IIChE NEWSLETTER 2024

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SPOTLIGHT

President's Corner

Dear Members,

At the outset, I wish you all a Happy New Year. May the year 2024 be filled with happiness and fulfilment! We have begun the year at IIChE with a team – 2024 of the Council. While conveying my gratitude to the fellow Council Members for entrusting me as the President, I commit to do my best to honour the confidence shown in me. I also welcome my colleagues of the Council. Our objective will be not only to carry forward the dynamism and initiatives of our predecessors but go beyond it by introducing new concepts, ideas and new schemes.

We had a very successful CHEMCON 2023, which also marked the conclusion of the year-long IIChE Platinum Jubilee celebration. CHEMCON 2023 witnessed four days of jam-packed programmes during 27 – 30 December 2023 at Heritage Institute of Technology, Kolkata. Focussing on the central theme of Energy Transition, it included vigorous and insightful lectures, presentations and interactions by renowned academics, research scholars and industry experts. An elaborate report is included in this issue of Newsletter.

In today's milieu of globalisation, the indispensability of collaboration and cooperation have been proven beyond any contention. IIChE has all along been a strong advocate of seamless collaboration between academia, research bodies and industry. Every CHEMCON is the best example of such partnership. Other than CHEMCONs, over the years, several collaborations have been in place with a number of fraternal professional organisations in India and abroad as well as industry bodies and research organisations. Our objective will be to expand such endeavour for becoming part of an even wider network of inter-disciplinary forums and to be more visible in the international Chemical Engineering circuit.

Chemical Engineering is an all-encompassing discipline and its expanse is ever widening. The never ending process of development in products, processes, materials, catalysts, equipment, etc., demands continuous update of manpower skills and knowledge of the important resources. In this context, I would like to update our members about the IIChE Training Institute (IIChE TI) that has been initiated last year for broad-basing skill enhancement programmes of IIChE and strengthening the Institute's visibility as a formidable partner in the scheme of national development. Recently its Board of Directors held the first meeting to chart out a detailed road map. The major initiatives that will be launched shortly include:

i. An annual Industry Conclave that will be hosted by one of the Regional Centres (RCs) with financial backup by the Council.

ii. A dedicated R&D lab will be established at the IIChE Headquarters in Kolkata to provide hands-on training to the Student Members of IIChE. A consultancy/testing cell at the HQ office is also on the cards. These setups will boost IIChE's R&D activities and strengthen its credentials among the industries;

iii. IIChE TI will facilitate MSMEs to upgrade quality / Safety / Environment / Zero Discharge / Energy transformation, etc. under the banner of IIChE.

iv. FDP (Faculty Development Programmes) will be conducted across the country under the banner of the IIChE Student Chapters (SCs) or RCs. The programmes will be conducted according to the AICTE modalities. Moreover, AICTE will be approached for recognition of these programmes. Indeed, once the ball sets rolling, newer plans and initiatives will evolve as we make progress.

Such initiatives will offer useful takeaway wraps from IIChE and will strengthen its connect with industries and academia.

A very important aspect of this dynamism will be more active and vigorous involvement of our 47 RCs and 186 SCs.As a matter of fact, the RCs and the SCs are the most important constituent of IIChE. While our collaboration with other stake holders, i.e., industry, academia and research bodies, needs to be widened, at the same time, we need to look inwards and enhance the spirit of partnership not only between the HQ and the RCs / SCs but also among the RCs and the SCs. I request all our colleagues at the RCs and SCs to ponder over this idea and let us know what their opinion is. We will look forward to receiving their constructive suggestions and ideas, which could boost the standing of IIChE at the end.

Looking around the present scenario, a special focus on safety is necessary these days. The challenge for the chemical engineering fraternity is to ensure that the growing knowledge base is appropriately translated into technologies that will nurture humanity and uphold a safe and sustainable earth. It has become all the more essential in the face of the impending climate disaster due to alarming global warming and the growing carbon footprints. Chemical engineers across the globe have great responsibilities in ensuring survival of the Planet Earth by devising and promoting right technologies.

Notwithstanding our limited resources and strength, we, the IIChE community, are cut out for our role through advocacy for sustainable development and enhancement of knowledge and practical skill by creating a positive ecosystem. IIChE has been and will continue to focus these important issues steadfastly through workshops, seminars, awareness programmes and so on. In all these, the need for collaboration and partnership between the HQ, RCs and SCs remain indispensable.

Finally, Members are the pillars of IIChE. Without active participation and support of the Members, all endeavours and visions of IIChE will remain a pipe dream. So I request all IIChEians, corporate members as well as the RCs, to take a proactive role in expanding our fraternity by encouraging more and more chemical engineers to join us.

Thank you.

S.I. Thakar
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OBITUARY

With profound grief, we announce the sad demise of our following respected Members:

Prof. B.N. Srimani (LF 00497). The late Prof. Srimani joined IIChE in May 1961

Mr. A. Krishna Reddy (LM 11437). The late Mr. Reddy joined IIChE in December 1993

Mr. B.M. Sharma (LM 01185). The late Mr. Sharma joined IIChE in June 1968

Prof. V. Subramanyam (LM 03678). The late Prof. Subramanyam joined IIChE in October 1973

Mr. Palli Sita Rama Reddy (LM 09288). The late Mr. Reddy joined IIChE in November 1989

Prof. Chityala Ayyanna (LM 07479). The late Prof. Ayyanna joined IIChE in November 1984

Prof. P.N. Singh (LM 05756). The late Prof. Singh joined IIChE in November 1984

Prof. K. Vasudeva (HF 08946). The late Prof. Vasudeva joined IIChE in February 1989

Mr. Amitava Banerjee (LM 47773). The late Mr. Banerjee joined IIChE in August 2013

We offer our heartfelt condolence to the bereaved families of the departed Members.

NOMINATIONS FOR SOME IIChE AWARDS/PRIZES FOR 2024

The Institute invites nominations for iiche awards/prizes for 2024, which are given in recognition of meritorious work in the field of chemical engineering in India. The awards/prizes are:

- Lala Shriram National Award for "Leadership in Chemical Industry"
- Herdillia Award for "Excellence in Basic Research in Chemical Engineering"
- NOCIL Award for "Excellence in Design or Development of Process Plant and Equipment"
- Jubilant Award for "Outstanding Contribution in the area of Chemical Process Design"
- IPCL Award for "Safety/Hazard Management in Petrochemical Industry"
- ONGC Award for "Excellence in Design and Development of Oil/Gas related Process Plant and/or Chemicals"
- Hindustan Lever Biennial Award for 'The Most Outstanding Chemical Engineer of theYear" under the age of 45 Years as on 31st December 2023.
- Hindustan Dorr-Oliver Award for "Excellence in Use of Science and Technology in RuralDevelopment"
- ICI India Limited Award for "Excellence in Process or Product Development"
- Amar Dye-Chem Award for "Excellence in Research and Development" – for ChemicalEngineer below the age of 35 years as on 31st December 2023
- P K Nair Biennial Memorial Award for "Excellence in Design or Development of Process Plant and Equipment"
- Lupin Industries Best Chemical Engineering Teacher Award for the Faculties in PrivateColleges below the age of 50 years as on 31.12.2023
- Dr A V Rama Rao Foundations Best Ph.D. Thesis and Research Award in Chemical Engineering/Technology for the Year 2024
- Prof Shyamal Kanti Sanyal Memorial Award for the "Best PhD Thesis in the area ofMembranes Research with Significant Commercial Potential"
- The Chemical Weekly Prize for "Best Research Paper Published in a High Impact FactorInternational Journal by an Undergraduate Chemical Engineering Student"
- (First and Second Prize)
- "Padmashri Professor G D Yadav and Dr (Mrs) Vasanti G Yadav Awards for the most versatile Chemical Engineering/Technology Students in India"
- Professor Ashutosh Sharma Award for the Best Research Paper Published in a National/ International Journal by an Undergraduate Chemical Engineering Student (~~Male~~/Female alternative year).
- Prof. A Suryanarayana and Mrs. Vanajakshi Award for the Best Author/(s) of Chemical Engineering Book and/or Book Chapter.

  The forms, duly filled-in should reach the IIChE Office on or before 30th June 2024.

- Ambuja's Young Researcher's Awards for Doing Post-Graduate Studies in India for theYear 2024 (10 awards)

  The forms, duly filled-in should reach the IIChE Office on or before 31st August,2024

- Shah-Schulman Award 'for the best Ph.D. thesis in the area of Colloid and Interface Science'.
- Dr K Anji Reddy Innovator of the Year in Chemical Engineering and Technology in India by publishing in Reputed International Journal in Chemical Engineering & Biotechnology/Patents of merit.

  Both the forms, duly filled-in should reach the IIChE Office on or before 31st May 2024.

The Institute also invites nomination for:

Acharya P C Ray Award (First and Second Prize) and Ambuja's Best Home Paper or Design Project Report Award (First, Second and Third Prize)

Nomination Forms for these two awards have to be endorsed by the Head of the Department of Chemical Engineering, of the concerned institution. Forms, duly filled-in along with the Project Report should reach the IIChE Office on or before 17th July 2024.

All Nomination forms for Awards and Prizes are available in the Website of the Institute.

IIChE AWARDS 2023

Following is the list of IIChE Awards and the Awardees. These Awards were presented on the occasion of CHEMCON 2023 and SCHEMCON 2023 in recognition of eminence, excellence and talents in various spheres of chemical engineering profession and education.

