed. A CO2 Supply Curve (CSC) was used to assess the economic viability of biochar substitution under carbon emission trading schemes (ETS). The results indicate that wood-based biochar, compared to straw-based biochar, demonstrated a greater carbon reduction potential of 1.47 t CO2e (CO2-equivalent) per ton of crude steel, with a reduction potential of up to 66.94%. Among all production processes, the blast furnace in the BF-BOF route accounted for the largest share of emissions (72.06%), with the greatest global warming potential (GWP100) reduction potential of 73.66%. Incorporating wood-based biochar into the sintering process was identified as the most economically viable and emission-reducing scenario. If implemented nationwide in China, this scenario could reduce 2.01 million tons of CO2e in 2021. This study provides crucial insights to guide the iron and steel industry in adopting biochar as a substitute for fossil fuels.

Invited Talk - 4:

Mr.R.Chandrasekaran, Deputy General Manager, SAIL - Salem Steel Plant delivered an insightful invited talk on Stainless steel – A Promising Material for the modern era where sustainability matches performance. Stainless steel is the material for the new generation. Whatever be our expectation it could match and will take us to beyond the horizon. Salem Steel Plant is an ISO certified Organization way back and now it is also certified ISO 14001 certified. Quality is the nerve center of monitoring and correcting various Production process right from scrap to finished sheets and coils. Salem Steel Plant has won several accolades for its production and environment concern including safety.

Production capacity of Salem steel plant is 1,80,000 t of stainless steel coils and sheets and 1,80,000 tons of carbon steels. Even though it is very challenging to manufacture stainless steel, that involves, selection of raw materials, process route, chemical composition, quality and cost, modern world rely only on those materials which are versatile, ecofriendly, less carbon print on Environment, useful lifespan, at the end recyclable character makes it the most wanted material for Engineers, Architects and Industrialist alike. Production route implemented in Salem steel plant is Steel Melting Shop, Hot Rolling Mill and Cold Rolling Mill complex.

Types of stainless steel

Depending on the alloying elements, they are generally classified into three categories.

200 grades : Low cost low nickel and optimum chromium and manganese. This is mainly caters the huge demand of utensil makers.

300 grades : This is one of the solid performer in various stainless steel grade which contains 18% Chromium and 8% Nickel. Due to its high corrosion resistance and impact strength, it is preferred in corrosive atmosphere and high temperature applications.

400 grades : It is the most promising and economically viable grade where a huge market is available readily in India and abroad. It contains minimum 10.5% chromium in its composition.

DUPLEX stainless steel

2201 and 2205 are two major grades of duplex stainless steel which possess the critical character of both austenite and ferrite.

Manufacturing stainless steel

Stainless making is really ecofriendly in the sense that it uses most of the mild steel scrap generated from various industries right from long products to flat products and light to heavy scraps generated from dredging of ships. Once scrap is selected other Ferro alloys are added to make it stainless steel through melting, refining and homogenizing. Melting is done through Electric Arc Furnace or Induction Furnace, refining is carried out in Argon oxygen decarburization converter or Vacuum oxygen decarburization converter. Homogenization is done through Ladle refining furnace or Argon Rinsing units.

Since hot metal handling is the core process of stainless steel making, Refractories and fluxes selections are as important as raw material selection. Most of the stainless processes are basic process in the sense that basic refractories are used for furnace lining and hot metal ladle handling.

Once hot metal is generated, next step is to refine it. It is achieved through decarburization and reduction of the melt. Carbon removal efficiency is governed by combined environment of both oxygen and inert gasses. At the end with the required chemistry, stainless steel is teemed in a Ladle. After homogenizing it is ready for casting. Casting involves converting liquid stainless steel into solid slabs or blooms or billets. Generally in modern stainless steel making continuous casting is more efficient and economical. Once desired slabs or blooms are cast it is being stacked in storage yard to cater further downstream processing like hot rolling and then cold rolling.

Hot Rolling

Hot rolling is done to convert the higher thickness slabs or blooms into lower thickness coils/sheets through pre heating to recrystallization temperature and reduce thickness in a mill. Hot rolling mill available in Salem Steel Plant is a 4 high reversible roughing mill and 4 high reversible steckelplant whereby the initial thickness of 145 mm is reduced into 3.0mm coils or sheets.