Dr.B.P.Godrej Life Time Achievement Award
Prof. B B Paira, *Advisor, MAKAUT, West Bengal*

Shri Dhirubhai Ambani Orator & Chair Award
Padma Vibhushan Prof. M. M. Sharma, *Professor of Eminence and former VC, ICT Mumbai*

Lala Shriram National Award for Leadership in Chemical Industry
Mr. Ashok R Boob, *MD, CST Ltd.*

Herdillia Award for Excellence in Basic Research in Chemical Engineering
Prof. Prakash D Vaidya, *ICT, Mumbai*

ICI India Ltd Award for Excellence in Process or Product Development
Dr. Palash Kumar Mollick, *BARC, Trombay*

NOCIL Award for Excellence in Design and Development of Process Plant and Equipment
Ms. Sutanwi Lahiri, *BARC, Trombay*

Amar Dye-Chem Award For "Excellence in Research and Development" for Chemical Engineering below the age of 35 years
Dr. Ananth Govind Rajan, *IISc. Bangalore*

Dr K Anji Reddy Innovator of the Year in Chemical Engineering & Technology in India by Publishing in the Reputed International Journal in Chemical Engineering & Bio-Technology /Patents of Merit
Dr. Madhu Agarwal, *MANIT, Jaipur*

Jubilant Award for Outstanding Work in the area of Green Technology
Dr. S Sridhar, *CSIR-IICT, Hyderabad*

Prof Ashutosh Sharma Award for Best Research Paper Published in a National/ International Journal by a Undergraduate Chemical Engineering Student (Male)
Mr Vikram Vinayak Shanbhag, *ICT, Mumbai*

Prof Shyamal Kanti Sanyal Memorial Award for the best PhD Thesis in the Area of Membranes Research with Significant Commercial Potential
Dr. Himanshu Pradeep Kohli, *RNGPIT, Gujarat*

Padmashri Professor G D Yadav and Dr (Mrs) Vasanti G Yadav Awards for the Most Versatile Chemical Engineering/Technology Students in India (2 prizes – Best Male & Female)
Mr. Jitendra Choudhary (Dr Chakma), *IISER, Bhopal*

RPG Life Sciences Padma Vibhushan Prof M M Sharma Medal and Chemcon Distinguished Speaker Award
Prof. Ganapathy Ayappa, *IISc Bangalore*

Asian Paints Padma Bibhushan Dr R A Mashelkar Medal and Chemcon Distinguished Speaker Award
Prof. Ajayan Vinu, *Director, School of Engineering, The University of Newcastle,Australia*

Deepak Group's Padma Bhushan Prof L K Doraiswamy Chemcon Distinguished Speaker Award
Prof. Sanjay M. Mahajani, *IIT Bombay*

Hetero Drugs Prof G S Laddha Chemcon Distinguished Speaker Award
Dr. Sandip Lahiri, *President, IIIC, NIT Durgapur*

Chemical Weekly's Padmashri Dr G P Kane Chemcon Distinguished Speaker Award
Mr. Arvind Kumar, *MD, CPCL*

CSIR-IICT-Avon's Padmashri Dr G S Sidhu Chemcon Distinguished Speaker Award
Mr. S Bharathan, *Director (Refineries) HPCL*

Sartorius India's Chemcon Distinguished Speaker Award
Mr. Alok Sharma, *ED, CHD*

UPL Smt. Sandra R. Shroff Chemcon Distinguished Speaker Award
Mr. Atul Mulay, *President and Strategic Business Unit Head, Praj Industries*

Hikal's Chemcon Distinguished Speaker Award
Mr. Pankaj Kumar, *Director (Production), ONGC*

CSIR-CSMCRI Chemcon Distinguished Speaker Award
Mr. Bhaskar Jyoti Phukan, *Managing Director, Numaligarh Refinery Limited*

CSIR-CLRI Padmabhushan Dr Y Nayudamma Chemcon Distinguished Speaker Award
Mr. Arup Jhampri, *CEO, ONGC Petro additions Limited*

DOST Professor S K Sharma Medal and Chemcon Distinguished Speaker Award
Dr. Biswajit Roy, *DG, GERMI*

CSIR-NEERI CHEMCON Distinguished Speaker Award
Prof. Aniruddha B. Pandit, *Vice Chancellor, ICT Mumbai*

Alkyl Amins Padma Bhushan Prof B D Tilak Chemcon Distinguished Speaker Award
Mr. Parthasarathi Chatterjee, *EVP & Head of Offshore, L&T Energy and Hydro Carbon*

Indorama Dhunseri Chemcon Distinguished Speaker Award
Mr. Biswanath Chattopadhyay, *CEO, Dhunseri Petrochem Ltd., Kolkata*

Prof A Suryanarayana and Mrs Vanajakshi Award for the Best Author/(s) of Chemical Engg Book and/or Book Chapter
Prof. Chandan Das, *IIT Guwahati* & Dr. Sujoy Bose, *IIChE HQ*

Heritage Institute of Technology Award for Innovative Research and Sustainable Process Development
Prof. Shishir Sinha, *Director General, CIPET, Govt. of India and Professor, IIT Roorkee*

Professor Venkateswara Rao & Smt. Anjani Devi Malapati Endowment Lecture Award on "Green Energy & Environment for Sustainable Development"
Prof. G. D. Yadav, *Past President, IIChE* and *Former VC, ICT Mumbai*

Shah-Schulman Award 'for the best Ph.D. thesis in the area of Colloid and Interface Science' for 2022
Dr. Palash Dhara, *IIT Kharagpur*, Guide: Prof.Rabibrata Mukherjee, IIT *Kharagpur* Jointly with
Dr. Ranajit Mondal, *IIT Bombay*, Guide: Prof. Madivala G. Basavaraj, *IIT Madras*

Dr A V Rama Rao Foundation Best Ph D Thesis and Research Award
Dr. Debiparna De, *CSIR-IICT, Hyderabad* and
Guide: Dr. B. Satyavathi, *Chief Scientist, CSIR-IICT, Hyderabad*

The Chemical Weekly Prize for Best Research Paper published in a High Impact Factor International Journal by an Undergraduate Chemical Engineering Student (First and Second Prizes)
1st Prize: Mr. Animesh Chaturvedi, *ICT, Mumbai* &
2nd Prize: Mr. Jitendra Choudhary, *IISER, Bhopal*

Chemical Weekly Award for the Best Paper Published in the Institute's Journal (ICE-2022)
1) Dr Kuldeep Singh, *HPU Shimla* and 2) Dr Suvarcha Chauhan, *HPU Shimla*

IIChE NRC Award Best Paper in 'Indian Chemical Engineer' 2022
1) Dr Abha Sahu, 2) Dr Nilesh Vijay Rane, 3) Dr Badal G Lodaya , 4) Prof Aniruddha B Pandit, *ICT, Mumbai*

The Kuloor Memorial Award to the best technical paper published in the journal of the Institute in the issues of the preceding year
1)Dr Achyut Pakhare, *ICT Mumbai*; 2) Dr Channamallikarjun Mathpati, ICT, *Mumbai;* 3) Dr Vishwanath H Dalvi, *ICT Mumbai*, 4) Dr Jyeshtharaj Joshi, *ICT, Mumbai*, 5) Dr Raosaheb Patil, *TSIPL, Nashik*, 6) Dr. Ekambara Kalekudithi, *TSIPL, Nashik*

IIChE NRC Award 2nd Best Paper in 'Indian Chemical Engineer' 2022
1) Dr Sourav Poddar, *NIT Tiruchirapally*, 2) Dr J N Ullas Krishnan, *NIT Trichy*, 3) Dr J Sarat Chandra Babu, *NIT Trichy*

Sisir Kumar Mitra Memorial Award to the second best technical paper published in the journal of the Institute in the issues of the preceding year
1) Dr Deeksha Matthew, *NIT Mangalore*, 2) Dr Vidya Shetty K, *NIT Mangalore* Jointly with 3) Dr Virendra K Rathod, *ICT Mumbai*, 4) Dr Keerthiga G, *ICT Mumbai*, 5) Dr Neha N Gharat, *ICT Mumbai*

IIChE NRC Award 3rd Best Paper in 'Indian Chemical Engineer' 2022
1) Dr Friedrich Y Lee, *UTA, USA*, 2) Dr Michael Baldea, *UTA, USA*, 3) Dr Thomas F Edgar, *KNU, South Korea* 4) Dr Jietae Lee, *KNU, South Korea*

Mrs.Chinnamaul Memorial Prize for Best Tech Paper presented in preceding year CHEMCON
1) Dr D.Venkata Padma, *MVGRCE, Andhra Pradesh* (A), 2) Dr S V.A.R.Sastry, *HBTU Kanpur*, 3) Dr S.Kishore Kumar, *AUCE Visakhapatnam*

Kishore K Das Memorial Prize for Best Home Paper in Associate Membership Examination
AMIIChE September 2022: Mr Adarsh Kumar Soni and *AMIIChE March 2023*: Mr P Narasinga Rao

N R Nandi Memorial Prize for securing highest marks in Associate Membership Examination
Mr Dharmendra Kumar Panday

The Late Lakshmi Nandakumar Award for a Lady Student for the Best Presentation in the SCHEMCON of the Year
Ms. Spandana Mentha, *MSRIT Bangalore*

Gouri Dutta Award for the Best Paper Presentation in SCHEMCON of the Year
Mr Deep Laha, *NIT Durgapur*

Ambuja's Young Researcher's Awards for doing Post-Graduate Studies in India after GATE Examination
1. Mr Dharmesh J Machhi, *SVNIT, Surat*; 2. Mr Aman Kumar Kesari, *IICT, Hyderabad*; 3. Mr Bharat Rengarajan, *ICT, Mumbai*; 4. Ms Anushka Aggarwal, *ICT, Mumbai*; 5. Mr Yashkumar Thakorbhai Patel, *ICT, Mumbai*; 6. Mr Abhishek Kumar, *IIT Guwahati*; 7. Mr Adarsh Kumar A Sahu, *IIT Guwahati*; 8. Ms Shankhari Swaminathan, *IIT Guwahati*

Ambuja's Best Student Chapter Award (2 Prizes)
1st Prize: IIChE Student Chapter, *Sri Venkateswara College of Engineering, Sriperumbudur,Chennai*
2nd Prize: IIChE Student Chapter, *Vellore Institute of Technology, Vallore*

Pidilite's Best Student Chapter Award
IIChE Student Chapter, *SSN College of Engineering, Chennai*

Prof.P.Sen Gupta Award for Best Employee of the Year
Mr Sumon Das, *IIChE HQ*

M P Chary Memorial Award
Dr. Baby Salini J R, *IIT Madras*

Best IIChE Regional Centre Trophy
Category "A" Best: Northern Regional Centre; *Category "B" Best:* Bangalore Regional Centre, *Category "B" Second Best:* Amaravati Regional Centre

To mark the closure of the Platinum Jubilee celebration of IIChE, Platinum Jubilee Awards were conferred upon the following eminent personalities:

Padma Vibhushan Prof. M M Sharma, Emeritus Professor of Eminence, ICT Mumbai
Padma Shri Prof. G D Yadav, Emeritus Professor of Eminence & Former VC, ICT, Mumbai
Mr. Samir Somaiya, Chairman & Managing Director, Godavari Biorefineries Limited
Mr. Subhasendu Chatterjee, Vice Chairman, Haldia Petrochemicals Limited

IIChE-CHEMCON 2023

WB Governor Dr. C.V. Ananda Bose inaugurating IIChE-CHEMCON 2023

IIChE-CHEMCON 2023, the 76th annual Chemical Engineering Congress, was organised in a grand style by the Headquarters of Indian Institute of Chemical Engineers (IIChE) in Kolkata during 27 – 30 December 2023 in Kolkata in association with Heritage Institute of Technology, Kolkata (HITK); Rajiv Gandhi Institute of Petroleum Technology (RGIPT), Jais (Amethi); Jadavpur University (JU), Kolkata and University of Calcutta, Kolkata. Held at the impressive campus of HITK, CHEMCON 2023 was all the more important because it marked the conclusion of the Platinum Jubilee celebration of IIChE that started in the year 2022. The central theme for CHEMCON 2023 was 'Energy Transition: Challenges and Opportunities'. As many as 24 eminent speakers from industry and academia delivered lectures while 900 research papers were presented over the four-day congress.

The inaugural session on 27 December 2023 started with the arrival of the Chief Guest, the Governor of West Bengal, Dr. C.V. Ananda Bose. Besides the Governor, other dignitaries present on the podium included Prof. Anil Kumar Saroha, President (2023), IIChE; Prof. A.S.K. Sinha, Chairman, National Organising Committee (NOC), CHEMCON 2023; Mr. Vikram Swarup, Chairman, Local Organising Committee (LOC), CHEMCON 2023; Padma Shri Mr. P.R. Agarwala, Chairman, HIT; and, Guest of Honour, Mr. H.K. Chaudhary, Chairman, Heritage Group of Institutions and Chairman Emeritus, Vikram Solar Ltd. Following lighting of the lamp, floral tributes were paid to the founding father of IIChE and its first President, Dr. H.L. Roy. The Commemorative Volume on CHEMCON 2023 was released by the Governor. This was followed by the release of the Platinum Jubilee commemorative edition of the book, *Life and Times of Hiralal Roy* by Prof. Asit Kumar Mitra, former President of IIChE and ex-HoD, Chemical Engineering Department, JU along with the grand-daughter of Dr. H.L. Roy, Smt. Sudakshina Ghosh. Other members of her family and members of the IIChE Council were also present on the dais.

IIChE President, Prof. Saroha, while welcoming all the guests and dignitaries, stressed IIChE's long commitment in creating an empowered workforce, who would be contributing to the sustainable growth and progress of the nation. He also narrated about IIChE's activities for contributing to a sustainable society. The Governor, Dr. Bose, while drawing attention of the audience to the impending danger of the climate disaster, emphasised the importance of the Indian way of development through self-reliance. He stressed the vision and action together so that the dream can be translated into reality. The Governor also lauded IIChE and hoped it would continue with its pursuits for perfection as envisaged by Dr. H.L. Roy and other stalwarts. All the dignitaries were felicitated with mementos and shawls.

The inaugural function was followed by the Award Ceremony of IIChE. Around 50 awards, including life time achievement awards, national awards, CHEMCON Distinguished Speaker Awards, student awards, etc. were given away to eminent academics, world renowned scholars, reputed chemical engineers, prominent entrepreneurs, etc. Additionally, to mark the finalé of the Platinum Jubilee celebration of the Institute, IIChE Platinum Jubilee Awards were conferred upon Padma Vibhushan Prof. M.M. Sharma, Padma Shri Prof. G.D. Yadav, Mr. Subhasendu Chatterjee, Mr. Samir S. Somaiya and Dr. C.V. Ananda Bose.

Contrary to the traditional practice, this year, presentation of the three signature Memorial Lectures, namely, Dr. H. L. Roy Memorial Lecture Sponsored by Jacobs Worley, Aker Powergas's Prof. N.R. Kamath and Mrs. Ruzena Kamath Memorial Lecture and Inventaa C.K. Murthy Memorial Lecture were spread out over the four-day congress.

Aker Powergas's Prof. N.R. Kamath Memorial Lecture was delivered by Ms. Sukla Mistry, Director (Refineries), Indian Oil Corporation Ltd. on 27 December 2023. 'Energy Transition, A Paradigm Shift – Oil Refiner's Perspective' was the title of her lecture.

Presentation of N.R. Kamath Memorial Lecture

Inventaa C.K. Murthy Memorial Lecture was delivered on 28 December 2023 by Mr. Prabh Das, Managing Director & Chief Executive Officer, HMEL. Centering his lecture on the CHEMCON 2023 theme, Mr. Das focussed on the issues like energy security, equitable access to energy, environment and climate, etc.

Presentation of C K Murthy Memorial Lecture

Dr. H. L. Roy Memorial Lecture was delivered on the concluding session of CHEMCON 2023 on 30 December 2023 by Padma Shri Prof. G.D. Yadav, Emeritus Professor of Eminence and Former Vice Chancellor, ICT, Mumbai. Prof. Yadav chose the title of his lecture to be 'God Still is a Chemical Engineer'. Prof. Yadav based his lecture on the idea of Chemical Engineering being the most versatile discipline, which is present everywhere from atmosphere to atom. He also emphasised the all importance of carbon-free energy and pointed out the emergence of a new trinity of Solar, Wind and Hydrogen energy for sustenance and survival of the future civilisations.

Presentation of Dr. H. L. Roy Memorial Lecture

CHEMCON 2023 featured three panel discussions on 27 December and 28 December 2023. The first one in the afternoon session of the inaugural day was held on the theme of 'Affordable & Sustainable Energy mix for India's Energy Transition'. The second and the third one were held on the next day, 28 December, respectively centring on the themes of 'Readiness of Chemical Process Industries towards Net-zero with COP28 Mandate of Sustainable Action' and 'Roles of IIChE in Promoting Industry-Academia Interaction'. Top echelons of industry and technocrats participated in these brainstorming sessions.

Another important feature of CHEMCON 2023 was the Indo-Canadian Joint Symposium on 28 December 2023. The focus of the symposium was 'Green Fuels, Chemicals and Materials from Alternative Resources.' A panel of 15 distinguished academics and technologists, associated with different Indian and Canadian universities, technological institutes and startups took part in this session. The prevalent tone of all the presentations was the indispensability of the global search for alternative energy sources, particularly bio-energy and hydrogen fuel; reduction of waste generation; various approaches to achieve the goals of net zero emission of Green house gases, and, the efficacy of the next generation technologies for navigating the roadmap of the future.

Dhirubhai Ambani oration

The Dhirubhai Ambani Commemoration Day was observed on 28 December 2023 as customary. The Dhirubhai Ambani Oration was delivered by the legendary scientist, academic and chemical engineer, Padma Vibhushan Prof. M.M. Sharma. He went in detail to narrate the present scenario of chemical engineering domain and explained the gaps that need to be addressed. Prof. Sharma also focussed on the climate change and observed that revolutionary innovations are being made as far as the removal of CO_2 is concerned.

Over the four days of CHEMCON 2023, 15 Parallel Technical Sessions were conducted featuring lectures and interactions as well as 17 CHEMCON Distinguished Speaker lectures were delivered. Technical Sessions were held under the titles of 'Energy and Environment', 'Transformation for Energy Transition', 'Advanced Nano-materials and Nano-technology', 'Water and Wastewater Treatment', 'Advanced Chemical Engineering', 'Advanced Polymer and Composite' and 'Biochemical and Bioscience Engineering'. Each session commenced with a lecture by one of the IIChE national award winners (2023).

On 29 December 2023, the ICC (Indian Chamber of Commerce) Industry Summit was organised in which Speakers comprised the heads of top industry houses, research organisations and professional bodies.

Signing of MoUs with EFCE and AIChE

Two Memoranda of Understanding were signed during CHEMCON 2023. The first one was signed between IIChE and European Federation of Chemical Engineering (EFCE) was signed on 27 December 2023. EFCE was represented by Prof. Favio Maneti and IIChE by Prof. A.K. Saroha during the signing.

The second MoU was signed between IIChE and American Institute of Chemical Engineers (AIChE) on 28 December 2023. Dr. Veera M. Boddu represented AIChE.

The Valedictory Session of CHEMCON 2023 was held in the afternoon of 30 December 2023, which was presided over by Dr. Avijit Ghosh, Organising Secretary, CHEMCON 2023 and Honorary Secretary, IIChE. Chief Guest for the session was Shri Vikram Swarup, Chairman, LOC, CHEMCON 2023 while the Guest of Honour was Padma Shri Prof. G.D. Yadav. Others present on the dais were Prof. Anil K. Saroha, President 2023, IIChE; Vice Presidents, IIChE, Prof. C. Karthikeyan and Prof. K.S. Rajanandam; Prof. A.S.K. Sinha, Chairman, NOC; Shri Biswanath Chattopadhyay, Vice Chairman, NOC; Shri Pradip Agarwal, CEO, Heritage Group of Institutions; and, Shri Sunil Thakar; IIChE President Elect, 2024. Prof. Anil K. Saroha praised the organising team for doing a wonderful job and working like a well-oiled machine. He hoped that Jalandhar, which will host CHEMCON 2024 next year, will match the bar, which has been set by this Kolkata CHEMCON. Dr. Avijit Ghosh thanked each and every one associated at different stages of organising CHEMCON and expressed gratitude to sponsors for funds.

Photo session at the Valedictory programme

A unique addition in this year's CHEMCON was publication of IIChE-CHEMCON 2023 Tabloid in multicolour during all the four days of the event, which was greatly appreciated and commended by the attendees.

An exhibition was also organised on the occasion in which several start-ups participated, besides a number of student groups and research scholars, showcasing their projects. Following were the sponsors for CHEMCON 2023: Reliance Industries, Haldia Petrochemicals-MCPL, Godrej Industries Ltd., Somaiya Vidyavihar University, WBPDCL, Balmer Lawrie & Co. , Indian Chamber of Commerce, Chennai Petroleum corporation, Nandesari Industries Association, Bhumistha Infra Services, Indian Chemical News**,** Exide Industries Ltd. (Exhibitor), Vikram Solar (Exhibitor) and Terrae Green (Exhibitor).

SCHEMCON 2023

The 19th Annual Session of Students' Chemical Engineering Congress (SCHEMCON 2023**)** was organized by the Student Chapter at the Department of Chemical Engineering, Kongu Engineering College, Perundurai (Tamil Nadu) under the aegis of the Coimbatore Regional Centre of IIChE on 22 and 23 September 2023.

The program started with a grand inaugural programme in the presence of the Chief Guest, Mr. Arvind Kumar, Managing Director, Chennai Petroleum Corporation Limited, Chennai; Guest of Honour Prof. .S.K. Sinha, Director, Rajiv Gandhi Institute of Petroleum Technology, Jais, Rae Bareli; the Chief Patron of the programme, Padma Shri Prof. G.D. Yadav, former Vice Chairman, ICT Mumbai, Patron of the conference, Thiru.A.K. Ilango, Correspondent, Kongu Engineering College; Dr. V.Balusamy, Principal Kongu Engineering College; Prof. Anil K. Saroha, IIChE President; Dr. Avijit Ghosh, Honorary Secretary, IIChE and Dr. T.Kannadasan, Chairman, Coimbatore RC; Prof. M Chidambaram, and Prof. V.Sangeetha, Head, Department of Chemical Engineering. SCHEMCON 2023 was coordinated by Prof. K.Kannan, Chairman, Dr.S.Mothil, the Secretary of the Organizing Committee and Dr.Vivek Joe Bharath, Joint-Organizing Secretary. The function was hosted at Kongu Convention Centre which is the Asia's second largest auditorium.