Cold Rolling

Once hot rolling is completed the actual process of stainless steel rolling in cold condition is started to maintain its surface aesthetics and smooth surface. In SSP the facility available is 20 high z-mill1,2 and 3. Initial coils are undergoing leader end attachments in coil build up line and Annealing and pickling line and then to Cold rolling mill. Depending on the final thickness, single stage or double stage rolling is planned. After the HRC are rolled into lower thickness required by customer, it is slit into coils or cut into sheets.

Various applications of stainless steel

1. Chandrayan, 2.Vandebharath, 3.Elevators, 4.Architectures, 5.Art and sculpture, 6.Coins, 7.Utensils8. Cutleries and scissors, 9.Automobile applications, 10. Construction of structural , 11. Food and dairy
Industry.

Quality assurance

Quality is the foremost guidelines of making stainless steel in Salem Steel Plant. Stainless Steel produced by Salem Steel Plant not only satisfies the customer but also excite them. All physical and chemical compositions are ensured to cater the various application environments and guide the customers to choose better grades for their application.

Papers were presented on the following themes on 2 days of the convention.

1. CO_2 reduction in Steel making process
2. Continuous casting of liquid Steels
3. Inclusion control & engineering in Steel products

4. Energy Scenario in Steel Making
5. Thermo Mechanical Stimulation of Steel
6. Stainless Steel making (AOD/VOD)
7. Hot Rolling of High Strength Steel
8. AI/ML in Steel making
9. Circular Economy by the students on the second day of the convention.

Paper Presentation - II

Presenter Name	Topic
Deepakkumar A. Government College of Engineering, Salem	Challenges and Defect Mitigation in the Casting of High-Cleanliness Interstitial-Free Steels for Automotive Applications
Dr.A.Kanakaraj, N.Balaji Viswanathan, S.Manikandan , Thiagarajar Polytechnic College, Salem	AI / ML in Steel Making
Dr. K.T.Thilagham, D.Noorullah, Government College of Engineering, Salem.	Review on Niobium Effects on Hot Rolling of HSLA Strip Steels
Baji Katta Manjini Sambandam Research & Development, JSW Steel Ltd-Salem works, Salem	An experimental and numerical analysis on the effective utilization of waste heat from ladle pre-heating system through heat exchanger system
Mr Tarun Jakhar, JSW Steel Ltd-Salem works, Salem	Plant simulation of Blast Furnance using Aspen Plus
Mr Sethu Prasanth, JSW Steel Ltd-Salem works, Salem	Optimization of calcium treatment to prevent clogging in continuous casting of resulphurized steels
Mr Eswarakrishnan, JSW Steel Ltd-Salem works, Salem	Final Electromagnetic stirrer effect on solidification defect formation in continuous casting of steels.

Technical Session I

Technical Session II

Panel Discussion:

The panel discussion on the theme of "Modern Steel Manufacturing Process" explored recent advancements and technologies that are shaping the future of steel production. Er K K Mehrotra, Chairman, MMDB,IE(I), Dr Manjini JSW, Mr R Chandrasekaran SSP, Prof Noorullah, GCE , Mr S Prabhakaran SSP, Dr A Kanakaraj, TPT & Er S Natarajan, Member, MMDB IE(I) were the panelist. Experts highlighted the need to shift away from traditional coal-based methods, such as blast

furnaces, which are energy-intensive and produce significant CO_2 emissions. Modern steelmaking processes, such as Electric Arc Furnaces (EAF) and Direct Reduced Iron (DRI), are gaining prominence due to their ability to use alternative, less carbon-intensive energy sources. EAF, for example, primarily uses electricity to melt scrap steel, reducing reliance on coal and significantly lowering CO_2 emissions. Similarly, DRI uses natural gas or hydrogen to reduce iron ore, offering a cleaner alternative to blast furnaces. The discussion stressed that as renewable energy adoption in the sector increases, these methods are expected to play an even larger role in reducing the carbon footprint of steel production.

Another crucial point was the integration of Hydrogen-based Steelmaking, which has the potential to completely transform the industry. Using green hydrogen as a reluctant in the DRI process can eliminate CO_2 emissions altogether, making steel production a zero-emission process. Though the technology is still in its early stages, companies like M/s Tata Steel and M/s Arcelor Mittal are already testing hydrogen-based solutions. The panel also addressed the importance of Carbon Capture, Utilization, and Storage (CCUS) technologies, which are being developed to capture CO_2 emissions from existing plants. These technologies allow for the captured CO_2 to be used in other industries, such as chemicals and construction, rather than being released into the atmosphere. Panelists agreed that a combination of these modern techniques, along with policy support and innovation, would be key to ensuring the sustainability and competitiveness of the steel industry in the coming decades.