Chief Guest Mr. Arvind Kumar, Chief Patron Padma Shree Prof. G.D. Yadav and Guest of Honour Prof. A.S.K.Sinha being honoured at the inaugural programme

The Inaugural function was followed by Industrial Panel Discussion on the Topic 'Engineering & Entrepreneurship for a Sustainable Future,' moderated by Mr. Praveen Saxena, Senior Member of IIChE and Graphite Equipment Advisor & Mentor. Mr.Ramesh Srinivasan (Wipro Technologies), Mr.Srinivas Vadlamani (Schlumberger SLB), Mr. Venkatesh (WTT International Pvt. Ltd), Dr. Shravan Srisailam (BASF- Catalyst Division), and Mr. P. Naveen (Sim Infosystem) took part in the deliberation, in which the students and the professors also participated.

The two-day event included a Keynote Lecture by Prof. M. Ramasamy, Principal, KPR Institute of Engineering & Technology; Mr. Ramu Boya, CEO, Neostik Tapes Pvt. Ltd. Bangalore; Dr. Udaya Baskar Reddy, Associate Professor, Amrita Vishwa Vidyapeetham, Coimbatore and Dr. Sunil Baran Kuila, Professor & Head, Haldia University of Technology, Haldia. Invited Lectures were also delivered by eminent scientists, academics from CSIR, DAE, IITs, Central Universities as well as industry professionals.

Around 300 abstracts were received and around 220 papers (Oral and Poster) were presented during SCHEMCON 2023. This conference featured 14 parallel sessions as well as announcement of MP Chary Memorial Award. Dr. Baby Salini J R, Post-Doctoral Fellow, IIT Madras was the recipient. Students also put up a cultural show in the first evening of the programme.

Mr. Shailesh Kumar, CEO, VA Tech Wabag, India Cluster was the Chief Guest for the Valedictory function and distributed the prizes for the winners of technical and other events. Best presentation for each session was also announced and cash prize was given away.

Mr. Shailesh Kumar, CEO, VA Tech Wabag, India Cluster was the Chief Guest for the Valedictory function and distributed the prizes for the winners of technical and other events. These two days witnessed keen participation by professionals, academics, research scholars and students and stimulating sessions of dialogues, discourses and discussions at SCHEMCON.

MP Chary Award winner was announced during the valedictory function during the conference. Best presentation for each session were also announced and cash prize was given to the winners.

IIChE Training Institute

The IIChE Training Institute commenced last year in order to streamline and rationalise the Institute's initiatives for skill and knowledge enhancement. The Training Institute will be fully functional from the current year. The major initiatives that will be launched include:

1. Conduct of IIChE-Industry Conclave annually.
2. Dedicated R&D lab at the Headquarters office.
3. MoU between IIChE Training Institute and Industry / Academia.
4. Conduct of regular FDPs across the country.
5. Providing Certificates of Recognition / Appreciation to MSMEs.

1. One Industry Conclave will be organised annually, preferably in the metro cities and industry clusters of India. The primary objective of such conclave will be to widen network of the Institute through collaborations with industry and accordingly expand the IIChE ecosystem. The current year's conclave will be held at Ankleshwar, followed by Mumbai in 2025.

2. A dedicated R&D lab and a consultancy/testing cell will be set up at the HQ office in Kolkata. The objective will be to offer hands-on training to the Student Members of IIChE which will showcase IIChE's R&D activities. IIChE will also take up regular industry consultancy assignments. The Institute is recognized upto 31.3.26 by the Department of Science and Technology, Government of India, as a Scientific and Industrial Research Organization. Such activities will also strengthen IIChE's case for IT exemption.

3. Out of the five R&D Faculty Projects, which are selected each year for funding by IIChE, one will be allocated to the HQ R&D facilities. There will be an open invitation for the selection of the project, which will be finally selected on the basis of the R&D committee recommendations. In course of time, MoUs will be signed between the IIChE Training Institute and Industry / Academic / research bodies for collaborative programmes.

4. IIChE will provide Certificates of Recognition / appreciation to MSMEs for quality / Safety / Environment / Zero Discharge / Energy transformation, etc.

5. Annually 12 FDP (Faculty Development Programmes) will be organised under the banner of one of the IIChE Student Chapters or Regional Centres according to the AICTE modalities. The Organisational Members of IIChE will be approached so that customised programmes can be initiated to suit the specific needs of the industry houses.

IIChE Training Institute is also working on a process to grant joint certification for various programmes by collaborating with Rajiv Gandhi Institute of Petroleum Technology, Jais, Rae Bareli. However, it has not yet been finalised.

CLIMATE CHANGE AND SUSTAINABLE MANUFACTURING –IV

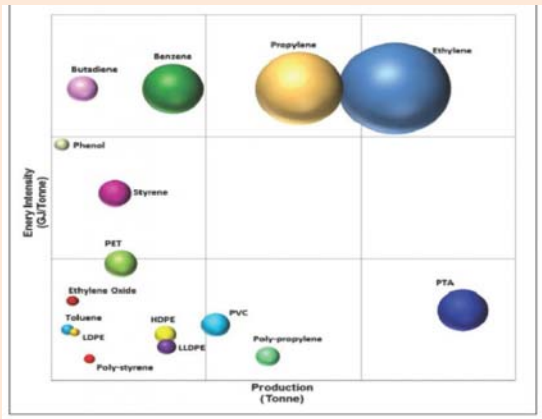
Energy and Water Conservation Ideas in Chemical, Petrochemicals and Refinery sectors -2/3

Joy M. Shah[1]

Introduction:

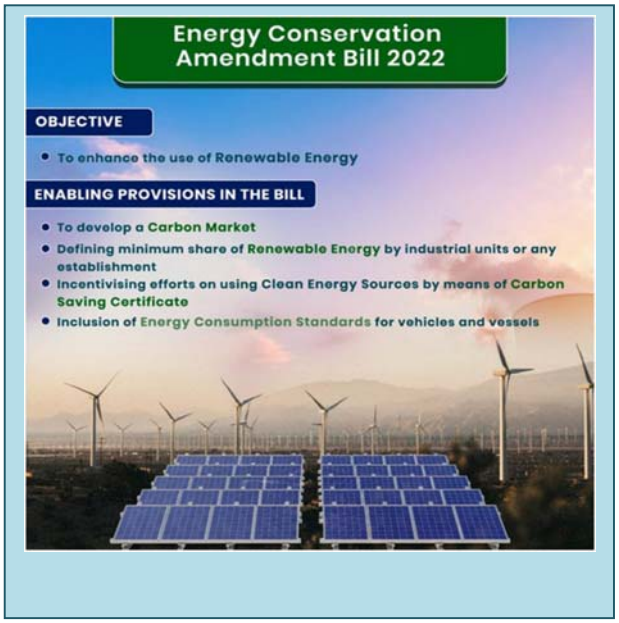
Reducing carbon foot print, the first step is to conserve energy and improve energy efficiency of existing assets. It is possible to reduce 10 - 15% specific energy consumption by improving operational discipline and identification of all low hanging fruits and execute the ideas. It requires structured approach which is the energy management system.

The below mentioned drawing shows how petrochemicals are consuming energy and where more focus is required in petrochemical sectors. Energy conservation Amendment Bill 2022 is passed by Parliament for focused approach on not only energy efficiency but transition in to low carbon energy.



Estimated product-wise energy consumption for Indian petrochemical sector gives a more insight into product-wise energy consumption as estimated for the sector. The graph plots the petrochemical products based on their energy intensity (GJ/T) versus the total production. The size of the bubble indicates the total estimated energy consumption of the product.

Sources: Chemical and Petrochemical Sector, IEA 2009; Ministry of Chemicals and Fertilisers; CMIE



In previous article, I mentioned about 40 such ideas. In this article, I shall talk about 41 more ideas which I practised over the years. You may check possibilities to implement at your plants.

EMS - 41: Source and price of energy is very dynamic in last 10 years. The scheme which was techno-economically feasible a few years back is found unviable due to change of source and price. Vice versa is also true. Therefore, it is essential to review position periodically. One of the methods is to carry out periodic energy audit of facilities to identify energy saving opportunities and prepare short term and long term road map for energy conservation drive.

EMS - 42: Refinery and petrochemical plants are very complex and have many valves with gland packing, flanges with gaskets as well as rotary equipment seals to arrest any leakage. These are prone to minor diffusion of line material and in case of wear and tear or aging, the rate of diffusion and leakage to atmosphere increases. Some of the companies carry out accounting of fugitive emission loss and periodic maintenance based on leak test by soap solutions or LEL detectors. However, the exercise is very cumbersome and manpower intensive. Moreover, unapproachable locations cannot be monitored. It is worthwhile to consider fugitive emission leak detection program for complex chemical plants using infra-red camera for its monitoring, identification and arresting leakage quickly. Although the cost of camera is high but can be paid back by careful regular monitoring in first round of leak detection program.

EMS - 43: Steam and condensate lines in any plants are insulated. There is more probability of corrosion under insulation esp. where there is cyclic temp and wet atmosphere. The insulation gets damaged due to many reasons. It is observed that frequent leakage gets developed in steam and condensate line leading to loss of expensive utilities. Similarly, frequent operation of trap as well as moving part damage, cyclic temp operation, trap also malfunction leading to loss of expensive steam. Steam and condensate lines normally cannot be isolated, therefore leaks are arrested by on line sealing. Prior to annual turnaround of any plant, survey of leakage, online sealing joint as well as severely corroded lines and meticulous planning of repair of these areas can bring significant loss reduction and energy saving.

EMS - 44 : Compressed gas/ air is used in process plants for various locations. Over a period of time, leakage of compressed gas from union, joints, pinholes due to corrosion, valves glands leakage lead to increase in consumption. Many location, utility points valves are also passing and not closed tightly. Till the capacity of supply is limiting, such leakage is not given focus to arrest. It is observed that such leakage can contribute up to 20-25% loss of energy in compressed air unless focused approach of periodic leak detection survey of air, nitrogen and other compressed gas lines are taken up and repair the same.

EMS - 45 : Stand by pumps for high temp. service are provided with warm up line to avoid thermal shock while start up. esp. when pump is multistage. Many pumps are provided with minimum circulation lines with RO which ensures minimum circulation through standby pumps all the time for keeping it warm. This recirculation is loss of energy. During normal operation, such continuous recirculation can be stopped by providing automation to establish flow as and when

required. In some of the pump applications, it was possible to stop continuous warm up circulation and pump was warmed up just prior to start up.

EMS - 46: Deaerator consumes LP steam to increase temp of DMW. In case low level heat is available, deaerator is operated at high pressure/temp however it will reduce heat recovery from flue gas and may increase flue gas temp. In order to recover flue gas heat to maximum extent, deaerator can be operated at low temp and low pressure too without compromise in integrity of oxygen removal. It is possible to optimise Deaerator temp and pressure based on free heat available in flue gas and cost of LP Steam.

EMS - 47 : The strength of various circulating absorbents or solvent is decided based on solidification possibility at higher strength or limited by high temp to avoid degradation or equipment limitation. One of the possibility of energy conservation in such system is to Increase of strength of absorbent or solvent to operate at reduced flow. This will not only save pumping energy but save thermal energy for preheating of solvent.

EMS - 48 : Low temp heat is removed from process using circulating cooling water or released to atmosphere. In some of the applications, it is in millons of calories of heat. Such low level heat can be utilised to generate work either in terms of electricity or refrigeration. One of the idea is application of organic rankine cycle (ORC) for energy recovery and power generation.

EMS - 49 : Plant is designed for auto control and to certain extent feed forward, cascade as well as sequence control. Advance process control is normally designed and executed after start up and stabilisation of plant operation. For some of the complex plants, APC is not executed due to various reasons and plant operates with basic controller for years together. It is essential to give priority and implement of advance process control to drive process to optimum operating points all the time. It is expected that 2-3% energy saving can be achieved by APC.

EMS - 50 : Manual valves, control valves as well as Pressure relief valves can start passing after frequent operation. There are hundreds of such valves in complex plant for pressure control and regulations. Normally leak or passing of valves is not visible, although experienced operator can recognise based on change in sound pattern or visible sweating on pipeline downstream of valve. It is possible to Monitor Leak and passing of Control valves, Safety valves and manual valves using fixed or portable ultra-sonic sound detector for identification and early repair of the same.

EMS - 51 : Small capacity Turbine driven pumps and compressors are provided in design for improved reliability and meet the steam balance requirement. However, it is observed many time, back pressure turbine generates LP steam for which there is no sink. Sometimes to run turbine using HP steam, steam is letdown from SHP header. Now a day, increase in power reliability makes turbine driven reliability redundant. In such case, it will be economical and prudent to replace steam turbine by electric motor.

EMS - 52 : Multiple level steam headers are connected by PRDS. In case of short fall or surplus in any of the header, stream is letdown from one to other header. However due to mis match in demand supply of any of the header, the let-down of steam from high pressure to lower pressure through PRDS is taking place on continuous basis to meet low pressure steam requirement. In such case it is worth considering mini stream tribune in place of PRDS for power generation.

EMS - 53 : In large vacuum columns, multistage ejector is provided. Steam consumption in such ejector can be very high, if inert loading is more. It is observed at some of location that replacing all or any one stage using vacuum pump can reduce steam consumption substantially for energy saving.

EMS - 54 : Azeotrop of any chemical can reduce latent heat of vaporisation. It also reduces boiling point in many cases. In some of the application, it is observed that converting conventional distillation to Azeotropic distillation by addition of entrainer can reduce steam / heat requirement significantly.

EMS - 55 : Distillation columns design pressure is decided based on many constraints. In normal operation, it is observed that margin exists in various constraint for manipulating pressure of distillation column. Operation of distillation column at lowest possible pressure will reduce temp requirement and reduce reflux ratio. It will reduce energy consumption significantly and also improve product quality.

EMS - 56 : When temp difference of top and bottom of any distillation column is not large, provision of vapour compression Heat pump in place of overhead condenser and steam usage in its reboiler can be justified for significant energy saving.

EMS - 57: Due to design margin as well as composition mis-match, many distillation columns are operating better product quality than design. In case there is no premium for superior quality, reflux can be optimised for Quality give away of distillation column top and bottom product can reduce energy requirement.

EMS - 58 : Nitrogen is inert gas and is used for blanketing, conveying, inertising and pressure control in hydrocarbon industry. It is an expensive utility. In some of the dry applications, pure nitrogen could be replaced by available waste Carbon dioxide / reactor off gas after its drying.

EMS - 59: India have taken up project to convert normal house hold lights by LED making LED bulbs not only affordable but easily available. This reduced electricity consumption significantly. New installation also considers LED lights. However, old industry installations as well as commercial buildings lag in this initiatives for energy conservation. Replace standard lighting fixture by LED on priority in all industrial and commercial installations.

EMS - 60: Public installation of solar lights is considered in areas where electricity is not available. Due to risk of theft and requirement of battery maintenance, it is being avoided in public places in cities and villages. It will be worth to consider mounting solar panel on such public poles which are providing clear access to solar energy and connect 20-30 poles to electricity grid through inverter for use of solar electricity.

EMS - 61: For an electric power system, a load of induction motors with a low power factor draws more current than a load with a high power factor for the same amount of useful power transferred. The higher currents increase the energy lost in the distribution system and require larger wires and other equipment. Because of the costs of larger equipment and wasted energy, electrical utilities will usually charge a higher cost to industrial or commercial customers where there is a low power factor. It is normally practised to improve power factor by capacitor bank or by integrating synchronous motor load to electrical network.

EMS - 62: At many locations in a complex process, to improve reliability of operation, liquid is pumped two times using intermediate tank. Some of the examples are pumping of hot water and cold water in chilling system, pumping of liquid from reflux drum to intermediate tank and then to final tank, etc. Check such cases. It is possible to avoid double pumping of liquid in many applications..

EMS - 63: Fans are used in many applications. Many of the fans are provided with fan blade angle control system or possibility of adjusting blade angle to adjust load. Normally blade angles are not changed even if plant load or flow requirement reduces. Significant power saving is possible by regular Blade angle adjustment for required duty for fans.

EMS – 64: Deaerator is designed for fixed vent rate with an orifice to remove non-condensable. Some application, this vent with orifice plate do not have isolation valves. Combining chemical and mechanical de-aeration can reduce oxygen in BFW and steam vent rate can be reduced maintaining DO level.

EMS -65: Air leakage in to furnace chamber is one of the major reason for poor efficiency. Operation of furnace chamber at slightly positive pressure to reduce air leakage is one of the option. Regular inspection and repair of gaskets of peep door and man holes is good practice to minimise air leakage.

EMS – 66: Steam PRDS are designed for very high flow. But after optimisation of the energy users, normally flow is minimised for energy conservation. At a lower flow, control of pressure and de-superheating are not effective. Often BFW passes lead to two-phase flow downstream. In such case, it is worthwhile to design PRDS with two control valves, one for fine (small) flow and other for coarse (large) flow.

EMS -67: Boiler blowdowns kept fixed by many operators to control TDS, Fe and Silica. It can be optimised to reduce heat and chemical losses taking advantage of better quality of boiler feed water. It will conserve both, energy and water.

EMS -68: Many of the furnaces require de-cocking to reduce tube metal temp. The frequency of de-cocking requirement varies from few days to several months based on feed composition and severity of operation. There are many possible theories by which coke formation is taking place. Careful study and identifying root cause as well as hard and soft changes can increase time between two decokes and save energy significantly.

EMS -69: Boiler and steam turbine efficiency reduces over time and again regained after cleaning and periodic maintenance. Some manufacturers runs periodic boiler and turbine efficiency maintenance program to identify root cause of loss of efficiency and take quick corrective actions for significant energy conservation.

EMS -70: Cooling water exchangers get fouled over time irrespective of its treatment. Due to inbuilt dirt factor, margin available in downstream equipment as well as operation at low capacity, such fouling is not affecting process and normally overlooked. Periodic review and cleaning of an exchanger is observed effective strategy for energy conservation and reliability improvement.

EMS – 71: We have seen provision of VFD or change of blade angle of fans fan for minimum required duty reduces energy consumption. However for multiple fans application, turning off some of the fans to meet minimum required load can be one of easiest feasible option.

EMS -72: Any chemical complex, air and nitrogen compressors are designed and operated at fixed pressure. These are high power consuming equipment. By careful study of minimum pressure requirement, operating pressure of air and nitrogen compressors can be reduced for reducing loss in leakages as well as reduce energy consumption of compressors.

EMS -73: Air compressors are provided with Intermediate and final knock out drums to remove moisture. In order to reduce capex, the drain valves are fixed drain with orifice or with air trap to pass water. Based on atmospheric humidity, such moisture varies or due to mal-functioning, trap passes leading to loss of pressurised air. It is worthwhile to consider knockout drum with level control valve to drain water.

EMS – 74: Suction strainer of pump fouls, leading to high diff. Pressure. Sometimes it results in to cavitation of pumps and damages it. Similarly, discharge filter also gets fouled and is cleaned as and when process limitations observed. It is worthwhile to consider provision of DP meter across selected filter and clean periodically to save energy and improve reliability.

EMS – 75: At many of the complex and commercial establishment, lighting load itself is very high. In such cases, auto start and stop of lighting load based on timer based or photo sensors in open space and motion sensors in close space can save significant energy.

EMS – 76: Task lighting is the concept to providing adequate light where required instead of illumination of whole office room or conference room. It is always scientific and energy-efficient to provide task lighting as and where required based on illumination survey.

EMS – 77: Many workshops and closed large halls need large lighting load to illuminate it even during day time. Day lighting load can be reduced significantly by providing light pipes and glass windows to use sun lights for energy saving.

EMS – 78: In a large complex, only one pressure level of Air and Nitrogen headers is provided. At many locations, low pressure Air and Nitrogen are required which is let down from a common header. In such cases, providing two pressure levels of Air and Nitrogen by design with intermediate withdrawal or two different level compressors can be an energy-efficient option.

EMS – 79: Energy conservation with lighting system. India have identified major house hold energy consumption in lighting system and achieved major energy conservation by replacing incandescent bulbs by CFL. Following are some more initiatives which can further reduce lighting load.

- In many workshops and sheds, as well as house holds, use of natural day lighting. Use of transparent roof, larger area of glass windows, use of light pipes are some of the possibilities.
- New installations use electronic chokes. But old installations still have conventional electromagnetic ballast. Replace them by electronic chock.
- Use slim LED light and replace old 40 W standard fluorescent tubes.

- Use timer control or photo sensors or occupancy detector for lighting circuit control.
- Use task based lighting for focused lux instead of one or multiple light in room.
- Use of lighting voltage transformer for industries and commercial building lighting circuit.
- Segregate lighting circuits for easy switch on and off based on requirement.
- Street lights are also significant load. Many initiatives are visible in recent past to reduce load. Check street lights are also replaced by LED lights.
- Use of electronic chokes for HPSV, HPMV and metal hallo de lamps.
- Daytime lights should be witched off when enough sunlight is available.

EMS – 80: Energy conservation for mild heating. For heating of space or water, electric or steam heater is a normal practice. Here you need 1 KW power for 860 kcal/hr. Heat pump is a device which can heat space with 3 to 5 coefficient of performance and can provide refrigeration too in case of requirements, in different space. i.e. power requirements can be reduced to 20% to 34%. It is worthwhile to consider usage of heat pump in place of electric / stream heaters for energy conservation.

EMS -81: Hydrocarbon loss management in integrated and complex plants of refineries and petrochemicals. To reduce loss of hydrocarbon molecule, it is essential to know the areas and quantity of loss, e.g., find, measure and manage. Following areas can be considered to arrest loss of material.

1. Loss to flare header
2. Emission from storage tanks
3. Drainage to process sewers
4. Routine and non-routine purge
5. Passing of PSVs, CVs and manual valves
6. Start up and shutdown losses
7. Sampling loss
8. Fugitive emission from seals, flanges, glands, etc.
9. Leakage due to holes, cracks etc.
10. Ship and receipt loss
11. Tanker filling loss
12. Transportation loss
13. Losses due to poor measurement, volume correction as well as weight calculation
14. Coke on spent catalyst and carbon deposits in process
15. Hydrogen leakage due to diffusion.
16. Poor efficiency of heaters, furnace and boilers.
17. Quality of crude, feed, i.e. non-hydrocarbons in crude, feed, etc.