Valedictory Session:

Valedictory session was held on 7th December 2024 at 4.00 pm at TPT Alumni Auditorium, Salem. **Dr. V. Karthikeyan,** Chairman, IE(I) Tamil Nadu State Center and Chairman, IE(I) Environmental Engineering Division Board delivered the welcome address. He thanked to the Educational institutions and industries for their sponsorships for the successful conduct of this convention. He appreciated the outstanding work done by Er S Natarajan, Convener, Er K N Sivaraju, Organising Secretary, Technical Committee, council members, committee members Er.D.Gokul, Hon. Secretary and Dr.C.Prabhu, Joint Secretary, for their excellent cooperation in making this convention a grand success.

Honouring Valedictory Chief Guest : Shri.V.K.Pandey Executive Director I/c, SAIL –Salem Steel Plant

Er. S. Natarajan, Convener & Committee Member, IE(I) TNSC, Member, MMDB, IE(I) summarized the two days convention briefly. He thanked the technical committee members for their effortless support for making the convention a grand success. **Shri.V.K.Pandey,** Executive Director I/c, SAIL –Salem Steel Plant delivered the valedictory address and appreciated the efforts taken by the team for the successful conduct of the convention. He explained about the Challenges and Opportunities faced by Steel Industries. The participants were awarded certificates for their contribution to this convention.

Award of certificates by Chief Guest

Er.K.N.Sivaraju, Organising Secretary, Member, MMDB,IE(I) proposed the vote of thanks and the programme concluded with National Anthem. More than 150 members / students were participated in the convention.

IEI TNSC FOUNDERS DAY CELEBRATION (25.01.2025)

The Institution of Engineers (India) Tamilnadu State Centre was established originally as the Southern India Centre at Chennai on 22nd December 1922. The Institution of Engineers (India) Tamilnadu State Centre is entered into its Centenary year during 22nd December 2022.

In continuation with the Institution of Engineers (India) Tamilnadu State Centre celebrated the Founders Day on 25th January 2025 at 4.15 pm at IEI TNSC Auditorium, Chennai.

The program started with Tamilthai Valthu. Welcome address was delivered by **Dr V Karthikeyan**, Chairman IE(I) Tamilnadu State Centre, Chairman, IE(I) ENDB. **Er C S Karunakaran**, Committee Member , IE(I) Tamilnadu State Centre introduced the Chief Guest **Prof Dr D Arivuoli,** FRSC, CChem, FASCh, FICS, FISDS, Former Director, Crystal Growth Centre, Anna University, Chennai. Chief Guest was honoured with Shawl and Memento by **Dr V Karthikeyan**, Chairman IE(I) Tamilnadu State Centre, Chairman, IE(I) ENDB.

Dr V Karthikeyan, Chairman, IE(I) TNSC honoured the Chief Guest Prof. Dr. D. Arivuoli, FRSC, CChem, FASCh, FICS, FISDS, Former Director, Crystal Growth Centre, Anna University,Chennai.

Prof Dr D Arivuoli, FRSC, CChem, FASCh, FICS, FISDS, Former Director, Crystal Growth Centre, Anna University, Chennai delivered the IEI TNSC Founders day address with power point presentation. He delivered on the topic "Quantum Technology: The Sustainable Future" .

Address by the Chief Guest

Throughout history, society has been continually transformed by new technology and basic advancements in science and technology came about twice a century and led to massive wealth creation: during industrial revolution era, Textile, Railways and automobiles dominated and during information revolution era computer and nanotechnology acted as the revolutionary forces bringing in vast changes in the human life. Now we are in the quantum world and the United Nations (UN) announced 2025 as the International Year of Quantum Science and Technology. This announcement not only commemorates the 100-year anniversary of quantum mechanics but showcases the growing importance of quantum technologies in the modern world. Quantum technology is an emerging field of science and engineering which is about creating practical applications based on properties of quantum mechanics, especially quantum superposition, interference and entanglement. Quantum mechanics is the theory that describes the behaviour of microscopic systems, such as photons, electrons, atoms, molecules, etc.

Quantum mechanics deals with the mathematical description of the interaction & motion of subatomic particles and includes concepts of wave–particle duality, quantization of energy, correspondence principle, and the uncertainty principle. It has applications in several fields including cryptography, chemistry, computing, imaging, simulation, and

others. The four main domains of quantum technology include quantum sensing & meteorology, quantum computation, quantum communication, and quantum simulation. Progress in these four main areas hinges on the development of key enabling technologies including photonics, electronics, cryogenics and nano-fabrication capabilities, alongside advanced quantum software and dedicated algorithms.