I am sure that Professional Chemical Engineers will appreciate their role to actively take up the ideas to execution for sustainable manufacturing and reducing impact on climate change. **We shall discuss ideas of Water Conservation in the next issue.**

[1]**The author is the Founder and Chief Consultant, Innov8 ProTech Solutions, The Sustainability and Management Consultant. Formerly, he was Sr. Vice President (Head - Technical) at Reliance Industries Ltd. He was also a member of the IIChE Chemical Process Safety, Energy and Environment Committee from 2018 to 2022. For the last five years, he has been consulting for Energy and Water Management, Green company advisor and branding for Sustainable Manufacturing as well as Process Safety and Risk Management. Email: shahjoym@hotmail.com; Mob: +919374715109**

REGIONAL CENTRE ACTIVITIES

Amaravati Regional Centre

Amaravati Regional Centre has a new office address, which was inaugurated on **6 August 2023** at JKC College campus, Guntur. The office was inaugurated by **Dr Rayapati Srinivas**, President Nagarjuna Education Society (NES) and former Member of Legislative Council (MLC) of the combined state of Andhra Pradesh in the presence of **Mr. J. Murali Mohan**, Chairman, Amaravati RC; **Dr. V. Govardhana Rao**, former professor IIT Bombay and immediate past Chairman IIChE ARC and other members and well-wishers of the Regional Centre.

The office room, obtained under the initiative of Mr. Murali Mohan, has been renovated and refurbished with contributions from several individuals and institutions. Dr. M. Venkateswara Rao, Honorary Secretary, IIChE Amaravati RC warmly welcomed the guests, the members of the RC present and other invitees. Mr. Murali Mohan, in his opening remarks, commended the role of Dr. Rao in starting IIChE ARC in 2015 and appreciated his untiring efforts in organizing the meetings and enrolling students from various colleges under the purview of ARC as Student Members and chemical engineering professionals as Life Members of IIChE.

Ankleshwar Regional Centre

A **Talk** was organised on **10 November 2023** on **water technology**. **Mr. Nitin Patel**, General Manager, GNFC was the Chief Guest. He discussed about the cooling water technology. The personnel of Chembond Water Technologies Ltd., Ankleshwar gave an informative presentation on the water technology. **Dr. Avijit Ghosh**, Hony. Secretary, IIChE in his talk, stressed about the need for new membership drive for the Institute.

Mr. Sandeep Parekh, Hony. Secretary, Ankleshwar RC, IIChE briefed about the activities of Ankleshwar RC and the roadmap for the future initiatives. T he programme was coordinated by **Mr. Jayesh Modi**.

Bhubaneswar Regional Centre

Dr. R. N. Patra, Former CMD, Indian Rare Earths Limited, delivered the **IIChE-BRC Er. D.P. Misra Distinguished Oration** on **27 September 2023**.

Bhubaneswar RC will organise a **National Student Seminar,** titled, **Challenging Applications of Chemical Engineering (CAChE-2K24)** on **16 March, 2024**.

Calcutta Regional Centre

Engineers' Day was observed at the initiative of the Calcutta RC, on **15** and **16 September 2023**. On **15 September**, the **Student Chapters** of i) **Calcutta University (CU), Rajabazar** and ii) **Calcutta Institute of Technology (CIT), Uluberia** organised programmes to mark the occasion. At the CU programme, **Dr. S. Datta** and **Dr. S. Barma** delivered talks. At CIT, chemical engineers **Mr. S. Chakraborty**, **Mr. A. Bhar** and **Mr A. Mallick** presented talks. A few of the EC members of Calcutta RC were present.

On **16 September,** technical lectures were delivered at Calcutta RC. **Dr A. K. Roy**, formerly with SAIL, delivered a lecture on '**Application CFD in Steel Making Process**' and **Prof. P. Ray**, former faculty member of Calcutta University presented lecture on '**Expanding Universe of Chemical Engineering**'.

On **2 November 2023,** the **birth anniversary of Dr. Hira Lal Roy,** the founder President of IIChE, was celebrated. On the occasion, **Dr. A. Mondal**, formerly with ONGC, delivered a lecture, titled, '**Application of EOR Tech in Sustainable Growth in Oil & Gas Energy Sector**'.

Members of the Calcutta RC had their annual **picnic** on **24 January 2024** at a farm house garden in the outskirts of Kolkata. The 44 participants included the families of some of the CRC members. Following the picnic, Calcutta RC **donated Rs 7,500 to an NGO, Arogya Sandhan**, which maintains the garden. Arogya Sandhan takes care of differently-abled children and adults by giving them special education.

Professor D.K. Dutta Memorial Lecture was delivered on **24 February 2024** by **Dr. Asit Kumar Das**, Head, Refinery R&D and Process Development, Reliance Industries Ltd. (RIL), Jamnagar. The title of Dr. Das's lecture was '**Developed India: An Image of India's Future in Energy & Chemicals**'.

Following the lecture, a **Quiz Contest** was held, in which students of Chemical Engineering from various engineering institutes around Kolkata participated.

Northern Regional Centre

On **12 December 2023**, the **30th Lovraj Kumar Memorial Lecture - 2023** was delivered by **Dr. V.K. Saraswat**, Hon'ble Member, NITI Aayog, Government of India. The event was organized by **Lovraj Kumar Memorial Trust** in association with Northern RC, IIChE. (**Detailed report inside**).

The Foundation Day of Northern RC was celebrated on **24 February 2024** with **Lectures**. It was followed by distribution of **IIChE (NRC) Golden Jubilee Scholarships 2023-24** and **Award for best M. Tech Thesis** in Chemical Engineering and/or allied discipline (2022-23).

Prof. S. Basu, Professor (HAG), Department of Chemical Engineering, Indian Institute of Technology Delhi, delivered the lecture, titled, '**Electrochemical Reactors Integrated Into Bio-Refinery: Furfural Conversion to Various Platform Chemicals**'.

The second Lecture was delivered by **Mr. Rahul Kul Shreshtha**, Strategic Alliances Division, Office of Principal Scientific Adviser, Government of India. The title of his lecture was '**Manthan – Multi stake holder Collaboration Platform for Research and Innovation Aligned with Sustainable Development Goals and Emerging Technologies**'.

On **28 February 2024**, **Lectures** were arranged for college and school students on Climate Change in association with **Climate Change Research Institute (CCRI)**.

A **Lecture**, titled, '**Towards Net Zero Emission in Chemical Industry**' was delivered in **March 2024**.

Ahmedabad Regional Centre

Shrish Parikh Memorial Lecture was delivered by **Prof. Parag R. Gogate**, ICT, Mumbai on **16 February 2024**. The theme of the lecture was '**Process Intensification of Chemical Processing Applications Using Cavitation Reactors**'. The programme was held in collaboration with **L D College of Engineering**.

Prof. Gogate, among other issues, discussed the ongoing research at ICT Mumbai. He also talked about the research team and the facilities that the team uses.

STUDENT CHAPTER ACTIVITIES

Government Engineering College, Bharuch

The IIChE Students Chapter at the Department of Chemical Engineering, GEC Bharuch received the **Best Students Chapter Award** from the Ankleshwar Regional Centre for the year 2023.

On **1 February 2024**, around 30 students of the Department of Chemical Engineering (6th semester), **Government Engineering College (GEC), Bharuch** went on a visit to the Ankleshwar unit of **Bharuch Enviro Infrastructure Limited (BEIL), Gujarat**. BEIL is one of the leading Hazardous Waste Treatment companies in India. The students were explained about landfilling process of toxic waste with the help of membranes and handling of the liquid waste in MEE (Multiple Effect Evaporator). They also learned how to handle the E-waste and incineration of solid waste.

A selected group of students attended the **CCPS (Centre for Chemical Process Safety) India Regional Meeting** on the theme, '**Process Safety Incidents and Lessons Learned**' on **2 December 2023**. The issues highlighted included Leadership Panel, Technical Panel, Process Safety Incident Case Studies, Best Practice Sharing and CPS Global Updates.

On **15 September 2023**, the students celebrated **Engineer's Day**. A lecture, titled, **GNFC - Growth nucleus for Country**' was delivered by **Mr. Jayesh Modi**, Manager, Formic Acid Plant, GNFC. He explained the role of GNFC in development of the country and the role of chemical engineers in protection of the environment. **Prof. (Dr.) P.P. Lodha**, Principal, GEC Bharuch was the Chief Patron. **Prof. A.N. Vaghela**, Head, Dept. of Chemical Engineering and Chairman, IIChE Students' Chapter, GEC Bharuch and **Dr. N.H. Tahilramani**, Asst. Professor, Dept. of Chemical Engineering and Faculty Coordinator, IIChE Students' Chapter, GEC Bharuch were also present.

Student Members observed **Teachers' Day** on **5 September 2023**. Students devoted the day to thank all the teachers through various activities. **Prof. A.N. Vaghela**, Head, Dept. of Chemical Engineering and Chairman, IIChE Students' Chapter, GEC Bharuch and **Dr. N.H. Tahilramani**, Asst. Professor, Dept. of Chemical Engineering and Faculty Coordinator, IIChE Students' Chapter GEC Bharuch were present during the day-long celebration.

Students were part of a Summit, '**Vibrant Gujarat 24'**, which was organised on **12 January 2024** by **GOC** in collaboration with **Confederation of Indian Industry (CII)** and **iNDEXTb**. Focussing on the theme, '**Gateway to the Future'**, the meet brought together global leaders, policy makers and industry experts to discuss and explore opportunities for sustainable development.

Government Engineering College, Bharuch

Visvesvaraya National Institute of Technology, Nagpur

A Workshop was organised by the Department of Chemical Engineering in collaboration with **IIChE Nagpur Regional Centre** and **DRDO** on '**Advances in Explosive and Propellants' during 8 – 12 May 2023**. Mr. **A.M. Naik,** former Board Member, Ordnance Factory was the Chief Guest while **Dr. B.C. Bag,** Scientist-F, Jt. Director & OIC, DRDO Nagpur and **Mr. K. Thiagarajan,** Jt. Chief Controller of Explosives, PESO, Nagpur were the Guests of Honour at the inauguration of the workshop. **Prof. P.M. Padole,** Director & Chairman, BoG, VNIT presided over the inaugural programme. Keynote addresses were delivered respectively by **Mr. A.M. Naik**, **Dr. G.K. Ghosal**, Former Head, Pet. Refining & Petrochem. Tech., LIT, Ex-R&D Consultant, SIIL (Explosive), Nagpur and **Mr. Ajai Nigam**, Ex. Chief COE, PESO, Nagpur.

The workshop included several invited talks and lectures by experts. The participants also visited several plants during the four days, such as, NAPES & TS, Gondkhairy ; Ordnance Factory, Bhandara ; BPCL, Borkhedi and Ordnance Factory, Ambazari, Nagpur.

Amrita School of Engineering, Coimbatore

The regular talk series, **CHEM TALK** was organised respectively on **15 June 2023**, **17 August 2023, 31 August 2023** and **23 September 2023**. As part of the programme, experts and professionals in diverse fields of Chemical Engineers shared their on-field experiences, provided insights into the relevant field of studies and gave hands-on advices. The talks served as a bridge between classroom learning and real-world applications, offering students an opportunity to explore the exciting possibilities in the field of Chemical Engineering.

On **19 June 2023**, **Ocean Odyssey** was organised to commemorate the Ocean Day, which falls on 8 June 2023. The event featured two competitions: one for creating posters online and the other for writing essays. These contests provided participants with a platform to express their creativity, passion for the ocean and knowledge about marine conservation.

An online event, namely, **Trivia Titan**, was held on **5 August 2023** to observe National Thermal Engineer day and World Nature Conservation Day. A quiz competition was specially held to raise awareness about the Student Chapter.

CONNECT-ED-CAREERS, an interactive session was held on **7 September 2023** to provide career counselling to the students. Industry professional **Dr. Shrisudersan Jayaraman**, drawing from his extensive experience, provided thoughtful and informative insights into various facets of industry, including job opportunities, internships, scopes for higher studies and the acquisition of critical skills.

The IIChE Student Chapter was formally **inaugurated** at Amrita Vishwa Vidyapeetham on **20 September 2023**, marked by a series of events. The SC has been playing a crucial role in nurturing the interests and skills of budding chemical engineers.

A three-day **Workshop** also commenced on the day on **Solar Photovoltaic Application** along with DIY and opportunities for hands-on experience.

Madan Mohan Malavya University of Technology, Gorakhpur

The following **Webinars** were conducted by means of expert talks:

On **29 September 2023,** the Webinar on '**Introduction to Electroplating Industry'** was held to educate and train about electroplating industry. It was conducted by **Mr. Puru Pandit**, currently serving as a Research & Development Engineer at MKS Atotech.

On **10 October 2023,** the Webinar, titled, '**Turning Waste into Wealth: The Microbial Fuel Cell Revolution'** was conducted by **Dr. Shiv Singh**, a Scientist and Assistant Professor at CSIR-AMPRI Bhopal. The seminar aimed to provide an insightful discourse on microbial fuel cells (MFCs).

On **7 November 2023**, the Webinar on '**Hydrogen Energy Value Chain'** was led by **Dr. Sanjay Danao**, Director of Danao Green Tech Pvt. Ltd. and Chairman of SURYA (Society of Urban and Rural Youths. Dr. Danao offered valuable insights into hydrogen as an emerging and vital energy carrier.

On 2 December 2023, the Webinar on '**Chemical Engineering in Process Industries'** was held featuring **Mr. Ashish Kumar, Asia Pacific HSSE Advisor at Shell**. The speaker underscored the pivotal role of Health, Safety, Security and Environment (HSSE) in chemical engineering and emphasized sustainable practices and a steadfast commitment to safety standards.

On **1 December 2023**, the **University Foundation Day** was observed. The event included a **Fluid Mechanics Quiz Competition and** a **Best Poster Presentation Competition.** Esteemed faculty members, **Dr. Vitthal L. Gole** and **Dr. Jyoti**, delivered motivational speeches, emphasizing the significance of University Foundation Day and the role of IIChE in shaping future chemical engineers.

Chemisch'Graphy was organized online during 5 – 15 January 2024, merging chemistry and photography. Students showcased their creativity in visually portraying scientific phenomena. A panel of experts evaluated the submissions, based on creativity, scientific relevance and visual impact. The event underscored the dynamic interaction of science and art within our community.

Sri Sivasuvramaniya Nadar College of Engineering, Chennai

The 8th International Conference, titled, **Recent Advancements in Chemical, Environmental and Energy Engineering** (**RACEEE 2024**) was organised on **15** and **16 February 2024**. The conference was organised by the Department of Chemical Engineering in collaboration with the IIChE Student Chapter in the college.

Harcourt Butler Technical University, Kanpur

On **29** and **30 November 2023**, an **International Workshop** was held on **Recent Advances in Water Purification & Waste Water Treatment** under the initiative of Department of Chemical Engineering Department of Biochemical Engineering and Indian Desalination Association (InDA) in association with IIChE Student Chapter. The major themes of the Workshop were **Water Purification to solve drinking water problems**, **Waste Water Treatment** and **Use of Artificial Intelligence tools in Water Purification and Water Treatment**. The Workshop included **Oral Presentations**, **Poster Presentations**, **Innovative Idea Presentations** and **Animation Video Presentations**.

CHEM-TECHNOVA 2024 will be organised by IIChE Student Chapter and Department of Chemical Engineering, Department of Biochemical Engineering; School of Chemical Technology, Harcourt Butler Technical University Kanpur with American Chemical Society as the co-sponsor. The theme will be **Sustainable Green Chemical Technologies: Challenges & Opportunities.** Speakers will include renowned academics from India, USA and Canada.

Lovraj Kumar Memorial lecture 2023

Net Zero Transition

Lovraj Kumar Memorial Trust and IIChE NRC jointly organized Lovraj Kumar Memorial lecture on 12 December 2023 on the theme 'Accelerating Net Zero Transition with Project Management', which was delivered by Dr V K Saraswat , Member, Niti Ayog recently in New Delhi. Welcoming the delegates, Secretary of the trust, Mr Shyam Bang, said that several countries have made commitments to achieve Net Zero defining time lines. The Government of India has also made commitments in this regard. For India, the challenge is bigger than many other countries. Factors, such as, growing aspirations of people, growing energy needs and a change in the democratic social structure make the situation difficult and challenging. India has technical capabilities but managing transition is not an easy task, Mr Bang said.

At present only 2% population in India has air conditioned houses as compared to 98% in Japan. Probably only 10% families have cars. What happens when these numbers become comparable to the developed countries. The forecast is that India's GDP will increase by a multiple of 10 from the current level of US $ 3.7 trillion in the next 25 years. To achieve Net Zero while managing the economic growth is a big challenge. At the same time, it cannot be ignored as well. Some countries are talking about Carbon Border Adjustment Mechanism (CBAM), which can affect exports from India, meaning that India's economic growth will be affected if steps are not taken in the direction of Net Zero.

Recently, a high level delegation of the Government of India participated in COP28 in Dubai. Currently, the estimated emissions from India is about 3.5 billion tonnes. This is at the current GDP level. This number will increase with an increase in the GDP. So one can imagine how difficult it is to achieve Net Zero with a growing economy.

Dr Saraswat explained that with industrialization, consumption of oil, gas and coal has increased, which has increased concentration of carbon dioxide in the atmosphere. This, in turn, is causing global warming. As a result of the global warming, we have erratic climate conditions like more floods, storms, draughts, etc. All the countries have agreed to limit the temperature rise to 1.5 degree centigrade till the year 2100. This is possible only if emission of carbon dioxide is stopped completely, the concept known as Net Zero. The Developed countries have taken the target to achieve Net Zero by the year 2050. India has also taken target to achieve Net Zero by the year 2070. Major carbon emission is from the use of fossil fuels like oil, gas and coal. While it is not possible to eliminate the use of fossil fuels, we have to work on alternative technologies to reduce the consumption of fossil fuels.

At present, India's total installed capacity for power generation is 425 GW, which includes 206 GW from coal, 25 GW from gas, 7.4 GW from nuclear, 47 GW from hydro, 6.6 GW from lignite and 132 GW from renewable sources like wind and solar . Total thermal power capacity is 239 GW, which is considered to be carbon emitting. India's target is to increase installed capacity of non-fossil fuel-based capacity to 50% of the total installed power capacity by the year 2030. There has been a good progress in last decade in this direction and already it has crossed 40 %. The Increasing renewable energy from solar and wind also demands energy storage system . To reduce dependence on imported Li-ion batteries, lot of research work is going on to develop alternative technologies, such as the one based on sodium, aluminium, etc . Besides technology, it calls for huge investment also. Hydrogen and pumping water for hydro power are also considered as alternative storage systems. At present, the cost of producing hydrogen by water electrolysis is US $ 5 per kg as compared to US $ 1.5 for hydrogen produced by steam reforming of natural gas. Large investment is required for producing electrolysers in large capacity to reduce the cost of hydrogen production.

Nuclear energy is considered as a clean energy option. Currently, the trend is to set up large capacity nuclear power plants, which calls for large investment. It is proposed to invest in small modular reactors (SMR). Such SMR will need less land and can be installed at multiple locations for specific needs of large industries like steel, aluminium, cement, etc. This should reduce the capital cost and running cost as well.

We may need multiple initiatives like improving technologies in coal based power plants to reduce emissions, improving energy efficiency in all consuming industries, increasing renewable energy, increasing nuclear energy, using hydrogen, energy from biomass and exploring carbon capture and utilization. One possible technology option is to capture carbon dioxide and together with hydrogen produce syngas / methanol from that. Fuels like methanol and ethanol are also being promoted for automobiles .

Technology development work is in progress on these options. Some pilot plants are being set up. Clarity on technologies will emerge in the coming years. However, we need strong policy framework in place to achieve the target of Net Zero by 2070.

Institute of Chemical Technology Support

Nathalal Parekh Marg, Matunga, Mumbai 400 019
Email: vc@icmumbai.edu.in; Website: www.ictmumbai.edu.in

Profile: Established on 1 October 1933 as the University Department of Chemical Technology (popularly called UDCT) of the University of Bombay (now Mumbai), with the noble intention of advancing India's knowledge reserves in chemical science and technology, the Institute has grown to become a premier (deemed) university, devoted to education, training, research and industrial collaboration in chemical engineering, chemical technology, applied chemistry, pharmacy, biotechnology and bio-processing. The then UDCT grew in stature over the years and was granted partial autonomy by the University of Mumbai in 1985, which was taken to the next echelon under the concept of autonomy propagated by the University Grants Commission (UGC)

State-of-the-Art High Pressure, High Temperature, Continuous Flow Catalytic Fixed-Bed Reactor for Jadavpur University, Kolkata

A Continuous Flow High Pressure and High Temperature Catalytic Fixed-bed vertical Reactor has been donated to the Chemical Engineering Department, Jadavpur University, Kolkata by an ex-student (1971 batch), Mr. C. Ravi Prasad, for conducting experiments by the students and for sophisticated research work. The donation has been made in memory of his late parents. The Reactor has been fabricated and assembled in Mumbai under the 'Made in India' initiative. It has already been installed in the University. Commissioning, Dry Runs and Trials are in full swing and will be completed soon.