In the first quantum revolution during the early twentieth century, scientists learned to understand and apply the properties of quantum mechanics – the interactions of molecules, atoms, and even smaller particles like photons and electrons, ultimately allowed to create transistors, lasers and microprocessors: foundational technologies for computers, telecommunications, satellite navigation, smartphones, modern medical diagnostics, and much more.

Now, the second quantum revolution is underway. Researchers can detect and manipulate individual particles and their physical properties and interactions, and build new technologies and systems that make use of the properties of the underlying quantum mechanics. These developments have led to major technical advances in many different areas, including quantum computing, sensors, simulations, cryptography and telecommunications.

It is crucial to develop a sustained pipeline of graduates with transferable skills and expertise in quantum science, engineering and technology, who are ready for future roles in the public and private sector. The importance of this is threefold. First, the growth of ecosystem critically depends on the provision of highly skilled graduates who will take on specialist roles across the public and private sector. Second, advances in frontier research achieved by rising talent may provide a differentiator to establish a competitive advantage in emerging areas of quantum technologies. Finally, investment in the talent pipeline will not only produce a highly skilled workforce of scientists and engineers for the quantum technologies sector, but their transferable skills will add value to the Information and Communication Technologies and related sectors also.

The Indian Government has initiated the National Quantum Mission (NQM) from 2023-24 to 2030-31, aiming to seed, nurture and scale up scientific and industrial R&D and create a vibrant & innovative ecosystem in Quantum Technology (QT). Mission Implementation includes setting up of four Thematic Hubs in the domains: Quantum Computing, Quantum Communication, Quantum Sensing & Metrology and Quantum Materials & Devices.

By 2030, with the rapid advancement of quantum technology (from digital to quantum, we can expect to see significant changes in our lives and the world is set to experience a transformation that we can only imagine. like the power to create unbreakable encryption, supercharge the development of AI, and radically expedite the development of drug treatments, totally revolutionizing our world.

Dr S Dharmalingam, Council Member, IE(I), & Chairman, CCC proposed the Vote of thanks. The event witnessed the enthusiastic participation of corporate members from various engineering sectors and students, contributing to the tremendous success of the celebration. The program ended with National Anthem.

Chartered Engineer Certification

The Members who have not availed the Chartered Engineer Certificate [CEng(I)], are requested to apply through online:

https://www.ieindia.org/WebUI/iei-Memb.aspx#chartered-engineering

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 in 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.

Certificate of Practice for Practicing Chartered Engineers

The Corporate Members of the Institution having **Chartered Engineer Certificate in the current grade of Membership with five years of experience** as an Engineer in the relevant field can apply for **Practicing Chartered Engineers Certification**. The Institution will issue **Practicing Registration No.** for practicing Chartered Engineers, which is valid for **five years.**

The application fee for empanelment is, Rs.5900/- (GST included), which may be paid through Demand Draft/ Multi-city Cheque in favour of "The Institution of Engineers (India)" payable at Kolkata.

The hard copy of application form duly filled in alongwith supporting documents should reach to:-

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

Please visit : **https://www.ieindia.org/webui/IEI-RegistrationForPPCE.aspx for more details.**

Forthcoming Technical Activities

Date	Title	Venue
21-02-2025	One Day Seminar on "Harnessing Solar Energy for Sustainable Marine Development: Aligning with SDG 14" .	AMET University ,Chennai
28,29-03-2025	All India Seminar on " "Design and development of public fast charging infrastructure for electric and hybrid Electric vehicles"	IE(I) TNSC Auditorium, Chennai

Licensed to post without pre-payment
Posted on 17th February 2025 : Posted at Egmore RMS (Patrika)

Bulletin

IF UNDELIVERED RETURN TO : The Institution of Engineers (India) Tamilnadu State Centre,

19, Swami Sivananda Salai,

Chepauk, Chennai - 600 005.

Phone : 044-2536 0614 / 9962950333

Printed by Er.D.Gokul, Honorary Secretary and Published on behalf of The Institution of Engineers (India) Tamilnadu State Centre, 19,SwamiSivanandaSalai, Chepauk, Chennai-600005 and printed at Sunitha Printers,193,Peters Road, Chennai 600014.

Editor: Er. D. Gokul, Honorary Secretary