Design Features:

Design Pressure	**200 bar**
Design Temperature	**700 ^{o}C**
Reactor Volume	**100 ml**
MOC	**SS 316 grade**
Design	**ASME Sec VIII Div 1**
Safety Features:	
Rupture Disc	**One**
Safety Relief valves	**Two**
Back Pressure Control Valve One, pneumatically operated	
Mounting and Overall Dimensions	**Skid Mounted System; 2.2 M x 0.6M x 2.0 M ht**

The Reactor System comprises Electrically Heated Furnace, Preheater and Line Heater for Gas Feed; Liquid Feed Storage vessel, High Pressure Plunger Pump, Vaporizer, and Line Heater for Liquid Feed. There are quick-opening special closures for the Reactor vessel with provision for fast Catalyst loading on bed supports.

For the Reactor outlet section, there are Water cooled Condenser, Gas-Liquid Separator, Liquid Product receiver vessel (MOC Glass) for product liquid while for product Gas, there are Gas Scrubber with Circulating Pump, Wet Gas Meter and Gas Bomb for the sampling of gas.

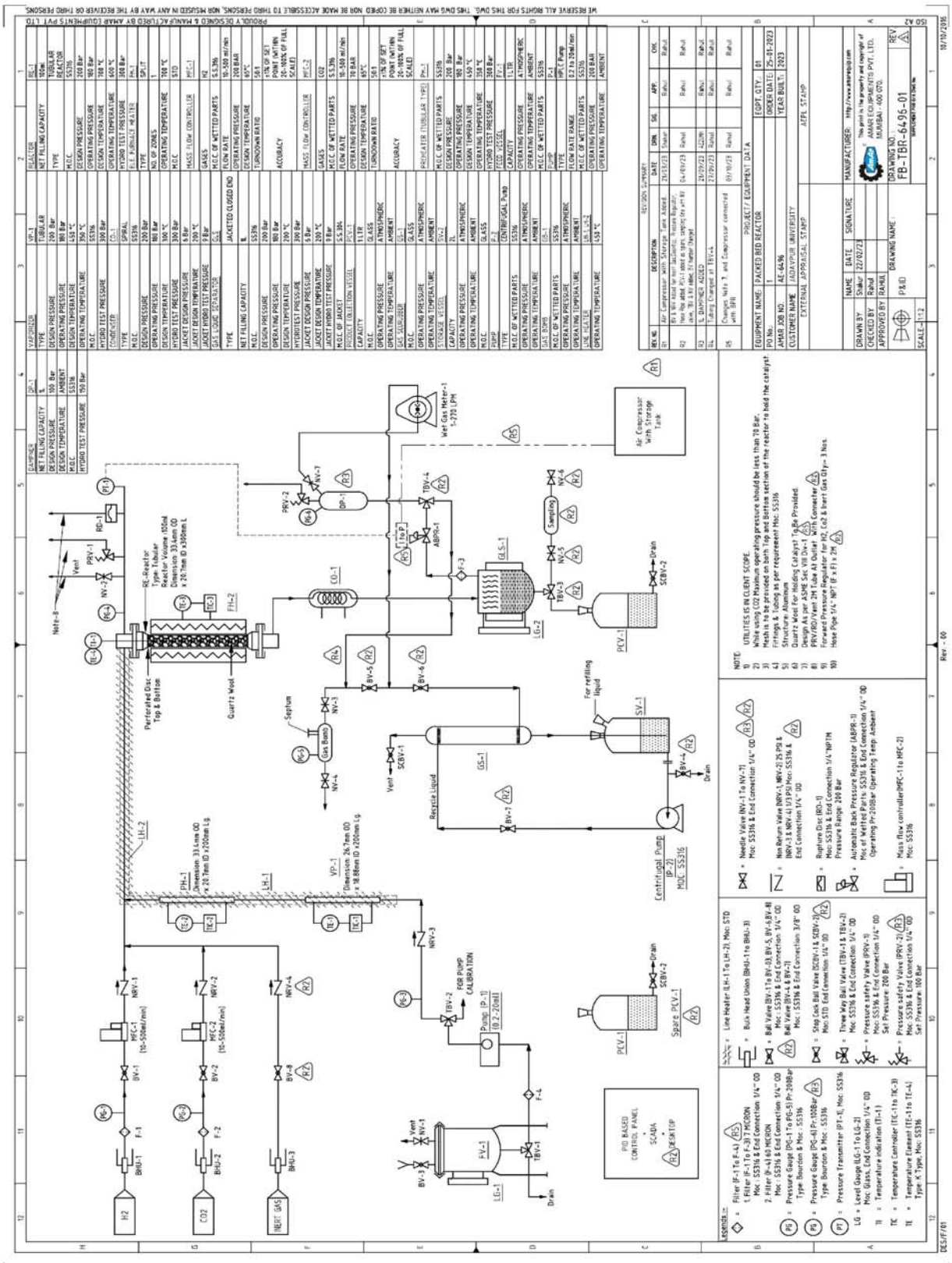
The system is supported by a robust instrumentation system consisting of Pressure and Temperature measurements at vantage points, Back Pressure Automatic Control valve, Mass Flow Controllers (for H2 and CO2), Level Gauges, PID based Control panel with SCADA, and aDesktop computer for On-line data viewing and retrieval.

This system can be used for experimenting on Hydrogenation, Hydro-treatment, GTL Conversion, Advance Oxidation, Selective Reduction and also check specific catalyst activity and selectivity. The results can be viewed on-line instantly.

This facility will propel the students to the forefront of advanced research and will help initiate novel developments in the chemical industries in the country. Industries can also benefit from it. They can contact for specific experimental assignments which can bolster their process:

Contact: The Head, Chemical Engineering Department, Jadavpur University, Kolkata 700032

This report has been contributed by Asok Nag, Department of Chemical Engineering, Jadavpur University, Kolkata (1971 batch)



PROFILE: IIChE LIFE ORGANISATIONAL MEMBERS

Vellore Institute of Technology, Vellore

We welcome academic, research or industrial organisations, joining IIChE as Life Organisational Member.

We would like to introduce them with their brief profile. Newly inducted Life Organisational Members may send their brief profile (around 300 words) to IIChE (iichehq@iiche.org.in), which will be published in the E-Newsletter.

Vellore Institute of Technology (VIT) was established with the aim of providing quality higher education on par with international standards. Engineering and Technology subject areas of VIT are the 240th best in the World and the 9th best in India, eight subjects of VIT are within the top 500 in the world (as per QS World University Rankings by Subject 2023). The 9th best University, the 10th best research institution and the 12th best engineering institution in India (NIRF Ranking, Govt. of India 2022). It persistently seeks and adopts innovative methods to improve the quality of higher education. The campus has a cosmopolitan atmosphere with students from all corners of the globe. Experienced and learned teachers are strongly encouraged to nurture the students. Our Memoranda of Understanding with various international universities are our major strength. They provide for an exchange of students and faculty and encourage joint research projects for the mutual benefit of these universities. Many of our students, who pursue their research projects in foreign universities, bring high quality to their work and esteem to India and have done us proud.

The School of Chemical Engineering (SCHEME) is determined to improve the quality of life through innovations in Chemical Engineering. Our school is placed in the 301-350 rank in the QS world ranking and has secured 11th rank in India. Our mission is to drive excellence in Chemical Engineering education and training thereby lead to the creation of a common platform for connecting academia and industry in the exchange of knowledge. Besides high-quality teaching and instruction at UG level, the faculty members of the school are actively involved in executing many R&D and consultancy projects from government agencies, including DST, DBT and from many reputed organizations. The school has also regularly benefitted from international linkages facilitated by MoUs with leading universities from abroad. The state-of-art laboratories cater to the practical applications of the Chemical Engineering principles to processes and UG level research. The placement record of the school is very impressive. Every year students visit abroad for their final year projects under the Semester Abroad Program (SAP).

The IIChE Students Chapter at VIT was established in 2010 and it aims at providing a platform for all chemical engineering and related undergraduate degree students to grasp unchartered knowledge in the vast ocean of engineering academia and research. The chapter was nominated for the Best Technical Chapter Award in VIT for three consecutive years and conducted more than 200 events in the last two years.

FEEDCHEM (INDIA) PRIVATE LTD., Rajkot

The FEEDCHEM group is in the manufacturing of foundry Binders, Coatings as well as Lustrous Carbon Additives, at the Foundry Hub of Rajkot (Gujarat), where around 750 foundry units are working to serve the nation. FEEDCHEM has been pushing boundaries in every possible way in terms of trending technology and accelerating the competency of our customers across foundries.

The company closely collaborates with the foundries and consistently improves its products to assure their technological and practical suitability. It is ensured that the products meet the benchmark of quality and perfection. Customer satisfaction is a top priority as reliability and transparency make FEEDCHEM go long and quick. In this industry, differentiation matters a lot in terms of the fineness and richness of the products. Hence, the primary strategy is to cater powerful products to the company's esteemed customers, based on three prior performance metrics:

1. Enhanced Surface Finish,

2. Reduced Defects in Castings and

3. Decreased Consumption of Sand Additives, Shots and Sand.

The production involves Refractory coatings, Binders, Hardners and other allied products which is used in Foundry. As there was no reputed company in the region and only few companies are serving in the country, one is sure about the bright future of FEEDCHEM (INDIA) PVT. LTD.

FEEDCHEM (INDIA) PVT. LTD. provides services and solution to foundry. This also gives a great help to the customers by means of keeping a single window operation. The Team consists of Metallurgist, Chemical Technologist and Foundry men with vast experience in foundry in India and abroad.

IIChE Council 2024

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FEES FOR DIFFERENT CATEGORIES OF IIChE MEMBERSHIP

Life Fellows (For all age groups)	**Compound Fees** Rs. 10,000/- + GST@18% (Including Registration Fee Rs. 100/- and Admission Fee Rs. 600/-)
Life Members	**Compound Fees** (Including Registration Fee Rs. 100/- and Admission Fee Rs. 400/-)
Age: 26 – 50 years **51 – 60 years** **Above 60**	Rs. 7,000/- + GST@18% Rs. 6,000/- + GST@18% Rs. 5,000/- + GST@18%
Life Associate Members (For all age groups)	**Compound Fees** **Rs. 5,000/-** + GST@18% (Including Registration Fee Rs. 100/- and Admission Fee Rs. 400/-)
Student Members	**Compound Fees** Rs. 500/- + GST@18%

Interested candidates have to apply online for Membership.

Please visit: www.iiche.org.in

ORGANISATIONAL MEMBERSHIP FEES

Life Organisational Member with turnover	Admission Fee (in Rs)	Life Subscription Fee (in Rs)	Total (in Rs)
- 100 crores and above	1,000/-	1,00,000/- + 18,180 GST	1,19,180/-
- above Rs. 10 crores	1,000/-	50,000/- + 9,180 GST	60,180/-
- below Rs. 10 crores	1,000/-	25,000/- + 4,680 GST	30,680/-
Academic Institutions, Govt. R&D organizations (*Irrespective of turnover*)	--	25,000/- + 4,500 GST	29,500/-